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Innovation in Online Birth Certificate Services: A Qualitative Study of Population Administration Reform at the Department of Population and Civil Registration of Wajo Regency

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Abstract

This study examines innovation in online birth certificate services as part of population administration reform implemented by the Department of Population and Civil Registration of Wajo Regency, Indonesia. The research aims to analyze the form of service innovation, its implementation process, and the supporting and inhibiting factors influencing its effectiveness. This study employs a qualitative descriptive approach, with data collected through observation, in-depth interviews, and documentation. Informants include key officials, service operators, and community members who utilize online birth certificate services. The analysis is guided by Rogers' innovation attributes framework, which includes relative advantage, compatibility, complexity, trialability, and observability. The findings reveal that online birth certificate services provide significant benefits in terms of efficiency, accessibility, transparency, and time effectiveness compared to conventional services. The innovation enables citizens to submit applications remotely, reduces administrative costs, and minimizes face-to-face interactions. However, several challenges remain. Supporting factors include strong government commitment, leadership support, adequate regulatory frameworks, inter-agency collaboration, and improving digital infrastructure. Conversely, inhibiting factors consist of limited public awareness, low digital literacy among some community members, insufficient human resources, budget constraints, and uneven internet connectivity. Cultural habits and limited socialization efforts also affect the adoption of online services. Overall, the study concludes that online birth certificate service innovation has positively contributed to improving public service quality, although its sustainability depends on continuous capacity building, infrastructure enhancement, and intensive public outreach. The findings provide practical implications for local governments seeking to strengthen digital-based public service delivery in population administration.

Keywords: Public Service Innovation, Online Birth Certificate, Population Administration, Digital Government, Local Government Services.

INTRODUCTION

Birth registration is a fundamental component of population administration and civil registration systems, as it provides legal identity and serves as the basis for access to essential public services such as education, healthcare, and social protection. The absence of birth certificates often results in

administrative exclusion and long-term social disadvantages, particularly in developing and middle-income countries (World Bank, 2021). Despite national and international commitments to universal civil registration, disparities in service access and quality remain evident at the local government level, where administrative capacity and service delivery practices vary considerably.

In response to these challenges, digital transformation has emerged as a strategic approach to improve public service delivery. Governments across the world have increasingly adopted digital government and e-government initiatives to enhance efficiency, reduce bureaucratic complexity, and strengthen transparency and accountability (OECD, 2020; Dunleavy et al., 2019). Within the field of population administration, digital innovation has been applied to civil registration processes, including the development of online birth certificate services that allow citizens to submit applications remotely and access services more conveniently. Ideally, such innovations are expected to lower transaction costs, shorten processing time, and expand service coverage.

However, existing studies suggest that the implementation of digital public services does not automatically lead to improved service outcomes. Digital innovation in the public sector is a socio-technical process that involves not only technological change but also institutional adaptation, organizational capacity, and user readiness (Mergel et al., 2021). Empirical evidence shows that many digital government initiatives face persistent challenges, such as limited digital literacy, unequal internet infrastructure, insufficient human resources, and resistance to organizational change, which can hinder service effectiveness and inclusivity (Twizeyimana & Andersson, 2019; Mensah et al., 2020).

From a public administration perspective, innovation is understood as the introduction of new ideas, processes, or service models that generate added public value compared to existing practices. Recent literature emphasizes that successful public service innovation requires alignment between technological design, institutional context, and citizen needs (Ansell & Torfing, 2021). Rogers' (2003) diffusion of innovation theory further highlights that the adoption of innovation is influenced by attributes such as perceived relative advantage, compatibility, complexity, trialability, and observability. These attributes provide a useful analytical framework for examining how citizens and organizations respond to new service models in practice.

In Indonesia, population administration services are primarily managed by local governments through the Department of Population and Civil Registration. Although national policies encourage service innovation and digitalization, the outcomes of online public services differ significantly across regions. Local-level studies indicate that leadership commitment, regulatory clarity, institutional capacity, and public awareness play a decisive role in shaping the success of digital public service innovation (Putri & Pratama, 2022; Sari et al., 2023). Consequently, examining local government experiences is essential to understanding how digital population administration reforms are implemented and sustained.

