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Research Article

From Bureaucracy to Efficiency: How Information Technology Utilization Enhances Accountability and Performance in North Sumatra's Provincial Government

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ABSTRACT

The utilization of information technology can enhance efficiency and accountability in public services, thereby boosting the performance of the North Sumatra provincial government. This study aims to analyze the impact of information technology utilization on the government's performance in North Sumatra Province, with accountability as a mediating variable. The study adopts a quantitative approach, using primary data collected from 294 personnel within the government of North Sumatra through purposive sampling. Analysis was conducted using the Structural Equation Model Partial Least Square (SEM-PLS) method with WarpPLS 8.0 software. The research findings reveal that the significant utilization of information technology improves the performance of the North Sumatra government through accountability, particularly in enhancing the efficiency and effectiveness of public services, data-driven decision-making, and better communication with the public. The implications of these findings suggest that the North Sumatra government should continue to promote the digitalization of public services through e-government systems. Therefore, there is a need for increased allocation of resources to enhance IT infrastructure across the region. The implementation of these policies should be supported by clear regulations governing the use of IT in government administration and public services. Stringent regulations on data security and public privacy must be enforced to safeguard the integrity of e-government systems and build strong public trust in government digital initiatives, thereby enhancing government performance that can directly contribute to achieving Sustainable Development Goals (SDGs), particularly in environmental-economic aspects.

Keywords: *Accountability, Information Technology Utilization, Government Performance*

JEL Classification: H1, H4, O3, G

INTRODUCTION

Government performance is often spotlighted in efforts to achieve sustainable development goals (Rahman, 2021). Globally, enhancing government performance is seen as crucial for achieving efficiency, effectiveness, and accountability in public service delivery (Boris, 2015). Good government performance encompasses not only efficient administrative task execution but also the ability to achieve broader strategic goals such as economic growth, societal well-being, and environmental sustainability (Abhayawansa et al., 2021). In Indonesia, particularly in North Sumatra Province, various issues related to government performance remain challenging, with slow and inefficient bureaucracy often hindering economic growth and optimal public service delivery.

According to the Audit Board of North Sumatra (BPK Sumatera Utara), the Unqualified Opinion (WTP) was obtained for 28 (eighty-two point thirty-five percent) of the Financial Statements of 34 (thirty-four) local governments in the Province of North Sumatra. The achievement of the provincial and district governments' opinions has exceeded the target of the bureaucratic reform activities in the accountability system of the provincial and district governments set in the RPJMN 2020-2024 respectively by 93.00% and 82.00% in 2022, while the achievement of the opinion of the City Government has not yet reached the RPJMN 2020-2024 target of 93.00% (BPK RI Perwakilan Provinsi Sumatera Utara, 2024). Nevertheless, these achievements indicate that most local governments in North Sumatra

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Research Article

have successfully conducted their administrative tasks transparently and accountably, in accordance with the standards set by the BPK. The WTP opinion obtained by the local governments is a crucial indicator in assessing financial performance and accountability. The WTP opinion indicates that the Financial Statements have been prepared in accordance with Government Accounting Standards (SAP) and there are no material deviations found. This WTP opinion reflects the commitment of local governments to maintain integrity and quality in financial reporting, directly supporting efforts to enhance government performance in delivering effective and efficient services to the public (Dachi et al., 2020 & Fathiyah & Putriana, 2020).

Government performance is often hindered by various factors such as inefficient bureaucracy, lack of transparency, and insufficient accountability, impacting sectors including environmental economics and sustainable development goals (SDGs) (Abhayawansa et al., 2021); (Auriacombe & Vyas-doorgapersad, 2019); (Meuleman, 2020, 2021); (Lincoln et al., 2020). Based on data, achieving SDG targets in this province still lags behind, especially in terms of environmental management and sustainable economic development. Data from the Central Statistics Agency (BPS) shows that in 2023, only 60% of the environmental management targets were achieved in North Sumatra (BPS-Statistics Indonesia, 2024a), while the poverty rate remains high at 9.8% according to BPS-Statistics Indonesia (2024b).

One of the key factors influencing government performance is the utilization of information technology (Laka & Suprasto, 2020); (Agustina et al., 2024); (Abdulkareem & Mohd Ramli, 2021). The use of information technology can create efficiency in various aspects of governance, including administrative processes, data management, and public services. The Resource-Based View (RBV) theory asserts that valuable, rare, and difficult-to-imitate resources (Madhani, 2009), such as information technology, can be a source of competitive advantage for organizations, including governments. Additionally, Information Economics theory emphasizes the importance of information technology in reducing information asymmetry and enhancing operational efficiency.

