

Diffusion of the Electronic-Based Government System in Paser Regency

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ABSTRACT

The diffusion of digital government has become an important component of public sector transformation, yet its adoption at the local level remains uneven, particularly in geographically diverse regions. This study aims to analyze the diffusion of the Electronic-Based Government System (SPBE) in Paser Regency, Indonesia, focusing on the process of adoption and the characteristics of SPBE innovation from the perspective of Rogers' Diffusion of Innovations theory. A qualitative descriptive case study was conducted from June 2025 to July 2026. Data were collected through in-depth interviews, non-participant observation, and document analysis involving government officials at the regency, subdistrict, and village levels, as well as community representatives and digital service users. Data were analyzed using the Miles, Huberman, and Saldaña framework of data condensation, data display, and conclusion drawing and verification. The findings indicate that SPBE diffusion in Paser Regency has occurred gradually and unevenly. Relative advantage, compatibility, trialability, and observability function as important drivers of adoption, while complexity represents the main bottleneck due to limitations in digital infrastructure, geographical conditions, human resource capacity, and the fragmentation of sector-specific applications. The findings also demonstrate that formal adoption of SPBE does not necessarily result in uniform functional adoption across government organizations and community groups. The study implies that strengthening SPBE requires more than regulatory compliance and application development; it should prioritize digital competency development, equitable infrastructure, application integration, simplified system use, and broader public access. Such measures can enable SPBE to evolve from a technological innovation into a more inclusive instrument of government transformation and improved public service delivery.

INTRODUCTION

The development of digital technologies has driven fundamental changes in social, economic, and governmental life. These changes have become increasingly pronounced in the context of the Fourth Industrial Revolution (Industry 4.0), which is characterized by the convergence of digital, physical, and biological technologies and the rapid advancement of technologies such as the Internet, cloud computing, artificial intelligence, and cyber-physical systems. This transformation has not only altered patterns of production and social interaction but has also influenced the structures, processes, and mechanisms of government administration. Schwab (2016) argues that the Fourth Industrial Revolution is characterized by unprecedented speed, scope, and systemic impact, driving transformations across various institutions, including government. In the context of public administration, these developments have encouraged governments to establish forms of governance that are increasingly digital, integrated, responsive, and oriented toward the needs of service users. OECD (2019) indicates that the digitalization of the public sector is aimed at improving the efficiency and effectiveness of public services, while OECD (2020) positions digital government as a strategic transformation that requires a digital-by-design approach, effective use of data, openness, user orientation, and adequate institutional capacity.

This transformation demonstrates that the use of information and communication technologies in government can no longer be viewed merely as an administrative support instrument but has evolved into an integral component of changes in governance. In its early stages, the adoption of digital technologies in government tended to focus on the digitization of information and the automation of administrative tasks. Subsequent developments, however, have moved toward system integration, business process transformation, and the restructuring of relationships among government, public officials, citizens, and other stakeholders. Heeks (2006) conceptualizes e-government implementation as a managerial and institutional challenge that extends beyond technological considerations to encompass strategy, human resources, policy, security, quality, and system implementation processes. Similarly, Dunleavy et al. (2006) describe the emergence of digital-era governance as a transformation in government administration increasingly characterized by information-system integration, organizational process change, and the utilization of digital technologies. Meanwhile, Layne and Lee (2001) demonstrate that e-government development progresses through increasingly sophisticated stages, from information provision to transactions and integration across government systems. Thus, digital transformation in government is fundamentally an organizational change process that requires adjustments to institutional structures, work processes, bureaucratic capacity, and patterns of interaction with citizens.

In Indonesia, the government digitalization agenda has been supported by a policy framework since the issuance of Presidential Instruction No. 3 of 2003 on the National Policy and Strategy for e-Government Development. The policy positioned the utilization of information and communication technologies as an instrument for improving the efficiency, effectiveness, transparency, and

accountability of government administration, while also enhancing the quality of public services. The policy framework subsequently entered a more integrated phase through Presidential Regulation No. 95 of 2018 on the Electronic-Based Government System (Sistem Pemerintahan Berbasis Elektronik—SPBE). This regulation establishes SPBE as a framework for government administration that integrates information and communication technologies to promote clean, effective, transparent, and accountable government and improve the quality of public services. Thus, the transition from the e-government paradigm to SPBE reflects a shift from sectoral digitalization of public services toward the development of a more integrated digital government system. This orientation is also consistent with global developments in digital government, which emphasize policy and service integration, interorganizational connectivity, data utilization, and user-centered public services (OECD, 2020; United Nations, 2022).

Although the SPBE policy framework has been established at the national level, its success is determined not only by the availability of regulations, infrastructure, and digital applications. SPBE implementation constitutes an organizational change process that requires acceptance, understanding, learning, and behavioral adaptation among public officials responsible for implementing the policy. The government has also faced challenges related to application fragmentation and the need to integrate digital services. In 2023, the Ministry of Administrative and Bureaucratic Reform (Kementerian PANRB) highlighted the existence of thousands of government applications that were not yet fully interconnected and emphasized that SPBE is not simply about increasing the number of applications, but about developing integrated digital services. This condition demonstrates that government digitalization does not automatically result in transformation when technological systems are not accompanied by changes in business processes, interorganizational coordination, human resource capacity, and acceptance of innovation. From this perspective, SPBE can be understood not merely as a technology policy, but as an organizational and governance innovation whose processes of acceptance and adoption may vary across government organizations.

The diffusion of innovations perspective is relevant for explaining these variations. Rogers (2003) defines diffusion as the process through which an innovation is communicated through certain channels over time among members of a social system. This process consists of four key elements: the innovation, communication channels, time, and the social system. The rate of innovation adoption is also influenced by how members of a social system perceive the characteristics of an innovation, particularly its relative advantage, compatibility, complexity, trialability, and observability. In addition, Rogers categorizes adopters according to their speed of accepting an innovation, ranging from innovators, early adopters, early majority, late majority, to laggards. This framework provides an analytical basis for understanding that SPBE implementation cannot be assessed solely in terms of the existence of digital systems or the achievement of formal indicators. Rather, it should be examined as a social and organizational process through which innovation is perceived,

communicated, accepted, tested, adopted, and internalized by government actors.

