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Strategies for Implementing Digital Governance for Smart City Development

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ABSTRACT

***Purpose**: This study aims to analyze the implementation strategies of digital governance in supporting Smart City development in Makassar City during 2025.*

***Subjects and Methods:** The study employed a quantitative descriptive-explanatory approach involving 200 respondents consisting of government officials, Smart City implementers, technical staff, academics, and community members. Data were collected using structured questionnaires and analyzed using descriptive statistics and multiple linear regression analysis with SPSS version 26.*

***Results:** The findings indicate that corporate strategy, program strategy, resource support strategy, and institutional strategy significantly influenced digital governance effectiveness. Program strategy emerged as the most dominant factor affecting Smart City governance performance. Digital governance implementation improved service efficiency, transparency, responsiveness, and accessibility through integrated digital public services and Smart City applications. Institutional coordination and organizational adaptability remained important challenges affecting governance sustainability.*

***Conclusions:** Effective digital governance in Makassar City depends on the integration of technological innovation, strategic governance, institutional strengthening, and inclusive citizen participation to support sustainable and responsive Smart City development.*

INTRODUCTION

In the era of rapid urbanization and technological change, cities are increasingly adopting the Smart City paradigm to enhance public service delivery, improve governance, and foster sustainable development. Central to this transformation is digital governance, a concept that encompasses the use of information and communication technology (ICT) to make government operations more transparent, efficient, participatory, and responsive. For Makassar one of Indonesia's largest and most dynamic cities digital governance has become a critical lever in realizing its vision of a Smart City that is inclusive, resilient, and future-ready.

Makassar has made notable strides in its Smart City journey. According to the 2024 evaluation of the *Gerakan Menuju Kota Cerdas* (Movement Towards Smart City) program by Indonesia's Ministry of Communication and Digital Affairs, Makassar achieved a score of 3.64 out of 4, rising from 3.14 in the previous year. This indicates both progress and potential, especially in dimensions such as program output, outcome, and the impact of digital governance initiatives.

Key components cited include integrated digital public service systems, formal legal frameworks, institutional alignment of technology strategies, and enhanced risk management.

Despite these advancements, Makassar faces multiple challenges in translating digital governance into consistently high-quality outcomes for all citizens. Issues such as digital divides (in terms of access, literacy, and infrastructure), regulatory bottlenecks, human resource capacity, inter-agency coordination, and sustainable financing remain significant barriers. These constraints echo findings from research on Makassar's Smart Governance, which show that dimensions related to technology infrastructure and institutional readiness are more mature compared to those concerning human capital, service delivery uniformity, and citizen participation.

Because Smart City development requires systemic change, focusing solely on deploying technologies is insufficient. Digital governance must be embedded in the city's institutional culture through participative leadership, policy coherence, stakeholder engagement, and adaptive regulation. Makassar has taken steps in this direction: for example, initiatives such as digital government services (e-government), transparent financial information systems, and anti-corruption measures facilitated by ICT. These reflect efforts to strengthen good governance principles such as transparency, accountability, and public oversight. Other projects include capacity-building workshops for civil servants, digital readiness assessments, and collaborative programs with foundations and external partners to build e-infrastructure and inclusive services.

The relevance of digital governance in Makassar is closely tied to both local needs (traffic, waste management, licensing, public health, urban planning) and national priorities (digital economy, sustainable development goals, good governance). As urban populations increase and demands on city services grow, digital tools provide both opportunities for leapfrogging traditional bottlenecks and risks of exacerbating inequalities if not carefully managed. In Makassar, for instance, citizens' ability to access and benefit from digital services is uneven, with remote or low-income neighborhoods often underserved. Regulatory oversight, data privacy and security, and institutional capacity are also topics of concern in the academic and policy discourse.

Based on this background, this article aims to analyze strategies for implementing digital governance in Makassar as part of its Smart City development. The specific objectives are: (1) to identify the existing components and strengths in Makassar's digital governance framework, (2) to examine the bottlenecks and challenges, (3) to propose actionable strategies for enhancing integration, citizen participation, institutional capacity, and sustainability in Makassar's Smart City agenda.

By contributing to the empirical and policy literature, this research hopes to provide insights for Makassar city managers, policymakers, civil society actors, and other stakeholders who are involved in or affected by Smart City initiatives. In doing so, it also seeks broader relevance for other mid-sized cities in Indonesia and beyond, which face similar trade-offs between technology adoption, social equity, and governance reform.

LITERATURE REVIEW

Digital Governance

Digital governance refers to the strategic use of information and communication technologies (ICT) by governments to enhance transparency, accountability, efficiency, and citizen participation in public administration. Unlike traditional e-government, which focuses mainly on online service delivery, digital governance emphasizes an integrated framework where technology reshapes institutional structures, decision-making processes, and the interaction between government and society (Bannister & Connolly, 2020). Effective digital governance requires a multidimensional approach encompassing infrastructure, policy, institutional readiness, digital literacy, and citizen engagement (Meijer et al., 2019).

Scholars highlight that digital governance must be adaptive to local contexts. In developing countries, challenges often include inadequate ICT infrastructure, lack of skilled human resources, limited inter-agency collaboration, and social inequalities that exacerbate digital

divides (Ndou, 2004; Gil-Garcia et al., 2018). To address these, governments need strategies that combine technological adoption with institutional reforms and inclusive policies.

Smart City Development

The Smart City concept emerged as a response to urban challenges such as rapid population growth, environmental degradation, and inefficient governance. According to Caragliu et al. (2011), a city is "smart" when investments in human and social capital, traditional and modern communication infrastructure, and sustainable economic development fuel high quality of life with wise management of natural resources. Smart Cities integrate digital technologies into various sectors, including transportation, energy, waste management, healthcare, education, and public administration, to achieve sustainable and livable urban spaces (Hollands, 2008; Ahad et al., 2020).

Smart City development requires a governance framework that ensures coordination across sectors, promotes innovation, and actively involves citizens. Meijer & Bolívar (2016) argue that Smart Cities cannot succeed solely by deploying technology; instead, they must embed governance models that are transparent, participatory, and accountable. In this regard, digital governance provides the institutional backbone for Smart City initiatives by enabling cross-sectoral data integration, real-time decision-making, and citizen-driven service design.