The utilization of information technology has the potential to create significant efficiencies. Information technology can help streamline bureaucratic processes, accelerate information flow, and improve coordination among departments (Addo, 2022). Previous studies indicate that the implementation of e-government systems can increase operational efficiency by up to 25% (Arendsen et al., 2014); (Santa et al., 2019). Accountability plays a crucial role as a mediating variable linking the use of information technology to government performance (Pratolo et al., 2018); (Laka & Suprasto, 2020); (Hutahayan, 2020); (Thi Tran et al., 2022). According to accountability theory, transparency in reporting and managing public resources is key to building public trust and enhancing government performance (Sofyani et al., 2020). Research by Fung (2015) shows that increasing accountability through information technology can enhance local government performance.

Several studies indicate a positive relationship between the use of information technology and government performance through accountability. For example, research by Kim et al., (2009) found that the use of information technology enhances accountability and ultimately government performance in South Korea. However, there are also conflicting studies, such as research by Bernstein & Rodríguez (2023), which suggests that information technology alone is not sufficient without accompanying bureaucratic reforms. This underscores the need for the use of information technology to be accompanied by efforts to enhance accountability and structural changes in bureaucracy to achieve optimal outcomes.

Thus, this study aims to further explore how the use of information technology can enhance efficiency and accountability, and ultimately the government performance of North Sumatra Province. This study will provide valuable insights for policymakers in designing more effective strategies to achieve sustainable development goals.

LITERATURE REVIEW

Information technology is defined as the infrastructure and applications that facilitate the collection, processing, storage, and dissemination of information within government (Cuary et al., 2024). Proper IT utilization can generate efficiency and effectiveness in public services, enable more informed decision-making, and foster better

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communication with the public (Brown & Toze, 2017). On the other hand, accountability refers to the government's responsibility to transparently answer for their policies, funds, and performance to the public (Khotami, 2017).

Stewardship theory emphasizes the importance of responsibly and efficiently utilizing resources to achieve organizational goals (Chrisman, 2019, Siahaan et al., 2024). This theory posits that managers (in this case, government officials) act as stewards responsible for the resources entrusted to the government, especially when there are systems that promote transparency and accountability (Keay, 2017). These findings support the Resource-Based View (RBV) theory, which suggests that valuable, rare, and difficult-to-imitate resources create competitive advantages (Madhani, 2009); (Gerhart & Feng, 2021). Information technology meets these criteria due to its requirement for significant investment and specialized skills for implementation and maintenance.

The utilization of information technology has the potential to create significant efficiencies. Information technology can help streamline bureaucratic processes, accelerate information flow, and improve coordination among departments (Addo, 2022). Previous studies indicate that the implementation of e-government systems can increase operational efficiency by up to 25% (Arendsen et al., 2014); (Santa et al., 2019). Accountability plays a crucial role as a mediating variable linking the use of information technology to government performance (Pratolo et al., 2018); (Laka & Suprasto, 2020); (Hutahayan, 2020); (Thi Tran et al., 2022). According to accountability theory, transparency in reporting and managing public resources is key to building public trust and enhancing government performance (Sofyani et al., 2020). Research by Fung (2015) shows that increasing accountability through information technology can enhance local government performance.

Several studies indicate a positive relationship between the use of information technology and government performance through accountability. For example, research by Kim et al., (2009) found that the use of information technology enhances accountability and ultimately government performance in South Korea. However, there are also conflicting studies, such as research by Bernstein & Rodríguez (2023), which suggests that information technology alone is not sufficient without accompanying bureaucratic reforms. This underscores the need for the use of information technology to be accompanied by efforts to enhance accountability and structural changes in bureaucracy to achieve optimal outcomes.

Research has shown that IT implementation in government not only enhances operational efficiency but also increases government accountability through strengthened transparency mechanisms. With e-government systems and social media platforms, governments can provide public services that are more accessible to citizens, such as identity document issuance and tax payment, which previously required slower and error-prone manual processes. Improved speed and accuracy in data management also enhance the government's ability to make timely and evidence-based decisions, aiding in prioritizing and allocating resources more efficiently.

Nevertheless, strong accountability ensures that the benefits of IT utilization are maximized for the public, minimizing the risks of corruption and abuse of power. Through open and accountable budget management and secure data handling, governments can build strong public trust and support the sustainable implementation of technology in delivering public services. Therefore, this literature review highlights the strategic integration of IT and accountability in designing inclusive and responsive public policies to meet the needs of society, particularly in the context of governance in North Sumatra Province.

Based on the literature review, the hypotheses of this research are:
H1: The utilization of information technology influences the performance of the North Sumatra Provincial Government.
H2: Accountability mediates the influence of information technology utilization on the performance of the North Sumatra Provincial Government.

