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Smart Governance Strategies for Citizen-Centric Digital Transformation of Population Administration Services in Makassar City

Indri Apriani Nur[1]*, Nuryanti Mustari[1], Lukman Hakim[1], Muhlis Madani[1], and Abdi[1]

[1]Department of Public Administration, Universitas Muhammadiyah Makassar, Indonesia

*Corresponding Author Email: indriapriani.nur340@gmail.com, No Telp: +62 856-9600-4872

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Abstract

This study aims to examine the orchestration of smart governance in the digital transformation of population administration services in Makassar City, identify supporting factors, and assess citizen-centricity through digital service quality and public satisfaction. An exploratory sequential mixed-methods design was employed, combining semi-structured interviews, direct observations, document analysis, and a questionnaire administered to 50 digital service users. Qualitative data were analyzed thematically using five readiness dimensions: input, process, output, institutional, and stakeholder readiness, supported by NVivo. Quantitative data were analyzed using simple linear regression to examine the relationship between digital service quality and public satisfaction. The findings indicate that basic digital infrastructure and electronic service processes are in place, although readiness remains uneven due to infrastructure constraints, differences in digital literacy, continued reliance on assistance, and coordination requirements. The hybrid service model functions as a transitional governance mechanism that maintains accessibility while supporting greater citizen independence. Digital service quality was positively and significantly associated with public satisfaction ($B = 0.512$; $t = 7.728$; $p < 0.05$; $R^2 = 0.554$). The novelty lies in integrating government readiness, smart governance orchestration, and citizen-centricity within a single analytical perspective. Its originality is reflected in conceptualizing digital transformation as a transition from assisted digital access toward self-sustaining citizen-centric services. The study contributes an integrative analytical perspective for more inclusive and sustainable digital public services.

Keywords: Citizen-Centric, Digital Transformation, Population Administration Services, Public Satisfaction, Smart Governance

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Introduction

In today's rapidly evolving digital era, the transformation of public services has become an imperative to enhance administrative efficiency and service delivery quality. In this context, the implementation of electronic government (e-government) extends beyond the mere adoption of information and communication technology (ICT), it fundamentally demands institutional and governance restructuring to ensure public service effectiveness, transparency, accessibility, and responsiveness (Asmawanti-S et al., 2025; Eom & Lee, 2022). Governments worldwide have adopted e-government systems as a core strategy to modernize public administration and streamline bureaucratic performance (Almazrouei et al., 2024; Asmawanti-S et al., 2025). Within this broader reform agenda, civil registration and population administration (*administrasi kependudukan*) constitute a pivotal domain, given that these frontline services demand rigorous legal accuracy, procedural speed, cost-effectiveness, and direct responsiveness to public needs (Hernández et al., 2024).

In Indonesia, the digital transformation of public services is progressing rapidly, particularly in population administration, where citizens increasingly expect expedited, accurate, and seamless administrative interactions (Febiri et al., 2024). Nevertheless, the success of digital governance cannot be guaranteed solely by technological readiness. Robust cross-agency collaboration, institutional alignment, and continuous engagement with diverse societal actors are indispensable to building integrated, resilient, and community-centered digital services (Gong & Li, 2023; Gong & Yang, 2025). These dynamics underscore that digital civil administration requires an orchestrated governance architecture capable of harmonizing statutory regulations, organizational workflows, technological infrastructures, and civil service digital competences (Scholta & Lindgren, 2023; Wilson & Mergel, 2022). In Makassar City, examining this transformation is critical because the digitalization of population services cannot be assessed merely by system deployment. Rather, it must be evaluated through the lens of institutional capacity, multi-actor coordination, organizational readiness, and the municipal administration's ability to satisfy citizen expectations. Consequently, a smart governance framework is essential to analyze how technology, internal institutional capabilities, and collaborative governance arrangements can be synchronized to support citizen-centric population services in Makassar City.

The digital transformation of government in Indonesia represents a national strategic priority, explicitly mandated in the 2020–2024 National Medium-Term Development Plan (RPJMN), Presidential Regulation No. 95 of 2018 on the Electronic-Based Government System (SPBE), and Presidential Regulation No. 132 of 2022 concerning the National SPBE Architecture (Yulianto et al., 2023). Despite these overarching regulatory mandates, regional implementation encounters recurrent structural impediments, including infrastructure and system fragmentation, redundant and siloed software applications, inter-agency rivalries ("sectoral egos"), and disparities in digital literacy among municipal staff (Merlin-Brogniart et al., 2022). The progression of local digital maturity within this national framework is illustrated in Figure 1.

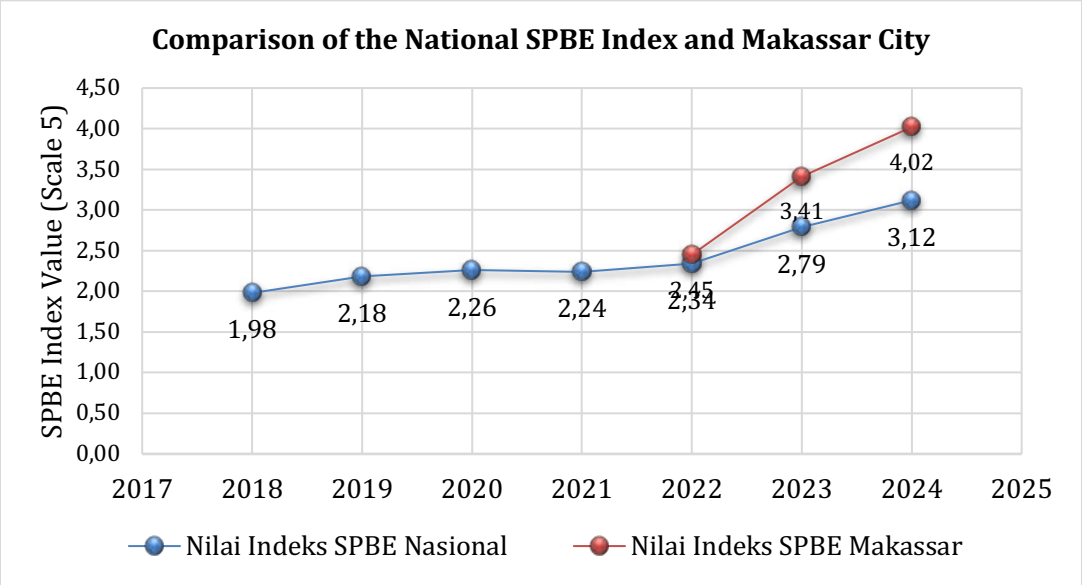


Figure 1. Comparison of the National SPBE Index and Makassar City. Source: Ministry of PANRB (2024) and Makassar City Communication and Information Office (2024).

