



Electronic-Based Government Systems, Institutional Capacity Building, and Public Service Performance in Ambon City

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ABSTRACT

Purpose of the study: This study analyzes the influence of the Electronic-Based Government System (SPBE) and human resource capacity on employee performance at the Office of Communication, Informatics, and Encryption of Ambon City, while interpreting both variables as part of institutional capacity building and social learning in digital governance reform.

Methodology: A quantitative survey approach was used. Data were collected through closed-ended questionnaires distributed to all 21 employees and analyzed using validity, reliability, classical assumption, multiple regression, t-test, F-test, and coefficient of determination procedures.

Main Findings: SPBE implementation and human resource capacity have positive and significant effects on employee performance, both partially and simultaneously. SPBE strengthens coordination, data transparency, administrative efficiency, and service responsiveness, while human resource capacity supports digital literacy, adaptability, problem solving, and institutional learning.

Novelty/Originality of this study: This study reframes SPBE as a socio-technical system and human resource capacity as collective learning within local government. It connects quantitative performance analysis with the social dynamics of decentralized digital governance in Eastern Indonesia.

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1. INTRODUCTION

Digital government has become an important agenda in contemporary public administration because citizens increasingly expect services that are transparent, fast, accountable, and accessible. Global assessments show that digital government development is closely related to online service availability, telecommunications infrastructure, and human capacity [1]-[3]. However, digital transformation in the public sector is not simply the adoption of software or networks. It is a social and institutional process that changes how public organizations coordinate work, share information, make decisions, and interact with citizens [4]-[6].

In Indonesia, the development of e-government and the Electronic-Based Government System (Sistem Pemerintahan Berbasis Elektronik/SPBE) is supported by a series of regulations. Presidential Instruction No. 3 of 2003 introduced the national policy and strategy for e-government development, while Presidential Regulation No. 95 of 2018 strengthened the governance, management, and service architecture of SPBE [7], [8]. Monitoring and evaluation are further regulated through the Minister of Administrative and Bureaucratic Reform Regulation No. 59 of 2020, and the principles of fast, transparent, and accountable public services are reinforced

by Law No. 25 of 2009 concerning Public Services [9], [10]. The national evaluation results also indicate increasing attention to SPBE performance across ministries and local governments [11].

At the local level, SPBE is expected to support better administrative performance, public service integration, and data-based governance. Ambon City has developed SPBE as part of regional digital transformation and smart city governance, including the strengthening of electronic signatures, digital archives, and service integration. The Office of Communication, Informatics, and Encryption of Ambon City has a strategic role because it manages information systems, digital infrastructure, data communication, and coordination among government units. Therefore, employee performance in this institution is directly related to the success of digital public service reform [12].

Previous studies have provided important foundations for understanding digital government. Mergel, Edelmann, and Haug conceptualized digital transformation as organizational change rather than mere technological adoption [13]. Vial emphasized that digital transformation reshapes organizational structures, processes, and value creation [14]. Haug, Dan, and Mergel showed that digitally induced change in the public sector produces both incremental and transformative effects [15]. Meanwhile, Moser-Plautz and Schmidhuber, Eom and Lee, Irani et al., and Crusoe et al. demonstrated that public sector digital transformation is strongly affected by organizational culture, legacy systems, institutional complexity, and the risk of decoupling between formal digital reform and actual organizational practice [16]-[19].

Despite these contributions, a specific research gap remains. Studies by Heeks and Fountain have long emphasized the institutional and socio-technical dimensions of e-government, while studies by DeLone and McLean and Venkatesh et al. explain information system success and technology acceptance [20]-[23]. However, these works do not specifically examine how SPBE and human resource capacity interact within small municipal government institutions in Eastern Indonesia. More recent studies on digital leadership, artificial intelligence adoption, and digital public service delivery also tend to focus on national or comparative contexts rather than the everyday learning processes of local civil servants [24]-[28]. Therefore, this study addresses the gap left by Heeks, Fountain, Mergel et al., Haug et al., and Adie et al. by examining how SPBE and human resource capacity jointly influence employee performance in the specific institutional context of Ambon City.

The novelty of this study lies in its effort to combine quantitative analysis with a socio-institutional interpretation of digital governance. Unlike studies that treat SPBE as only a technical system and human resource capacity as only an individual skill variable, this study positions SPBE as a socio-technical structure and human resource capacity as a collective learning process. This perspective is important because digital systems can only improve performance when employees develop shared understanding, adaptive competence, and new routines that support accountable public services [29], [30].