Digital Governance and Smart City Nexus

The intersection between digital governance and Smart City development is widely recognized in academic and policy discussions. Digital governance provides the regulatory, institutional, and participatory frameworks necessary to manage and scale Smart City projects. Without effective digital governance, Smart City initiatives risk becoming fragmented, elitist, or technology-driven projects that fail to address broader social and developmental goals (Nam & Pardo, 2011).

Empirical studies highlight both opportunities and challenges. For instance, Anthopoulos (2017) notes that digital governance facilitates interoperability across city systems, but also emphasizes the importance of managing cybersecurity risks, safeguarding privacy, and ensuring data-driven accountability. Similarly, Kitchin (2016) critiques Smart Cities that focus excessively on technology, warning that they may create "technocratic governance" that sidelines citizen participation. Thus, strategies for implementing digital governance in Smart Cities must balance technological innovation with social inclusiveness and institutional resilience.

Digital Governance in Indonesia

Indonesia has embraced the Smart City agenda through the *Gerakan Menuju 100 Smart City* program initiated in 2017 by the Ministry of Communication and Information Technology (Kominfo). The program emphasizes six dimensions: Smart Governance, Smart Living, Smart Economy, Smart Environment, Smart People, and Smart Mobility. Within this framework, digital governance plays a crucial role in building transparent and efficient public services, enhancing local government performance, and fostering citizen engagement (Firman et al., 2024).

Research shows that Indonesian cities implementing Smart City programs often succeed in digital service provision (e.g., online licensing, e-health platforms, digital tax systems), but face challenges in sustainability, cross-agency integration, and digital literacy among citizens (Purnomo, 2020; Nugraha & Nugroho, 2022). Moreover, decentralization in Indonesia means that local governments have varying capacities and resources, leading to disparities in Smart City outcomes across regions.

Digital Governance in Makassar

Makassar is one of the pioneer cities in Indonesia's Smart City movement. Its digital governance initiatives include *War Room* for real-time data monitoring, *e-government* platforms for licensing and financial transparency, and the *Lorong Wisata* (tourism alley) program, which integrates technology with community-based economic empowerment (Ariany & Abdullah, 2021). These initiatives reflect efforts to combine technological infrastructure with social innovation, aligning with Smart City principles of inclusivity and sustainability.

Studies also highlight constraints in Makassar's Smart City development. These include uneven digital literacy among citizens, budgetary limitations, lack of comprehensive regulatory frameworks, and fragmented coordination between government agencies (Rahman et al., 2022; Hakim & Hayat, 2024). Furthermore, while technological infrastructure has advanced, institutional and cultural adaptations often lag behind, limiting the impact of digital governance on service quality and citizen trust.

Strategic Approaches

The literature identifies several strategic approaches for strengthening digital governance in Smart City contexts (Tan & Taeihagh, 2020). First, the corporate strategy dimension focuses on aligning digital governance with the city's long-term vision and integrating it into urban development planning (Koteen, 1997). Second, program strategies emphasize the design and implementation of sector-specific Smart City initiatives such as e-health, e-transportation, and smart waste management. Third, resource support strategies ensure that financial, human, and technological resources are mobilized to sustain digital governance initiatives. Finally, institutional strategies address organizational structures, regulatory frameworks, and capacity-building efforts to enhance government readiness and accountability.

These strategic dimensions provide a comprehensive lens for analyzing how Makassar can implement digital governance effectively in its Smart City journey. By synthesizing global theories and local empirical evidence, the literature underscores that success lies not only in adopting cutting-edge technologies but also in embedding governance reforms, fostering inclusive participation, and ensuring long-term sustainability.

METHODOLOGY

This study employed a quantitative research approach to analyze the implementation strategies of digital governance in supporting Smart City development in Makassar City. Quantitative research was selected because it enables the systematic measurement of perceptions, institutional readiness, governance effectiveness, and strategic dimensions related to digital governance implementation. According to Creswell, quantitative research is appropriate for examining relationships among variables through statistical procedures and generating empirical generalizations from collected data. In the context of this study, the quantitative approach was considered suitable for identifying the influence of strategic governance dimensions on the effectiveness of Smart City implementation in Makassar. The study focused on measuring institutional, technological, and participatory aspects of digital governance through structured instruments distributed to respondents involved in Smart City programs.

Research Design

The research used a descriptive-explanatory survey design. The descriptive component aimed to provide a comprehensive overview of the current condition of digital governance implementation in Makassar City, while the explanatory component sought to examine the relationship between strategic governance dimensions and Smart City development outcomes. The study adopted a cross-sectional design in which data were collected at a single point in time from respondents representing government institutions, Smart City stakeholders, and community members who utilize digital public services. The conceptual framework of the study was adapted from strategic management perspectives proposed by Koteen (1997), which emphasize four major strategic dimensions: corporate strategy, program strategy, resource support strategy, and institutional strategy. These dimensions were operationalized into measurable indicators to evaluate the effectiveness of digital governance implementation in Makassar. The research also incorporated Smart City governance indicators derived from Meijer and Bolívar (2016), particularly those related to transparency, accountability, citizen participation, technological integration, and institutional adaptability.

Research Location and Context

The study was conducted in Makassar City, South Sulawesi Province, Indonesia. Makassar was purposively selected because it is recognized as one of Indonesia's leading Smart City models under the national "Gerakan Menuju 100 Smart City" program initiated by the Ministry of

Communication and Information Technology. The city has implemented various digital governance innovations, including the War Room command center, e-government platforms, digital complaint services, and integrated public information systems. Makassar represents an important case for examining digital governance because of its rapid urban transformation and continuous investment in technology-based public administration. The city has demonstrated significant progress in Smart Governance dimensions, particularly in digital service integration, transparency initiatives, and public participation mechanisms. However, challenges such as digital inequality, infrastructure disparities, institutional coordination, and human resource capacity remain significant concerns. Therefore, Makassar provides an appropriate empirical setting for evaluating strategic governance implementation within Smart City development.

