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Transformation Without Engagement: Adoption and Service Quality of an Integrated Mobile Government Application in an Indonesian Regency

Nurhadi[1*], Chelsilia Nurfauziah[2], Ruddy Haryadi[3], Gabriel Chol Kuac[4]
[1,2,3] Department of Public Administration, Faculty of Social and Political Sciences, Universitas Al-Ghifari, Bandung, Indonesia
[4]University of Juba, Juba, South Sudan

*Corresponding author-email: * nurhadiustadz392@gmail.com*

Abstract

National progress in digital government does not necessarily reach the regencies where most basic citizen services are delivered. This study examines an integrated service application developed by a densely populated Indonesian regency, asking at which stage of digital government evolution it stands, which factors support and hinder it, and what it implies for mobile government service quality. Earlier studies of the application relied on single frameworks and treated institutional design, adoption, and quality separately. We conducted a qualitative case study based on regulations, official documents, prior empirical studies, and app-store reviews, analysed through directed content analysis that combines Janowski's evolution model, Rogers' diffusion of innovations, and the m-government quality dimensions of Al-Hubaishi and colleagues. The application has reached the Transformation stage, with strong service integration but no features of Engagement. Its download-to-population ratio rose to at most 13.1 percent, at the threshold of critical mass. Information and outcome quality are strong, whereas system and network quality are weakest. The study contributes a three-layer framework for local digital innovations and the proposition of transformation without engagement.

Keywords: *Digital Government, Mobile Government, Diffusion of Innovations, Service Quality, Local Government*

IJIS
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1. Introduction

Digital government has become a central agenda of public sector reform. Its aim is not only to automate bureaucratic processes but also to reshape the relationship between the state and its citizens (Janowski, 2015). The 2024 United Nations E-Government Survey assessed 193 countries using the E-Government Development Index (EGDI), which comprises online services, telecommunication infrastructure, and human capital (United Nations Department of Economic and Social Affairs [UN DESA], 2024). In that survey Indonesia rose 13 places, from 77th in 2022 to 64th with a score of 0.7991, and entered the very high EGDI group for the first time (Ministry of State Apparatus Empowerment and Bureaucratic Reform [KemenPANRB], 2024).

National achievements, however, do not necessarily reflect conditions at the subnational level. The services that citizens use most often, such as civil registration and population administration, are delivered by regency and city governments whose fiscal capacity, human resources, and infrastructure vary considerably. A cross-country study of the member states of the Association of Southeast Asian Nations (ASEAN) shows that the digital divide, encompassing access, skills, and use of technology, is a critical factor in the success of e-government programmes (Apriliyanti et al., 2021). The risk is substantial. Heeks (2003) estimated that in developing countries about 35 percent of e-government projects are total failures, 50 percent partial failures, and only 15 percent successes, and traced most failures to gaps between the assumptions embedded in system design and the local realities in which systems are implemented. In Indonesia, Presidential Regulation No. 95 of 2018 on the Electronic-Based Government System (Sistem Pemerintahan Berbasis Elektronik, SPBE) requires local governments to integrate their services, which makes the question of how such integration unfolds at the regency level a pressing one.

This study examines the issue through the case of a regency with a population of more than three million, whose territory spans urban areas and mountainous rural areas. To preserve the anonymity of the research site, the regency is referred to as Regency X and its application as the integrated service application (ALT). Since 2023 the Regency X government has developed ALT as an application-based integrated service platform that replaced an earlier population administration application. Several studies have examined ALT. Study S1 identified the innovations and challenges of SPBE in its use, study S2 analysed its implementation for population administration services, study S3 measured the effect of ALT on m-government service quality, and study S4 examined strategies for optimising its use. Full details of the coded studies and documents are available from the corresponding author on request.

