Journal of STI Policy and Management, Volume 11(1), 2026, pp. 51 – 64

STI POLICY AND MANAGEMENT

Journal homepage: http://www.stipmjournal.org

The Role of E-Government as a Bureaucratic Reform Innovation Infrastructure

Ignatius Novianto Hariwibowo[1], Rio Ageng Surya Susandy[1], Agustinus Edi Sutarta[2], Krist Setyo Yulianto[3]

[1] *Accounting Department, Universitas Atma Jaya Yogyakarta, Special Region of Yogyakarta, Indonesia*
[2] *Economics Development Department, Universitas Atma Jaya Yogyakarta, Special Region of Yogyakarta, Indonesia*
[3] *Public Financial Accounting Department, Universitas Terbuka, Jakarta, Indonesia*

ARTICLE INFO

Article History:
Received : 07 April 2026
Revised : 19 June 2026
Accepted : 07 July 2026
Available online : 15 July 2026

Authorship Contribution:
All authors have equal contribution as the main authors.

Keywords:
E-government;
Accountability;
Bureaucratic Reform; and
Public Policy.

ABSTRACT

Improving public services is one way to achieve government success. Within the framework of New Public Management, Indonesia created a grand design for bureaucratic reform through Presidential Regulation No. 81/2010. The government also implemented the Electronic-Based Government System (SPBE) as the foundation of e-government to reaffirm its commitment to improving services. This study examines e-government as an infrastructure that moderates the influence of bureaucratic reform and accountability on public services. The data includes the bureaucratic reform index, SPBE, SAKIP (accountability), and public services from provincial governments. The role of e-government as a moderator analyzed using panel regression with secondary data from 31 provincial governments and 186 panels from 2019 to 2024. By positioning e-government as a moderator, this study explores the role of technology as a platform for public service innovation, a previously unstudied topic. The results show that bureaucratic reform and accountability directly improve public services, but e-government does not strengthen the influence of either. These findings confirm that technology adoption is not an innovative tool to accelerate improvements in public service quality. This implies that the government requires digital capacity, data integration, and IT governance to deliver fast, transparent services to citizens without halting procedures.

* Corresponding Author.
E-mail: novianto.wibowo@uajy.ac.id

DOI: 10.14203/STIPM.2026.456

I. INTRODUCTION

Bureaucratic reform in Indonesia positions public service as a key objective of good governance, as mandated by Presidential Regulation No. 81 of 2010. Optimizing public service within this policy framework is designed not only to enhance service effectiveness but also to act as a catalyst for achieving social welfare goals (Rudyanto et al., 2022). The paradigm shift driven by bureaucratic reform has positioned public service as a strategic entry point for governance improvements, facilitated by the spirit of transparency and public participation in governmental processes (Ibrahim et al., 2023). Thus, accountable and participatory public service becomes pivotal in strengthening government legitimacy and building public trust (Pratama, 2017). Through the adoption of modern accountability systems, Indonesian government efforts underscore how public service functions as a primary indicator of bureaucratic reform success, reflecting the state-citizen social contract.

To achieve bureaucratic reform and strengthen accountability, the utilization of information technology has become a strategic element in modern government transformation. Multiple studies affirm that the digitization of public administration can be an innovative step that significantly enhances service quality and public satisfaction (Gil-Garcia et al., 2018; Lindgren et al., 2019). The important role of technology in public services has been demonstrated in various previous studies. Research conducted in European countries shows that the adoption of technology in public services has resulted in strengthening the role of technology in directly improving public services (El Ammar & Profiroiu, 2020; Hodžić et al., 2021). The positive impact of technology adoption on public services is also evident in Asia, such as in Bahrain and China, which show similar patterns despite political factors that may influence them (Mahmood et al., 2019; Mao & Zhu, 2025; Xhafka et al., 2024). In this case, technology is not merely an administrative tool, but an innovative way to facilitate policy infrastructure enabling efficiency, transparency, and responsiveness in governance.

However, most prior research positions technology—particularly e-government—as a factor directly influencing public service effectiveness, predominantly measured through user satisfaction indicators which reflects public service quality (Latupeirissa et al., 2024). In fact, the application of technology in government is never separated from a country's national policy (Idzi & Gomes, 2022). Therefore, technology also needs to be viewed as an infrastructure to innovate policy processes, streamline service delivery, and strengthen institutional legitimacy in the digital governance era (Hwang, 2019). Supporting this statement, Nurullah et al. (2025) research has shown the role of technology in simplifying processes, indicating that technology serves as a means of influencing the efficiency of administrative processes. However, in efforts to improve public services, how the application of technology is positioned as an innovative infrastructure of policy has not been widely explained in previous studies. Especially in Indonesia, the Indonesian government has initiated regulatory frameworks since Presidential Instruction No. 3 of 2003 on e-Government to the latest 2023 Electronic-Based Government System (SPBE/Sistem Pemerintahan Berbasis Elektronik) policy to increase public service. These measures reflect a commitment to digital transformation as the foundation for driving a more adaptive and participatory bureaucratic reform. Although technological adoption has become integral to Indonesia's bureaucratic reform policies, technology's role as a policy infrastructure moderating the relationship between bureaucratic reform and public service quality improvement remains empirically underexplored.