Population and Sample

The population of this study consisted of government officials, Smart City program implementers, employees of the Department of Communication and Information Technology (Diskominfo), and citizens who actively use digital public services in Makassar City. The inclusion of multiple stakeholder groups was intended to capture diverse perspectives regarding the implementation and effectiveness of digital governance initiatives. The sampling technique employed was purposive sampling combined with proportional sampling. Purposive sampling was used to identify respondents who possessed direct experience and knowledge related to Smart City implementation and digital governance practices. Meanwhile, proportional sampling ensured balanced representation across institutional and community groups. The sample size was determined using Slovin's formula with a confidence level of 95% and a margin of error of 5%. Based on the estimated population involved in Smart City governance activities, a total of 200 respondents were selected. The respondents included public officials, technical staff, Smart City coordinators, and service users from different districts in Makassar. This sample size was considered adequate for statistical analysis and hypothesis testing.

Data Collection Techniques

Primary data were collected through structured questionnaires distributed directly and electronically to respondents. The questionnaire consisted of closed-ended statements measured using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). The instrument was designed to measure several variables related to digital governance implementation, including technological readiness, institutional capacity, service integration, public participation, transparency, and strategic governance effectiveness. The questionnaire items were developed based on theoretical frameworks from digital governance and Smart City literature. Indicators related to transparency, accountability, and citizen engagement were adapted from Meijer et al. (2019), while institutional and strategic dimensions were derived from Koteen's strategic management framework. Before data collection, the instrument was subjected to expert validation involving academics and public administration practitioners to ensure content validity. In addition to primary data, secondary data were obtained from official government documents, Smart City master plans, Ministry of Communication and Information Technology reports, statistical publications, policy documents, and previous academic studies related to digital governance in Indonesia. Secondary data were used to strengthen contextual analysis and support the interpretation of quantitative findings.

Research Variables and Measurement

The study consisted of independent and dependent variables. The independent variables included corporate strategy, program strategy, resource support strategy, and institutional strategy. These variables represented strategic governance dimensions influencing Smart City implementation. The dependent variable was the effectiveness of digital governance implementation in Makassar City. Each variable was operationalized into measurable indicators. Corporate strategy included indicators related to policy alignment, long-term planning, and governance vision. Program strategy measured the effectiveness of digital public services and innovation programs. Resource support strategy focused on financial support, technological infrastructure, and human resource competence. Institutional strategy assessed inter-agency coordination, regulatory support, and

organizational adaptability. The dependent variable included indicators such as service efficiency, transparency, citizen satisfaction, and participatory governance.

Data Analysis Technique

The collected data were analyzed using descriptive and inferential statistical techniques. Descriptive statistics were employed to describe respondent characteristics and summarize the distribution of responses for each research variable. Mean scores, percentages, and standard deviations were used to identify the level of agreement regarding digital governance implementation in Makassar. Inferential statistical analysis was conducted using multiple linear regression analysis to examine the influence of strategic governance dimensions on the effectiveness of Smart City implementation. Prior to regression analysis, classical assumption tests were performed, including normality, multicollinearity, heteroscedasticity, and linearity tests to ensure the validity of the statistical model. The data analysis process was conducted using Statistical Package for Social Sciences (SPSS) software version 26. Hypothesis testing used a significance level of 0.05. The regression model enabled the study to identify which strategic dimensions had the strongest influence on digital governance effectiveness in Makassar City.

Validity and Reliability

To ensure instrument validity, construct validity and content validity tests were conducted. Content validity involved expert judgment from scholars and practitioners in public administration and digital governance. Construct validity was tested statistically using Pearson Product Moment correlation analysis. Questionnaire items were considered valid if the correlation coefficient exceeded the critical value at the 0.05 significance level. Reliability testing was conducted using Cronbach's Alpha coefficient. Variables were considered reliable when the alpha coefficient exceeded 0.70, indicating consistent measurement across questionnaire items. The reliability results demonstrated that all research variables met acceptable reliability standards, confirming the consistency and stability of the measurement instrument. This study adhered to research ethics principles throughout the data collection and analysis process. Respondents were informed about the purpose of the study and participated voluntarily. Confidentiality and anonymity of respondent information were maintained to protect participant privacy. Data obtained from respondents were used solely for academic research purposes and were analyzed collectively without identifying individual participants.

RESULTS AND DISCUSSION

This section presents the empirical findings regarding the implementation strategies of digital governance in supporting Smart City development in Makassar City during 2025. The presentation of results follows the quantitative research procedures outlined in the methodology section, including respondent characteristics, descriptive statistical analysis, validity and reliability testing, classical assumption testing, and multiple linear regression analysis. The purpose of this section is to explain the influence of corporate strategy, program strategy, resource support strategy, and institutional strategy on the effectiveness of digital governance implementation in Makassar City.

The findings were obtained from questionnaires distributed to 200 respondents consisting of government officials, Smart City implementers, Diskominfo employees, and citizens who actively used digital public services throughout 2025. Data analysis was conducted using SPSS version 26. Secondary data from the Makassar Smart City evaluation report and the Ministry of Communication and Digital Affairs in 2025 were also used to strengthen the analysis.

Respondent Characteristics

This section describes the demographic profile of respondents involved in the study. The analysis of respondent characteristics is important to ensure that the collected data represent stakeholders directly associated with Smart City implementation and digital governance practices in Makassar City during 2025. The respondents consisted of government officials, Smart City technical staff, academics, and community members who actively utilized digital public services. Their participation provided relevant perspectives regarding the effectiveness of digital governance implementation in Makassar City.

Table 1. Respondent Characteristics

Characteristics	Frequency	Percentage (%)
Male	115	57.5
Female	85	42.5
Age 21–30 Years	66	33.0
Age 31–40 Years	77	38.5
Age 41–50 Years	40	20.0
Above 50 Years	17	8.5
Undergraduate Degree	121	60.5
Master's Degree	50	25.0
Diploma Degree	16	8.0
Doctoral Degree	13	6.5
Government Employees	90	45.0
Smart City Technical Staff	36	18.0
Academics/Researchers	24	12.0
Community Members	50	25.0

Source: Processed Primary Data (2025)

The respondents were predominantly individuals within productive age groups and possessed relatively high educational backgrounds. The composition of respondents indicates that the study successfully involved participants who had adequate knowledge and direct experience related to digital governance and Smart City implementation. The dominance of government employees and Smart City technical staff reflects the institutional relevance of the data, while the inclusion of community members and academics broadens the perspective of the analysis regarding public service accessibility, governance effectiveness, and citizen participation in digital governance practices in Makassar City.