The urgency of this research is also practical. Local governments are increasingly dependent on digital systems to provide public services, but unequal infrastructure, limited digital literacy, and uneven organizational readiness can reduce the benefits of digital reform. In regions such as Ambon, digital transformation must be understood through the interaction between technology, human capacity, organizational learning, and local governance conditions. Thus, this study aims to analyze the influence of SPBE and human resource capacity on employee performance at the Office of Communication, Informatics, and Encryption of Ambon City, both partially and simultaneously, while explaining their implications for institutional capacity building and public service performance.

2. RESEARCH METHOD

2.1 Research Design

This study employed a quantitative research design using a survey method. The quantitative approach was selected because the study examines measurable relationships between independent variables and a dependent variable through statistical procedures [31], [32]. The independent variables are the Electronic-Based Government System (SPBE) (X1) and Human Resource Capacity (X2), while the dependent variable is Employee Performance (Y). This design enables the researcher to test whether SPBE and human resource capacity influence employee performance partially and simultaneously.

Although the study applies quantitative analysis, the interpretation of findings is connected to digital governance, socio-technical systems, and organizational learning. This approach allows statistical results to be discussed not only as numerical relationships but also as evidence of institutional change in local government organizations.

2.2 Research Location and Time

The research was conducted at the Office of Communication, Informatics, and Encryption of Ambon City. This location was selected purposively because the institution is responsible for supporting SPBE implementation, digital infrastructure, information management, and government communication services in

Ambon City. The study was carried out over a two-month period after the proposal seminar, covering instrument preparation, questionnaire distribution, data collection, statistical analysis, and report writing.

2.3 Research Instruments and Measurement Scale

The research instrument was a closed-ended questionnaire developed from the indicators of each variable. Closed-ended questionnaires were used to ensure response consistency and to facilitate numerical coding for regression analysis [33]. Each item was formulated as a positive statement and measured using a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. The use of a Likert scale is appropriate for measuring perceptions, attitudes, and self-reported organizational experiences in public administration research [34].

The instrument grid was developed to ensure alignment between research variables, theoretical indicators, and questionnaire items. This grid supports content validity by connecting each construct with measurable indicators before the instrument is distributed to respondents [35].

Table 1. Instrument grid of the study

Variable	Indicators	Item Numbers	Number of Items
Electronic-Based Government System (SPBE) (X1)	System integration, ease of use, service efficiency, data transparency, inter-unit coordination	1-5	5
Human Resource Capacity (X2)	Digital literacy, technical skills, adaptability to technology, training participation, problem-solving ability	6-10	5
Employee Performance (Y)	Work quality, work quantity, timeliness, responsibility, service responsiveness	11-15	5

2.4 Population, Sample, and Data Collection Techniques

The population of this study consisted of all 21 employees at the Office of Communication, Informatics, and Encryption of Ambon City. Because the population size was relatively small, all employees who met the research criteria were included as respondents. This approach allows the study to capture the perceptions of employees directly involved in SPBE-related administrative and technical work.

Data were collected through questionnaire distribution in printed or digital form. Completed questionnaires were checked for completeness, coded, and tabulated before analysis. Secondary data were obtained from regulations, institutional documents, SPBE evaluation materials, and relevant academic literature to support interpretation of the results.

2.5 Data Analysis Techniques

Data analysis was conducted using multiple linear regression to examine the influence of SPBE and human resource capacity on employee performance. Before hypothesis testing, validity and reliability tests were conducted to ensure measurement accuracy and internal consistency. Classical assumption tests, including normality, heteroscedasticity, multicollinearity, and autocorrelation tests, were also performed to ensure that the regression model met the requirements for unbiased estimation [36]-[38].

Hypothesis testing was conducted using the t-test to examine partial effects, the F-test to examine simultaneous effects, and the coefficient of determination (R²) to measure the explanatory power of the regression model. The statistical analysis was supported by statistical software, and the results were interpreted at a significance level of 0.05.

2.6 Research Procedures

The research procedures were conducted systematically to maintain methodological rigor. The process began with problem identification and literature review, followed by research framework development, hypothesis formulation, questionnaire construction, instrument testing, data collection, data coding and tabulation, assumption testing, regression analysis, interpretation, and research reporting. The procedure is illustrated in Figure 1.