These studies generally rely on a single analytical framework and treat the institutional dimension, citizen adoption, and service quality in isolation. The broader literature on m-government service quality likewise focuses on user perceptions measured through surveys (Al-Hubaishi et al., 2018; Mao et al., 2023; Rahman &

Immortalis Journal of Interdisciplinary Studies
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Vol. 2 Issue 2, June 2026, pp. 283-299

Pangendra, 2022) without linking them to the institutional stage of digital government evolution. There is therefore no integrated explanation of why a platform that is institutionally integrated may still face limited adoption and uneven service quality.

This study integrates three frameworks across three analytical layers: Janowski's (2015) digital government evolution model at the institutional layer, Rogers' (2003) diffusion of innovations theory at the adoption layer, and the m-government service quality dimensions of Al-Hubaishi et al. (2017) at the user experience layer. Three research questions are posed. (RQ1) Which stage of digital government evolution does ALT represent, and how are its innovation attributes perceived? (RQ2) Which factors support and hinder its implementation? (RQ3) What are the implications of ALT for m-government service quality in Regency X? The study makes three contributions: a three-layer analytical framework applicable to other local digital government innovations, a synthesis of documentary evidence on ALT that has so far been fragmented, and the proposition that a design-reality gap explains why ALT remains at the Transformation stage. The article reviews the literature, describes the method, reports the results for each research question, discusses them, and concludes

2. Literature Review

2.1 Digital Government Evolution

Janowski (2015) maps the evolution of digital government onto four increasingly complex stages. The first, Digitisation (Technology in Government), uses technology to digitise internal processes without changing how the organisation works. The second, Transformation (Electronic Government), occurs when technology changes the structure and processes of service delivery, for example by integrating services from several units into a single point of access. The third, Engagement (Electronic Governance), is characterised by the involvement of citizens and other stakeholders in governance, including participation and the co-production of services. The fourth, Contextualisation (Policy-Driven Electronic Governance), is reached when the use of technology is tailored to local or sectoral contexts and policy goals. Janowski et al. (2018) extend this idea through the concept of platform governance, the use of digital platforms to reshape relationships between citizens and public administration. The model is useful because it separates technical integration from changes in the relationship between government and citizens, a distinction that single-stage maturity rankings tend to blur. In Indonesia, the SPBE framework established by Presidential Regulation No. 95 of 2018 emphasises the integration of applications and data across agencies. Read through Janowski's model, this emphasis corresponds mainly to the Transformation stage, and it leaves open how local governments are expected to move towards engagement and contextualisation.

IJIS
Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 2, June 2026, pp. 283-299

2.2 Diffusion of Innovations in the Public Sector

Rogers (2003) defines diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system. The rate of adoption is shaped by five perceived attributes: relative advantage, compatibility, complexity, trialability, and observability. Rogers classifies adopters into innovators, early adopters, early majority, late majority, and laggards, and notes that the rate of adoption tends to accelerate once an innovation reaches a critical mass of roughly 10 to 20 percent of the population. In local digital government in Indonesia, a study of the SIPINTAR PEDULI application in Pekanbaru City shows that technical complexity and inclusive design determine how widely an innovation is adopted across diverse groups of citizens (Handrian & Novita, 2025). Diffusion theory thus directs attention to who adopts and when, which complements the institutional focus of evolution models.

2.3 Mobile Government Service Quality

Al-Hubaishi et al. (2017) identify 20 sub-dimensions of m-government service quality grouped into six dimensions: interaction quality, environment quality, information quality, system quality, network quality, and outcome quality. A subsequent empirical test shows that all six dimensions correlate positively with overall m-government service quality, which in turn is associated with user satisfaction (Al-Hubaishi et al., 2018). Other studies find that the service quality of government applications affects continuance intention indirectly through expectation confirmation, perceived usefulness, and satisfaction (Mao et al., 2023). In the case of Jogja Smart Service, system quality, information quality, service quality, and trust have positive effects on user satisfaction (Rahman & Pangendra, 2022). These studies indicate that initial adoption does not guarantee continued use if service quality is not maintained.