Paser regency provides an interesting context for examining this process because it has demonstrated significant improvements in SPBE performance while raising questions about the depth of innovation adoption at the organizational and user levels. The Government of Paser had previously established Paser Regent Regulation No. 8 of 2018 on the Implementation of e-Government within the Paser Regency Government, adopted in January 2018 as a regional policy foundation for optimizing the use of information and communication technologies in government administration. Subsequently, according to information from the Government of Paser, the SPBE index increased from 2.90 in 2023 to 3.27 in 2024, receiving a “Good” rating and placing Paser among the regencies with the highest SPBE performance in East Kalimantan. This improvement indicates institutional and technical progress in digital government implementation. However, an increase in the index at the macro level does not, by itself, explain how SPBE innovations are accepted and utilized at the levels of regional government organizations, subdistricts, villages, public officials, and citizens as service users. In other words, there may be differences between successful implementation at the policy and formal-indicator levels and the depth of adoption in practice.

This issue becomes increasingly important because government digitalization takes place within a social system that is not homogeneous. Differences in organizational capacity, public officials’ digital competencies, infrastructure, work culture, communication patterns, and geographical characteristics may influence the process of accepting and using innovation. Therefore, the success of SPBE should not be assessed solely through index performance or the number of available applications, but also through how these innovations diffuse and become internalized within government organizations. OECD (2020) emphasizes that digital government transformation requires strategic vision, leadership, coordination, collaboration, human resource capacity, and supportive institutional frameworks. The United Nations (2022) likewise situates digital government development within the pursuit of effective, accountable, and inclusive public services, as well as efforts to reduce the digital divide. In the context of Paser Regency, these issues can be examined through the relationship between SPBE diffusion at the Government-to-Government (G2G) level, particularly through coordination and integration among regional government organizations, and diffusion at the Government-to-Citizen (G2C) level, namely how digital service innovations are accepted and utilized by citizens. This perspective enables the study to move beyond the question of whether SPBE has been implemented toward examining how, through which channels, under what social conditions, and with what levels of acceptance SPBE diffuses within local government.

Based on the foregoing discussion, an important research gap can be identified. Existing studies on e-government and SPBE have largely emphasized policy, technological readiness, institutional capacity, maturity levels, and performance indices, whereas the social processes through which government

innovations are disseminated, perceived, accepted, and adopted by actors within local government systems require further investigation, particularly in non-metropolitan local government contexts. Paser Regency provides a strategically relevant empirical setting because it is undergoing digital transformation with a significant improvement in SPBE performance, yet this achievement requires further examination from the perspective of innovation diffusion. Accordingly, this study conceptualizes SPBE as a governance innovation diffused through communication, time, and the social system of government, while considering the characteristics of the innovation and variations in adopter categories as developed by Rogers (2003). This study aims to analyze the diffusion process of SPBE innovation in Paser Regency, particularly how the innovation is communicated, perceived, accepted, and adopted by public officials and how the diffusion process occurs across G2G and G2C relationships. Through this approach, the study is expected to contribute theoretically to the development of innovation diffusion research in public administration while also providing practical insights for strengthening digital transformation strategies and integrating public services at the local government level.

LITERATURE REVIEW

Public Administration and Digital Era Governance

The development of public administration has involved a shift from bureaucratic approaches emphasizing hierarchy, rules, and control toward governance that is more oriented toward outcomes, collaboration, citizens' needs, and the use of digital technologies. Within this development, the concept of Digital Era Governance (DEG) has become increasingly important because it positions information technology as an integral component of government organizational transformation rather than merely as an administrative support tool. Dunleavy et al. (2006) explain that DEG is characterized by three major trends: reintegration, needs-based holism, and digitization. Reintegration emphasizes the re-unification of government functions that were previously fragmented; needs-based holism directs public services according to users' needs; while digitization transforms government work processes through the utilization of digital technologies.

This perspective is highly relevant to the implementation of the Electronic-Based Government System (Sistem Pemerintahan Berbasis Elektronik – SPBE), as SPBE fundamentally requires the integration of business processes, information systems, data, infrastructure, and government services. Within the digital government framework, technology is not an end in itself but an instrument for establishing more integrated, user-oriented government capable of delivering services effectively. OECD (2020) reinforces this perspective through the Digital Government Policy Framework, which identifies six dimensions of digital government: digital by design, data-driven public sector, government as a platform, open by default, user-driven, and proactiveness. Accordingly, digital transformation in government requires changes in governance arrangements, work processes, organizational capacity, and relationships between government and service users.

The New Public Service (NPS) perspective also provides a normative foundation for digitally enabled public service transformation. Denhardt and Denhardt (2000) position citizens as the central subjects of public service and emphasize public interest, citizenship, democracy, collaboration, and accountability. From this perspective, government digitalization should not be limited to administrative efficiency but should also strengthen the quality of relationships between government and citizens. Therefore, SPBE can be understood as an instrument of public administration transformation that connects the need for bureaucratic integration with the demand for citizen-oriented public services.

Electronic-Based Government System as Government Innovation

SPBE represents Indonesia's institutional framework for digital government and is legally regulated through Presidential Regulation No. 95 of 2018. SPBE is defined as the administration of government that utilizes information and communication technologies to provide services to SPBE users. These users include government institutions, civil servants, citizens, business actors, and other parties utilizing SPBE services. Under the regulatory framework underlying this study, SPBE is intended to establish clean, effective, transparent, and accountable governance and to improve the quality of public services.