Descriptive Statistical Analysis

Descriptive statistical analysis was conducted to evaluate respondents' perceptions regarding the implementation of digital governance strategies in Makassar City during 2025. The analysis used mean score interpretation based on a five-point Likert scale.

The findings indicate that respondents generally perceived the implementation of digital governance positively. Program strategy obtained the highest mean score among the independent variables, indicating that digital public service programs and technological innovation initiatives were considered highly effective during 2025. Institutional strategy recorded the lowest mean score, reflecting continuing challenges in institutional coordination and organizational adaptability.

Table 2. Descriptive Statistics of Research Variables

Variable	Mean	Standard Deviation	Category
Corporate Strategy	4.12	0.61	High
Program Strategy	4.28	0.56	Very High
Resource Support Strategy	4.01	0.68	High
Institutional Strategy	3.86	0.72	High
Digital Governance Effectiveness	4.16	0.59	High

Source: Processed Primary Data (2025)

Makassar City demonstrated strong performance in implementing digital governance strategies throughout 2025. The highest mean score was obtained by program strategy (4.28), reflecting successful implementation of digital innovations such as online licensing systems, integrated public complaint services, the War Room monitoring center, and Smart City service applications.

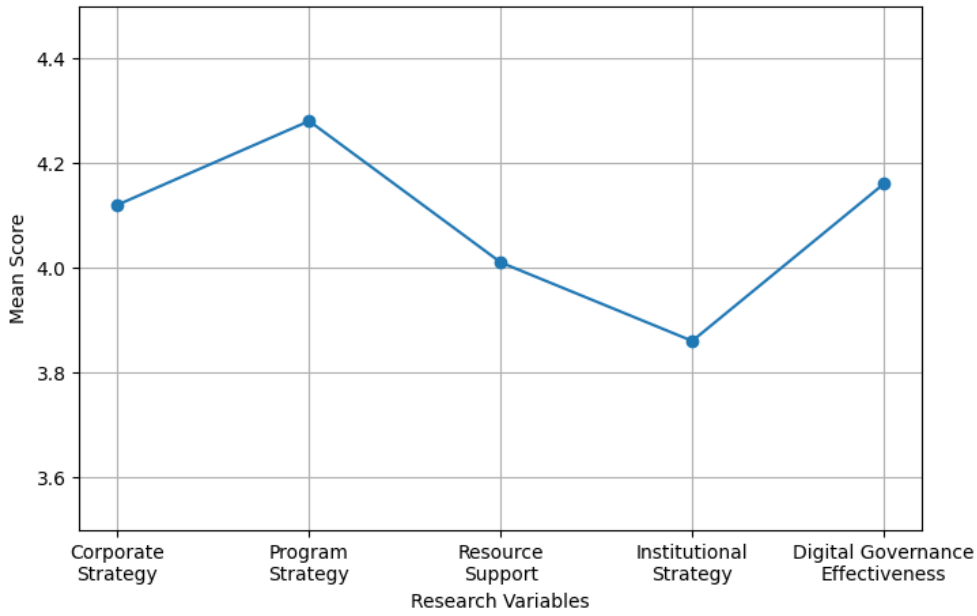

Figure 1. Mean Scores of Research Variables in 2025

Figure 1 visually demonstrates the comparative mean scores of each research variable. Program strategy obtained the highest score, indicating that respondents perceived digital service innovation and Smart City program implementation as highly effective. Institutional strategy recorded the lowest score, suggesting that coordination among government agencies and institutional adaptability still require improvement to support sustainable digital governance implementation.

The digital governance effectiveness variable also obtained a high mean score (4.16), indicating positive public perceptions regarding service transparency, responsiveness, efficiency, and accessibility. Resource support strategy received favorable responses due to improvements in technological infrastructure, internet connectivity, and digital training programs for civil servants. Institutional strategy recorded the lowest mean score among all variables. Respondents highlighted that inter-agency coordination and policy integration still required improvement to strengthen digital governance sustainability.

Validity and Reliability Testing

Validity testing was conducted using Pearson Product Moment correlation analysis to determine whether questionnaire items accurately measured the intended research variables. The analysis showed that all questionnaire items possessed correlation coefficients greater than the r-table value of 0.138 at the 0.05 significance level. Therefore, all instrument items were declared valid.

Reliability testing was subsequently conducted using Cronbach's Alpha coefficients. All variables produced reliability coefficients above 0.70, indicating strong consistency of the measurement instrument.

Table 3. Reliability Test Results

Variable	Cronbach's Alpha	Interpretation
Corporate Strategy	0.836	Reliable
Program Strategy	0.854	Reliable
Resource Support Strategy	0.817	Reliable
Institutional Strategy	0.792	Reliable
Digital Governance Effectiveness	0.869	Reliable

Source: Processed Primary Data (2025)

The findings in Table 3 indicate that the questionnaire instrument possessed high internal consistency and reliability. The instrument effectively measured strategic governance dimensions associated with Smart City implementation in Makassar City during 2025.

Classical Assumption Testing

Prior to conducting multiple linear regression analysis, classical assumption testing was performed to evaluate whether the regression model fulfilled the statistical requirements necessary for hypothesis testing. This procedure is essential in quantitative research because the accuracy and validity of regression results depend on the extent to which the data satisfy the assumptions underlying the regression model. In this study, the classical assumption tests included normality, multicollinearity, heteroscedasticity, and linearity testing.

The normality test was conducted using the Kolmogorov-Smirnov method to examine whether the residual values were normally distributed. The test result indicated that the residual distribution met the normality criterion, suggesting that the regression model could be used for further statistical analysis. Subsequently, multicollinearity testing was performed to identify potential correlations among the independent variables used in the model. Multicollinearity analysis utilized Tolerance and Variance Inflation Factor (VIF) values as indicators for assessing the degree of correlation between variables.