2.4 Design-Reality Gaps and the Digital Divide

A fourth body of work explains why digital services designed at the centre of an organisation may falter at its periphery. Heeks (2002) argues that information systems in developing countries often fail because their designs embody assumptions about infrastructure, skills, and organisational routines that do not hold where they are implemented. The larger the gap between design and reality, the greater the risk of total or partial failure. The digital divide literature specifies one important source of such gaps. Differences in physical access to devices and connections are only the first level; differences in skills and in the purposes for which people use technology persist even when access is provided (Van Dijk, 2020). In ASEAN countries, these gaps in access and skills are among the critical factors that distinguish successful from unsuccessful e-government programmes (Apriliyanti et al., 2021). For a regency that spans dense urban areas and remote mountain villages, these perspectives suggest that the same application may be experienced very differently depending on where and by whom it is used.

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 2, June 2026, pp. 283-299

2.5 Integrated Analytical Framework and Research Position

The three core frameworks are complementary because each addresses a question at a different layer. Janowski's model explains the institutional position of an innovation, Rogers' theory explains how the innovation is received by citizens, and the dimensions of Al-Hubaishi et al. explain the quality of the user experience that determines whether use is sustained. The design-reality gap perspective serves as an interpretive bridge between the layers. Table 1 summarises the framework, which also served as the a priori coding frame. The research position of this study lies in combining the layers, since existing studies of ALT and of m-government quality in Indonesia have examined them separately.

Table 1. Integrated three-layer analytical framework

Layer	Framework	Analytical question	A priori codes
Institutional	Janowski (2015)	At which evolutionary stage is ALT situated?	Digitisation; Transformation; Engagement; Contextualisation
Adoption	Rogers (2003)	How are the innovation attributes of ALT perceived, and to what extent has it been adopted?	Relative advantage; compatibility; complexity; trialability; observability; level of adoption
User experience	Al-Hubaishi et al. (2017)	What is the quality of ALT from the user's perspective?	Interaction; environment; information; system; network; outcome

Source: compiled by the authors.

3. Research Method

3.1 Approach and Design

This study adopts a qualitative approach with a single case study design (Yin, 2018). The case, ALT, is bounded by place (Regency X) and by time, from its release in July 2023 to May 2026. A case study was chosen because the study seeks to understand how and why a digital innovation develops within a particular institutional context, where the boundary between the innovation and its context is not sharp.

3.2 Types and Sources of Data

The study relies on documentary data, analysed through document analysis, a systematic procedure for reviewing and interpreting printed and electronic documents to elicit meaning and develop empirical knowledge (Bowen, 2009). The corpus comprises

IJIS
Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 2, June 2026, pp. 283-299

four categories of sources: (a) regulations that form the legal basis for digital public services and SPBE; (b) official documents and channels of the Regency X government, including the websites of technical agencies, the public information office, sub-districts, and villages, and an official video channel (coded D1 to D11); (c) prior empirical studies of ALT, namely journal articles, undergraduate theses, and academic reports (coded S1 to S4); and (d) user reviews of ALT on Google Play. Documents were included if they explicitly addressed ALT, its predecessor application, or its legal basis, were published or accessed between July 2023 and May 2026, and were publicly accessible.

3.3 Selection of Sources and Instruments

Because the study involved no interviews, the purposive selection that would normally apply to informants applied to documents. Sources were selected for their relevance to at least one of the three layers in Table 1. User reviews were read from the application's public store page during the study period; reviews unrelated to the service, such as empty reviews or advertisements, were excluded. To protect privacy, reviewer account names are not reported and reviews are paraphrased rather than quoted. The instruments were a document coding sheet derived from Table 1 and the evidence rating rubric in Table 2.