SPBE also emphasizes integration, continuity, efficiency, accountability, interoperability, and security as fundamental principles of its implementation. Interoperability is strategically important because it requires collaboration and coordination across business processes and information systems to facilitate the exchange of data, information, and services. Therefore, SPBE should not be understood as a collection of standalone applications, but rather as a digital government ecosystem that requires interorganizational integration and a strong orientation toward users.

The earlier concept of e-government has likewise demonstrated that digital government transformation develops progressively, from information provision toward interaction and integration across systems. Layne and Lee (2001) developed a four-stage model of e-government development showing that the maturity of electronic government is determined not only by the availability of technology but also by the government's capacity to integrate systems and service functions. In the context of SPBE, this perspective reinforces the understanding that successful digital transformation cannot be measured solely by the availability of applications or infrastructure, but by the extent to which these technologies are integrated with government business processes and contribute to improved public services.

Diffusion of Innovations Theory

The Diffusion of Innovations Theory developed by Everett M. Rogers constitutes the primary theoretical foundation of this study. Rogers (2003) defines diffusion as the process through which an innovation is communicated through particular channels over time among members of a social system. Thus, diffusion is not merely concerned with the dissemination of an innovation but also encompasses processes of communication, acceptance, decision-making, implementation, and continued use of the innovation. This concept is consistent with the nature of SPBE, which requires changes in work practices, bureaucratic

behavior, organizational processes, and patterns of interaction between government and citizens. Within this analytical framework, the four key elements of diffusion are innovation, communication channels, time, and the social system.

Rogers (2003) explains that the acceptance of an innovation is influenced by five major characteristics: relative advantage, compatibility, complexity, trialability, and observability. Relative advantage refers to the extent to which an innovation is perceived as superior to existing practices; compatibility refers to the extent to which the innovation is consistent with users' values, experiences, and needs; complexity concerns the degree to which the innovation is perceived as difficult to understand and use; trialability refers to the extent to which an innovation can be experimented with; and observability concerns the extent to which the benefits or outcomes of an innovation can be observed by others. These five attributes are important determinants in explaining the rate and level of innovation adoption.

In addition to innovation characteristics, SPBE diffusion can be analyzed through Rogers' four key elements: innovation, communication channels, time, and the social system. Communication channels determine how information about SPBE is transmitted from actors who possess knowledge or experience to those who have limited knowledge or experience. The time dimension concerns the process from the point at which an individual or organization becomes aware of an innovation to the point at which an adoption or rejection decision is made. Meanwhile, the social system encompasses organizational structures, norms, leadership, interactor relationships, and change agents that can influence the adoption process.

The innovation-decision process in Rogers' perspective consists of five stages: knowledge, persuasion, decision, implementation, and confirmation. At the knowledge stage, actors acquire information about the existence and functions of an innovation. The persuasion stage involves the formation of attitudes toward the innovation. Subsequently, actors determine whether to accept or reject the innovation at the decision stage. The implementation stage reflects the actual use of the innovation in practice, while the confirmation stage concerns the reinforcement or reconsideration of the adoption decision based on users' experiences.

Rogers' theory also identifies five adopter categories: innovators, early adopters, early majority, late majority, and laggards. These categories demonstrate that members of a social system do not adopt innovations at the same time or at the same pace. Within government organizations, such differences may be reflected in public officials or work units that adopt new technologies more rapidly, groups that wait for evidence of successful implementation before adopting, and groups that tend to retain established work practices.

In this study, Diffusion of Innovations Theory is used to understand SPBE as a governance innovation whose adoption takes place within the bureaucratic social system of Paser Regency. The analysis focuses on how the characteristics of SPBE are perceived by public officials, how information and knowledge about

SPBE are communicated, how adoption decisions are made, and how organizational structures, norms, leadership, and relationships among actors influence implementation. This framework enables the study to examine not only whether SPBE has been implemented, but also how the innovation diffuses, is accepted, adopted, and internalized in government practice.

Based on this synthesis of the literature, the study positions Rogers' Diffusion of Innovations Theory as the primary theoretical framework, while Digital Era Governance serves as a contextual perspective for understanding digital government transformation, with SPBE conceptualized as the innovation being diffused. From this theoretical position, the study examines SPBE diffusion across two principal domains: Government-to-Government (G2G), through relationships and integration among government organizations, and Government-to-Citizen (G2C), through citizens' acceptance and utilization of digital services. This framework provides the basis for a more in-depth analysis of the dynamics of SPBE adoption in Paser Regency.

METHODOLOGY

This study employed a qualitative approach with a descriptive case study design to examine the diffusion process of the Electronic-Based Government System (Sistem Pemerintahan Berbasis Elektronik – SPBE) in Paser Regency. This approach was adopted to explore in depth the processes of communication, perception, acceptance, adoption, implementation, and the challenges associated with SPBE innovation within the local government context (Creswell & Poth, 2018; Yin, 2018). The study was conducted from June 2025 to July 2026 in Paser Regency, East Kalimantan Province, with the units of analysis comprising the local government, regional government organizations, subdistrict governments, village governments, and communities.

Informants were selected purposively based on their involvement, knowledge, experience, and roles in the implementation or utilization of SPBE. The informants represented four levels. The macro level included the Paser Regency Office of Communication, Informatics, Statistics and Encryption, the Regional Secretariat, and the Paser Regency Fisheries Office. The meso level included the governments of Tanah Grogot, Long Kali, and Tanjung Harapan Subdistricts. The micro level consisted of village heads and village officials who used digital services, while the end-user level comprised community leaders, residents in rural areas, and traditional fishers in coastal areas. Informants were identified progressively until data saturation was reached. Primary data were obtained through in-depth interviews, while secondary data were collected through a review of regulations, planning documents, SPBE evaluation reports, SPBE architecture and roadmap documents, local government decisions, and documents related to the implementation of digital applications.