Table 4. Multicollinearity Test Results (2025)

Variable	Tolerance	VIF	Interpretation
Corporate Strategy	0.674	1.483	No Multicollinearity
Program Strategy	0.618	1.618	No Multicollinearity
Resource Support Strategy	0.703	1.422	No Multicollinearity
Institutional Strategy	0.649	1.541	No Multicollinearity

Source: Processed Primary Data (2025)

All independent variables fulfilled the multicollinearity requirements. The tolerance values indicate that each variable maintained sufficient independence from the others, while the VIF values confirm the absence of excessive correlations among the explanatory variables. These findings suggest that the regression model was free from multicollinearity problems, meaning that each independent variable could explain the dependent variable without causing instability in the regression coefficients.

In addition to multicollinearity testing, heteroscedasticity analysis was conducted using the Glejser method. The results showed that the residual variance remained constant across observations, indicating homoscedasticity within the regression model. This condition implies that the estimation errors were distributed consistently and did not bias the regression results. Furthermore, linearity testing confirmed that the relationships between the independent variables and the dependent variable were linear, supporting the appropriateness of multiple linear regression analysis.

The classical assumption tests indicate that the regression model used in this study fulfilled all statistical requirements. The fulfillment of normality, multicollinearity, heteroscedasticity, and linearity assumptions confirms that the regression analysis was statistically reliable and suitable for examining the influence of digital governance strategies on Smart City development in Makassar City during 2025.

Multiple Linear Regression Analysis

Multiple linear regression analysis was conducted to examine the influence of corporate strategy, program strategy, resource support strategy, and institutional strategy on digital governance effectiveness in Makassar City during 2025.

The findings demonstrate that all independent variables significantly influenced digital governance effectiveness. Program strategy produced the highest regression coefficient, indicating that implementation of digital service innovations exerted the strongest influence on Smart City effectiveness.

Table 5. Multiple Linear Regression Results

Variable	Regression Coefficient (β)	t-value	Significance
Constant	1.286	3.741	0.000
Corporate Strategy	0.284	4.126	0.000
Program Strategy	0.372	5.488	0.000
Resource Support Strategy	0.251	3.662	0.001
Institutional Strategy	0.193	2.954	0.004

Source: Processed Primary Data (2025)

Program strategy was the most dominant factor influencing digital governance effectiveness in Makassar City during 2025. This finding suggests that the implementation of digital innovations, online public services, and integrated governance applications significantly improved governance quality and service responsiveness.

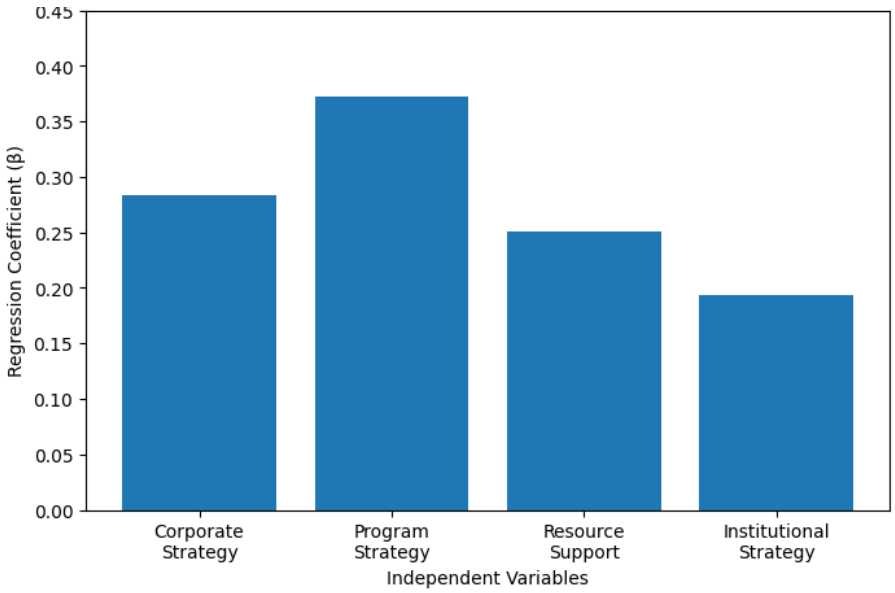

Figure 2. Regression Coefficients of Strategic Variables

Figure 2 illustrates the comparative influence of each strategic variable on digital governance effectiveness. Program strategy showed the highest regression coefficient, confirming that the implementation of digital innovation programs and online public services had the strongest contribution to Smart City effectiveness. Institutional strategy produced the lowest coefficient, indicating that institutional coordination and organizational adaptation remain challenges within Makassar's digital governance framework.

Corporate strategy also demonstrated a significant positive influence, indicating that policy alignment, strategic planning, and long-term Smart City vision contributed substantially to governance effectiveness. Resource support strategy significantly affected digital governance through investments in technological infrastructure, internet accessibility, and human resource development.

Institutional strategy also demonstrated a positive and significant effect, although its coefficient value was lower compared to other variables. This indicates that coordination among government agencies and institutional adaptation still require strengthening to support sustainable Smart City governance.

Coefficient of Determination (R^2)

The coefficient of determination analysis was conducted to evaluate the explanatory strength of the regression model in predicting the effectiveness of digital governance implementation in Makassar City during 2025. This analysis is important because it measures the extent to which the independent variables included in the model are capable of explaining variations in the

dependent variable. In this study, the coefficient of determination was used to assess how far corporate strategy, program strategy, resource support strategy, and institutional strategy collectively contributed to digital governance effectiveness within the Smart City framework.

Table 6. Coefficient of Determination

Model	R	R Square	Adjusted R Square
Regression Model	0.826	0.682	0.674

Source: Processed Primary Data (2025)

The regression model possesses strong explanatory capability in analyzing digital governance effectiveness in Makassar City. The correlation coefficient (R) indicates a strong relationship between the independent variables and the dependent variable, suggesting that the strategic dimensions examined in this study were closely associated with Smart City governance effectiveness.