3.4 Data Collection and Analysis

Documents were collected from official websites, academic databases, and the application store, and each was assigned the code (D or S) used throughout this article. The data were analysed through directed content analysis, in which coding begins with categories derived from theory while allowing new categories to emerge from the data (Hsieh & Shannon, 2005; Krippendorff, 2013). A priori codes were derived from Table 1, whereas codes for supporting and inhibiting factors were developed inductively and grouped into five dimensions: regulation and policy, leadership and institutions, technical infrastructure, outreach and literacy, and public adoption. The analysis proceeded through data reduction, coding, categorisation, matrix display, and the drawing and verification of conclusions. Each attribute and dimension was rated with the three-level rubric in Table 2, so that every rating can be traced back to its evidence.

IJIS
Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 2, June 2026, pp. 283-299

Table 2. Evidence rating rubric

Rating	Criteria
Strong	Positive evidence is found in at least two different source categories, with no substantial negative evidence.
Moderate	Both positive and negative evidence are found, or positive evidence comes from a single source category only.
Weak	Negative evidence predominates and is found in at least two source categories.

Source: compiled by the authors.

3.5 Theoretical Framework

The analysis was guided by the three-layer framework in Table 1. At the institutional layer, each document was read for evidence of the features that distinguish Janowski's (2015) stages, in particular whether ALT changes how services are delivered (Transformation), whether it creates channels for citizens to take part in decisions or co-produce services (Engagement), and whether its policies differ across local contexts (Contextualisation). At the adoption layer, evidence was coded against Rogers' (2003) five attributes and against indicators of the level of adoption. At the user experience layer, evidence was coded against the six dimensions of Al-Hubaishi et al. (2017). The design-reality gap perspective (Heeks, 2002) was not coded directly; it was used at the interpretation stage to explain relationships among findings across the layers.

3.6 Credibility and Ethics

Credibility was supported by source triangulation, comparing evidence across the four document categories (Bowen, 2009). Coding was carried out by two of the authors, and discrepancies were resolved through discussion until agreement was reached (Neuendorf, 2017). Coding decisions were recorded in an audit trail and checked against the rubric to limit the influence of prior expectations. The study analysed only publicly available documents and app-store reviews and involved no direct contact with human participants. Reviewer names are not reported and reviews are paraphrased, so that no reviewer can be identified.

4. Results

4.1. Case Profile

ALT was released in July 2023 (D5) as a successor to an earlier population administration application and became fully operational in 2024 (D1). The platform is accessible through a citizen application on Google Play and through the regency government's official web portal, and it includes a separate officer version for processing

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 2, June 2026, pp. 283-299

applications (D4). ALT offers eight service features. Five are population administration services: electronic identity cards (KTP-el), birth certificates, death certificates, change-of-residence letters, and family cards. The other three are supporting services: an e-complaint channel, access to traffic closed-circuit television (CCTV), and tourism information (D2; D7). ALT therefore operates primarily under a Government-to-Citizen (G2C) model.

4.2. Evolutionary Stage and Innovation Attributes (RQ1)

Table 3 presents the innovation attributes of ALT based on Rogers' (2003) theory.

Table 3. Innovation attributes of ALT

Attribute	Key evidence	Rating	Sources
Relative advantage	Population services without queuing at offices; savings in time and transport costs; accessible at any time via mobile phone	Strong	D4; S2; Google Play reviews
Compatibility	Aligned with Presidential Regulation 95/2018 on SPBE; replaces a familiar predecessor application; Android-based	Strong	Presidential Regulation 95/2018; S1
Complexity	Interface designed for diverse user groups, but document and photo upload reported as difficult by some users	Moderate	D6; Google Play reviews
Trialability	Free to install at any time, but no demonstration mode; trying a service requires genuine civil registration data	Moderate	D5
Observability	Application status can be tracked and outputs are issued as digital documents; outreach in rural areas remains limited	Moderate	D4; S4

Source: document analysis, 2026.