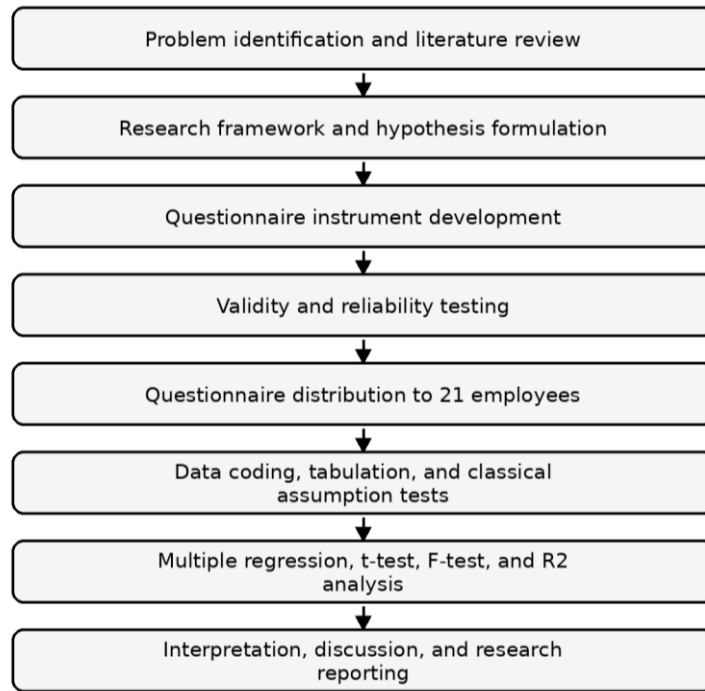


Figure 1. Research procedure flowchart

3. RESULTS AND DISCUSSION

This section presents the results of the statistical analysis and discusses their meaning in relation to digital governance, institutional capacity building, social learning, and public service performance. The analysis uses multiple linear regression, partial testing, simultaneous testing, and the coefficient of determination based on questionnaire data from 21 respondents.

3.1 Multiple Linear Regression Analysis

Multiple linear regression was used to determine the direction and magnitude of the relationship between SPBE implementation, human resource capacity, and employee performance. The results are presented in Table 2.

Table 2. Results of multiple linear regression analysis

Variable	Regression Coefficient (B)	Standard Error	t-value	Sig.
Constant	2.115	0.482	4.386	0.000
SPBE (X1)	0.387	0.124	3.121	0.005
Human Resource Capacity (X2)	0.452	0.137	3.298	0.004

Based on Table 2, the regression equation can be written as $Y = 2.115 + 0.387X_1 + 0.452X_2$. The positive coefficient of SPBE indicates that stronger implementation of electronic-based government systems contributes to higher employee performance. The positive coefficient of human resource capacity indicates that employees with stronger digital literacy, technical skills, adaptability, and problem-solving ability tend to demonstrate better performance.

These results show that performance improvement is not generated by technology alone. SPBE provides the digital structure for work coordination, while human resource capacity determines whether employees can use that structure productively. In socio-technical terms, organizational performance emerges from the interaction between technological arrangements and human capability rather than from either factor separately [39], [40].

3.2 Partial Hypothesis Testing (t-test)

The t-test was conducted to examine the individual effect of each independent variable on employee performance. The results are shown in Table 3.

Table 3. Results of t-test (partial test)

Variable	t-value	Sig.	Decision
SPBE (X1)	3.121	0.005	Significant
Human Resource Capacity (X2)	3.298	0.004	Significant

The significance value for SPBE is 0.005, which is lower than 0.05. This means that SPBE has a significant partial effect on employee performance. In practical terms, the use of digital systems helps employees complete work more efficiently, retrieve data more quickly, reduce manual errors, and coordinate tasks across units. These improvements contribute to better public service performance because administrative processes become more structured and accountable.

The significance value for human resource capacity is 0.004, also lower than 0.05. This confirms that human resource capacity significantly affects employee performance. Employees who possess better digital literacy and technical competence are more able to adapt to digital procedures, solve operational problems, and respond to service demands. This finding is consistent with public sector digital transformation literature emphasizing that human capability, training, and digital leadership are critical conditions for successful technology adoption [41]-[43].

3.3 Simultaneous Hypothesis Testing (F-test)

The F-test was performed to determine whether SPBE and human resource capacity simultaneously influence employee performance. The results are presented in Table 4.

Table 4. Results of F-test (simultaneous test)

Model	F-value	Sig.	Decision
Regression	18.742	0.000	Significant

Table 4 shows that the F-value is 18.742 with a significance value of 0.000. Since the significance value is below 0.05, SPBE and human resource capacity simultaneously have a significant effect on employee performance. This indicates that digital systems and employee capacity should be developed together. If SPBE is strengthened without adequate capacity building, implementation may become procedural. Conversely, if employee capacity improves without integrated systems, performance improvement may remain fragmented.

The simultaneous effect also has implications for institutional capacity building. SPBE encourages more standardized workflows, while human resource capacity enables employees to learn, adapt, and collaborate within those workflows. As a result, digital reform becomes part of institutional learning rather than merely an administrative requirement [44], [45].

3.4 Coefficient of Determination (R²)

The coefficient of determination was used to measure how much variation in employee performance can be explained by SPBE and human resource capacity. The results are shown in Table 5.

