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The Role of STOPE Framework in the Effectiveness of E-Catalog at the Ministry of Public Works and Public Housing

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ABSTRACT

The implementation of sectoral e-catalogs is a crucial part of government procurement reform, aiming to enhance transparency, accountability, and efficiency. However, its effectiveness still encounters several challenges in practice. Understanding the influencing factors is essential for optimizing the system.. This study adopts a quantitative approach using a survey method. The respondents are employees of the Ministry of Public Works and Public Housing who are directly involved in the management and use of sectoral e-catalogs. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the STOPE (Strategy, Technology, Organization, People, Environment) framework as the theoretical basis. The findings reveal that strategic, technological, organizational, and people-related factors have a positive and significant effect on the effectiveness of sectoral e-catalog implementation. In contrast, environmental factors did not show a significant impact. The results highlight the importance of strengthening internal capacity and alignment across strategic, technological, organizational, and human resource dimensions to improve e-catalog performance. These insights are valuable for developing more adaptive and responsive electronic procurement policies in the public sector.

KEYWORDS *sectoral e-catalog, procurement of goods and services, STOPE, effectiveness*

INTRODUCTION

The digital transformation of the public sector has become increasingly crucial amid rapid technological advancements. In Indonesia, this transformation is exemplified by the implementation of electronic procurement (e-procurement) and e-purchasing systems based on the electronic catalog (e-catalog). This policy is mandated by Presidential Instruction No. 1 of 2015, which emphasizes accelerating the adoption of e-procurement as a strategic effort to enhance transparency, accountability, and efficiency in public procurement governance (Maytandi & Abbas, 2020; Kartika, 2022).

The e-catalog system is considered a key instrument in procurement reform, aiming to mitigate corruption risks and improve the quality of public service delivery. By enabling digital audit trails and streamlining transaction processes, digital procurement systems increase process integrity and reduce procurement cycle times (Rashid & Uddin, 2023; Kumar et al., 2023). The Ministry of Public Works and Public Housing is one of the primary implementers of the sectoral e-catalog policy, in line with the 2023–2024 National Strategy for Corruption Prevention (STRANAS-PK).

Despite achievements such as e-purchasing transactions totaling IDR 20.94 trillion in the 2023 fiscal year, the implementation of sectoral e-catalogs still faces various challenges. These include mismatches in product specifications, limited technical human resources, vulnerability to data manipulation, and weak verification mechanisms, all of which can lead to procurement fraud (ICW, 2023; Kompas, 2023). Audit findings and corruption cases highlight the urgency of strengthening the system's effectiveness.

This study focuses on analyzing the effectiveness of sectoral e-catalog implementation in government procurement at the Ministry of Public Works and Public Housing. Effectiveness is assessed through the extent to which the system achieves its policy goals, supports inter-organizational integration, and adapts to external environmental changes. The research applies the STOPE model (Strategy, Technology, Organization, People, Environment), an extension of the Technology-

Organization-Environment (TOE) framework that incorporates strategic and human resource factors critical to technological innovation success in public institutions (Bakry, 2004; Al-Osaimi et al., 2008).

The objective of this study is to examine the influence of each STOPE element on the effectiveness of the sectoral e-catalog system at the Ministry of Public Works and Public Housing. The study employs a quantitative approach using a survey method with employees directly involved in the management and use of the system. The findings are expected to make several contributions. Theoretically, this research contributes to the literature on public sector digital procurement by expanding the use of STOPE in assessing system effectiveness. Practically, it offers insights into key improvement areas in system implementation. From a policy perspective, the results provide recommendations to enhance the design and execution of sectoral e-catalogs in Indonesia's public procurement context.

Literature Review and Hypothesis Development

New Public Management (NPM)

The concept of New Public Management (NPM) introduced by Christoper Hood in 1991 provides a new outlook on management reform in the public sector. Implementing NPM in public sector organizations introduces the concept of performance. According to Lane (2000), NPM is a management approach that aims to improve efficiency, effectiveness, and accountability in delivering public services. This concept adopts management principles from the private sector to be applied in public sector administration, emphasizing achieving performance targets, optimizing the use of resources, and improving the quality of services to the community.

Another understanding expressed by Pollitt and Bouckaert (2017) is that NPM focuses on performance and achievement of targets as an instrument to assess the effectiveness of public services. With a structured performance measurement system, public organizations are expected to be more oriented towards achieving expected results and increasing accountability to the community. In addition, the implementation of NPM aims to strengthen public administration's responsiveness to citizens' needs by implementing indicators such as economic efficiency, effectiveness (value for money), flexibility, choice, and transparency in the public sector.

Procurement System Effectiveness and STOPE Model

Effectiveness is the level at which an organization's goals are achieved (Steers, 1980; Duncan, 1973). In public procurement, effectiveness includes achieving strategic objectives such as cost efficiency, transparency, and system adaptability (Siagian, 1978; Mardiasmo, 2009). The effectiveness measurement model used in this study refers to the approach of Duncan (1973), namely:

1. Goal Attainment: Measures the extent to which an organization or policy has succeeded in achieving the goals and objectives that have been set.
2. Integration refers to the organization's ability to create good internal and external coordination and build communication and consensus between work units.
3. Adaptation: Assessing the organization's ability to respond to changes in the environment, both in terms of technology, policies, and user needs.

To explain the determinants of effectiveness in the context of electronic procurement, this study uses the STOPE (Strategy, Technology, Organization, People, Environment) model developed by Bakry (2004) as a development of the TOE (Technology, Organization, Environment) model by Tornatzky and Fleischer in 1990 in their book entitled The Processes of Technological Innovation. The STOPE model provides a more comprehensive approach by adding the dimensions of strategy and human resources as determinants of the successful implementation of technology systems in public sector organizations.