The 2024 National SPBE Index shows the development of electronic-based governance implementation in South Sulawesi, reflecting efforts to strengthen digital governance and public services. In this context, Makassar City, as one of the metropolitan cities in Indonesia, continues to develop the Smart City concept through various digital innovations, including in the administration of population services (Hujran et al., 2023). Population administration is one of the strategic sectors in digital transformation because it is directly related to the basic needs of the community and serves as the foundation for the provision of various public services. The development of digitalization in population administration in South Sulawesi is also evident from the achievement of Digital Population Identity (IKD) activation, which places South Sulawesi among the top five provinces with IKD activation achievements nationally in 2023

Population administration represents a vital public service pillar because civil records underpin citizen legal identity, constitutional rights, and access to healthcare, education, and social safety nets. At the regional level, South Sulawesi demonstrated significant progress in digital identity rollouts, ranking among the top five provinces nationally in the activation of the Digital Population Identity (*Identitas Kependudukan Digital* / IKD) system (Directorate General of Population and Civil Registration, 2023). However, substantial transaction volumes and diverse demographic characteristics across Makassar City pose intricate operational challenges, as summarized in the administrative service outputs displayed in Figure 2.

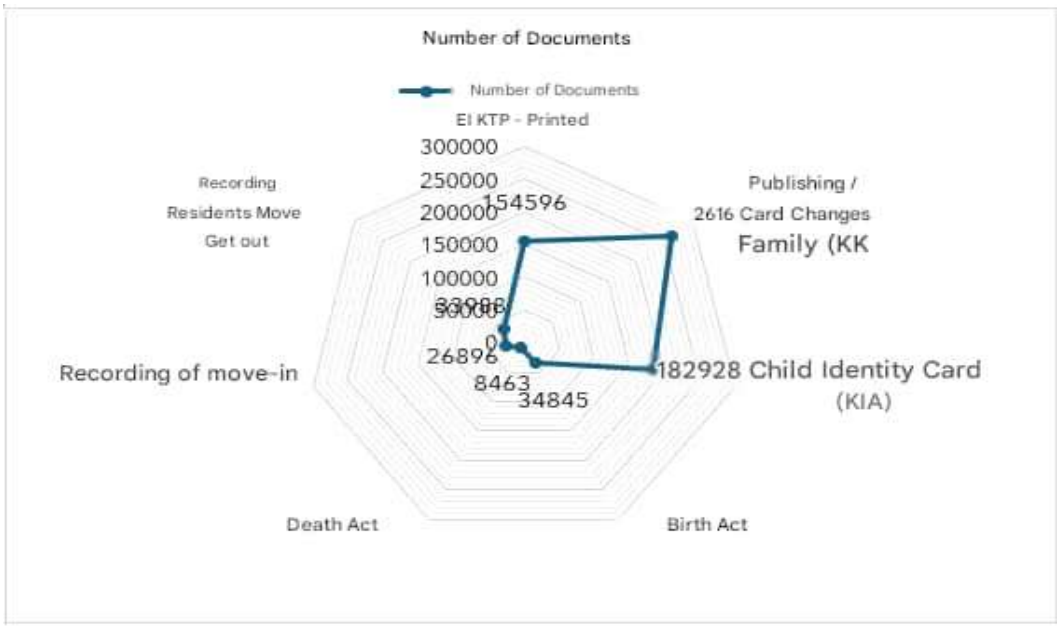


Figure 2. Makassar City Population and Civil Registration Service Output Statistics (2024). Source: operational statistical reports by Disdukcapil Makassar City (2024).

Based on the Directorate General of Dukcapil, as of August 22, 2023, South Sulawesi ranks fifth nationally in the achievement of Digital Population Identity (IKD) activation (SULSEL 5th in IKD Activation Achievement in Indonesia, 2023). In the city of Makassar, around 50,000 residents have used the Digital Population Identity (IKD) by the end of 2023. In 2024, the issuance of 154,596 e-ID cards, 34,845 birth certificates, and 8,463 death certificates was recorded (Report on the Progress of Digital Transformation of Population Services in South Sulawesi, 2025). The same report indicates that the level of public satisfaction with the services of the Disdukcapil of Makassar City reached 94%, which is the highest satisfaction level recorded by the agency (Report on the Progress of Digital Transformation of Population Services in South Sulawesi, 2025). The satisfaction rate of 94% cannot be directly interpreted as the impact of digitalization, because public satisfaction with Disdukcapil services can be influenced by various service aspects, such as service reliability, staff responsiveness, service competence and assurance, ease of access, service facilities, and administrative procedures. Therefore, in this study, the 94% figure is used as a contextual representation of the overall level of public satisfaction with Disdukcapil services, not as causal evidence that digitalization causes that level of satisfaction. The relationship between digital service quality and public satisfaction was analyzed separately through empirical testing in this study.

This high level of satisfaction reflects the public's positive response to the development of electronic-based population services, which have been continuously improved over the 2021–2024 period (Disdukcapil Makassar, 2023). The digitalization of Makassar's population administration services has not been fully citizen-focused, as evidenced by the low adoption of the IKD, with only around 50,000 users compared to the city's total population (Makassar Digital ID Users Reach 50,000; Population and Civil Registration Agency Steps Up Outreach, 2023).

Initial observations by the researcher at the Population and Civil Registration Office of Makassar City indicate that although some population administration services have been shifted to digital platforms, the basic service processes have not changed significantly. This condition suggests that digitalization should not be viewed merely as a change in the medium of service delivery, but

also in terms of the extent to which digital services place citizens' needs and experiences at the center of service provision. Recent research on citizen-centricity in digital government indicates that citizen orientation encompasses attention to users, service design, governance, and outcomes experienced by citizens (Dechamps et al., 2025). In this study, citizen-centric digital transformation refers to the utilization of digital technologies to meet citizens' needs through reliable and responsive services, provide certainty and a sense of security, address users' needs, and ensure adequate service facilities and infrastructure. Thus, a citizen-centric orientation is determined not only by the availability of digital platforms but also by the quality of citizens' experiences and the value generated through digital services (Luna et al., 2024).

In Makassar City, the digital transformation of population administration continues to encounter significant operational frictions, particularly concerning inconsistent citizen engagement, fragmented stakeholder coordination, and gaps in institutional execution finding(Febiri et al., 2024; Li & Wang, 2024; South Sulawesi Provincial Government, 2023). Overcoming these barriers requires systemic adjustments in organizational capacity, employee digital capabilities, and collaborative governance networks rather than isolated technological procurement (Eom & Lee, 2022; Gong & Li, 2023).

Previous studies have examined digital transformation, smart governance, organizational readiness, and citizen-oriented digital services, but these dimensions have largely been investigated separately. Limited attention has been given to integrating government readiness, smart governance orchestration, and citizens' experiences in the digital transformation of population administration services at the local government level. In particular, further understanding is needed of how technological, human, organizational, and governance readiness interact with service delivery processes and citizens' experiences. This gap provides the basis for this study to analyze how smart governance orchestration connects government readiness, stakeholder collaboration, and digital service quality in supporting the transformation of population administration services toward a more citizen-oriented model in Makassar City.

Literature Review

Smart governance integrates advanced digital technologies with organizational capacity, institutional arrangements, multi-stakeholder collaboration, and data-informed decision-making. Digital transformation within the public sector extends well beyond technology adoption; it necessitates deep adaptations in administrative workflows, institutional capabilities, and public service architectures to respond dynamically to evolving citizen needs (Eom & Lee, 2022; Hujran et al., 2023; Moser-Plautz & Schmidthuber, 2023).