IJIS
Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 2, June 2026, pp. 283-299

Download data show steep growth. In 2022, when the predecessor application was still in use, downloads stood at 100+. After the transition to ALT they reached 10,000+ in 2024 (S1; S4), and by May 2026 they had reached 500,000+ (D5). Relative to the regency's 2026 population (D9), the ratio of downloads to population rose from approximately 0.26 percent to at most 13.1 percent. This figure is an upper bound rather than an actual adoption rate. A single user may download the application more than once, downloaders are not necessarily residents of Regency X, and Google Play reports download ranges rather than exact counts.

With these caveats, a ratio of around 13 percent places ALT at the threshold of the 10 to 20 percent critical mass that, according to Rogers (2003), marks the point at which adoption begins to accelerate. Cumulatively, the figure is roughly equivalent to the combined share of innovators and early adopters (about 16 percent), indicating that ALT has not yet reached the early majority. The moderate ratings for complexity, trialability, and observability suggest that extending adoption to the majority will meet greater obstacles than the early phase did, because later adopters tend to be more cautious and to rely more on the experiences of others.

At the institutional layer, ALT exhibits the characteristics of the Transformation stage in Janowski's (2015) model. The integration of population administration and supporting services into a single point of access changes the way citizens interact with government, rather than merely digitising internal processes. Features of the Engagement stage, however, are not clearly present. Although the e-complaint channel and comment feature are available, both function as one-way grievance channels rather than as mechanisms for participation or service co-production. Nor has the Contextualisation stage been reached, since no evidence was found of service policies differentiated by territorial characteristics, for example between urban and rural areas.

4.3. Supporting and Inhibiting Factors (RQ2)

The supporting and inhibiting factors identified through document analysis are summarised in Table 4.

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 2, June 2026, pp. 283-299

Table 4. Factors supporting and inhibiting the implementation of ALT

Dimension	Supporting factors	Inhibiting factors
Regulation and policy	Law 25/2009 on Public Services; Presidential Regulation 95/2018 on SPBE; relevant regional and regent regulations (D10; D11)	No regional regulation found that specifically sets service standards and performance monitoring for ALT
Leadership and institutions	Commitment of the regent through a flagship digitalisation programme; technical and evaluation meeting on ALT implementation (June 2024); coordination between the civil registration agency and the communication and informatics agency	No published performance measures for ALT were found
Technical infrastructure	Android and web versions available; separate applications for citizens and officers	Server instability at peak hours; internet disruptions in rural areas
Outreach and literacy	User guides published at village level; service information on the public information portal	Uneven outreach; low digital literacy among older people and farmers
Public adoption	Downloads grew from 100+ (2022) to 10,000+ (2024) and 500,000+ (May 2026)	Download-to-population ratio of at most 13.1 percent; signs of an urban-rural digital divide

Source: compiled from Republic of Indonesia (2009, 2018), D3, D6, D8, D10, D11, S1, S2, S4, and Google Play reviews.

Institutionally, the Regency X civil registration agency held a technical and evaluation meeting on ALT implementation in June 2024, involving ALT operators and the communication and informatics agency, to identify operational constraints (D3). This evaluation mechanism, together with the regulatory support of SPBE and the commitment of the regional head, forms an institutional foundation that distinguishes ALT from local innovations operating without a clear policy framework. On the inhibiting side, the documents and reviews point repeatedly to three conditions: server instability when use peaks, weak connectivity in rural areas, and difficulty among older people and farmers in scanning and uploading documents.

4.4. Implications for M-Government Service Quality (RQ3)

The assessment of the six dimensions of m-government service quality (Al-Hubaishi et al., 2017) is presented in Table 5.