Wajo Regency represents an interesting case for studying online birth certificate service innovation due to its proactive adoption of digital mechanisms in civil registration services. The local government has introduced an online birth certificate system aimed at simplifying administrative procedures, reducing face-to-face interactions, and improving service accessibility for citizens. While the system reflects the principles of digital government, preliminary observations suggest that not all segments of the population have fully utilized the service, and various operational challenges persist, including limited public socialization, digital literacy gaps, and infrastructural constraints.

Despite the growing body of literature on digital government and public service innovation, there remains a lack of in-depth qualitative research that explores how online civil registration services are implemented and experienced at the local level in Indonesia. Many existing studies focus on policy frameworks or quantitative performance indicators, offering limited insight into everyday administrative practices and citizen experiences. This study seeks to address this gap by providing a qualitative analysis of online birth certificate service innovation in Wajo Regency, emphasizing both institutional and user perspectives.

The contribution of this study is twofold. Theoretically, it enriches the public administration literature by applying innovation attributes to analyze digital service adoption in a local government context. Practically, it offers empirical insights that can inform policymakers and practitioners on how to strengthen the effectiveness and inclusivity of online population administration services. Accordingly,

this study aims to analyze: (1) the characteristics of innovation in online birth certificate services, (2) the process of service implementation at the local government level, and (3) the supporting and inhibiting factors that influence the effectiveness of the innovation in Wajo Regency.

METHODS

Research Design and Approach

This study employs a qualitative descriptive approach to examine innovation in online birth certificate services implemented by the Department of Population and Civil Registration of Wajo Regency. A qualitative approach is appropriate because the study seeks to explore processes, meanings, and contextual factors underlying public service innovation rather than to test causal relationships or quantify service performance. Qualitative research enables an in-depth understanding of how digital service innovation is designed, implemented, and experienced by both service providers and service users within a real-world administrative context (Ansell & Torfing, 2021).

The research is designed as a single case study focusing on online birth certificate services as a form of digital innovation in population administration. Case study design allows for detailed examination of complex administrative phenomena within their institutional and social settings, making it suitable for analyzing local government innovation processes (Mergel et al., 2021).

Research Site and Object of Study

The study was conducted at the Department of Population and Civil Registration of Wajo Regency, Indonesia. This institution was purposively selected because it has actively implemented online birth certificate services as part of its population administration reform. The object of the study is not limited to the digital system itself but includes the broader innovation process, encompassing service procedures, organizational arrangements, regulatory frameworks, and interactions between service providers and citizens.

Analytical Framework

To guide the analysis, this study adopts the innovation attributes framework proposed by Rogers (2003), which includes relative advantage, compatibility, complexity, trialability, and observability. This framework is widely used in public administration and digital government studies to analyze the adoption and diffusion of innovation in organizational and service contexts. The framework enables systematic examination of how online birth certificate services are perceived, adopted, and utilized by different stakeholders.

Informants and Sampling Technique

The population of this study comprises stakeholders involved in or affected by the implementation of online birth certificate services in Wajo Regency. Informants were selected using purposive sampling based on their roles, experiences, and relevance to the research objectives. The selected informants included: (1) senior officials responsible for policy formulation and service management, (2) technical staff and service operators handling online birth certificate applications, and (3) community members who had used or attempted to use the online birth certificate service.

Purposive sampling is appropriate for qualitative research as it allows the selection of information-rich cases that can provide deep insights into the phenomenon under study (Braun & Clarke, 2022). The diversity of informants was intended to capture both institutional and user perspectives.

Data Collection Techniques

Data were collected through three main techniques: observation, in-depth interviews, and documentation review. Observation was conducted to examine service workflows, the use of digital platforms, and interactions between service providers and users, allowing the researcher to understand how formal procedures are translated into practice. In-depth interviews were carried out using semi-structured interview guides to explore informants' perceptions, experiences, and assessments of the

online birth certificate service, particularly regarding service effectiveness, usability, and implementation challenges.