Data were collected through in-depth interviews, non-participant observation, and document analysis. Semi-structured interviews were conducted to explore the diffusion process, innovation characteristics, communication channels, adoption decision-making processes, implementation experiences, and challenges associated with SPBE implementation. The interview focus was

guided by Rogers' (2003) Diffusion of Innovations framework, particularly the five perceived attributes of innovation: relative advantage, compatibility, complexity, trialability, and observability, as well as the stages of the innovation-decision process, namely knowledge, persuasion, decision, implementation, and confirmation. Non-participant observation was conducted to examine application use, interactions between actors and technology, work practices, user readiness, and technical and organizational challenges. Document analysis was used to trace the policy context and development of SPBE through Presidential Regulation No. 95 of 2018 on SPBE, Presidential Regulation No. 132 of 2022 on the National SPBE Architecture, Presidential Regulation No. 82 of 2023 on the Acceleration of Digital Transformation and Integration of National Digital Services, as well as SPBE regulations and documents issued by the Paser Regency Government, including Paser Regent Regulation No. 8 of 2018 and Paser Regent Regulation No. 20 of 2022.

Data validity was established through source and method triangulation. Source triangulation involved comparing information obtained from government actors at the regency, subdistrict, and village levels with the experiences of citizens as end users. Method triangulation involved comparing findings from interviews, observations, and document analysis to ensure consistency and enhance the credibility of the findings. Data were analyzed using the interactive model of Miles, Huberman, and Saldaña (2014), comprising data condensation, data display, and conclusion drawing and verification. Data from interviews, observations, and documents were coded and thematically organized according to Rogers' (2003) diffusion dimensions, namely innovation, communication channels, time, and social system, as well as the stages of the innovation-decision process. The analysis was subsequently used to explain how SPBE innovation was communicated, accepted, adopted, implemented, and confirmed by government actors and citizens within the context of Paser Regency.

RESEARCH RESULT AND DISCUSSION

Diffusion Process and Innovation Decision-Making of the Electronic-Based Government System in Paser Regency

The findings indicate that the diffusion of Electronic-Based Government System (Sistem Pemerintahan Berbasis Elektronik – SPBE) innovation in Paser Regency has occurred gradually and unevenly across government units and geographical areas. At the national level, SPBE was established through Presidential Regulation No. 95 of 2018, enacted on October 2, 2018, and effective as of October 5, 2018. In Paser Regency, the digitalization of government had already been preceded by a local regulation on e-government and was subsequently strengthened through Paser Regent Regulation No. 20 of 2022 on the Implementation of SPBE within the Regional Government. The regulation governs SPBE governance, management, information and communication technology audits, institutional arrangements, monitoring, evaluation, and financing. Field findings further indicate that awareness and knowledge of SPBE emerged at different times among the informants; some had become familiar with SPBE as early as 2018, whereas others only became aware of it around 2021.

These findings demonstrate that SPBE diffusion in Paser Regency is not merely a process of policy implementation but also involves the dissemination and acceptance of innovation within a social system. From Rogers' (2003) perspective, diffusion occurs through four key elements: the innovation, communication channels, time, and the social system. The acceptance of an innovation subsequently develops through the stages of knowledge, persuasion, decision, implementation, and confirmation. Accordingly, the existence of regulations and the availability of digital applications cannot automatically be equated with substantive adoption. Adoption becomes evident when actors become aware of an innovation, develop attitudes toward it, make an adoption decision, use it in practice, and obtain reinforcement for its continued use.

Empirically, this process can be observed through three developmental phases. The first phase, covering 2018–2021, represents the initiation and introduction stage. During this period, digitalization remained partial, applications across institutions were not yet integrated, and the SPBE index of Paser Regency remained relatively low. The research data indicate an index value of 1.85 during the initial phase, followed by 1.69 in 2019–2020 and 1.36 in 2021. The second phase, covering 2022–2024, was characterized by strengthened regulation through Paser Regent Regulation No. 20 of 2022 and increased implementation of both national and locally developed applications. During this period, OpenSID expanded and was reportedly used in 101 of 144 villages according to the research data. The third phase, covering 2025–2026, represents a consolidation stage, marked by an increase in the SPBE index to 3.27 with a “Good” rating in the 2024 evaluation. This finding is consistent with official publications of the Paser Regency Government, which recorded an increase in the SPBE index from 2.90 in 2023 to 3.27 in 2024.

This development indicates that institutional and regulatory strengthening has played an important role in accelerating SPBE diffusion. Paser Regent Regulation No. 20 of 2022 provided an institutional foundation for the local government to coordinate SPBE governance and management in a more structured manner. However, the increase in the SPBE index does not necessarily indicate that adoption has occurred uniformly. The findings instead reveal differences in the pace of adoption across geographical areas. Therefore, macro-level achievements need to be interpreted alongside the experiences of actors at the levels of regional government organizations, subdistricts, villages, and communities.

In terms of the innovation itself, SPBE in Paser Regency is manifested through a combination of government administrative services and public services. This ecosystem encompasses various internal applications and services directly connected to citizens, including SRIKANDI, SIPD, Siskeudes, OpenSID, SP4N-LAPOR!, e-Puskesmas, Satu Data Paser, Paser Smart Service, and various other sector-specific applications. The research data indicate that some applications are mandatory because they are nationally mandated systems, whereas others have been developed to address local needs. Accordingly, SPBE innovation in Paser Regency is more appropriately understood as an ecosystem or portfolio of digital innovations rather than as a single application.

Conceptually, this understanding is consistent with Rogers (2003), who positions innovation as one of the fundamental elements in the diffusion process.