While numerous studies indicate that digital technology adoption, including e-government, directly enhances public service quality, this research offers novel contributions by positioning e-government as a moderating variable to evaluate Indonesia Government innovative approach in the bureaucratic reform policy to increase public service. This approach introduces a fresh perspective by framing e-government not merely as a technological tool, but as a policy infrastructure that reinforces the linkage between institutional reform and service performance (Ahmed et al., 2025). Departing from prior studies that predominantly treat e-government as an independent variable with direct effects on service delivery or organizational performance, this research emphasizes technology's intervening role in amplifying reform policy effectiveness (Dharmawan et al., 2024). Consequently, conceptualizing e-government as a moderator addresses a critical research gap, enriching our understanding of digital integration within public governance contexts—particularly in developing nations like Indonesia (Almajali et al., 2024).

The research findings are expected to contribute to institutional governance theory by incorporating e-government as an institutional element moderating bureaucratic reform and performance accountability dynamics. The results should also enrich scholarly discourse on public administration and digital-era good governance. Practically, this study aims to provide strategic inputs for transformative policymakers in Indonesia. By understanding e-government's role in bureaucratic reform, local governments can optimize ICT utilization to enhance policy effectiveness and deliver higher-quality public services.

II. ANALYTICAL FRAMEWORK

A. The Role of Bureaucratic Reform and Accountability in Strengthening Public Service Delivery

Bureaucratic reform can be understood as a systematic, comprehensive, and sustained effort to transform the structure, processes, and work culture of civil servants to become more adaptive, professional, integrity-driven, and public service-oriented. This reform constitutes part of Indonesia's national strategy as regulated in the Grand Design of Bureaucratic Reform 2010–2025, which aims to establish a competitive, effective, and efficient government. Bureaucratic reform represents an urgent necessity for many nations, particularly in the developing world, responding to public sector underperformance characterized by sluggishness, opacity, and inadequate responsiveness to societal needs. Dysfunctional bureaucracy not only impedes administrative processes but also erodes public trust in government. Consequently, bureaucratic reform is directed toward creating simplified organizational structures, accelerated procedures, and citizen-centric service delivery (Azam & Bouckaert, 2025; Nawaz et al., 2025).

The cornerstone of this reform is strengthening accountability—defined as the obligation of public institutions and officials to openly, transparently, and auditably justify performance outcomes to citizens (Fan, 2025). In Indonesia, accountability encompasses administrative, legal, political, and social dimensions, forming the foundation for implementing good governance principles. Practically, bureaucratic reform's success hinges on the comprehensive, consistent, and institutionalized application of accountability within public service systems. Simultaneously, accountability serves as an indispensable pillar of bureaucratic reform by ensuring public officials act transparently, responsibly, and within their mandated authority. Enhanced accountability enables citizen oversight of government operations, minimizes abuse of authority, and promotes equitable, results-oriented service delivery. As Azam & Bouckaert (2025) affirm that the absence of accountability in bureaucratic structures often constitutes the primary catalyst for public service degradation. Consequently, bureaucratic reform and accountability strengthening must function as mutually reinforcing pillars within an integrated strategy for achieving responsive, efficient, and inclusive public service quality.

B. E-Government to Accelerate Public Service Policy

High-quality public service constitutes a primary indicator of modern bureaucratic success. Within this context, technology functions as a fundamental facilitator. Shkalenko & Kozlova (2024) demonstrate that e-government effectively enhances service accessibility, accelerates administrative processes, and reduces bureaucratic inefficiencies. However, persistent digital divides and technological literacy disparities among citizens remain critical challenges that must be addressed to ensure truly inclusive service transformation.