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Research Article

METHODOLOGY

This study adopts a quantitative approach to investigate the impact of information technology utilization on government performance in North Sumatra. By collecting primary data from 294 human resources respondents working within the government of North Sumatra through purposive sampling method, the research aims to provide a comprehensive understanding of how IT implementation influences efficiency, effectiveness, and accountability of public services, as well as decision-making within the governmental environment. Analysis will employ the Structural Equation Model Partial Least Squares (SEM-PLS) method (Hair et al., 2022), using WarpPLS 8.0 software, enabling researchers to test complex relationships among variables in the model, thereby strengthening the validity of the research findings within the context of North Sumatra.

RESULTS

This study utilizes SEM-PLS to analyze relationships between variables and evaluate their convergent validity. Convergent validity ensures that indicators accurately represent the measured concepts. Convergent validity is assessed by factor loadings significant at 0.7.

Table 1. Loading Factor

Construct	Indicator	Y	X	Z	Critical Point	Conclusion
Y	Y1	**0.928**	0.021	-0.004	0.7	Valid
	Y2	**0.966**	0.006	-0.094	0.7	Valid
	Y3	**0.957**	-0.040	-0.040	0.7	Valid
	Y4	**0.953**	-0.018	0.022	0.7	Valid
	Y5	**0.941**	0.018	0.126	0.7	Valid
	Y6	**0.950**	0.009	0.008	0.7	Valid
	Y7	**0.905**	0.006	-0.016	0.7	Valid
X	X1	-0.002	**0.852**	0.048	0.7	Valid
	X2	0.027	**0.923**	-0.013	0.7	Valid
	X3	-0.061	**0.938**	-0.019	0.7	Valid
	X4	-0.044	**0.935**	0.013	0.7	Valid
	X5	-0.011	**0.853**	-0.066	0.7	Valid
	X6	0.068	**0.873**	0.060	0.7	Valid
	X7	0.016	**0.864**	0.010	0.7	Valid
	X8	0.012	**0.869**	-0.033	0.7	Valid
Z	Z1	0.030	0.026	**0.903**	0.7	Valid
	Z2	-0.012	0.030	**0.930**	0.7	Valid
	Z3	0.015	-0.020	**0.922**	0.7	Valid
	Z4	-0.025	0.015	**0.960**	0.7	Valid
	Z5	0.041	-0.126	**0.894**	0.7	Valid
	Z6	-0.014	0.056	**0.858**	0.7	Valid
	Z7	-0.031	0.018	**0.961**	0.7	Valid

The testing results in Table 1 show variation in the outer loading values for each indicator on its latent variable. Indicators with outer loading values above 0.70 are classified as valid and suitable for further analysis.

Good convergent validity is indicated by a high AVE (Average Variance Extracted) value. This demonstrates that one latent variable can explain more than half of the average variance of the indicators. AVE values generally should be above 0.5 to indicate good convergent validity.

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Table 2. Average Variance Extracted (AVE)

Variable	AVE	Critical Point	Conclusion
GOVP (Y)	0.889	0.5	Good Validity
ITG (X)	0.790	0.5	Good Validity
ACCT (Z)	0.844	0.5	Good Validity

The analysis results of the Average Variance Extracted (AVE) values indicate that all AVE values for each construct are above 0.5. This suggests good convergent validity, indicating the strength of the constructs in explaining the variance of related indicators.

Discriminant validity testing is conducted to ensure that each measured construct has clear differentiation from other constructs in their interrelationships. On the other hand, AVE testing ensures that the variance measured by the construct is greater than the variance measured by other variables.

Table 3. Fornell-Larcker Criterion

Construct	GOVP (Y)	ITG (X)	ACCT (Z)
GOVP (Y)	**0.943**	0.456	0.560
ITG (X)	0.456	**0.889**	0.071
ACCT (Z)	0.560	0.071	**0.919**

Through the Fornell-Larcker criterion analysis, as shown in Table 3, it can be concluded that all constructs in the research model have good discriminant validity. This is evidenced by the higher Average Variance Extracted (AVE) values (on the diagonal) compared to the inter-construct correlations (off-diagonal). Higher AVE values indicate that each construct is unique and distinct from others, confirming its discriminant validity.

The next step is the Reliability test, which consists of Composite Reliability and Cronbach's Alpha, to ensure the reliability of indicators in measuring a construct.