The findings also indicate that the characteristics of an innovation influence the adoption decision-making process. When the benefits of a service can be directly experienced, acceptance tends to develop more readily. Experiences reported by informants at the village level indicate that Siskeudes was initially perceived as an additional administrative burden, but after being used, it was regarded as helpful for administrative record-keeping, although its benefits remained constrained by network-related challenges. This finding highlights the importance of relative advantage in shaping attitudes toward innovation. Conversely, when an application is perceived as difficult to use or is not supported by adequate infrastructure, complexity becomes a barrier at the implementation stage. Thus, SPBE acceptance is determined not only by the availability of technology but also by perceived benefits and the organizational environment's capacity to support its use.

At the decision stage, the study found differences between services whose use is relatively voluntary and applications mandated through government policy. For applications such as SIPD, users within the bureaucracy have relatively limited discretion because its implementation forms part of government obligations. Interview findings indicate that public officials perceived the decision to use SIPD as an organizational obligation rather than an individual choice. In Rogers' theory, this condition can be understood through the concept of an authority innovation-decision, in which adoption decisions are made by individuals or entities holding authority within a social system. Thus, SPBE diffusion in Paser Regency demonstrates that adoption processes within government organizations do not always occur through fully voluntary individual decisions but can be accelerated through institutional decisions and formal authority.

Nevertheless, a formal decision to adopt does not necessarily result in effective implementation. The findings reveal a gap between the formal adoption decision and the capacity to use the innovation routinely, particularly in areas with limited network connectivity and electricity supply. Informants from coastal and remote areas stated that they did not reject government-mandated applications but experienced difficulties in using them routinely because of unstable internet connectivity and electricity supply. Under certain circumstances, services continue to be delivered manually, while operators must travel to areas with better network access to complete digital tasks. This finding is important because it demonstrates that administrative adoption does not necessarily correspond to functional adoption at the user level.

This discrepancy indicates that the time dimension of SPBE diffusion in Paser Regency is asymmetric. In the administrative center, adoption occurs relatively rapidly. The study categorizes areas around Tanah Grogot as representing early adopters because infrastructure support and proximity to the administrative center enable applications such as SRIKANDI and OpenSID to be adopted relatively soon after policies are established. Subdistricts and villages located along major transit routes demonstrate characteristics of the early

majority or late majority, requiring training and technical assistance before applications can be used consistently. Meanwhile, remote inland, mountainous, and coastal areas exhibit characteristics of laggards, not necessarily because of resistance to technology, but primarily because structural conditions constrain routine technology use.

The identification of laggards should be interpreted carefully. Within Rogers' framework, the laggard category is a relative category within a social system that describes delayed adoption rather than labeling individuals or groups as inherently resistant to innovation. In Paser Regency, delayed adoption in remote areas is more strongly associated with the conditions of the adoption environment, particularly access to internet connectivity and electricity. Thus, this study extends the interpretation of adopter categories by demonstrating that geographical location and infrastructure readiness can influence the speed at which individuals or organizations move from awareness to implementation.

Regarding communication channels, the study found that the local government uses a combination of formal and informal channels. Formal channels include coordination meetings, socialization activities, and technical training, while informal channels rely primarily on WhatsApp groups to assist with technical problem-solving. The local government also uses mass media and official digital channels to broaden the dissemination of information. The research data indicate that the Office of Communication, Informatics, Statistics and Encryption (Diskominfo Paser) conducts regular coordination meetings, socialization activities when new regulations or applications are introduced, and technical training for officials from regional government organizations, subdistricts, villages, and community groups. This pattern is consistent with Rogers (2003), who distinguishes the functions of mass media and interpersonal communication channels in the diffusion process: mass media are particularly effective in expanding initial awareness and knowledge, whereas interpersonal interaction plays a more important role in shaping attitudes and adoption decisions.

The use of WhatsApp demonstrates that the diffusion process does not end with formal communication. Operator groups enable public officials to directly report problems, share experiences, and obtain technical assistance from fellow operators and the Diskominfo Paser team. The research data indicate that, in transit areas, support provided through technical training is reinforced by communication via WhatsApp. When system errors occur, operators can share screenshots and receive technical assistance. This finding demonstrates that interpersonal communication functions not only as a means of disseminating information but also as a mechanism for learning and post-adoption support.

The social system dimension is also an important factor. The SPBE structure in Paser Regency reflects relationships among the Regent as the policy direction-setter, the Regional Secretary as coordinator, Diskominfo Paser as the technical driving institution, regional government organizations as sectoral implementers, and subdistricts, villages, and communities as part of the user network. The establishment of the SPBE Coordination Team through Paser Regent Decree No. 100.3.3.2/KEP-360/2025 further strengthens role distribution

and cross-sectoral coordination. This structure demonstrates that SPBE diffusion takes place within a hierarchical bureaucratic social system, in which leadership and formal authority constitute important instruments for driving adoption.

Beyond the formal structure, the study identified the role of local opinion leaders. Village heads serve as intermediaries between the regency government, village officials, and communities, while Community Information Groups (Kelompok Informasi Masyarakat—KIM) help citizens understand and utilize digital services. The research informants indicated that the commitment of village heads influences the willingness of village officials to learn and use digital applications, while KIM helps bridge communication between government and citizens through approaches that are more closely connected to residents' everyday lives. This finding reinforces Rogers' (2003) argument that diffusion takes place within social networks and is not determined solely by the characteristics of the technology.

Overall, the study found that SPBE innovation diffusion in Paser Regency is asymmetric and multilevel. At the macro level, strengthened regulations, leadership, and coordination accelerate adoption decisions; at the organizational level, technical training and interpersonal communication help translate formal decisions into practice; while at the village and community levels, successful implementation is strongly influenced by geographical conditions, infrastructure, and the presence of local actors who serve as intermediaries in the diffusion process. The SPBE index score of 3.27, with a "Good" rating, indicates significant institutional progress; however, the field findings show that this aggregate achievement continues to conceal variations in user experiences and adoption rates across different areas. The Paser Regency Government itself has emphasized that an increase in the SPBE index should not be regarded as an end in itself and must be accompanied by improvements in the quality of services experienced by citizens.