Documentation review involved the analysis of relevant institutional documents, including standard operating procedures, service guidelines, internal reports, and regulatory documents related to population administration. Document analysis helped contextualize empirical findings and provided supporting evidence for data obtained from interviews and observations (OECD, 2020).

Data Analysis Procedure

Data analysis was conducted using a qualitative thematic analysis approach. The analysis followed several stages: data familiarization, data reduction, coding, theme development, and interpretation. Data from interviews and observations were transcribed and systematically coded to identify patterns related to innovation characteristics, implementation processes, and supporting and inhibiting factors. Themes were then interpreted in relation to the analytical framework and existing literature on public service innovation and digital government (Braun & Clarke, 2022).

Trustworthiness of the Study

To ensure the credibility and trustworthiness of the findings, data triangulation was applied by comparing information obtained from different data sources and informant groups. Member checking was conducted informally during interviews to confirm the accuracy of interpretations. In addition, maintaining detailed field notes and documentation records enhanced the dependability and transparency of the research process. These strategies are commonly recommended in qualitative public administration research to strengthen analytical rigor (Ansell & Torfing, 2021).

Ethical Considerations

Ethical considerations were observed throughout the research process. Informants were informed about the purpose of the study and provided their consent prior to participation. Anonymity and confidentiality were maintained to protect informants' identities and institutional positions. Data were used solely for academic purposes and analyzed in a manner that respects ethical standards in qualitative research.

RESULTS AND DISCUSSION

Results

This section presents the empirical findings of the study based on data collected through observations, in-depth interviews, and document analysis conducted at the Department of Population and Civil Registration of Wajo Regency. The results describe the implementation of online birth certificate services, the characteristics of service innovation, and the supporting and inhibiting factors that influence service performance.

Overview of Online Birth Certificate Service Implementation

The findings indicate that the implementation of online birth certificate services represents a significant transformation in population administration practices. Prior to the adoption of the online system, applicants were required to submit applications in person, provide physical documents, and wait for processing times that were often uncertain. The online service allows citizens to submit applications remotely, upload digital documents, and receive birth certificates in electronic format.

Observational data show that the online system has reduced direct visits to the service office, particularly during the initial stages of application submission. Service operators reported that digital submission facilitates document organization and application tracking, contributing to improved administrative efficiency. These findings reflect the characteristics of digital public services aimed at streamlining bureaucratic procedures and enhancing service accessibility (OECD, 2020).

However, offline services continue to operate alongside the online system. This hybrid model is maintained to accommodate applicants who experience difficulties using digital platforms, indicating that full digital migration has not yet been achieved.

Characteristics of Service Innovation

The online birth certificate service demonstrates several key characteristics of innovation as conceptualized in the diffusion of innovation framework. Both service providers and users perceive the innovation primarily as a procedural and service delivery change rather than merely a technological upgrade. The innovation alters the interaction between citizens and administrative institutions and reshapes internal service workflows (Rogers, 2003).

Table 1 presents a comparison between conventional and online birth certificate services based on field findings.

Table 1. Comparison of Conventional and Online Birth Certificate Services

Aspect	Conventional Service	Online Service
Application method	Face-to-face submission	Remote digital submission
Document handling	Physical documents	Digital upload
Processing time	Relatively long and uncertain	Shorter and more predictable
Cost for applicants	Transportation and time costs	Minimal indirect costs
Service transparency	Limited	Higher transparency

Source: Research Results, 2025.

The table illustrates that the online service offers a relative advantage in terms of efficiency, cost reduction, and transparency, which are commonly identified as expected outcomes of digital government initiatives (Dunleavy et al., 2019).

Perceived Relative Advantage

Perceived relative advantage emerged as the most prominent factor supporting the adoption of online birth certificate services. Interview data indicate that applicants value the time efficiency and reduced need for repeated office visits. Service operators also reported that digital applications allow for better monitoring and coordination of service processes.