Institutional theory elucidates how public organizations adopt technologies, including e-government, not merely technical efficiency, but as responses to normative, mimetic, and coercive environmental pressures. Within public bureaucracy contexts, e-government adoption frequently reflects not internal organizational needs, but external pressures to conform to globally legitimized or modern practices (Shkalenko & Kozlova, 2024). The implementation initiative of e-government is also inseparable from the political and institutional context that surrounds it. The impact of the implementation of e-government is greatly influenced by cultural and political aspects that determine how technology is accepted and used by the community and the government, as happened in India (Samuel et al., 2020), Qatar (Elayah, 2025), and in the small countries like Cyprus (Glyptis et al., 2020). The institutional design underlying the development of e-government often limits or strengthens the use of Information and Communication Technology (ICT) to provide integrated public services, increase public participation and transparency, and improve public policy management. In this context, institutional theory becomes very relevant, as it emphasizes the importance of the constitutive role of political and institutional contexts in designing, implementing, and evaluating the impact of various e-government initiatives (Myeong & Bokhari, 2023; Tomor et al., 2021). Within the Institutional Theory framework, technology's moderating role in government policy stems not only from technical efficiency pursuits but also from the need to gain institutional legitimacy from citizens in an innovative way (Ramirez-Madrid et al., 2022). In this context, e-government adoption functions not merely as an administrative tool, but as a symbolic manifestation of alignment with modern governance norms such as transparency, accountability, and technology-based public service. Consequently, e-government can be positioned as an institutional component that moderates the relationship between bureaucratic reform, accountability, and public service quality (Shkalenko & Kozlova, 2024).

Despite having great potential in transforming public administration, the implementation and adoption of e-government still faces various challenges. Some of the key challenges that need to be addressed include the limitations of technological infrastructure, vulnerability to cyberattacks, resistance to changes in government institutions, and lack of public awareness of e-government-based services (Zhang & Kaur, 2024). On the other hand, the potential for e-government transformation provides various important opportunities for governance, such as simplifying the service delivery process, increasing transparency, wider accessibility, saving costs, and encouraging active participation from citizens. As a future approach, the use of institutional theory combined with dynamic simulation methods such as system dynamics is proposed as a comprehensive and integrated way to understand the phenomenon of e-government in more depth. This approach is believed to be able to provide a clear picture of the two-way relationship between formal institutional processes, institutional networks, and the use of technology in real practice in the field (Breaugh et al., 2023; Salomo & Rahmayanti, 2023).

C. Hypotheses Development

Bureaucratic Reform and Public Service

Bureaucratic reform can be seen as a practice of power, where new models of reform are established as truths and used to discipline and transform bureaucratic behavior (Paskarina, 2017). Various international studies show that bureaucratic reform plays a key role in improving the quality of public services, especially in developing countries that face structural and cultural challenges in public administration systems. Studies on bureaucratic reform confirm that simplifying administrative procedures and strengthening the competence of government apparatus are critical drivers of improved service responsiveness (Nurullah et al., 2025). A similar thing was found in Latupeirissa et al., (2024), where bureaucratic professionalization and institutional restructuring have been proven to improve service efficiency, although still constrained by bureaucratic culture that has not completely changed. Nurdin (2018) emphasized that results-based bureaucratic reform contributes directly to service improvement if supported by strong institutional commitment.

The implementation of bureaucratic reform and accountability demonstrates potential for enhancing public service delivery (Shettigar & Misra, 2022). Nevertheless, transformation efforts through bureaucratic reform in Indonesia face significant challenges. As a paradigm shift, bureaucratic reform can trigger organizational culture changes that provoke resistance due to alterations in civil servants' duties, authorities, and work procedures. Furthermore, such transformation involves complex stakeholder interests requiring accommodation. Consequently, Indonesia's bureaucratic reform implementation requires evaluation to assess its outcomes (Turner et al., 2022). While prior research has examined bureaucratic reform's role and impact in Indonesia, such studies primarily evaluate implementation challenges and organizational effects within government institutions. Thus, the evaluation of bureaucratic reform and accountability impacts on public service improvement remains underexplored. Existing studies testing bureaucratic reform effects are also limited to specific local government cases (Pribadi, 2023). Therefore, comprehensive assessment of bureaucratic reform and accountability influence across Indonesia is necessary to determine these policies' actual impact on public services. Considering the theoretical foundation and empirical support, the hypotheses proposed in this study are as follows:

H1: The implementation of bureaucratic reform has a positive effect on improving public services.

Accountability and Public Service

Accountability is one of the main principles in modern governance that aims to improve the quality of public services. Accountability requires transparency and accountability of public officials for the results obtained from the service process (Khawaja & Khalid, 2022). According to the perspective of Institutional Theory, accountability serves as a control mechanism that encourages officials and public institutions to act according to established operational and maintain consistency between actual performance and public expectations (Y. Han, 2020). The application of accountability encourages public sector organizations to be more responsive and effective in meeting the needs of the community, to increase public satisfaction and trust (Chien & Thanh, 2022). In addition, accountability can minimize opportunistic and corrupt behavior in public institutions due to strict supervision and the obligation to report performance openly to the public and relevant stakeholders.