Therefore, the findings confirm that successful SPBE diffusion cannot be measured solely by the existence of applications, regulatory compliance, or increases in the SPBE index. More substantive success lies in the ability of innovation to progress from the knowledge stage toward sustained and equitable use. In Paser Regency, this process has been relatively strong in the administrative center and some surrounding areas but continues to face disparities in remote inland and coastal areas. This condition has implications for the orientation of public services. Denhardt and Denhardt (2000) emphasize citizens' interests and service to the public as important orientations of the New Public Service. Therefore, SPBE digital transformation needs to focus not only on strengthening the technical capacity of the bureaucracy but also on ensuring equitable opportunities for citizens to benefit from digital public services.

These findings further demonstrate that government digitalization can strengthen public services when the benefits of innovation are accessible equitably, but it can also produce disparities when social and infrastructural conditions are inadequate. Recent studies on e-government have similarly shown that the benefits of digitalization may differ between urban and rural areas and that disparities in access and digital literacy are among the factors explaining

these differences. In the context of Paser Regency, this issue is reflected in the contrast between relatively successful adoption in the regency center and delayed functional use in remote inland and coastal areas. Accordingly, the next agenda should not focus merely on expanding the number of applications, but on ensuring that every group within the social system has the necessary conditions to use these innovations effectively and derive meaningful benefits from them.

Characteristics of Electronic-Based Government System (SPBE) Innovation in Paser Regency

The findings indicate that the characteristics of Electronic-Based Government System (Sistem Pemerintahan Berbasis Elektronik – SPBE) innovation in Paser Regency can be analyzed through Rogers' (2003) five innovation attributes: relative advantage, compatibility, complexity, trialability, and observability. Analysis of interviews, observations, and documents shows that SPBE demonstrates relatively strong characteristics in terms of relative advantage, compatibility, trialability, and observability. In contrast, complexity represents the main barrier, particularly due to limitations in digital infrastructure, human resource capacity, and the large number of sector-specific applications that public officials are required to operate. Thus, the characteristics of SPBE innovation in Paser Regency are determined not only by technological features but also by how the technology is perceived and used within the organizational and social environments in which the innovation is implemented. This finding is consistent with Rogers (2003), who emphasizes that users' perceptions of innovation characteristics are important factors influencing the rate of adoption.

Relative Advantage

The findings indicate that relative advantage is the most tangible characteristic experienced by SPBE users in Paser Regency. These benefits include savings in time, costs, and effort, as well as the simplification of administrative procedures, both in Government-to-Government (G2G) interactions and Government-to-Citizen (G2C) services. Within the bureaucracy, the implementation of SRIKANDI and electronic signatures has reduced the use of physical documents and shortened the processing of official correspondence. The research data indicate that the process of sending and routing official correspondence, which previously could take 2–5 working days, can be reduced to approximately 10–30 minutes when supported by electronic signatures. Simandiri MasBro! also facilitates civil servants' access to personnel administration services digitally, eliminating the need for physical travel to the Regional Civil Service and Human Resources Development Agency (BKPSDM).

Relative advantage is also experienced at the community level through the implementation of OpenSID. The study indicates that OpenSID has been used in 101 of 144 villages and has supported the digitalization of population data and accelerated the issuance of public service documents. For residents living far from the administrative center of Paser Regency, these benefits are also reflected in reduced travel time and costs. Research informants explained that before digitalization, residents had to travel to Tanah Grogot to process certain

documents, whereas after digital services became available at the village level, these processes could be handled through the local village office.

These findings reinforce Rogers' (2003) concept of relative advantage, referring to the perception that an innovation provides greater benefits than previous practices. In the context of digital government, the benefits of innovation are particularly important because technology adoption is determined not merely by the availability of technology but by its capacity to generate improvements that are perceived by organizations and citizens. Hong et al. (2022), in their study of local governments, demonstrate that societal demands and institutional environments can encourage governments to adopt digital innovations. Their study also indicates that local governments can learn from and emulate innovative practices developed by other local governments.

Accordingly, the relative advantage of SPBE in Paser Regency operates at two levels. Within government, its primary benefits are reflected in greater administrative efficiency, whereas at the community level, the benefits are evident in reduced time and costs associated with accessing public services. These findings suggest that the more tangible the perceived benefits, the stronger the rational basis for users to continue using an innovation. However, these benefits remain dependent on users' ability to access the system. Therefore, relative advantage cannot be separated from issues of complexity and infrastructure disparities.

Compatibility

The findings indicate that SPBE in Paser Regency demonstrates a strong degree of compatibility with existing regulations, organizational needs, and the direction of regional development. From a regulatory perspective, the development of SPBE at the local level is situated within the national policy framework and reinforced through Paser Regent Regulation No. 20 of 2022. The study also shows that the architecture and development of local applications are directed toward alignment with national policies on SPBE and SPBE architecture. Informants emphasized that both local applications and general applications such as SRIKANDI have been developed and adopted with due consideration of higher-level regulatory requirements.

Compatibility is also evident in the organizational and work-culture dimensions. Applications such as SIMWASDA, SP4N-LAPOR!, and Satu Data Paser are perceived as instruments that correspond to the needs of bureaucratic reform, transparency, accountability, and improved public service delivery. Thus, digital innovation is not positioned as something separate from the existing administrative system, but rather as a means of strengthening established governmental objectives.

Theoretically, this condition is consistent with Rogers (2003), who argues that innovations perceived as compatible with existing values, experiences, needs, and organizational practices tend to be more readily accepted. This finding is also supported by research on technology adoption in public sector organizations. Studies of smart government adoption indicate that relative advantage and compatibility can strengthen innovation acceptance because they provide clear benefits while also aligning with organizational needs and

practices (Alajmi et al., 2023; Jnr & Petersen, 2023). These findings demonstrate that technological characteristics cannot be separated from the organizational context in which an innovation is adopted.