To contextualize recent global scholarship and thematic trajectories, this study utilized VOSviewer to conduct a bibliometric co-occurrence analysis of peer-reviewed publications on digital transformation and public governance indexed in Dimensions AI over the 2021–2025 period. The resulting network mapping reveals prominent structural linkages among digital transformation, smart governance, citizen-centricity, digital literacy, organizational agility, and public value creation. This thematic convergence reflects an overarching paradigm shift within international public administration scholarship, moving from techno-centric administrative automation toward citizen-oriented and institutional transformation, as visualized in Figure 3.

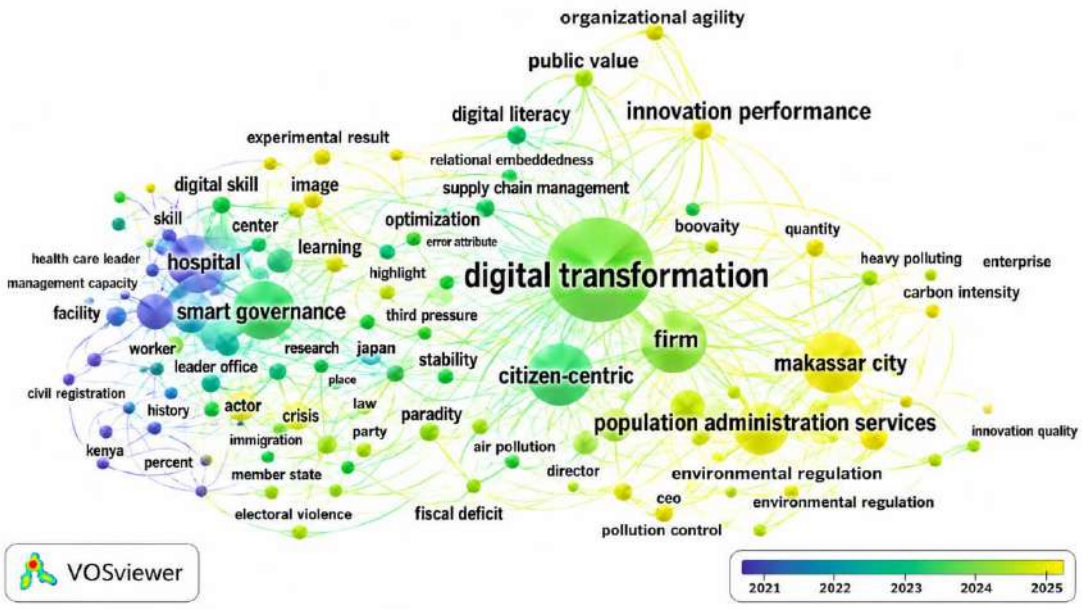


Figure 3. VOSviewer Network Visualization of Research Themes on Digital Transformation and Governance. Source: Researcher's analysis using VOSviewer, 2026.

The overlay visualization illustrates the development of research themes during the 2021–2025 period, indicating increasing attention to broader themes such as digital literacy, organizational agility, innovation performance, public value, and citizen-oriented service delivery. However, VOSviewer mapping is used only as contextual evidence of broader research trends and cannot independently establish the research gap. The research gap is therefore identified through the interpretation of the bibliometric mapping combined with a substantive review of previous studies.

In this study, smart governance is employed as the conceptual framework because the digital transformation of population administration services involves not only technology adoption but also the integration of organizational capacity, data, service processes, and stakeholder relationships. This framework enables the study to examine the interconnection of technology utilization, collaboration and participation, internal coordination, decision-making, and service outcomes in supporting citizen-oriented digital services (Alshurideh et al., 2024).

In the implementation of e-government, readiness is an important condition for transforming technology adoption into substantive improvements in service delivery. This study adopts five dimensions of readiness: input readiness, process readiness, output readiness, institutional readiness, and stakeholder readiness (Kibria & Hong, 2024). These dimensions enable digital transformation to be examined not only through technological availability but also through the preparedness of resources, service processes, service outputs, institutional arrangements, and stakeholders. In particular, input readiness concerns the availability of software, internet connectivity, servers and data infrastructure, supporting equipment, human resources, budgetary resources, and technical support required to sustain digital services.

Previous studies indicate that digitalization can improve service efficiency, transparency, and accessibility, but technology adoption does not automatically produce substantive digital transformation. Infrastructure limitations, human resource capacity, system integration, and citizens' ability to use technology may constrain implementation (Novienty et al., 2025; Paritranaya & Martini, 2025). Similarly, stakeholder involvement and coordination are important because weak

institutional integration may limit service outcomes even when technological systems are available (Sutrisno et al., 2026).

Based on the literature synthesis, the theoretical gap lies in the limited integration of government readiness, smart governance orchestration, citizen-centricity, and public value within a single analytical perspective. Existing studies tend to examine government readiness, smart governance, and citizen-centric digital services separately, with limited integration of public value as an outcome of digital transformation. Less attention has been given to how government readiness is orchestrated through smart governance mechanisms to translate technological and organizational capabilities into citizen-centric services and, ultimately, public value.

This theoretical and operational gap is especially salient in local-government population administration, where digital services must navigate complex legacy databases, rigid statutory mandates, cross-agency dependencies, and a demographically diverse citizenry exhibiting wide variations in digital literacy (Sung & Lee, 2024). In this context, citizen-centricity cannot be evaluated merely by the existence of digital portals or downloadable mobile applications; it must be assessed through usability, procedural equity, and the tangible creation of public value (Sundberg & Holmström, 2024). Furthermore, assisted, on-site, or hybrid service channels—such as front-office staff assisting citizens with digital identity applications—should be conceptualized as vital transitional mechanisms designed to mitigate digital exclusion among vulnerable groups while civic digital literacy and system interfaces mature, rather than as evidence of governance failure (Liu et al., 2025; Madsen et al., 2022; Peeters et al., 2025). Citizen-centric smart governance fundamentally entails reorganizing public administrative machinery around citizens' lived experiences, ensuring dignified accessibility, and redefining the relationship between local government and its public.

Accordingly, this study examines smart governance orchestration through five readiness dimensions input, process, output, institutional, and stakeholder readiness to understand how these dimensions interact with governance mechanisms and citizen experience in supporting citizen-centric digital transformation and public value creation in population administration services in Makassar City.

Research Methods

Research Design

This study employed an exploratory sequential mixed-methods design to analyze smart governance strategies in the digital transformation of population administration services in Makassar City. The qualitative component was prioritized to examine government readiness, governance arrangements, stakeholder relationships, and the implementation of digital services. The quantitative component was subsequently used as an exploratory assessment to complement the qualitative findings by examining the relationship between digital service quality and public satisfaction.

The two components served complementary purposes. The qualitative analysis examined how technological resources, organizational capacity, institutional arrangements, stakeholder involvement, and service processes shaped digital transformation. The quantitative analysis provided an empirical assessment of citizens' perceptions of digital service quality and their satisfaction with digital population administration services. The findings from both components were integrated at the interpretation stage to connect government readiness and governance mechanisms with citizens' service experiences.