These perceived benefits align with findings from previous studies indicating that efficiency and convenience are central motivations for citizen adoption of digital public services (Twizeyimana & Andersson, 2019; Mensah et al., 2020). Nevertheless, the relative advantage is not uniformly experienced, as users with limited digital skills reported difficulties that reduced the perceived benefits of the service.

Compatibility with User Needs and Administrative Practices

The findings reveal varying levels of compatibility between the online service and user conditions. Younger users and individuals with prior experience using digital applications reported that the service aligns well with their daily communication practices. In contrast, older applicants and those residing in rural areas encountered challenges related to internet access and device availability.

From an administrative perspective, staff members indicated that the online service is compatible with existing regulatory frameworks and standard operating procedures. However, internal adjustments were required to integrate digital verification processes into established workflows. This variation in compatibility supports the view that digital innovation success depends on alignment with both organizational routines and user contexts (Putri & Pratama, 2022).

Complexity and Usability Challenges

Complexity emerged as a notable barrier affecting service utilization. While administrators perceived the system as technically manageable, some users reported difficulties in understanding application procedures and document requirements. Observations showed that incomplete or incorrect document uploads were among the most common causes of application delays.

Table 2 summarizes the main user difficulties identified during implementation.

Table 2. Common User Difficulties in Online Birth Certificate Services

Type of Difficulty	Description
Technical	Internet instability, file upload errors
Procedural	Unclear document requirements
Digital literacy	Limited ability to use applications
Communication	Delayed response understanding

Source: Research Results, 2025.

These findings are consistent with studies highlighting perceived complexity as a critical barrier to digital service adoption, particularly in developing country contexts (Mensah et al., 2020).

Trialability and Observability
The online birth certificate service provides a degree of trialability, as citizens are allowed to choose between online and offline service channels. This flexibility enables gradual adaptation and reduces resistance among users unfamiliar with digital systems. Observability is relatively high, as applicants can track application status and receive electronic certificates directly.

Service users reported increased confidence when they could monitor service progress digitally, reinforcing transparency and accountability. Such features are commonly associated with increased public trust in digital government services (OECD, 2020).

Supporting Factors of Service Innovation
Several factors were identified as supporting the implementation of online birth certificate services. Leadership commitment was frequently mentioned by informants as a key driver of innovation, particularly in allocating resources and encouraging staff adaptation to new service models. Clear regulatory guidance and the availability of basic technological infrastructure further supported service implementation.

Table 3 presents the main supporting factors identified in the study.

Table 3. Supporting Factors of Online Birth Certificate Service Innovation

Category	Supporting Factors
Leadership	Commitment to service improvement
Regulation	Clear procedures and guidelines
Infrastructure	Computers, internet access
Human resources	Skilled service operators

Source: Research Results, 2025.

These findings support previous research emphasizing the role of leadership and institutional capacity in sustaining public service innovation (Mergel et al., 2021).

Inhibiting Factors Affecting Implementation
Despite the supporting conditions, several inhibiting factors constrain the effectiveness of the online service. Limited public awareness remains a major issue, as many citizens are unaware of the existence or procedures of the online service. Digital literacy gaps further reduce adoption, particularly among older and less technologically experienced users.

From the institutional side, limited human resources affect service responsiveness during peak periods, while technical disruptions occasionally interrupt service processes. These constraints illustrate

that technological innovation alone is insufficient to ensure service effectiveness without parallel investments in capacity building and citizen readiness (Ansell & Torfing, 2021; OECD, 2020).

Overall, the results indicate that online birth certificate service innovation has improved administrative efficiency and transparency but has not yet fully achieved inclusive service delivery across all population groups.

Discussion
Online Birth Certificate Services as Public Service Innovation

The findings of this study indicate that online birth certificate services in Wajo Regency represent a substantive form of public service innovation rather than a simple technological upgrade. The transition from conventional face-to-face procedures to digital-based service delivery reflects the principles of digital-era governance, which emphasize efficiency, integration, and citizen-oriented service design (Dunleavy et al., 2019; Dunleavy & Margetts, 2015). This innovation aligns with the broader digital government agenda that seeks to modernize public administration through the strategic use of information technology (OECD, 2020; United Nations, 2022).