In line with this, various international studies have consistently shown that accountability has a positive relationship with public services. Research by Sofyani et al., (2020) found that the effective implementation of accountability is closely related to improving service quality, resource management efficiency, and increasing public trust in public institutions. Similarly, Torres-Sandoval et al. (2025) show that public institutions that implement clear accountability mechanisms experience a significant increase in the efficiency and effectiveness of the services provided to the community. Considering the theoretical foundation and empirical support, the hypotheses proposed in this study are as follows:

H2: Accountability has a positive effect on improving public services

Technology as Policy Infrastructure

The adoption of e-government has become a key strategy in encouraging bureaucratic reform and strengthening public accountability (Setyarto et al., 2025). For example in Asia, the application of technology in India and Pakistan has encouraged community engagement and improved public services (Khawaja & Khalid, 2022; Sharma et al., 2024). In addition, research from El Ammar & Profiroiu, (2020) discovers how e-governance is the foundation for public service innovation by comparing practices in Romania and Lebanon. Hence, from previous research, E-government is not just a digitization of administrative processes, but an instrument of structural transformation that is able to change the pattern of relations between the government and society. Within the framework of bureaucratic reform, e-government allows for the simplification of service processes, the cutting of bureaucratic lines, and the creation of a more responsive and transparent work system. Research by Doran et al. (2023) confirms that the implementation of e-government can significantly strengthen the efficiency of public bureaucracy, especially when information systems are designed to support existing institutional logic, rather than simply as a technical tool.

In terms of accountability, e-government expands the social control mechanism for state apparatus through the provision of public access to information, service processes, and performance results of government institutions. Guo (2024) shows that the use of open, interactive, and informative official government websites is significantly correlated positively with increased public accountability, especially in terms of financial transparency and policy oversight. In line with that, the study by Malodia et al. (2021) highlights that the transformation of accountability in the context of e-government is not only administrative but also requires the reconstruction of power relations and responsibilities within the bureaucracy. This is important in the context of developing countries facing cultural and structural challenges in bureaucratic reform. From here, e-government can be seen as a catalyst that strengthens the pillars of bureaucratic reform and accountability simultaneously. It can be proposed that reform and accountability need a system to make it successful (Nurullah et al., 2025). Thus, the hypotheses proposed to test the role of e-government as a means of public service policy are:

H3: The implementation of e-government can increase the influence of bureaucratic reform to improve public services in Indonesia

H4: The implementation of e-government can increase the influence of accountability to improve public services in Indonesia

Write your study's analytical framework here; it must be based on a thorough review of theories, concepts, and models.

III. METHODOLOGY

A. Research Samples and Data

To get a comprehensive picture of the impact of transformative policies on public services in Indonesia, this study uses all provincial governments in Indonesia. By 2024, there will be a total of 38 provinces in Indonesia. Indonesia has a local government structure consisting of provincial governments, city/district governments. Based on Law Number 23 of 2014, concerning Regional Government, the provincial government has a strategic role as the implementer of general government affairs and concurrent government at the provincial level. As an extension of the central government, the provincial government plays a role in maintaining the direction of development and regional policies so that they are in line with the direction of national development. In addition, the provincial government organizes government affairs that cannot or cannot be effectively carried out by the district/city. Thus, the results of the provincial government's performance can provide an indication of the regional conditions regarding central government policies, namely bureaucratic reform, accountability, and public services. Based on this role, this research uses the provincial government as the subject of the research. The data used is data from 2019 to 2024 obtained from the website of the Ministry of Empowerment and State Apparatus and Bureaucracy (www.1data@kemenpanrb.go.id, accessed 2 March 2025).

B. Research and Measurement Variables

The research uses independent variables, namely bureaucratic reform, accountability, and the dependent variable is public services, while the implementation of e-government is a moderation variable. Bureaucratic reform in this study refers to Presidential Regulation No. 81 of 2010 which can be understood as an effort to reform governance in order to improve public services. This variable is measured through the bureaucratic reform index (BR). The value of the government's bureaucratic reform index is in the range of 0-100 which will be categorized into seven levels of assessment, starting from the predicate of very poor to special for the best service value. The bureaucratic reform index shows the level of achievement of governance through institutional structuring, governance, and human resources. Accountability in this study refers to Government Regulation No. 8 of 2006 which can be understood as the process of accountability for the performance of government agencies. This variabel is measured by the value of the Government Agency Accountability System index (ACCT). This index shows that the value of accountability evaluation from government agencies is a systematic series of activities to account for the performance of government agencies. The SAKIP index is in the range of 0-100, with seven categories with assessment predicates from very poor to very satisfactory. For the dependent variable, this study uses the public service index (PSERV) which can be understood as government performance in the delivery of public services. This variabel is measured through the public service index with a score of 0-5 which will be categorized into nine predicates of assessment levels, ranging from failure to excellent service. In this study, the implementation of e-government (EGOV) as a moderation variable will be measured using the SPBE index whose value has been measured by the government. The implementation of e-government, as measured by the SPBE index in this study, can be understood as the maturity level of technology utilization in government administration. The value of this index is in the value range of 0-5 with five categories with assessment predicates from less to satisfactory.