Research Site

The study was conducted at the Department of Population and Civil Registration of Makassar City in February 2026. The site was selected because the institution is responsible for population administration services and has implemented electronic-based service mechanisms. The services examined included electronic identity cards, family cards, birth certificates, death certificates, population transfers, data changes, and other population administration documents.

The study focused on the transformation of population administration services from conventional mechanisms toward digitally supported services. Particular attention was given to technology utilization, resource readiness, service processes, institutional capacity, stakeholder involvement, and citizen experience. Service delivery at the sub-district level was also considered because local personnel and service facilities function as an important link between government digital systems and citizens with different levels of digital capability and access.

Data Collection

Data were collected through questionnaires, semi-structured interviews, direct observations, and document analysis. The quantitative population consisted of residents of Makassar City who had used electronic-based population administration services provided by the Department of Population and Civil Registration. Based on the population data available for this study, there were 4,341 users of digital population administration services.

The quantitative component involved 50 respondents who had previously used digital population administration services. Respondents met the following criteria: (1) residents of Makassar City; (2) at least 17 years old; (3) had previously used digital population administration services; and (4) were willing to participate. Respondents were selected based on these eligibility criteria rather than through a probability sampling design. Given the limited sample size and non-probability selection, the quantitative findings were treated as an exploratory assessment and were not intended for population-level generalization.

Digital service quality was measured through reliability, responsiveness, assurance, empathy, and tangibles, while public satisfaction was assessed through expectation conformity, intention to reuse, and willingness to recommend.

For the qualitative component, six informants were purposively selected based on their position, experience, knowledge, and involvement in digital population administration services. They represented managerial and operational functions in population registration, civil registration, data utilization and service innovation, information management, and SIAK operation. The types of data collected, their relevance to the research, and the procedures used to obtain the data are presented in Table 1.

Table 1. Qualitative Data Collection

Data Collection Technique	Types of Data Collected	Relevance to the Research	How the Data Were Obtained
Semi-structured interviews	Information on the utilization of digital systems, including SIAK and IKD; coordination among organizational	Provides in-depth evidence of how smart governance is orchestrated, how actors coordinate and	Semi-structured interviews were conducted with six purposively selected informants from the Makassar City Population

	units and stakeholders; collaboration and participation; decision-making; organizational capacity; implementation challenges; and strategies for improving digital population administration services.	collaborate, and how organizational and governance conditions influence digital service transformation.	and Civil Registration Office, representing managerial, technical, and service-related roles. An interview guide was used, supplemented by probing questions to clarify relevant issues and emerging themes.
Direct observation	Information on digital service processes, system utilization, service procedures, interactions between service personnel and users, supporting infrastructure, and implementation practices.	Provides empirical evidence of how digital population administration services are implemented in practice and enables comparison between reported practices and observed service processes.	Observations were conducted directly at the Makassar City Population and Civil Registration Office during the implementation of population administration services. Relevant processes, interactions, facilities, and implementation conditions were recorded in field notes.
Document analysis	Regulations, policies, standard operating procedures (SOPs), institutional documents, service-related records, and other relevant documents concerning digital population administration services.	Provides evidence of institutional arrangements, organizational procedures, service standards, governance mechanisms, and the implementation context of digital transformation.	Relevant documents were obtained from the Makassar City Population and Civil Registration Office and other authorized sources. The documents were reviewed systematically and compared with interview and observation findings.

Source: Author research, 2026.

The three data collection techniques were used complementarily to strengthen the credibility of the qualitative findings. Interview data provided participants' perspectives and explanations, observation data captured the implementation of digital services in practice, and documentary data provided institutional and procedural evidence. The qualitative data were subsequently organized and thematically coded using NVivo to identify patterns related to smart governance orchestration, government readiness, stakeholder collaboration, digital service processes, and citizen-oriented service outcomes

Data Analysis

Quantitative data were analyzed using descriptive statistics and simple linear regression. Descriptive statistics were used to describe digital service quality and public satisfaction. Prior to regression analysis, the research instrument was assessed through validity and reliability tests, while a normality test was conducted as part of the assessment of the assumptions required for regression analysis.

Simple linear regression was used to examine the relationship between digital service quality and public satisfaction. The regression model was expressed as:

$$Y = a + bX + e$$

where Y represents public satisfaction, X represents digital service quality, a represents the constant, b represents the regression coefficient, and e represents the error term. The t-test was used to assess whether the regression coefficient differed statistically from zero, while the coefficient of determination (R^2) was used to describe the proportion of variation in public satisfaction statistically associated with digital service quality within the sample. Accordingly, the quantitative results were interpreted as evidence of statistical association rather than causal effect.

Qualitative data were analyzed through several stages: data preparation, transcription, coding, categorization, thematic analysis, interpretation, and presentation of findings. Interview transcripts, observation notes, and documentary materials were organized and reviewed to identify relevant patterns and themes. NVivo was used to assist the coding process.

The qualitative coding was organized around the five readiness dimensions and three categories of supporting factors: technological, human, and governance factors. Technological factors included infrastructure, system capability, security, and maintenance. Human factors included personnel competence, digital literacy, and adaptability. Governance factors included role distribution, evaluation and supervision, regulation, and coordination.

NVivo coding coverage was used to identify the extent to which particular themes appeared in the analyzed data. These percentages were not interpreted as numerical scores of readiness, performance, or effectiveness. For example, 100% coding coverage of stakeholder readiness indicates that stakeholder-related themes were identified across the analyzed informant categories; it does not indicate a 100% level of stakeholder readiness. Therefore, substantive interpretation was based primarily on the content and context of the coded data, supported by interviews, observations, and documentation.

The quantitative and qualitative findings were integrated at the interpretation stage. The qualitative findings were used to explain the organizational and governance mechanisms underlying digital service quality, including technological resources, service processes, institutional capacity, personnel capacity, stakeholder involvement, and citizen assistance. The quantitative findings complemented these results by examining whether differences in perceived digital service quality were associated with public satisfaction. This integration provided an empirical basis for assessing the citizen-centric orientation of digital population administration services.

Data Validation

Data credibility was strengthened through source and method triangulation. Source triangulation was conducted by comparing information obtained from informants occupying different managerial and operational positions within the Department of Population and Civil Registration of Makassar City. Method triangulation was conducted by comparing interview findings with direct observations and documentary evidence. These procedures were used to identify consistencies and differences across sources and to strengthen the credibility of the qualitative interpretations.

For the quantitative component, the research instrument was assessed through validity and reliability testing before the regression analysis. A normality test was also conducted as part of the prerequisite assessment for the regression model. These procedures were used to support the quality and consistency of the quantitative measurements.

The study also applied basic ethical principles for research involving human participants. Before data collection, informants and respondents were informed about the purpose of the study,

data collection procedures, and the academic use of the information provided. Participation was voluntary, and confidentiality was maintained throughout the research and reporting process. Qualitative informants were identified using participant codes rather than their full names, and information obtained through interviews and questionnaires was reported in a manner that protected participant privacy.