From a governance perspective, the innovation contributes to public value creation by improving transparency and reducing administrative burdens. Similar patterns have been observed in other digital public service initiatives, where process simplification and service accessibility become key indicators of innovation success (Gil-Garcia et al., 2018).

Relative Advantage and Citizen Adoption of Digital Services

The strong perceived relative advantage identified in this study confirms the relevance of diffusion of innovation theory in explaining citizen adoption of online public services. Time efficiency, cost reduction, and service convenience were central factors motivating users to adopt the online birth certificate service, consistent with Rogers' (2003) argument that perceived benefits drive innovation diffusion.

These findings are also in line with empirical studies on e-government adoption, which consistently identify efficiency and usability as primary determinants of citizen engagement with digital services (Mensah et al., 2020; Venkatesh et al., 2016). However, the uneven distribution of perceived benefits among different user groups suggests that relative advantage is mediated by users' digital capabilities and access to technology.

Compatibility and the Persistence of the Digital Divide

Compatibility between the online service and user conditions emerged as a critical factor influencing service effectiveness. Younger and digitally literate users found the service compatible with their daily practices, while older users and rural residents experienced structural barriers such as limited internet access and device availability. This finding supports existing literature on the digital divide in developing and middle-income countries (OECD, 2020; World Bank, 2021).

From an institutional standpoint, the service was largely compatible with existing regulatory frameworks and administrative procedures. Nevertheless, compatibility must be understood as a multidimensional concept that encompasses legal, organizational, and socio-cultural dimensions (Meijer & Bekkers, 2015). Without addressing disparities in access and digital literacy, compatibility remains partial and uneven.

Complexity, Usability, and User Experience

Despite its intended simplicity, the online birth certificate service was perceived by some users as complex, particularly in relation to document requirements and system navigation. This discrepancy between administrative perceptions and user experiences highlights a common challenge in public service innovation, where internal efficiency gains do not necessarily translate into improved user satisfaction (Meijer, 2015).

Prior research emphasizes that digital public services require user-centered design and iterative improvement processes to reduce perceived complexity and enhance usability (Mergel et al., 2021;

Janssen & van den Hoven, 2015). The findings suggest that simplifying procedures, clarifying instructions, and integrating user feedback mechanisms are essential to improving service effectiveness.

Trialability, Hybrid Service Models, and Inclusive Innovation

The availability of both online and offline service channels reflects a strategy of gradual innovation adoption through trialability. Allowing citizens to choose between service modes reduces resistance to change and supports learning among users unfamiliar with digital systems. This hybrid approach aligns with the concept of inclusive innovation, which emphasizes flexibility and adaptability in service delivery (Bekkers et al., 2013; Linders, 2012).

Rather than indicating innovation failure, the continued presence of offline services should be interpreted as a pragmatic response to diverse levels of digital readiness. This approach helps prevent service exclusion during periods of digital transition.

Observability, Transparency, and Public Trust

Observability of service outcomes, such as application tracking and electronic certificate issuance, enhances transparency and accountability in public service delivery. The ability of citizens to monitor service progress reduces uncertainty and strengthens trust in government institutions. These findings support previous studies linking transparency and observability to public value creation in digital government (Twizeyimana & Andersson, 2019; Gil-Garcia et al., 2018).

Transparency also contributes to reducing discretionary practices and increasing procedural fairness, which are essential elements of good governance in population administration services.

Institutional Capacity and Leadership Commitment

Leadership commitment emerged as a decisive factor in sustaining online birth certificate service innovation. Strong leadership support facilitates resource allocation, staff coordination, and organizational adaptation, confirming earlier findings on the role of leadership in public sector innovation (Ansell & Torfing, 2021; Mergel et al., 2021).

However, limited human resource capacity constrains service scalability and responsiveness. Digitalization redistributes administrative workloads rather than eliminating them, underscoring the need for organizational restructuring and capacity development alongside technological investment (Heeks & Bailur, 2007; Dunleavy et al., 2019).