C. Data Analysis

This study uses panel data regression analysis with two estimation model approaches, namely the Fixed Effect Model (FEM) and the Random Effect Model (REM). However, before conducting the panel data test, a regression test will generally be carried out to see the influence of all variables on the dependent variables fundamentally. The selection of the best model is carried out through Hausman testing to choose between FEM and REM. The approach is carried out in such a way, if the probability value of Chi-Square < 0.05, then FEM is more appropriate, and vice versa REM is chosen. After the selected model, a classical assumption test was carried out which included a multicollinearity test to detect the presence or absence of correlations between independent variables, a heteroscedasticity test to detect residual variance inconsistencies, and an autocorrelation test to detect correlations between residuals between time.

Furthermore, hypothesis testing is carried out through the F test to determine the influence of all independent variables simultaneously on the dependent variables, the t test to determine the influence of independent variables and moderation with the provision of each p< value of 0.05. The moderation value is obtained by multiplying the value of the independent variables, namely BR and ACCT, by the EGOV value, as moderation, after subtracting the average of each variable. Next, the coefficient of determination (R^2) will be used to measure how much variation of dependent variables is able to be explained by independent variables in the model. All of these processes are carried out using the Eviews 11 software.

IV. RESULTS

A. Description of Provincial Governments in Indonesia

By 2024, there will be 38 provinces in Indonesia. This number includes the newly formed provincial government. The existence of this new province has an impact on the existence of data that is not recorded in the data accessed. Data access on the website of the Ministry of State Apparatus Empowerment and Bureaucratic Reform will be carried out in March 2025. From this access, there are 31 complete provincial government and 186 panel data to be used. Thus, there are 7 provincial governments that are not used in this study because there is no data available. The following is a description of the data obtained from 31 provinces:

Table 1. *Data Description of 31 Provinces in Indonesia in 2019-2024.*

Var.	Years	Min	Max	Mean	Meaning
EGOV	6	1	4.73	2.8	Good
BR	6	52	82	65.4	Pretty good
ACCT	6	56	92	69.9	Good
PSERV	6	1	4	3.1	Good (with note)

Source: Data processed (2025)

In the range of 2019 to 2024, not all provincial governments have the same amount of data. In general, the information from Table 1 shows that the achievement rate of the implementation of e-government in provincial governments in Indonesia for 6 years has reached an average index value of 2.8, which can be categorized as good. Meanwhile, the achievement of implementing bureaucratic reform, accountability, and public services for 5 years received an average index score of 65.5, 69.9, and 3.1, which can be generally categorized as good. This condition indicates that there is a real effort to improve public services through bureaucratic reform and accountability in Indonesia.

To get a more detailed understanding of the description of Table 1 regarding the achievements of e-government, bureaucratic reform, accountability, and public services in Indonesia, the following is an overview of the average total achievement rate in each of these provinces in Indonesia.

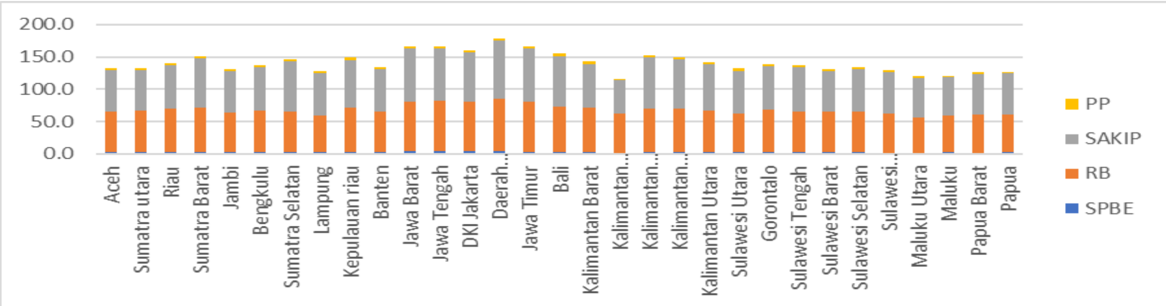

Figure 1. *The Total Index Score of 31 Provincial Governments in Indonesia (Source: Kemenpanrb Data Processed 2025).*

From Figure 1, it can be understood that the average level of achievement of the e-government index, bureaucratic reform, accountability, and public services is uneven for all provinces in Indonesia. This condition indicates a difference in the level of technology adoption as well as a difference in the level of achievement of bureaucratic reform, accountability, and public services in provincial governments in Indonesia.