Results and Findings

This study examines the digital transformation of population administration services at the Department of Population and Civil Registration of Makassar City from a citizen-centric perspective. The findings are organized around five readiness dimensions: input readiness, process readiness, output readiness, institutional readiness, and stakeholder readiness. The qualitative findings are complemented by an analysis of technological, human, and institutional/governance factors, while the quantitative component provides an exploratory assessment of the relationship between digital service quality and public satisfaction.

Research Findings

1. Input Readiness

In this study, input readiness refers to the preparedness of the resources required to operate electronic population administration services. It includes applications and software, internet connectivity, servers and data infrastructure, supporting equipment, human resources, budgetary support, and technical assistance. Thus, input readiness extends beyond technological infrastructure to encompass the organizational resources required to sustain digital service delivery.

The findings indicate that the basic resources required for digital population administration services are available, including computers, internet networks, service applications, and systems connected to the national population database. However, these resources are not uniformly optimal across service settings. Network instability, disruptions involving the central server, limitations in equipment in some service units, and the need for periodic maintenance and system upgrading remain implementation challenges.

MTR explained that the existing information technology infrastructure generally supports electronic population administration services, including computers, internet networks, and service systems connected to the national population database (MTR, Interview, 2 March 2026). This evidence indicates that the basic technological foundation for digital service delivery has been established, although its availability does not mean that input readiness is complete or free from operational constraints.

Human resources are also an important component of input readiness. Personnel are required not only to operate and maintain digital systems but also to assist citizens who encounter difficulties in using digital services. The presence of service personnel and administrative facilities at the sub-district level provides an additional connection between government digital capacity and citizens with different levels of digital literacy, device access, and connectivity.

These findings support Eom and Lee (2022), who emphasize that digital government transformation requires organizational adaptation and capacity beyond technology adoption. They also complement research on e-readiness that emphasizes organizational resources and institutional capacity. The Makassar case extends this perspective by demonstrating that input readiness is not a one-time condition achieved through infrastructure provision. Its effectiveness depends on the reliability, maintenance, technical support, and human capacity required to connect infrastructure

with actual citizen needs. Input readiness can therefore be understood as a continuously maintained enabling condition for digital transformation.

Digital transformation also depends on the interaction between technological infrastructure and organizational resources. The availability of information technology infrastructure alone does not necessarily guarantee improved e-government performance when organizational resources and capabilities are insufficient (Fan & Pan, 2023).

2. Process Readiness

Process readiness refers to the preparedness of the organization to integrate digital technologies into service procedures, workflows, verification, validation, and electronic document issuance.

The findings show that digital mechanisms have been incorporated into several stages of population administration services, including online submission, verification, validation, and electronic document issuance supported by electronic signatures and barcodes. MT explained: "Our officers already work according to digital-based SOPs, starting from receiving online applications, conducting verification, to issuing documents with electronic signatures and barcodes." (MT, Interview, 24 February 2026)

This statement demonstrates that digitalization has been incorporated into organizational procedures rather than being limited to the provision of an online submission channel. The process has been formalized through SOPs and digital workflows that structure the movement from application submission to document issuance.

This finding is consistent with Eom and Lee (2022), who conceptualize digital transformation as organizational and process transformation rather than technology adoption alone. It also corresponds with Gong and Li (2023), who emphasize organizational arrangements and coordination in digital service innovation.

However, the available data do not provide systematic before-and-after measurements of processing time, error rates, or administrative costs. Therefore, this study does not claim that digitalization has empirically reduced processing time or administrative errors. The evidence instead demonstrates that digital procedures have become more structured, documented, and standardized.

An important finding is the continued existence of a hybrid service arrangement. SR explained that sub-district personnel assist citizens who are not yet familiar with online procedures (SR, Interview, 27 February 2026). At the same time, services requiring biometric verification, such as electronic identity card recording, continue to require physical presence.

The hybrid arrangement should not be interpreted as evidence that smart governance has been fully achieved. Rather, it functions as a transitional governance mechanism that maintains service access while citizens have different levels of digital literacy, device access, connectivity, and service requirements. In the short term, human assistance helps prevent digital exclusion, aligning with inclusive public service strategies (Liu et al., 2025; Peeters et al., 2025). However, persistent dependence on intermediaries may also indicate limitations in citizens' digital capabilities or in the usability and UI/UX of digital services.

Process readiness is also important because digital transformation changes how public organizations organize service processes and interact with service users. Digital government

transformation may therefore involve organizational changes beyond the adoption of digital technologies (Moser-Plautz & Schmidthuber, 2023).

Therefore, the long-term direction of transformation should be to increase citizens' ability to complete services independently while retaining targeted assistance for citizens who genuinely require it. This finding extends the discussion of digital service channels in Prokop and Tepe (2022) by demonstrating that digital channels alone cannot resolve unequal digital capabilities. This interpretation is consistent with research showing that digital public services should not be evaluated solely according to the availability of digital channels, but also according to how service arrangements affect accessibility, administrative burden, and citizens' ability to complete interactions independently (Madsen et al., 2022; Scholta & Lindgren, 2023).

This finding also resonates with Alshallaqi and Al-Mamary (2024), who show that intermediary assistance can facilitate digital inclusion for digitally disadvantaged users while simultaneously reproducing dependence on intermediaries. This reinforces the interpretation of the hybrid model in Makassar as a transitional mechanism rather than a final form of citizen-centric digital governance.

3. Output Readiness

Output readiness refers to the organization's capacity to translate digital resources and processes into service outputs that are usable, accessible, and beneficial to citizens.

The findings indicate that digital population administration services provide practical benefits, including greater convenience, flexibility in submitting applications, and reduced need for repeated physical visits. Online channels, Anjungan Dukcapil Mandiri (ADM), and sub-district service units provide alternative access according to citizens' circumstances.

These findings are consistent with Dechamps et al. (2025), who argue that citizen-centric digital government should be assessed through citizens' needs and experiences rather than technology availability alone. They are also consistent with Luna et al. (2024), who demonstrate that digital service delivery can create public value when citizens perceive meaningful benefits from services.

However, these benefits are not experienced equally. Differences in digital literacy, device access, and connectivity mean that some citizens can use services independently, whereas others continue to require assistance. Consequently, greater availability of digital services does not necessarily produce universally accessible services.

Output readiness should therefore not be interpreted simply as the availability of completed digital outputs. It concerns the extent to which government capacity is translated into services that citizens can actually access, understand, use, and benefit from. The Makassar case thus connects internal government readiness with the accessibility and usability of service outputs.

4 Institutional Readiness

Institutional readiness refers to the capacity to embed digital service delivery within organizational rules, SOPs, role allocation, coordination mechanisms, organizational support, and monitoring and evaluation.

The findings indicate that national regulations provide the normative foundation for digital population administration services. However, national regulations alone do not demonstrate local institutional readiness. Local readiness becomes visible through the translation of regulations into SOPs, division of responsibilities, internal coordination, monitoring, evaluation, and daily service practices.