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 2, June 2026, pp. 283-299

Table 5. Service quality of ALT based on m-government quality dimensions

Dimension	Indicators	Findings	Rating
Interaction quality	Two-way communication; officer responsiveness	Comment, voice call, and video call features available; officer response times vary	Moderate
Environment quality	Interface; ease of navigation	Inclusive design, but photo and document upload reported as difficult by some users	Moderate
Information quality	Accuracy, completeness, and currency of information	Information on requirements and procedures reasonably complete; supporting information (CCTV, tourism) available	Strong
System quality	Reliability; speed; availability; status tracking	Server instability at peak hours; bugs reported in user reviews	Weak
Network quality	Accessibility under varying network conditions	Heavy dependence on connection quality; obstacles in rural areas	Weak
Outcome quality	Fit of service outputs; time efficiency	Population documents obtainable without visiting an office; benefits reported for population services	Strong

Source: compiled from S2, S3, and Google Play reviews.

These ratings are consistent with quantitative study S3 on population services in Regency X, which reports a coefficient of determination of 0.511. In that study's sample, the ALT innovation variable explains about 51.1 percent of the variance in perceived m-government service quality, with the remainder explained by factors outside the model. This figure is secondary data from a single study and describes the strength of a statistical association; it cannot be read as the size of a quality improvement caused by ALT. The profile in Table 5 shows an imbalance across dimensions. The dimensions within the control of application design, information and outcome, are strong, whereas those that depend on infrastructure, system and network, are weak.

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 2, June 2026, pp. 283-299

5. Discussion

5.1. Transformation Without Engagement

Integrating the three analytical layers yields a single proposition. ALT has reached the Transformation stage at the institutional layer, yet at the adoption layer it stands only at the threshold of critical mass, and at the user experience layer it remains weak on the infrastructure-dependent dimensions. These conditions reinforce one another. Weak system and network quality impede the extension of adoption to the majority, while limited adoption restricts the base of citizens who could be involved in the Engagement stage. This condition may be termed transformation without engagement, a situation in which service integration has been achieved but participatory relationships between government and citizens have not yet formed. The proposition extends Janowski's (2015) model by suggesting that progression between stages at the local level depends not only on institutional design but also on adoption thresholds and infrastructure quality.

The finding also qualifies the assumption that a one-stop digital service in itself reflects contextualisation. Technical integration is a feature of Transformation, whereas contextualisation requires policies tailored to diverse local needs (Janowski, 2015). In a regency that spans dense urban areas and remote rural areas, a single application with uniform requirements and no differentiated assisted channels is an integrated service, but not yet a contextualised one. Janowski et al. (2018) describe platforms as instruments that can reshape citizen-administration relationships; the case of ALT suggests that this reshaping remains limited when the platform is used mainly to transact and to complain.

5.2. The Design-Reality Gap

The pattern of inhibiting factors can be explained through the design-reality gap (Heeks, 2002, 2003). The design of ALT presupposes users who own smartphones, have stable internet connections, and possess the digital skills to scan and upload documents. These assumptions are largely met in urban areas but not in rural areas or among older people and farmers. Server instability at peak hours indicates that system capacity was not designed for rapidly growing use, so that successful adoption itself increases pressure on infrastructure. The pattern is consistent with the ASEAN-wide finding that gaps in access and skills are critical to e-government success (Apriliyanti et al., 2021), and with the second-level digital divide described by Van Dijk (2020), in which differences in skills persist after access is provided. It also suggests that the obstacles facing ALT are structural and cannot be overcome through improvements to the application alone.

5.3. Downloads, Satisfaction, and Continued Use

The imbalance across quality dimensions matters because the service quality of government applications affects continuance intention through user satisfaction (Mao et al., 2023), and system quality is a determinant of satisfaction with e-government services in Indonesia (Rahman & Pangendra, 2022). Growth in downloads therefore cannot serve

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 2, June 2026, pp. 283-299

as an indicator of outcome quality or satisfaction, since downloads reflect initial adoption, whereas continued use depends on post-adoption experience (Al-Hubaishi et al., 2018). The moderate rating for trialability adds to this concern. Because a citizen cannot try ALT without entering genuine civil registration data, a failed first attempt is costly, and early negative experiences may spread through the same interpersonal channels that Rogers (2003) identifies as decisive for later adopters. Data on active users and completion rates are needed to assess the impact of ALT more accurately.