B. Research Data Test Results

To determine how the variables influence PSERV in the presence of moderation, a preliminary test was conducted to assess the variables' influence on PSERV in the absence of moderation.

The results in Table 2 show that, fundamentally, all variables influence PSERV. This is an initial indication that all variables play a role in public service policy, although EGOV, as an independent variable, has a negative influence on PSERV. With the results of the Hausman test showing a Prob. Chi-Sq. Value: 0.0000 < 0.01 (alpha 1%), the selected model test indicates that the Fixed Effects Model is preferable to the Random Effects Model (FEM). Since the best model is FEM, this model requires testing of classical assumptions, namely the multicollinearity test and the heteroscedasticity test.

Table 2. *Multiple Regression Test*

Var.	Coefficient	Std. Error	t-Statistic	Prob.
BR__X1	0.096348	0.023499	4.099999	0.0001
ACCT__X2	0.103345	0.025744	4.014381	0.0001
EGOV__M	-0.271022	0.092519	-2.929380	0.0039
C	-9.673793	1.774359	-5.451993	0.0000

Source: Data processed (2025)

Table 3. *Multicollinearity Test*

	ACCT__X2	BR__X1	EGOV__M	BR*EGOV_X5	ACCT*EGOV_X6
ACCT__X2_	1.000000	0.833950	0.583924	0.270287	0.275272
BR__X1_	0.833950	1.000000	0.629924	0.313267	0.276285
EGOV__M_	0.583924	0.629924	1.000000	0.071432	0.082269
X_5	0.270287	0.313267	0.071432	1.000000	0.896269
X_6	0.275272	0.276285	0.082269	0.896269	1.000000

Source: Data processed (2025)

The multicollinearity test was conducted by examining the correlation coefficients between independent variables using a correlation matrix. The test results showed that most variable pairs had a correlation coefficient below 0.80, indicating no multicollinearity. However, there are two pairs of variables that exhibit a fairly high correlation: between ACCT (X2) and BR (X1), with a correlation of 0.8340, and between X5 and X6, with a correlation of 0.8963, where X5 and X6 represent the product of BR and ACCT, with EGOV serving as the moderator. Nevertheless, in the context of panel data analyzed using the Fixed Effect Model approach, the presence of a moderate correlation between independent variables can still be tolerated as long as the model as a whole remains significant, as indicated by a significant F-statistic value at a probability of 0.0000.

The heteroscedasticity test was conducted by comparing the calculated Chi-square value with the table Chi-square value. The calculated Chi-square value obtained was 84.63. Therefore, the value comparison is 84.63 (computed chi-square) > 12.59 (table chi-square). Based on these results, it can be concluded that there is no heteroscedasticity.

After confirming that the data used had passed the multicollinearity and heteroscedasticity tests, the next step was to conduct hypothesis testing using panel data. The following are the results of the panel data analysis using the fixed-effects model to determine the outcome of the hypothesis test in this study

Table 4. *Results of Panel Data Analysis using FEM*

Var.	Coefficient	Std. Error	t-Statistic	Prob.
BR__X1	0.099245	0.023697	4.187998	0.0000
ACCT__X2	0.110206	0.026629	4.138585	0.0001
EGOV__M	-0.309422	0.098948	-3.127126	0.0021
BR*EGOV_X5	-0.017258	0.021946	-0.786413	0.4329
ACCT*EGOV_X6	0.020128	0.018889	1.065603	0.2883
C	-10.25302	1.856562	-5.522582	0.0000

Source: Data processed (2025)

Table 4 indicates that the results of the partial t-test show that the BR variable (X1) has a positive and significant effect on PSERV, with a coefficient of 0.0992 and a probability value of 0.0000. This means that each one-unit increase in BR will increase PSERV by 0.0992, assuming that the other variables remain constant. The ACCT variable (X2) also exhibits a positive and significant effect on PSERV, with a coefficient of 0.1102 and a probability value of 0.0001, which means that an increase of one unit of ACCT will increase PSERV by 0.1102. Meanwhile, the EGOV variable (M), which is to be tested as a moderator, when tested partially or directly, shows a negative and significant effect on PSERV, with a coefficient of -0.3094 and a probability value of 0.0021, indicating that an increase of one unit of EGOV actually decreases PSERV by 0.3094.