Within the Department of Population and Civil Registration, service functions are distributed between units responsible for direct service delivery and units responsible for data management and data validity. Digital service development also requires coordination across internal units and with other relevant government institutions.

MAS explained that digital service development involves internal divisions and coordination with the Communication and Informatics Office as the city's information technology manager (MAS, Interview, 23 February 2026). This indicates that digital transformation is not implemented by a single organizational unit but requires coordination across institutional boundaries.

Monitoring and evaluation are also incorporated into service management. Technical problems, compliance with SOPs, system performance, and citizen complaints are used as inputs for identifying service improvement needs. These mechanisms demonstrate that institutional readiness is connected to organizational learning and continuous adjustment.

These findings support Gong and Li (2023), who emphasize organizational coordination in digital service innovation, and Merlin-Brogniart et al. (2022), who highlight multi-actor coordination in public service innovation. However, the Makassar case provides an important qualification: formal regulation and collaboration do not automatically constitute local institutional capacity. Institutional readiness depends on whether formal arrangements are translated into operational procedures and sustained organizational practices.

Leadership support is interpreted cautiously in this study. It is reflected in organizational decisions and service innovations, including the implementation of electronic signatures and barcodes, ADM services, and the expansion of service delivery to the sub-district level. However, leadership commitment was not independently measured and is therefore not presented as a quantified readiness dimension.

The main implication is that institutional readiness should be understood as ongoing institutionalization. Regulations provide legitimacy and direction, while SOPs, role allocation, coordination, monitoring, evaluation, and organizational decisions determine whether digital transformation becomes embedded in local government practice.

5. Stakeholder Readiness

Stakeholder readiness refers to the capacity and involvement of actors participating in digital population administration services, including government personnel, citizens, and external institutions.

The findings indicate that government personnel have adapted to electronic procedures and continue to assist citizens experiencing difficulties. Citizen participation in digital services has developed, while coordination with external institutions supports data synchronization and service integration. Nevertheless, disparities in digital literacy, device access, and internet connectivity remain important barriers.

The findings also show that stakeholder readiness involves interaction between organizational capacity and citizen capability. Government personnel are not only system operators but also function as facilitators for citizens who experience difficulties in accessing digital services. Similarly, citizens are not passive recipients of digital services; their ability to understand and use digital channels influences the extent to which digital transformation can become self-sustaining.

NVivo analysis recorded 100% coding coverage for stakeholder readiness. This percentage does not represent a 100% level of stakeholder readiness. It indicates that stakeholder-related themes appeared across all informant categories analyzed.

The finding is consistent with Febiri et al. (2024), who emphasize the critical synergy between human digital competence and public administration capabilities, and Dechamps et al. (2025), who emphasize citizens' needs and experiences in citizen-centric digital government. However, the Makassar findings extend these perspectives by showing that stakeholder readiness is not solely an individual characteristic. It is shaped by relationships among government capacity, citizen capabilities, institutional partners, and the support mechanisms available within the governance system.

Digital transformation also requires governance arrangements that enable actors to share information, coordinate resources, and work across organizational boundaries. Data collaboration can support the integration of different sources of information and expertise in addressing complex public problems (Ruijer, 2021).

This condition is consistent with Sung and Lee (2024), who highlight persistent differences in e-government use among digitally vulnerable groups and emphasize the importance of considering differences in user characteristics and service types when promoting digital inclusion.

Stakeholder readiness can therefore be conceptualized as an adaptive relational capacity rather than simply the preparedness of individual actors. The distribution of qualitative thematic coverage across the five analyzed readiness dimensions is illustrated in Figure 4.

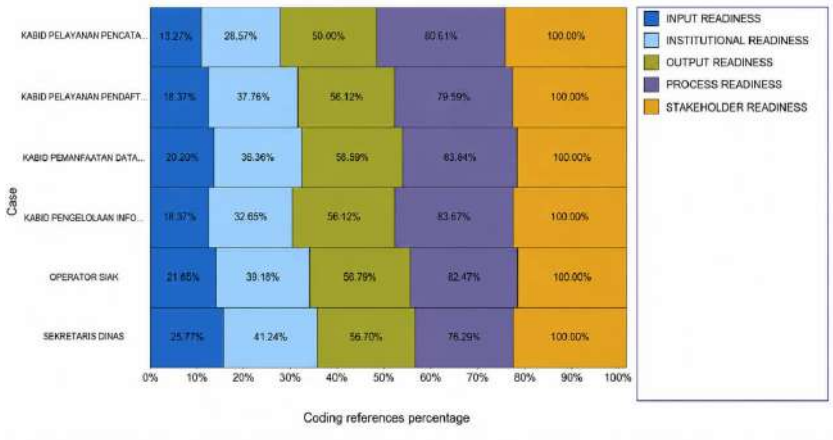


Figure 4. Distribution of NVivo Coding Coverage across the Five Readiness Dimensions. Source: Author research using NVivo, 2026.

Figure 4 shows coding coverage of 100% for stakeholder readiness, 76.29–83.84% for process readiness, 50.00–59.79% for output readiness, 28.57–41.24% for institutional readiness, and 13.27–25.77% for input readiness.

These percentages represent the extent to which particular themes appeared in the analyzed qualitative data. They do not constitute readiness scores, performance levels, effectiveness measures, or indicators of successful implementation. Accordingly, the 100% coding coverage for stakeholder readiness does not mean that stakeholders were completely ready. Likewise, lower coding coverage for input readiness does not mean that input readiness was quantitatively the weakest dimension.

Figure 4 is therefore interpreted as evidence of the breadth and multidimensionality of the themes identified through qualitative analysis, rather than as a quantitative ranking of readiness. The substantive interpretation remains grounded in interviews, observations, and documentation.

6. Factors Supporting Digital Population Administration Services

The findings identify three interconnected categories of supporting factors: technological, human, and institutional/governance factors.

Technological factors include infrastructure, system capability, security, connectivity, and maintenance. Human factors include personnel competence, adaptability to digitalization, and citizens' digital literacy. Institutional/governance factors include role allocation, coordination, monitoring and evaluation, supervision, and regulatory arrangements. The systemic interplay among these supporting categories is mapped in Figure 5.