Table 4. Cronbach's Alpha and Construct Reliability

Variable	Cronbachs Alpha	Critical Point	Composite Reliability	Critical Point	Conclusion
GOVP (Y)	0.979	0.6	0.983	0.7	Reliable
ITG (X)	0.962	0.6	0.968	0.7	Reliable
ACCT (Z)	0.969	0.6	0.974	0.7	Reliable

The reliability levels of each construct in this study were analyzed using two methods, namely Cronbach's Alpha and Composite Reliability. The analysis results indicated values reflecting the reliability levels of each construct. All constructs in the table exhibited Cronbach's Alpha values above 0.6 and Composite Reliability values above 0.7. This provides strong evidence that each construct and dimension has sufficient reliability in measuring its variables.

The R-squared analysis in this study aimed to determine how much the independent variables could explain the variance in the dependent variables. The interpretation of the R-squared values in this study categorizes them as high (0.67), moderate (0.33), and low (0.19).

Table 5. R-Square

Variable	R-square	Adjust R-square	Criteria
Audit Quality	0.543	0.540	Moderate Effect

The analysis in Table 5 shows an R-squared value of 0.540 for the variation in the performance of the North Sumatra

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government, categorized as a Moderate Effect. This indicates that the independent variable, accountability, significantly mediates the influence of technology information utilization in explaining 54% of the variance in the performance of the North Sumatra government.

The selection of the Partial Least Squares (PLS) method in this study aims to build a model and formulate hypotheses. Hypothesis testing was conducted at a significance level of 0.05. The following table will present detailed results of the hypothesis testing.

Table 6. Estimation Result

Path	β	P
Technology Information Utilization → Government Performance	0.381	<0.001
Technology Information Utilization → Accountability → Government Performance	0.560	<0.001

Based on the research findings presented in Table 6, it is evident that technology information utilization positively influences the performance of the North Sumatra government, with a p-value of 0.001 and a path coefficient (β) of 0.381. Additionally, accountability mediates the influence of technology information utilization on the performance of the North Sumatra government, with a p-value of 0.001 and a path coefficient (β) of 0.560. This indicates that increased use of information technology can enhance government performance through improved accountability. Information technology facilitates more efficient workflow processes, faster and more accurate data access, and higher transparency in administrative functions. Consequently, this strengthens accountability through better monitoring and reporting, which in turn contributes to overall government performance improvement. Therefore, investing in information technology and enhancing accountability represent significant strategic steps to enhance government performance in North Sumatra.

4. DISCUSSION

This research finds that the utilization of information technology (IT) has a positive and significant impact on the performance of the North Sumatra government. Information technology, as a crucial resource, can assist governments in enhancing the efficiency and effectiveness of public services, decision-making, and communication with the public. The use of e-government systems can expedite administration processes and increase transparency. With online public service portals, citizens can access various services such as ID card issuance, tax payments, and business permit applications without needing to visit government offices. This not only saves time and costs but also reduces opportunities for corruption as each transaction can be digitally tracked and audited. Therefore, the utilization of information technology not only enhances the efficiency and effectiveness of public services but also improves public satisfaction with government performance.

The use of management information systems (MIS) also aids governments in gathering and analyzing necessary data for informed, data-driven decision-making. With accurate and real-time data, governments can make more informative and strategic decisions. For example, the use of analytical dashboards allows government officials to monitor budget expenditures, program performance, and development indicators in greater detail, identifying areas needing budget adjustments. With accurate and current data, decisions can be made faster and more accurately, enhancing accountability and transparency in government decision-making. Furthermore, the use of social media and government websites facilitates more effective and efficient communication with the public. Through these platforms, governments can disseminate critical information, gather input from citizens, and promptly address concerns or inquiries. Governments can also provide updates on policies, programs, or emergency situations via social media, reaching a wide audience quickly. This increases government transparency and accountability while building public trust. For instance, during the COVID-19 pandemic, many local governments used social media to provide updates on case developments and health protocols.

This research also finds that accountability mediates the impact of IT utilization on the performance of the North Sumatra government. Accountability, as a critical internal resource, ensures that IT utilization is conducted responsibly and ethically, thereby maximizing its benefits to government performance. With transparent and easily

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Research Article

auditable systems, government employees are more accountable in carrying out their duties. The mediating role of accountability in the relationship between IT utilization and the performance of the North Sumatra government can be seen in several aspects. For example, e-budgeting ensures that budgets are used transparently and efficiently, minimizing the potential for corruption and misuse of funds. Accountability in managing citizens' personal data ensures the security and confidentiality of such data, enhancing public trust in government IT usage. Additionally, accountability in the use of social media ensures that information conveyed by the government is accurate and trustworthy, enhancing the government's image in the eyes of the public.