The test of the EGOV variable as a moderator was obtained by multiplying the values of the BR and ACCT variables by EGOV; therefore, the value of variable X5 is the product of the BR value and EGOV, and X6 is the product of the ACCT value and EGOV, serving as the moderator variable values. The results indicate that neither of these moderators was shown to have a significant effect on PSERV, with probability values of 0.4329 and 0.2883, respectively, which are greater than 0.05. These results indicate that the role of EGOV as a moderator does not make a significant contribution to changes in PSERV in this model. Therefore, it can be concluded that H1 and H2 are supported, whereas the moderation tests in H4 and H5 are not supported.

Table 5. *Model Testing*

R-squared	0.551973	Mean dependent var	3.129032
Adjusted R-squared	0.447433	S.D. dependent var	0.735006
Log likelihood	-131.4863	Hannan-Quinn criter.	2.053934
F-statistic	5.280032	Durbin-Watson stat	1.714584
Prob(F-statistic)	0.000000		

Source: Data processed (2025)

The results of the F-test indicate an F-statistic of 5.280, with a probability of 0.0000, which is less than the 0.05 significance level. This means that all independent variables collectively have a significant effect on the dependent variable (PSERV); therefore, the model developed is suitable for further analysis. The R-squared value of 0.5520 indicates that the independent variables in the model are able to explain 55.20% of the variation in the dependent variable, while the remaining 44.80% is explained by other variables outside the model.

The Adjusted R-squared value of 0.4474 confirms that the model still has adequate explanatory power after taking into account the number of variables used. The Durbin-Watson value of 1.714 falls within the range of 1.5–2.5, indicating that there is no significant autocorrelation in the model.

V. DISCUSSION

The results of the analysis indicate that bureaucratic reform (BR) has a positive and significant effect on public service (PSERV) (coefficient = 0.099; $p < 0.001$). These results confirm that BR has a positive and significant effect on public service ($\beta = 0.38$; $p = 0.009$). These findings confirm that improvements in the quality of public services can be directly driven by a change in the bureaucratic paradigm, which is manifested in the simplification of procedures, enhanced professionalism of civil servants, and institutional restructuring (Hajiji et al., 2024; Pribadi, 2023; Rengifurwarin, 2019; Yustia & Arifin, 2023)., 2024; Pribadi, 2023; Rengifurwarin, 2019; Yustia & Arifin, 2023). From the perspective of institutional theory, bureaucratic reform represents a paradigm shift from a procedural and hierarchical bureaucracy to a more responsive and public-oriented governance structure (Ismiyarto, 2018). The interesting aspect of this finding is that this positive effect persists even though, in this model, e-government is not shown to act as a moderator that enhances the impact of bureaucratic reform on public services. This indicates that the internal mechanisms of bureaucratic reform have their own power to drive improvements in public services, regardless of the extent to which digital infrastructure has been integrated (Y. Han, 2020). Thus, improvements in public service performance are fundamentally driven by a commitment to paradigm and cultural change within the bureaucracy, whereas technology adoption serves more of a complementary role, the effectiveness of which depends on the context and the level of maturity of implementation.

The results of this analysis show that accountability has a positive and significant effect on public services, with a regression coefficient of 0.110 ($p = 0.0001$). Although in this research model, e-government was not found to moderate the effect of accountability on public services ($p = 0.288$), accountability, as an independent variable, still had a significant direct effect on public services. These findings reinforce previous research indicating that the stronger the accountability mechanisms implemented in government whether in the form of formal accountability, procedural transparency, or public information disclosure the higher the quality of services that can be delivered (Khawaja & Khalid, 2022; Sofyani et al., 2020b; Torres-Sandoval et al.,, 2025).

From an institutional theory perspective, accountability serves as a control mechanism that creates normative and coercive pressure on the bureaucracy to act in accordance with public expectations (Salomo & Rahmayanti, 2023). The finding of a direct effect of accountability on public services without the moderating effect of technology reinforces the argument that strengthening internal accountability as the foundation of public governance is a role that cannot be replaced solely by digital infrastructure. In support of this, Maione et al. (2025) have explained that accountability is a prerequisite that cannot be replaced by technology. Thus, these findings underscore that efforts to improve public services need to maintain and strengthen fundamental accountability mechanisms while continuing to integrate technology gradually (Wilson & Mergel, 2022).

Based on the results of the data analysis presented in Table 4, it was found that the effect of the interaction between e-government and bureaucratic reform, as well as accountability, was not statistically significant (BR*EGOV: $p = 0.4329$; ACCT*EGOV: $p = 0.2883$). Thus, the role of e-government as an infrastructure for bureaucratic reform and accountability in improving public services has not been demonstrated. This finding is interesting because it runs counter to the dominant narrative in the digital public administration literature, which tends to assume that technology serves as a catalyst or an innovative infrastructure that enhances the impact of internal reforms (Madaki et al., 2024).