The coefficient of determination further confirms that the regression model was able to explain a substantial proportion of the variation in digital governance effectiveness. This finding indicates that corporate strategy, program strategy, resource support strategy, and institutional strategy collectively played significant roles in shaping the success of digital governance implementation in Makassar City during 2025.

The remaining unexplained variation suggests that digital governance effectiveness is also influenced by external factors beyond the scope of this study. These may include socio-cultural conditions, political dynamics, citizen digital literacy, technological adaptation, leadership style, and the broader institutional environment. Nevertheless, the relatively high explanatory power of the regression model demonstrates that the selected variables were appropriate and relevant for analyzing Smart City governance effectiveness in Makassar City.

Digital Governance Performance in Makassar City During 2025

The quantitative findings reveal several important patterns regarding digital governance implementation in Makassar City during 2025. First, program strategy emerged as the most influential variable affecting Smart City effectiveness. This indicates that implementation of digital public services directly shaped public perceptions regarding governance quality, transparency, and responsiveness. Second, Makassar City demonstrated significant progress in digital governance infrastructure and service integration throughout 2025. Respondents acknowledged improvements in administrative efficiency, accessibility of online services, and responsiveness of digital complaint systems. Third, institutional challenges remained evident despite positive overall performance. Respondents emphasized the importance of strengthening inter-agency coordination, improving regulatory harmonization, and enhancing institutional adaptability to technological developments. Fourth, resource support strategy significantly contributed to governance effectiveness. Investments in ICT infrastructure, internet networks, and digital literacy training programs strengthened Smart City implementation and public service delivery. The results indicate that Makassar City achieved substantial progress in implementing digital governance strategies during 2025. Institutional strengthening, policy integration, and inclusive public participation remain essential for ensuring sustainable and equitable Smart City development.

Discussion

The Effectiveness of Digital Governance Implementation in Supporting Smart City Development

The findings demonstrate that digital governance implementation in Makassar City during 2025 was generally perceived positively by respondents, particularly in terms of service efficiency, transparency, accessibility, and responsiveness. The high mean score of digital governance effectiveness indicates that Smart City initiatives in Makassar have contributed to improving the quality of public administration and strengthening citizen-oriented governance. The implementation of online licensing systems, integrated complaint platforms, and real-time

monitoring services through the War Room reflects the city government's commitment to integrating technology into public service delivery (Akhtar et al., 2025; Latupeirissa et al., 2024).

These findings support the argument of Meijer & Bolívar (2016), who emphasize that Smart City governance is not solely dependent on technological adoption but also on the capacity of institutions to create transparent and participatory governance systems. In Makassar City, digital platforms appear to have facilitated more efficient interactions between government institutions and citizens, particularly in administrative services and information accessibility. The quantitative results indicate that respondents perceived digital governance initiatives as capable of reducing bureaucratic complexity and improving responsiveness in public service management (Setyawan et al., 2024; Rulandari et al., 2025; Sadat etal., 2025).

The effectiveness of digital governance implementation is also closely related to the city's strategic orientation toward Smart Governance development. The strong performance of digital governance effectiveness suggests that Makassar has successfully integrated technological innovation into governance practices. This condition reflects the Smart City principle proposed by Nam & Pardo (2011), which emphasizes the interconnection between technology, institutions, and citizens in creating sustainable urban governance systems.

Despite the positive performance, institutional limitations remain visible in the implementation process. Aylett (2015) said that, respondents identified coordination challenges among government agencies and uneven institutional adaptation to technological transformation. These findings indicate that technological advancement alone is insufficient to ensure governance effectiveness without strong institutional integration and policy harmonization. The persistence of institutional barriers confirms previous studies suggesting that Smart City initiatives in developing countries often encounter governance fragmentation and organizational resistance during implementation processes (Padi & Thangavelu, 2025; Mitieka et al., 2025; Almulhim & Yigitcanlar, 2025).

The findings further indicate that digital governance effectiveness in Makassar City is influenced not only by technological infrastructure but also by the readiness of governance institutions to adapt to digital transformation. Public trust and citizen participation are likely to increase when digital governance systems provide accessible, transparent, and responsive services. This condition strengthens the relationship between digital governance and Smart City development, particularly in improving governance accountability and public service quality.

The Influence of Strategic Governance Dimensions on Digital Governance Effectiveness

The regression analysis demonstrates that corporate strategy, program strategy, resource support strategy, and institutional strategy significantly influenced digital governance effectiveness in Makassar City. Among these variables, program strategy emerged as the most dominant factor affecting Smart City governance effectiveness. This finding indicates that the implementation of practical digital innovation programs and integrated public services had the strongest contribution to improving governance performance (Aylett, 2015; Purnamasari et al., 2025; Lobonț et al., 2025).

The dominance of program strategy reflects the importance of operational implementation in digital governance practices. Respondents perceived digital service innovations such as online administration systems, integrated complaint services, and Smart City applications as directly affecting service quality and public satisfaction. This finding supports the perspective of Koteen (1997), who argues that program strategy plays a central role in translating strategic planning into practical governance outcomes. Effective digital programs allow local governments to improve service responsiveness while simultaneously strengthening public trust in government institutions.

Corporate strategy also demonstrated a significant influence on digital governance effectiveness. This finding suggests that policy alignment, governance vision, and long-term strategic planning are essential components in supporting Smart City implementation. Makassar City's ability to sustain digital governance initiatives appears to be strongly connected to the existence of strategic

planning frameworks that integrate digital transformation into urban governance policies. Strategic consistency enables government institutions to align technological innovation with broader development objectives (Usman et al., 2024; Song & Zhao, 2024; Rajan & Sushil, 2022; Chen et al., 2025).

Resource support strategy significantly affected digital governance implementation through technological infrastructure development, internet accessibility, financial support, and human resource competence. The quantitative findings indicate that investments in ICT infrastructure and digital capacity building contributed positively to Smart City implementation. This condition confirms the argument of Gil-Garcia et al. (2018), who emphasize that digital governance success depends heavily on technological readiness and institutional resource capacity. In Makassar City, resource support appears to strengthen the operational sustainability of digital governance systems and improve service accessibility for citizens.