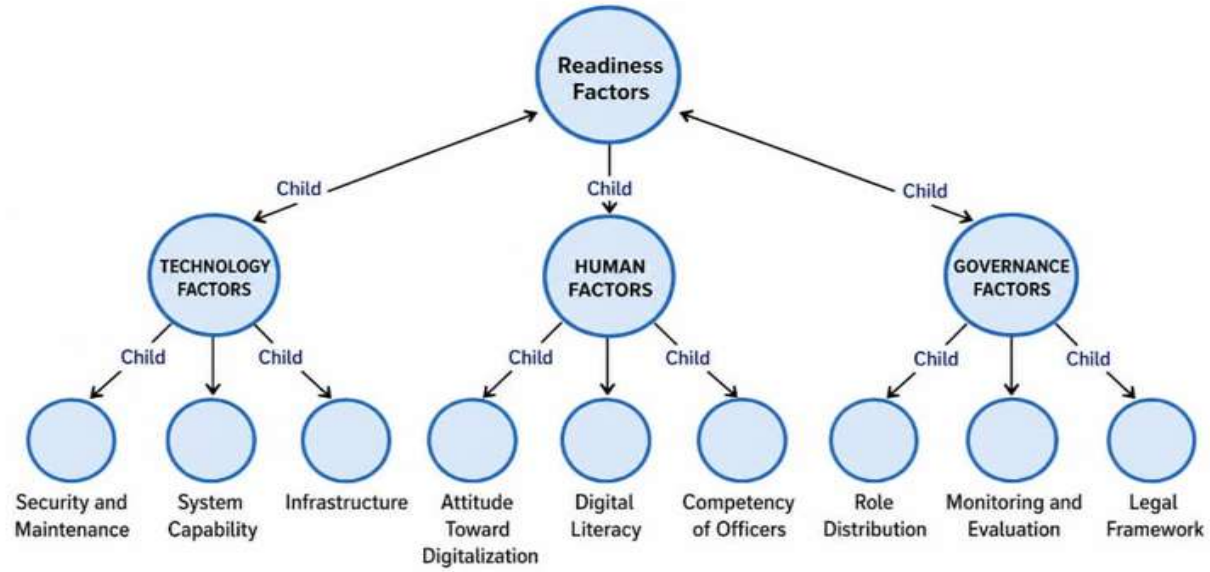


Figure 5. Concept Map of Factors Supporting Digital-Based Population Administration Services in Makassar City. Source: empirical findings and the smart governance framework (2026).

Figure 5 illustrates that digital population administration services are not determined by technological capacity alone. Service transformation depends on the orchestration of technological, human, and institutional/governance factors. Technology provides the infrastructure for digital services, human capacity enables system operation and citizen assistance, while governance arrangements coordinate responsibilities, monitoring, evaluation, and service improvement.

The central finding is therefore orchestration rather than technological determinism. Technology requires personnel who can operate, maintain, and troubleshoot digital systems. Citizens

require sufficient digital capabilities and, where necessary, assistance. Institutional arrangements are required to coordinate responsibilities and sustain service improvement.

This finding supports the broader literature emphasizing that digital transformation requires organizational and human adaptation alongside technological development. It extends that literature by demonstrating how technological capacity, human capacity, and governance arrangements operate simultaneously within a local population administration service environment.

4.1.7 Quantitative Findings

The quantitative component was conducted as an exploratory assessment to complement the qualitative findings concerning citizens' service experiences. Simple linear regression was used to examine the relationship between digital service quality and public satisfaction, with the regression parameters presented in Table 2.

Table 2. Results of Simple Linear Regression Analysis

Model	B	Std. Error	β	t	p
Constant	7.976	5.619	—	1.419	.162
Digital Service Quality	0.512	0.066	.745	7.728	< .001

Source: Author's analysis using SPSS, 2026.

The regression coefficient for digital service quality was $B = 0.512$, with $t = 7.728$ and $p < .001$ (statistically significant at $p < .05$), indicating a positive and statistically significant relationship between perceived digital service quality and public satisfaction within the study sample. The summary of model fit and the explanatory proportion are shown in Table 3.

Table 3. Coefficient of Determination (R^2)

R	R^2	Adjusted R^2	*std error of the estimate*
.745	.554	.545	3.619

Source: Author's analysis using SPSS, 2026.

The model yielded $R^2 = .554$, indicating that 55.4% of the variation in public satisfaction within the study sample was statistically associated with digital service quality, while 44.6% was outside the model.

However, because the quantitative component involved only 50 respondents selected through a non-probability approach, the findings are not intended to represent population-level estimates. The cross-sectional design also does not support causal inference.

This finding is consistent with Buyannemekh et al. (2024), who demonstrate that the quality of digital government services is closely related to citizens' use, satisfaction, and the public value generated through digital service delivery.

Interpretation of Research Results

The findings demonstrate that digital transformation in Makassar's population administration services is a multidimensional process of organizational and governance adaptation rather than a simple transition toward fully digital services. The five readiness dimensions are interconnected: input readiness provides the resources, process readiness incorporates them into service procedures, institutional readiness organizes responsibilities and coordination, output readiness translates capacity into usable services, and stakeholder readiness influences citizens' ability to use digital channels.

Citizen-centricity is therefore not achieved merely through digital availability. It depends on accessibility, usability, service experience, and increasing citizen independence. Human assistance currently functions as an inclusion mechanism for citizens with limited digital capabilities; however, continued dependence may also indicate unresolved digital literacy or UI/UX limitations.

Discussions

1. Research Synthesis

Taken together, the findings indicate that digital transformation in Makassar's population administration services is an ongoing smart governance orchestration process involving government readiness, technological infrastructure, human capacity, institutional arrangements, stakeholder coordination, and citizen capabilities.

The study extends previous research by connecting dimensions that are often examined separately. Research on digital transformation tends to emphasize organizational and technological change, whereas citizen-centric digital government emphasizes user needs, experiences, and public value. The present findings demonstrate that these dimensions need to be considered together because internal government capacity does not automatically become citizen-centric value.

The hybrid service arrangement illustrates this transition by maintaining accessibility while citizens develop greater digital independence. It should therefore be understood as a transitional mechanism rather than the final achievement of smart governance.

Instead, hybrid delivery represents a transitional governance mechanism between existing government digital capacity and the aspiration for more self-sustaining citizen-centric services. In the short term, human assistance helps prevent digital exclusion. In the longer term, persistent dependence on intermediaries may indicate limitations in digital literacy, accessibility, or UI/UX. Transformation should therefore progressively shift toward greater citizen independence while retaining assistance for users who genuinely require it.

2. Theoretical Implications

The study contributes to smart governance theory by demonstrating that citizen-centric digital transformation cannot be adequately explained through technology adoption alone. Smart governance emerges through the orchestration of multiple organizational, institutional, technological, and relational capacities. This interpretation is consistent with recent digital government research emphasizing that transformation involves the interaction of technology, organizational capabilities, institutional arrangements, and citizen-oriented outcomes rather than technology adoption in isolation (Moser-Plautz & Schmidthuber, 2023; Weigl et al., 2024).

First, the study connects government readiness with citizen experience and public value. Government may possess digital systems and organizational resources, but these resources do not automatically produce citizen-centric outcomes. They must be translated through service processes, institutional coordination, accessible channels, and appropriate user support. Second, the findings conceptualize readiness as an ongoing and multidimensional condition. Input, process, output, institutional, and stakeholder readiness are interconnected rather than independent levels of success.Third, the findings provide a more nuanced interpretation of hybrid service delivery. Rather than treating hybrid arrangements as evidence of successful digital governance, the study identifies them as transitional mechanisms for managing digital exclusion during transformation.

Finally, citizen-centricity should encompass satisfaction, accessibility, usability, user experience, and citizens' digital independence.