Public Awareness, Socialization, and Citizen Engagement

Limited public awareness of online birth certificate services remains a significant barrier to broader adoption. The findings indicate that insufficient socialization and communication strategies reduce citizen engagement, particularly among vulnerable groups. This supports existing research emphasizing the importance of outreach and engagement in digital public service initiatives (Putri & Pratama, 2022; Sari et al., 2023).

Effective digital government requires not only technological infrastructure but also active efforts to inform, educate, and engage citizens throughout the innovation process.

Implications for Digital Population Administration Reform

The findings of this study highlight a fundamental tension between efficiency and inclusivity in digital public services. While online systems enhance administrative efficiency, unequal access and digital literacy gaps risk marginalizing certain population groups. This tension reflects broader debates in digital governance regarding equity and public value creation (OECD, 2020; United Nations, 2022).

Overall, this study reinforces the view that digital transformation in population administration is an adaptive and context-dependent process. Sustainable and inclusive innovation requires integration of technology, institutional capacity, leadership commitment, and continuous citizen engagement (Ansell & Torfing, 2021; Rogers, 2003).

CONCLUSION

Conclusion

This study provides a deeper understanding of how digital innovation in population administration operates at the local government level through the case of online birth certificate services in Wajo Regency. Rather than viewing digitalization as a purely technical intervention, the study highlights the importance of understanding online public services as part of a broader institutional and governance transformation. Digital service innovation emerges as a strategic instrument for modernizing administrative practices, strengthening transparency, and reorienting public services toward citizen needs.

The conclusion of this study underscores that the effectiveness of digital public services cannot be assessed solely through technological performance indicators. Instead, it must be evaluated through its capacity to align technological systems with institutional arrangements, leadership commitment, and citizen readiness. Digital innovation in population administration functions optimally when it is embedded within supportive organizational structures and guided by clear governance principles. This finding reinforces the argument that digital government is a continuous and adaptive process rather than a one-time reform initiative.

From a theoretical perspective, this study contributes to the public administration literature by reaffirming the relevance of innovation diffusion and public value frameworks in analyzing digital public services at the local level. The findings demonstrate that innovation attributes such as relative advantage, compatibility, and observability remain essential in understanding adoption dynamics, while institutional capacity and governance context shape sustainability. By emphasizing these dimensions, the study enriches existing discussions on public service innovation in developing country contexts.

Overall, the study concludes that online birth certificate services hold significant potential to strengthen population administration and improve public service delivery. However, realizing this potential requires moving beyond technological solutions toward integrated strategies that address organizational capacity, governance coherence, and citizen inclusion as core components of digital transformation.

Recommendation

Based on the conclusions of this study, several recommendations are proposed to enhance the sustainability and inclusivity of online birth certificate services and similar digital population administration initiatives. First, local governments should adopt a strategic approach to digital service development that integrates technological innovation with institutional strengthening. This includes aligning digital platforms with organizational structures, standard operating procedures, and long-term governance objectives to ensure service continuity and adaptability.

Second, strengthening human resource capacity should be prioritized as a core component of digital transformation. Continuous training programs for service providers in digital service management, data handling, and user support are essential to improving service quality and responsiveness. At the same time, efforts to enhance citizen digital literacy should be incorporated into broader public service strategies to reduce access barriers and promote inclusive service utilization.

Third, local governments are encouraged to develop comprehensive communication and socialization strategies to increase public awareness of online services. Multi-channel outreach, including community-based engagement and collaboration with local institutions, can help ensure that information about digital services reaches diverse population groups. Clear and accessible communication is critical to fostering trust and encouraging citizen participation.

Finally, future digital population administration reforms should maintain flexible service models that accommodate varying levels of digital readiness. Hybrid service approaches, combined with continuous monitoring and evaluation, can support gradual adaptation while safeguarding service accessibility. Future research is also recommended to explore comparative and longitudinal perspectives to inform evidence-based digital governance and strengthen the effectiveness of local-level public service innovation.

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