5.4. Comparison with Other Local Applications

The profile of ALT resembles that of other local applications in Indonesia in some respects and differs in others. Like Jogja Smart Service, whose users' satisfaction depends on system and information quality (Rahman & Pangendra, 2022), ALT performs well where its designers control the content and less well where performance depends on infrastructure. Like SIPINTAR PEDULI in Pekanbaru, whose reach depended on inclusive design for diverse users (Handrian & Novita, 2025), ALT faces the question of how to serve citizens who cannot complete digital procedures alone. What distinguishes ALT is the scale and territorial diversity of its population. A regency of more than three million people, stretching from urban centres to mountain villages, magnifies both the benefit of integration and the cost of uniform design. The case therefore suggests that the larger and more diverse a local jurisdiction, the more its digital services will need differentiated channels in order to move beyond Transformation.

The comparison also points to a gap in the evidence base. Most Indonesian studies of local applications, including the four studies of ALT used here, rely on surveys of users or on descriptions of implementation. Few track what happens to citizens who start but do not complete a digital procedure, or who never start. These are precisely the groups on which progression beyond the critical mass depends, and their absence from the evidence makes downloads and satisfaction scores appear more favourable than the underlying adoption may be.

5.5. Theoretical and Practical Implications

Theoretically, the study shows that the digital government evolution model, diffusion of innovations theory, and the m-government service quality framework can be combined into a three-layer framework for assessing local digital government innovations. The framework helps explain why institutional achievements are not automatically followed by broad adoption and consistent service quality, and the proposition of transformation without engagement offers a testable expectation for other regencies with similar urban-rural divides.

Practically, the study suggests four priorities for the Regency X government and for other local governments developing similar applications. Server capacity and system availability standards should be increased, particularly to anticipate surges in use at peak hours. The expansion of internet connectivity in rural areas should be accelerated

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 2, June 2026, pp. 283-299

through coordination with the provincial government and telecommunications providers. Assisted services should be provided at village or sub-district offices for older people, farmers, and citizens with low digital literacy, with outreach tailored to each group. Usage metrics, such as active users, applications, and processing times, should be published regularly as a basis for evaluation and accountability

6. Conclusion

This study answers its three questions as follows. ALT is situated at the Transformation stage of digital government evolution, having integrated population administration and supporting services into a single G2C platform, but it does not yet exhibit features of the Engagement stage. Relative advantage and compatibility are perceived as strong, whereas complexity, trialability, and observability are moderate, and a download-to-population ratio of at most 13.1 percent places ALT at the threshold of critical mass. Implementation is supported by the SPBE regulatory framework, the commitment of the regional head, and institutional evaluation, and hindered by server instability, rural connectivity gaps, uneven outreach, and low digital literacy among certain groups, which together reflect a gap between design and local reality. Information and outcome quality are strong, whereas system and network quality are the weakest dimensions and may undermine continued use.

The main contribution of the study is the three-layer framework and the proposition of transformation without engagement, which explains why local digital innovations may stall at the Transformation stage. The study has limitations. The data are secondary, so the findings depend on the completeness and accuracy of available documents; download counts are only an indirect indicator of adoption; and app-store reviews tend to come from users with very positive or very negative experiences, excluding users of other devices and citizens who do not use the application. The findings describe one regency, although the framework and proposition may transfer to regencies with a similar urban-rural divide. Future research should combine user surveys based on an m-government quality instrument, interviews with operators and policymakers, and administrative log data to test the proposition more rigorously.

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Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 2, June 2026, pp. 283-299

request. During the preparation of this work the authors used generative AI tools to edit the English text and check references against their sources; the authors reviewed and edited the content as needed and take full responsibility for the publication.

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Immortalis Journal of Interdisciplinary Studies
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Vol. 2 Issue 2, June 2026, pp. 283-299

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