3 Practical Implications

The findings provide several practical implications for the Department of Population and Civil Registration of Makassar City. First, technological investment should prioritize system reliability, including connectivity, server access, equipment maintenance, technical support, security, and system upgrading. Second, human-resource development should include both technical competence and citizen-support capabilities. Personnel need to operate and troubleshoot systems effectively, while citizens require opportunities to develop digital literacy and confidence. Third, digital services should increasingly emphasize UI/UX, usability, accessibility, and independent completion. ADM and sub-district assistance should remain available as inclusion mechanisms, but avoidable dependence on bureaucratic intermediaries should gradually be reduced. Fourth, technical problems, complaints, and user feedback should be systematically incorporated into monitoring and service improvement.

Finally, coordination and interoperability among relevant government institutions should be strengthened so that citizens experience population administration as an integrated digital service ecosystem rather than as a collection of disconnected platforms and procedures.

4. Policy/Government Implications

At the policy level, digital population administration should be evaluated not only through platform availability but also through accessibility, usability, citizen experience, satisfaction, and the ability to complete services independently. Government policy should integrate digital transformation with measures addressing digital exclusion, particularly digital literacy, accessibility, connectivity, and targeted assistance. Local governments should translate national regulations into SOPs, role allocation, coordination, monitoring, and evaluation. The hybrid service model should be maintained as a transitional arrangement while government progressively strengthens system usability and citizen digital independence.

5. Overall Research Contribution and Novelty

This study connects government readiness, technological-human-institutional capacity, stakeholder coordination, and citizen experience in digital population administration.

The findings demonstrate that government readiness does not automatically produce citizen-centric outcomes. Readiness must be translated through governance arrangements, service processes, coordination, accessible channels, and appropriate user support. The study also conceptualizes hybrid service delivery as a transitional governance mechanism that maintains access while citizens develop greater digital independence, rather than as evidence of fully achieved smart governance.

The principal novelty lies in linking government readiness, smart governance orchestration, and citizen-centricity within a single analytical perspective and identifying the transition from assisted digital access toward more self-sustaining citizen use as an important dimension of citizen-centric digital transformation.

Context-Specific Limitations

This study has several context-specific limitations. First, the research was conducted within the institutional environment of the Department of Population and Civil Registration of Makassar City, where digital population administration is supported by specific arrangements such as Anjungan Dukcapil Mandiri (ADM), sub-district service assistance, linkage with the national population database, and biometric verification requirements. These arrangements may differ from those of other local governments and therefore limit direct empirical generalization. Second, the qualitative evidence primarily reflects the perspectives of internal organizational informants. Although interviews were complemented by observations and documentation, citizens' experiences were not explored with the same qualitative depth. This limits the ability of the qualitative component to fully represent diverse citizen experiences. Third, the quantitative component involved only 50 service users selected through a non-probability approach. The quantitative findings should therefore be interpreted as exploratory evidence within the study sample rather than as population-level estimates. Fourth, the cross-sectional design captures digital transformation at a particular period and does not allow the study to assess changes in readiness, service quality, or citizen satisfaction over time. It also does not support causal conclusions concerning the relationship between digital service quality and public satisfaction. Fifth, the NVivo coding percentages represent thematic coverage rather than objective measurements of readiness. They therefore cannot be used to rank the five readiness dimensions quantitatively.

Future research could address these limitations by involving citizens and external stakeholders more extensively, using larger probability-based samples, adopting longitudinal designs, and comparing digital population administration services across multiple local-government contexts.

Conclusion

This study concludes that the digital transformation of population administration services in Makassar City has established a foundation for citizen-centric digital governance, but the transformation is not yet fully mature, self-sustaining, or equally accessible to all citizens. The findings demonstrate that digital transformation depends not only on technology adoption but also on the orchestration of technological resources, human capacity, organizational processes, institutional arrangements, stakeholder coordination, and citizen capabilities. The five readiness dimensions demonstrate that digital resources and electronic service processes are already incorporated into population administration services and provide citizens with greater convenience and flexibility. However, infrastructure constraints, equipment limitations, differences in digital literacy, continued reliance on personnel assistance, coordination requirements, and services requiring physical presence indicate that digital transformation remains an ongoing process of organizational and social adaptation. The hybrid service model involving digital channels, Anjungan Dukcapil Mandiri, sub-district service units, and personnel assistance functions as a transitional governance mechanism that bridges government digital capacity and citizens' unequal digital capabilities. It should therefore not be interpreted as the final form of smart governance or as evidence of complete digital transformation. Rather, it represents an adaptive arrangement that maintains service accessibility while government and citizens move toward greater digital self-sufficiency. The exploratory quantitative findings complement the qualitative analysis by demonstrating a positive and statistically significant relationship between digital service quality and

public satisfaction within the study sample. Given the sample size of 50 and the use of non-probability respondent selection, this result should be interpreted as an exploratory empirical association rather than a causal or generalizable finding. The principal contribution of this study is its integrative smart governance orchestration perspective, which connects government readiness, technological-human-institutional factors, stakeholder coordination, and citizen experience within a framework of local digital public service transformation. The study demonstrates that government readiness does not automatically produce citizen-centricity; rather, readiness must be translated through governance arrangements, organizational processes, coordination mechanisms, assistance, and accessible service channels. For practice, strengthening digital population administration services should prioritize infrastructure reliability, system maintenance, personnel competence, citizen digital literacy, cross-actor coordination, monitoring and evaluation, and inclusive multichannel service design. These efforts can support the transition from technology-centered digitalization toward a more citizen-centric, inclusive, and sustainable model of smart governance.

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Declaration of Competing Interest

The authors declare that they have no financial or personal conflicts of interest that could influence the results reported in this article.

Use of Artificial Intelligence (AI)-Assisted Technology

The authors declare that no artificial intelligence (AI) tools were used in the preparation, analysis, or writing of this manuscript. All aspects of the research were conducted entirely by the authors.

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Author's Bio*

Indri Apriani Nur, Master of Public Administration, Universitas Muhammadiyah Makassar, Indonesia, Field of Scientific Expertise: Smart Governance, Digital Transformation, Public Administration, and Citizen-Centric Public Services, Email: indriapriani.nur340@gmail.com, and ORCID: Not Available.

Nuryanti Mustari, Master of Public Administration, Universitas Muhammadiyah Makassar, Indonesia, Field of Scientific Expertise: Public Administration, Governance, Public Policy, and Public Service Management, Email: nuryantimustari@unismuh.ac.id, and ORCID: Not Available.

Lukman Hakim, Master of Public Administration, Universitas Muhammadiyah Makassar, Indonesia, Field of Scientific Expertise: Public Administration, Governance, Public Policy, and Public Service Management, Email: lukmanhakim@unismuh.ac.id, and ORCID: Not Available.

Muhlis Madani, Master of Public Administration, Universitas Muhammadiyah Makassar, Indonesia, Field of Scientific Expertise: Public Administration, Governance, Public Policy, and Public Service Management, Email: muhlismadani@unismuh.ac.id, and ORCID: Not Available.

Abdi, Master of Public Administration, Universitas Muhammadiyah Makassar, Indonesia, Field of Scientific Expertise: Public Administration, Governance, and Public Service Management, Email: abdi_kopertis9unismuh@yahoo.co.id, and ORCID: Not Available.