Within the framework of institutional theory, successful innovation occurs when internalized paradigm shifts are reflected in changes to the logic, routines, and power relations that fundamentally underpin public service practices and bureaucratic work (de Mattos Donadelli &

Scott, 2025; Sønderskov et al., 2022)., 2022). This failure of moderation indicates that the implementation of e-government in Indonesia has not yet become an institutional infrastructure capable of bringing about a new institutional logic. The findings of this study indicate that the adoption of technology alone does not necessarily lead to social or institutional innovation (van Kersbergen & Vis, 2022).

In this regard, several previous studies have explained this phenomenon of e-government failure. First, the maturity level of e-government implementation may still be at an early stage, i.e., only at the technology adoption stage, and therefore has not yet reached the point where technology is systemically integrated with bureaucratic processes and accountability (Mergel et al., 2019)., 2019). Second, in institutions that are still dominated by a procedural bureaucratic culture, the adoption of e-government risks being ceremonial in nature and aimed at meeting institutional pressures, without bringing about a substantive transformation in public service practices (Wilson & Mergel, 2022). Third, theoretically, technology adoption is more likely to play the role of an autonomous or mediating variable in efforts to improve public services (F. Han & Zhang, 2024; Mao & Zhu, 2025; Susanto & Makmur, 2024). An interesting point in the analysis of this model is that e-government actually has a direct negative effect on public services (coefficient = -0.309; p = 0.0021), suggesting that the presence of digital systems in certain contexts can create additional complexity or administrative burdens that actually hinder service delivery if not accompanied by organizational readiness and human resources (Meng & Li, 2025; Scupola & Mergel, 2022). In the Indonesian context, the implementation of technology in public services can also act as a barrier to public access to public services due to the uneven adoption of technology across society. This situation reveals that the adoption of technology as an innovation needs to be balanced with support for adoption in terms of social infrastructure (Wilson & Mergel, 2022).

This study makes a theoretical contribution by demonstrating that the absence of a moderating effect does not mean that e-government is not important, but rather that the role of technology as an innovation infrastructure is conditional (F. Han & Zhang, 2024; Mao & Zhu, 2025). Technology will only be effective when implementation maturity, integration with core processes, and institutional capacity are adequate (Scupola & Mergel, 2022; Wilson & Mergel, 2022). The implication of these findings is that the government needs to prioritize strengthening bureaucratic reform and accountability as the primary foundation, as well as ensure that the development of e-government in Indonesia through the implementation of the SPBE is carried out in a parallel and integrated manner, rather than as a separate and symbolic project.

VI. CONCLUSION

This study aims to examine the role of e-government as an innovation infrastructure that moderates the effect of bureaucratic reform and accountability on public services, using institutional theory as the analytical framework. A summary of the key findings indicates that bureaucratic reform and accountability have been shown to have a positive effect on public services, confirming that internal bureaucratic mechanisms and the strengthening of traditional accountability remain the primary foundations for improving the quality of public services. However, the hypothesis that e-government acts as a moderating variable that strengthens the relationship between bureaucratic reform and accountability on the one hand and public services on the other is not empirically supported.

Thus, e-government fails to function as an innovative infrastructure that accelerates the impact of internal reforms; in fact, in this model, it shows a tendency to have a direct negative effect on public services.

These findings make an important theoretical contribution by correcting the overly optimistic dominant narrative regarding the role of technology as a force multiplier in the public sector. The novelty of this study lies in the evidence that institutional foundations—bureaucratic reform and accountability—play a greater role in improving public services than the mere adoption of digital technology. From an institutional theory perspective, the failure of e-government as a moderator indicates that new technologies will be effective as an innovation infrastructure only if they have reached an adequate level of implementation maturity, are systemically integrated with core work processes, and are supported by changes in norms and stakeholder cognition. Without these conditions, e-government risks becoming a ceremonial innovation that does not change service practices, or may even be counterproductive if poorly implemented.

This study has several limitations that require consideration. Cross-sectional design is unable to capture the dynamics of changes in e-government maturity over the long term, while technical-administrative measures of e-government have not yet been able to distinguish specific dimensions such as transparency, participation, or service integration, which may have different effects. Therefore, it is recommended that future research: (1) employ a longitudinal design to observe how the role of e-government changes as implementation maturity increases; or (2) conduct comparative studies across regions with different levels of e-government (e-GOV) maturity to identify the boundary conditions at which technology becomes effective as a public service innovation infrastructure.

ACKNOWLEDGEMENT

The author would like to express sincere gratitude for the collaboration and valuable contributions from all co-authors involved in this work. Appreciation is extended to colleagues from Accounting Department and Economics Development Department, Universitas Atma Jaya Yogyakarta, also the Public Financial Accounting Department, *Universitas Terbuka*, Indonesia. Their support and cooperation have been essential to the completion and helping improve this study.

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