The effective use of information technology by the North Sumatra government can directly contribute to achieving Sustainable Development Goals (SDGs), particularly in environmental and economic aspects. For instance, the implementation of e-government systems facilitating online administrative processes, such as ID card issuance and tax payments, reduces paper usage and carbon emissions from public transportation required for physical visits to government offices. This supports SDG 13 on climate action and SDG 15 on terrestrial ecosystems. Furthermore, the use of IT in e-budgeting and e-planning allows for more transparent and accurate budget management for environmental projects, such as waste management and natural resource conservation. With better oversight and reporting through digital platforms, governments can ensure that funds allocated for environmental projects are used efficiently and effectively, reducing wastage and preventing corruption. Additionally, online communication platforms like social media and government websites enable public participation in discussions and decision-making regarding environmental policies, enhancing government accountability and public participation. Government initiatives in using technology to monitor and report air and water quality provide real-time data to the public, prompting immediate action to address environmental issues and supporting SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action).

These findings support the Stewardship theory, which emphasizes the responsible and efficient use of resources to achieve organizational goals. This theory posits that managers (in this case, government officials) act as stewards responsible for the resources entrusted to the government, especially when systems promote transparency and accountability (Keay, 2017). These findings also support the Resource-Based View (RBV) theory, which states that valuable, rare, and difficult-to-imitate resources lead to competitive advantage (Madhani, 2009). Information technology meets these criteria as it requires significant investment and specialized skills for implementation and maintenance.

Several recent studies also support these findings. A study by Sofyani et al. (2020) shows that IT implementation in the public sector enhances operational efficiency and public trust through transparency and accountability. Another study by Pratolo et al. (2018) found that accountability strengthens the positive impact of IT on organizational performance by ensuring ethical and responsible IT use. Addo (2022) found that IT implementation in the public sector significantly improves organizational performance through increased efficiency and transparency.

Based on these findings, this research reveals that the effective utilization of information technology (IT) significantly enhances the performance of the North Sumatra government, particularly in terms of efficiency and effectiveness of public services, data-driven decision-making, and better communication with the public. The implications of these findings are that the North Sumatra government should continue to promote the digitization of public services through e-government systems. With the implementation of online public service portals, citizens can access services such as ID card issuance, tax payments, and business permits more quickly and transparently, reducing time and costs and minimizing potential corruption as all transactions are digitally recorded. Furthermore, the use of management information systems (MIS) enabling real-time data analysis will assist the government in making more accurate and strategic decisions, such as through analytical dashboards to monitor budget expenditures and program performance.

Policy recommendations can be formulated to strengthen implementation and broader benefits. First, governments need to allocate more resources to improve IT infrastructure across all regions, including network upgrades and hardware updates, as well as increasing accessibility for remote populations. With reliable infrastructure, e-

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government services can operate efficiently and enhance overall public service quality. Second, it is crucial for governments to develop sustainable training and development programs for IT human resources among government employees. This includes enhancing technical skills in information system management and raising awareness of ethics and security in managing public data. This reinforcement will support better data-driven decision-making and ensure that the benefits of information technology are evenly felt across all layers of society.

Implementation of these policies should also be supported by clear regulations regarding the use of IT in government administration and public services. Strict regulations on data security and public privacy need to be enforced to maintain the integrity of e-government systems and build strong public trust in government digital initiatives. Additionally, intensive socialization of the benefits of IT utilization in everyday life should continue to increase participation in available digital services. In this way, the North Sumatra government can optimize the positive impact of information technology in enhancing service quality, transparency, and accountability in performing administrative tasks and laying a solid foundation for achieving sustainable development goals in the future.

CONCLUSION

The findings of this research reveal that the utilization of Information Technology (IT) significantly enhances the performance of the North Sumatra government, particularly in the aspects of public service efficiency and effectiveness, data-driven decision-making, and improved communication with the public. The implications of these findings underscore the need for the North Sumatra government to continue promoting the digitization of public services through e-government systems. Therefore, the government should allocate more resources to enhance IT infrastructure across the region, including network upgrades, hardware updates, and improved accessibility. The implementation of these policies must be supported by clear regulations governing the use of IT in government administration and public services. Stringent regulations on data security and public privacy need to be enforced to uphold the integrity of e-government systems and build strong public trust in government digital initiatives, thereby fostering government performance that can directly contribute to achieving Sustainable Development Goals (SDGs), especially in the realm of environmental economic aspects.

AUTHOR CONTRIBUTIONS

Conceptualization:
Data curation:
Formal analysis:
Investigation:
Methodology:
Project administration:
Supervision:
Validation:
Software:
Resources:
Visualization:
Writing - original draft:
Writing - review & editing:

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