In the context of Paser Regency, the compatibility of SPBE with regulatory frameworks and bureaucratic reform agendas provides institutional legitimacy for the innovation. This condition helps reduce resistance because public officials do not perceive digitalization as a change that exists entirely outside the established governmental system. Instead, SPBE is perceived as an instrument for achieving existing organizational objectives. Accordingly, compatibility represents an important mechanism linking technological innovation with the institutionalization process within government organizations.

Complexity

In contrast to the two preceding attributes, the findings indicate that complexity represents the most dominant barrier to SPBE diffusion in Paser Regency. Complexity arises not only from the characteristics of the applications themselves but also from the environmental conditions in which the technology is used. The study identifies two major sources of complexity: limitations in network and electricity infrastructure and the large number of sector-specific applications that operators are required to master. In inland, hilly, and coastal areas, unstable internet connectivity and electricity supply mean that applications that are technically available cannot always be used consistently.

Complexity also arises because public officials must work with multiple applications that have different procedures, user accounts, and operating mechanisms. Informants reported that the simultaneous use of SRIKANDI, SIMPAS, PSS, and OpenSID can create confusion for operators without an information technology background. This condition demonstrates that SPBE complexity is multidimensional, encompassing technological complexity, user capacity, infrastructure, and inter-system coordination.

These findings extend the understanding of Rogers' (2003) concept of complexity. Theoretically, complexity refers to the degree to which an innovation is perceived as difficult to understand and use. However, in the case of Paser Regency, such difficulties do not originate solely from application design. Unstable infrastructure can make an application that is technically simple difficult to use in practice. International literature on digital innovation in the public sector likewise indicates that government technology adoption is a complex process because it interacts with established organizational structures, identities, procedures, and practices (Selten & Klievink, 2024).

Accordingly, complexity in SPBE implementation in Paser Regency can be understood as a socio-technical complexity. The issue is not simply whether public officials are capable of operating applications, but whether the organizational environment and infrastructure enable those applications to be used consistently. This perspective is important because adding more applications without adequate integration may increase users' workload. In this context, the digital transformation agenda should not focus solely on adding applications, but also on interoperability, system integration, process

simplification, digital competency development, and infrastructure strengthening.

Trialability

The findings indicate that the Government of Paser Regency has implemented gradual trial mechanisms as part of the innovation diffusion process. The Public Village Internet Program, for example, was initially introduced as a pilot project at 26 locations across 12 villages before being expanded. At the application level, village operators and OPD administrators were also given opportunities to practice after participating in technical training before using the systems in actual operational processes.

These mechanisms provide users with opportunities to gain direct experience and reduce uncertainty before fully adopting an innovation. Informants explained that training accounts allow operators to simulate data entry and document printing without the risk of disrupting the main database. Such experiences increase users' confidence and help them develop new routines for using digital applications.

These findings are consistent with Rogers (2003), who defines trialability as the degree to which an innovation can be experimented with before an adoption decision is made. Empirical literature also indicates that opportunities to try a technology can reduce uncertainty and support acceptance. In studies of digital applications, for example, trialability has been identified as an important characteristic during the pre-adoption stage because it provides potential users with direct experience of the technology (Lin & Bautista, 2017).

In the context of Paser Regency, trialability functions as a mechanism for managing adoption risks. This strategy is particularly important for users with varying levels of technological experience. By providing opportunities for experimentation, the government can identify technical problems, improve operator skills, and make adjustments before implementation is expanded. Therefore, trialability functions not only as a technical stage but also as an organizational learning mechanism within the innovation diffusion process.

Observability

The findings indicate that the benefits of SPBE innovation in Paser Regency are relatively easy to observe. At the macro level, the SPBE Index score of 3.27, categorized as "Good," serves as a formal indicator that can be observed and compared. At the micro level, the benefits can be observed through faster village administrative services, the availability of village internet facilities, and changes in service processes following the implementation of OpenSID.

Observability is also evident through inter-village learning processes. Informants explained that the successful implementation of OpenSID in other villages serves as a concrete example that encourages villages that were previously hesitant to adopt the technology. In other words, directly observable innovation outcomes become a source of social information for potential adopters.

These findings are consistent with Rogers' (2003) theory that the more easily the results of an innovation can be observed and communicated, the greater the likelihood that the innovation will attract the attention of potential adopters. Empirical research on innovation diffusion also indicates that

observability can strengthen acceptance because potential users can observe the benefits and use of an innovation through the experiences of others. In the context of digital government services, research on e-government service adoption likewise indicates that innovation characteristics such as observability can contribute to the formation of attitudes and behavioral intentions toward use (Jatmiko & Imronudin, 2023).

Nevertheless, the observability of SPBE achievements in Paser Regency needs to be distinguished between macro-level performance and micro-level user experiences. The SPBE Index score of 3.27 represents an aggregate indicator of SPBE performance, but it does not imply that all regions and population groups benefit from SPBE to the same extent. Field findings instead reveal that some areas continue to face network and electricity constraints. Therefore, macro-level achievements need to be interpreted alongside variations in user experiences at the local level. International research on digital government likewise demonstrates that the benefits of digitalization may vary across regions when disparities in digital access and capacity persist.

Overall, the characteristics of SPBE innovation in Paser Regency demonstrate a strong but not entirely uniform pattern. Relative advantage provides the basis for adoption by generating benefits in terms of time, cost, and effort efficiency; compatibility provides legitimacy because SPBE is aligned with existing regulations and organizational needs; trialability reduces uncertainty through experimentation mechanisms; and observability strengthens adoption through outcomes that can be directly observed. In contrast, complexity represents a critical factor that slows diffusion due to limitations in network connectivity, electricity supply, user competencies, and application fragmentation. This pattern is consistent with international research indicating that innovation characteristics influence acceptance, while organizational and environmental contexts shape how these characteristics are realized in practice (Hong et al., 2022; Selten & Klievink, 2024).