Institutional strategy also produced a positive and significant influence, although its contribution was relatively lower compared to the other strategic dimensions. This finding indicates that institutional coordination and organizational adaptability remain important challenges within Makassar's digital governance framework. Government agencies may possess technological capabilities, yet institutional fragmentation can reduce policy effectiveness and slow decision-making processes. The relatively lower influence of institutional strategy suggests that institutional transformation has not progressed at the same pace as technological innovation.

The strong explanatory power of the regression model indicates that the selected strategic variables were highly relevant in explaining digital governance effectiveness in Makassar City. The findings demonstrate that Smart City governance requires integrated strategic management combining policy alignment, operational innovation, resource readiness, and institutional adaptation. Digital governance effectiveness is therefore shaped by the interaction between technological development and governance capacity rather than by technological factors alone.

Challenges and Sustainability of Smart City Governance in Makassar City

The study findings indicate that Makassar City has achieved substantial progress in implementing digital governance strategies during 2025. Nevertheless, several structural and institutional challenges continue to affect the sustainability of Smart City governance. One of the major challenges identified in the findings relates to institutional coordination among government agencies. Respondents perceived that policy integration and inter-agency collaboration still require strengthening to support more effective governance implementation.

The relatively lower score of institutional strategy demonstrates that organizational adaptation remains an important issue within Makassar's Smart City framework. The transition toward digital governance often requires changes in organizational culture, administrative procedures, and institutional communication patterns. Resistance to change, fragmented bureaucratic structures, and inconsistent policy implementation may reduce the effectiveness of digital governance initiatives. These findings correspond with the argument of Kitchin (2016), who notes that Smart City implementation frequently encounters governance complexity despite technological advancement.

Digital inequality also remains a potential challenge affecting Smart City sustainability. Although Makassar has improved internet connectivity and digital service accessibility, disparities in digital literacy and technological access may limit equal participation among citizens. Smart City governance requires not only advanced technological systems but also inclusive participation mechanisms that allow all social groups to benefit from digital transformation. The existence of digital divides may reduce the inclusiveness of public services and create unequal access to governance resources (Jaeger et al., 2012; Yu et al., 2018).

The sustainability of digital governance implementation is further influenced by the capacity of local governments to maintain technological infrastructure and continuously improve human resource competence. The significance of resource support strategy in the regression analysis indicates that Smart City governance depends heavily on financial sustainability, technological

maintenance, and continuous digital training. Without sufficient resource allocation, digital governance systems may become ineffective or difficult to sustain over time.

Citizen participation also represents an important factor in ensuring sustainable Smart City governance. Digital governance systems become more effective when citizens actively utilize public service platforms and participate in governance processes. The findings suggest that Makassar City has succeeded in improving public engagement through digital service innovations, yet participatory governance mechanisms still require expansion to strengthen collaborative governance practices.

The findings imply that future Smart City development in Makassar City should focus not only on technological expansion but also on strengthening institutional integration, policy coordination, digital inclusiveness, and citizen participation. Sustainable digital governance requires governance systems capable of adapting to technological changes while maintaining transparency, accountability, and equitable public service delivery.

CONCLUSION

The implementation of digital governance strategies significantly contributed to Smart City development in Makassar City during 2025. The quantitative findings demonstrate that corporate strategy, program strategy, resource support strategy, and institutional strategy positively influenced digital governance effectiveness, with program strategy emerging as the most dominant factor. The implementation of digital public services, integrated governance applications, and Smart City innovations improved service efficiency, transparency, responsiveness, and public accessibility. The study also confirms that technological infrastructure development and human resource support strengthened governance performance and enhanced public service delivery. Despite these achievements, institutional coordination, policy integration, and organizational adaptability remain important challenges affecting the sustainability of Smart City governance. The findings indicate that successful digital governance requires not only technological advancement but also strong institutional capacity, strategic policy alignment, and inclusive citizen participation. Therefore, sustainable Smart City development in Makassar City depends on the integration of technological innovation with governance reform, institutional strengthening, and equitable digital participation to ensure responsive, transparent, and citizen-oriented urban governance.

REFERENCES

Ahad, M. A., Paiva, S., Tripathi, G., & Feroz, N. (2020). Enabling technologies and sustainable smart cities. *Sustainable cities and society*, *61*, 102301. https://doi.org/10.1016/j.scs.2020.102301

Akhtar, A. R., Murtaza, G., & Luqman, M. (2025). Technological Innovation in Public Service Delivery: Performance and Uptake of OPGRS in the Landscape of Digital Governance. In *Digital Transformation and Sustainability: Methods and Applications* (pp. 375-409). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-91278-8_17

Almulhim, A. I., & Yigitcanlar, T. (2025). Understanding smart governance of sustainable cities: A review and multidimensional framework. *Smart Cities*, *8*(4), 113.

Ariany, R., & Abdullah, H. (2021). *Lorong wisata and community empowerment in Makassar's Smart City program*. Journal of Urban Innovation, 7(2), 45–58.

Aylett, A. (2015). Institutionalizing the urban governance of climate change adaptation: Results of an international survey. *Urban Climate*, *14*, 4-16. https://doi.org/10.1016/j.uclim.2015.06.005

Bannister, F., & Connolly, R. (2020). The future of digital government. *Government Information Quarterly, 37*(1), 1–16. https://doi.org/10.1016/j.giq.2019.101410

Caragliu, A., Del Bo, C., & Nijkamp, P. (2011). Smart cities in Europe. *Journal of Urban Technology, 18*(2), 65–82. https://doi.org/10.1080/10630732.2011.601117

Chen, Z., Zhang, Q., Tang, T., & Deng, M. (2025). Strategic alignment of technological innovation for sustainable development: Efficiency evaluation and spatial analysis in China's advanced manufacturing industry. *Systems*, *13*(3), 139.