Table 5. Coefficient of determination

Model	R	R Square (R ²)	Adjusted R ²
1	0.821	0.674	0.642

The R Square value of 0.674 indicates that 67.4% of the variation in employee performance can be explained by SPBE and human resource capacity. The remaining 32.6% is influenced by other factors not examined in this study, such as leadership style, organizational culture, work motivation, budget support, infrastructure readiness, and inter-agency coordination.

The relatively high explanatory value indicates that digital systems and human resource capacity are important determinants of employee performance in the studied institution. However, the remaining unexplained variance also shows that digital transformation is complex. It depends not only on system availability and employee skills, but also on leadership, governance culture, trust, and continuous institutional support [46]-[48].

3.5 Discussion: SPBE, Social Learning, and Public Service Performance

The results confirm that SPBE significantly improves employee performance. This finding should be interpreted beyond technical efficiency. SPBE changes how employees communicate, document work, verify information, and coordinate service processes. In this way, digital systems function as institutional arrangements that reshape daily bureaucratic routines. Employees no longer rely solely on manual records or informal coordination; instead, they are encouraged to work through standardized digital procedures that increase traceability and accountability.

The finding that human resource capacity significantly affects performance also shows that digital transformation depends on learning. Capacity is not merely the possession of individual technical skills; it is formed through repeated practice, peer assistance, training, problem-solving, and adaptation to new work norms. This supports organizational learning theory, which argues that institutions improve when members collectively develop new knowledge and transform it into shared routines [49], [50]. In the context of the Office of Communication, Informatics, and Encryption of Ambon City, employee performance improves because digital competencies are gradually embedded into everyday administrative practices.

These results are in line with previous studies. Mergel et al. and Vial explain that digital transformation requires organizational change, while Haug et al. show that small digital changes can accumulate into broader institutional transformation [13]-[15]. Moser-Plautz and Schmidhuber also found that digital government transformation affects employee attitudes and organizational culture [16]. Similarly, Irani et al. and Crusoe et al. highlight that legacy systems, organizational resistance, and decoupling can reduce the effectiveness of public sector digital transformation [18], [19]. The present study supports these findings by showing that digital systems become effective when combined with human resource capacity and institutional learning.

The findings also have implications for public services. Improved employee performance can support faster administrative processing, more accurate data management, better coordination, and more responsive service delivery. Citizens indirectly benefit when employees can use digital systems efficiently and when data-based services reduce delays and errors. However, benefits may remain limited if digital reform is not accompanied by public-facing service integration, citizen education, and infrastructure strengthening. Therefore, SPBE should be connected to broader public service quality rather than measured only as internal administrative compliance.

This study contributes theoretically by reframing SPBE as a socio-technical system and human resource capacity as a learning process. Practically, it suggests that local governments should develop continuous training, mentoring, peer learning forums, and communities of practice. Capacity building should not be limited to one-time technical workshops. It should become a routine organizational mechanism that supports digital adaptation, problem solving, and innovation.

Nevertheless, this research has limitations. First, it focuses on one local government institution with a small number of respondents, so the results cannot be generalized to all local governments. Second, the quantitative design identifies statistical relationships but does not fully capture deeper cultural, political, or informal learning dynamics. Third, the study measures employee performance based on perceptions rather than long-term service outcome data. Future research should use mixed-method, comparative, and longitudinal designs to analyze how leadership, organizational culture, public trust, citizen participation, and service innovation mediate the relationship between SPBE and public service performance.

4. CONCLUSION

This study concludes that the Electronic-Based Government System (SPBE) and human resource capacity have positive and significant effects on employee performance at the Office of Communication, Informatics, and Encryption of Ambon City. The t-test results show that each variable has a significant partial effect, while the F-test results show that both variables simultaneously influence employee performance. The coefficient of determination indicates that SPBE and human resource capacity explain 67.4% of performance variation.

Substantively, the findings show that SPBE should be understood not only as a technological instrument but also as a socio-institutional system that restructures work coordination, data management, accountability, and service responsiveness. Human resource capacity is also not only an individual competency but a collective learning process through which employees adapt to digital governance reform. Therefore, improving public service performance requires the integration of digital infrastructure, human capacity development, organizational learning, and adaptive governance.

For policy practice, the Office of Communication, Informatics, and Encryption of Ambon City should strengthen continuous digital training, inter-unit mentoring, system integration, data governance, cybersecurity awareness, and performance monitoring. For future research, studies should involve multiple local governments, apply mixed-method approaches, examine additional variables such as leadership, organizational culture, public trust, citizen participation, and digital service innovation, and use longitudinal designs to assess the sustainability of SPBE-based institutional transformation.

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