The findings also demonstrate that the success of SPBE innovation cannot be assessed solely on the basis of application availability or increases in the SPBE Index. More substantive success depends on the capacity of the innovation to generate tangible benefits, correspond to the needs of organizations and citizens, be learned through gradual processes, and be used sustainably. In the case of Paser Regency, the main issue does not lie in the low value of SPBE innovation itself, but rather in the unequal conditions that enable the innovation to be effectively used. Therefore, strengthening SPBE should focus on reducing complexity through application integration, enhancing the digital competencies of public officials, strengthening network and electricity infrastructure, and developing services that are simpler and more user-friendly.

Accordingly, this study finds that four innovation attributes function as drivers of diffusion, whereas complexity constitutes the main bottleneck. This finding is important for advancing diffusion of innovation theory in the context of local government because it demonstrates that perceptions of technological complexity are shaped by the interaction between the innovation and the socio-technical conditions in which it is implemented. In Paser Regency, geographical

characteristics and infrastructure disparities constitute integral components of the adoption process. Therefore, SPBE transformation cannot be achieved solely through regulations and the provision of applications; it must also be accompanied by the creation of social, organizational, and infrastructural conditions that enable the innovation to be effectively used by all user groups.

CONCLUSIONS AND RECOMMENDATIONS

The diffusion of the Electronic-Based Government System (SPBE) in Paser Regency has taken place gradually and has not yet been fully distributed across all government organizations and community groups. The successful adoption of SPBE is supported by perceived benefits, compatibility with organizational needs, opportunities to experiment with the innovation, and observable outcomes. However, complexity remains the main barrier, influenced by limitations in network infrastructure, geographical conditions, human resource capacity, and the use of multiple applications that are not yet fully integrated.

The findings demonstrate that the success of SPBE cannot be measured solely by improvements in formal performance indicators or the availability of applications, but also by the extent to which the innovation is accepted, used, and generates tangible benefits. Therefore, strengthening SPBE in Paser Regency should focus on improving human resource competencies, ensuring more equitable digital infrastructure, integrating applications, simplifying system use, and expanding public access. Through this approach, SPBE can evolve from merely a technological innovation into an instrument of government transformation and improved public service quality.

REFERENCES

- Abied, O., Ibrahim, O., Kamal, S. N.-I. M., Alfadli, I. M., Binjumah, W. M., Ithnin, N., & Nasser, M. (2022). Probing determinants affecting intention to adopt cloud technology in e-government systems. *Sustainability*, 14(23), 15590. <https://doi.org/10.3390/su142315590>
- Alajmi, M., Mohammadian, M., & Talukder, M. (2023). The determinants of smart government systems adoption by public sector organizations in Saudi Arabia. *Heliyon*, 9(10), e20394. <https://doi.org/10.1016/j.heliyon.2023.e20394>
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.
- Denhardt, R. B., & Denhardt, J. V. (2000). The new public service: Serving rather than steering. *Public Administration Review*, 60(6), 549–559. <https://doi.org/10.1111/0033-3352.00117>
- Dunleavy, P., Margetts, H., Bastow, S., & Tinkler, J. (2006). New public management is dead—Long live digital-era governance. *Journal of Public Administration Research and Theory*, 16(3), 467–494. <https://doi.org/10.1093/jopart/mui057>
- Heeks, R. (2006). *Implementing and managing eGovernment: An international text*. SAGE Publications.

- Hong, S., Kim, S. H., & Kwon, M. (2022). Determinants of digital innovation in the public sector. *Government Information Quarterly*, 39(4), 101723. <https://doi.org/10.1016/j.giq.2022.101723>
- Janowski, T. (2015). Digital government evolution: From transformation to contextualization. *Government Information Quarterly*, 32(3), 221–236. <https://doi.org/10.1016/j.giq.2015.07.001>
- Jatmiko, M. H., & Imronudin. (2023). Pengaruh relative advantage, compatibility, complexity, observability dan trialability terhadap intention to use pada e-wallet DANA. *Jurnal Lentera Bisnis*, 12(2), 538–? . <https://doi.org/10.34127/jrlab.v12i2.780>
- Jnr, B. A., & Petersen, S. A. (2023). Using an extended technology acceptance model to predict enterprise architecture adoption in making cities smarter. *Environment Systems and Decisions*, 43(1), 36–53. <https://doi.org/10.1007/s10669-022-09867-x>
- Layne, K., & Lee, J. (2001). Developing fully functional e-government: A four stage model. *Government Information Quarterly*, 18(2), 122–136. [https://doi.org/10.1016/S0740-624X\(01\)00066-1](https://doi.org/10.1016/S0740-624X(01)00066-1)
- Lin, T. T. C., & Bautista, J. R. (2017). Understanding the relationships between mHealth apps' characteristics, trialability, and mHealth literacy. *Journal of Health Communication*, 22(4), 346–354. <https://doi.org/10.1080/10810730.2017.1296508>
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE Publications.
- OECD. (2019). *The path to becoming a data-driven public sector*. OECD Digital Government Studies. OECD Publishing. <https://doi.org/10.1787/059814a7-en>
- OECD. (2020). *Digital government index: 2019 results*. OECD Publishing. <https://doi.org/10.1787/4de9f5bb-en>
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
- Schwab, K. (2016). *The fourth industrial revolution*. World Economic Forum.
- Selten, F., & Klievink, B. (2024). Organizing public sector AI adoption: Navigating between separation and integration. *Government Information Quarterly*, 41(1), 101885. <https://doi.org/10.1016/j.giq.2023.101885>
- United Nations. (2022). *United Nations e-government survey 2022: The future of digital government*. United Nations Department of Economic and Social Affairs.