Firman, F., Sumatono, S., Muluk, M. K., Setyowati, E., & Rahmawati, R. (2024). Enhancing citizen participation: The key to public service transparency. *Journal of Law and Sustainable Development*, *12*(1), e2937-e2937. https://doi.org/10.55908/sdgs.v12i1.2937

Gil-Garcia, J. R., Dawes, S. S., & Pardo, T. A. (2018). Digital government and public management research: Finding the crossroads. *Public Management Review, 20*(5), 633–646. https://doi.org/10.1080/14719037.2017.1327181

Hakim, A., & Hayat, A. (2024). Transforming Public Policy in Developing Countries: A Comprehensive Review of Digital Implementation. *Journal of ICT Standardization*, *12*(3), 337-364. https://doi.org/10.13052/jicts2245-800X.1235

Hollands, R. G. (2008). Will the real Smart City please stand up? Intelligent, progressive or entrepreneurial? *City, 12*(3), 303–320. https://doi.org/10.1080/13604810802479126

Jaeger, P. T., Bertot, J. C., Thompson, K. M., Katz, S. M., & DeCoster, E. J. (2012). The intersection of public policy and public access: Digital divides, digital literacy, digital inclusion, and public libraries. *Public library quarterly*, *31*(1), 1-20. https://doi.org/10.1080/01616846.2012.654728

Kitchin, R. (2016). The ethics of Smart Cities and urban science. *Philosophical Transactions of the Royal Society A, 374*(2083), 1–15. https://doi.org/10.1098/rsta.2016.0115

Koteen, J. (1997). *Strategic management in public and nonprofit organizations*. Praeger.

Latupeirissa, J. J. P., Dewi, N. L. Y., Prayana, I. K. R., Srikandi, M. B., Ramadiansyah, S. A., & Pramana, I. B. G. A. Y. (2024). Transforming public service delivery: A comprehensive review of digitization initiatives. *Sustainability*, *16*(7), 2818.

Lobonț, O. R., Criste, C., Vintilă, A. I., Crăciun, A. F., & Moldovan, N. C. (2025). Assessing Digital Performance of Public Services in the EU: E-Governance and Technology Integration. *Systems*, *13*(6), 425.

Meijer, A., & Bolívar, M. P. R. (2016). Governing the Smart City: A review of the literature on Smart Urban Governance. *International Review of Administrative Sciences, 82*(2), 392–408. https://doi.org/10.1177/0020852314564308

Meijer, A., Lips, M., & Chen, K. (2019). Smart governance: Using a literature review and empirical analysis to build a research model. *Social Science Computer Review, 37*(2), 1–19. https://doi.org/10.1177/0894439318772874

Mitieka, D., Luke, R., Twinomurinzi, H., & Mageto, J. (2025). Mapping the Institutional and Socio-Political Barriers to Smart Mobility Adoption: A TISM-MICMAC Approach. *Smart Cities*, *8*(6), 182.

Nam, T., & Pardo, T. A. (2011). Conceptualizing Smart City with dimensions of technology, people, and institutions. *Proceedings of the 12th Annual International Conference on Digital Government Research* (dg.o 2011), 282–291. https://doi.org/10.1145/2037556.2037602

Ndou, V. (2004). E-Government for developing countries: Opportunities and challenges. *The Electronic Journal on Information Systems in Developing Countries, 18*(1), 1–24. https://doi.org/10.1002/j.1681-4835.2004.tb00117.x

Nugraha, R., & Nugroho, L. (2022). Challenges in Smart City implementation in Indonesia: Lessons from regional governments. *Jurnal Administrasi Publik, 9*(1), 55–67.

Padi, D., & Thangavelu, C. (2025). A case study on the barriers to achieving a sustainable smart city. *International Journal of Human Capital in Urban Management*, *10*(3).

Purnamasari, R., Hasanudin, A. I., Zulfikar, R., & Yazid, H. (2025). Technological infrastructure and financial resource availability in enhancing public services and government performance: The role of digital innovation adoption in Indonesia. *Social Sciences & Humanities Open*, *11*, 101621. https://doi.org/10.1016/j.ssaho.2025.101621

Purnomo, E. P. (2020). Digital governance and public service innovation in Indonesian local governments. *Jurnal Borneo Administrator, 16*(2), 179–198. https://doi.org/10.24258/jba.v16i2.673

Rahman, M., Yusuf, M., & Hasan, A. (2022). Digital literacy and Smart City development in Makassar. *Indonesian Journal of Public Administration, 8*(1), 22–35.

Rajan, R., & Sushil. (2022). Leveraging technological factors and strategic alliances to achieve sustainable development goals. *Journal for International Business and Entrepreneurship Development*, *14*(1), 106-124. https://doi.org/10.1504/JIBED.2022.124241

Rulandari, N., Taufiqurokhman, T., & Andriyani, L. (2025). Bureaucratic Reform and Public Trust: Evaluating Digital Governance in Indonesia's Public Sector. *Journal of Politica Humanitatis*, *1*(1), 14-29.

Sadat, A., Lawelai, H., & Yudarsat, A. P. (2025). The impact of digital governance on public service efficiency: A cross-country analysis. *Journal of Governance and Local Politics (JGLP)*, *7*(1), 22-35. https://doi.org/10.47650/jglp.v7i1.1871

Setyawan, R., Raharjo, B., & Dewayani, J. (2024). Governance in the digital era: Analyzing the adoption of e-government services in local authorities through quantitative methods. *Journal of Management and Informatics*, *3*(3), 434-450. https://doi.org/10.51903/jmi.v3i3.54

Song, W., & Zhao, K. (2024). Navigating the innovation policy dilemma: How subnational governments balance expenditure competition pressures and long-term innovation goals. *Heliyon*, *10*(15).

Tan, S. Y., & Taeihagh, A. (2020). Smart city governance in developing countries: A systematic literature review. *sustainability*, *12*(3), 899. https://doi.org/10.3390/su12030899

UNDP. (2019). *E-Governance and digital government strategy*. United Nations Development Programme.

Usman, M., Khan, N., & Omri, A. (2024). Environmental policy stringency, ICT, and technological innovation for achieving sustainable development: Assessing the importance of governance and infrastructure. *Journal of environmental management*, *365*, 121581. https://doi.org/10.1016/j.jenvman.2024.121581

Yu, B., Ndumu, A., Mon, L. M., & Fan, Z. (2018). E-inclusion or digital divide: an integrated model of digital inequality. *Journal of Documentation*, *74*(3), 552-574. https://doi.org/10.1108/JD-10-2017-0148