This model has been widely used in the analysis of e-government readiness (Al-Osaimi et al., 2008; Choi et al., 2016; Nani & Ali, 2020).

The TOE model is considered to have several limitations that are relevant to the context of the implementation of digital procurement systems in the public sector. First, the TOE model has not explicitly included strategy factors that affect implementation success. Policy strategies and leadership commitments are important cornerstones of public procurement practice to encourage technology adoption. Second, the TOE model also does not include specific human resource aspects, even though human resource capabilities, competencies, and awareness are crucial factors in supporting the sustainability of the digital system. Therefore, using the STOPE model is more appropriate because it can accommodate these two additional elements, thus providing a more holistic analysis of the effectiveness of the sectoral e-catalog system.

In more detail, the five domains of STOPE can be described as follows:

1. Strategy: includes the vision, mission, policy direction, and strategic planning of the organization in supporting the use of information technology. This domain assesses leaders' commitment and the extent to which the organization's strategy aligns with digital transformation goals.
2. Technology: relates to the available information technology infrastructure, including hardware, software, networks, and other supporting systems. The assessment includes technical readiness and technological sustainability.
3. Organization: This domain includes the organizational structure, internal regulations, management systems, and governance that support the implementation of technology. It evaluates leadership roles, interunit coordination, and the completeness of supporting policies.
4. People: focus on human resources competence, awareness, and involvement in supporting the digital system. This includes training, digital literacy, and adequate personnel availability.
5. Environment refers to external factors such as government policy support, laws and regulations, market conditions, and socio-political pressures that affect the implementation of digital systems.

Previous studies have shown that the five dimensions of STOPE influence the success of information technology adoption, including in e-procurement. Choi et al. (2016) highlight that organizational and environmental factors are the primary keys in developing countries. Meanwhile, Nani and Ali (2020) found that a clear strategy and competent human resource support significantly contribute to the effectiveness of e-procurement in Indonesia.

Concerning the theoretical framework and empirical findings, this study is designed to analyze how each element in the STOPE model affects the effectiveness of implementing sectoral e-catalogs in the Ministry of Public Works and Public Housing. Each variable in the STOPE model has the following indicators: (1) Strategy: indicators include policy suitability with the goals of digitalization, leadership support, and strategic planning; (2) Technology: indicators consist of IT infrastructure availability, system ease, data security, and application reliability; (3) Organization: indicators include organizational structure, internal SOPs, interunit coordination roles, and supervision systems; (4) People: indicators include human resource competence, user participation, training, and work motivation; (5) Environment: indicators consist of external regulations, market pressures, stakeholder support, and legal compliance.

Based on the literature review above, the development of this research hypothesis is formulated as follows:

H1: Strategy has a positive effect on the effectiveness of implementing sectoral e-catalogs in the procurement of government goods and services.

H2: Technology has a positive effect on the effectiveness of implementing sectoral e-catalogs in the procurement of government goods and services.

H3: Organizations have a positive effect on the effectiveness of implementing sectoral e-catalogs in the procurement of government goods and services.

H4: People positively affect the effectiveness of implementing sectoral e-catalogs in procuring government goods and services.

H5: The environment positively affects the effectiveness of implementing sectoral e-catalogs in the procurement of government goods and services.

RESEARCH METHODS

Types of Research

This study uses a causal quantitative research design that aims to explain the position of the variables being studied and identify the relationships between variables according to the hypothesis that has been formulated. Causal research is used to analyze the relationship or influence (cause-effect) of two or more phenomena through hypothesis testers (Bogie & Sekaran, 2020). This study employed a quantitative survey design to examine how strategic, technological, organizational, human, and environmental factors influence the effectiveness of sectoral e-catalog implementation in government procurement. The research was conducted at the Ministry of Public Works and Public Housing.

Respondents and Sampling

The population in this study is employees of the Ministry of Public Works and Public Housing who procure goods and services through sectoral e-catalogs. The sample extraction technique in this study uses judgment sampling, which involves selecting subjects who are in the most advantageous position or in the best position to provide the information needed (Bougie & Sekaran, 2020). The sample size in this study uses the concept of Rules of Thumb, which is a minimum of 90 respondents.

Data Collection

Data were collected using a structured questionnaire distributed via an online survey platform. The questionnaire used a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) and included items adapted from previous validated research instruments.

Variable and Measurements

The independent variables include five dimensions from the STOPE model: Strategy, Technology, Organization, People, and Environment. The dependent variable is the effectiveness of sectoral e-catalog implementation, measured through goal achievement, inter-organizational integration, and adaptability. Each construct was operationalized using indicators from prior studies (e.g., Al-Osaimi et al., 2008; Duncan, 1973; Nani & Ali, 2020).

Al-Osaimi et al. (2008) explained that the strategy domain focuses on the overall direction and planning related to developing and utilizing Information and Communication Technology (ICT) in an organization. The technology domain focuses on the current conditions related to ICT facilities in an organization. Domain organization focuses on the current conditions related to ICT regulation and management. The people domain focuses on the current conditions related to users and ICT expertise in an organization. The environment domain focuses on non-ICT conditions that affect an organization's ICT state.

Table 1. Variable Operational Matrix

Variable	Indicators	Reference
The Effectiveness of the Implementation of E-Catalog in the Procurement of Government Goods and Services (Y)	Goal Achievement Integration Adaptation	(Duncan, 1973); (Jannah & Widiyarta, 2023)
Strategy (X1)	Leadership Development plan	(Al-Osaimi et al., 2008); (Nani & Ali, 2020); (Prasetyo, 2019)
Technology (X2)	Information technology readiness User experience and satisfaction System integration Security and privacy	(Al-Osaimi et al., 2008); (Nani & Ali, 2020); (Prasetyo, 2019); (Luo et al., 2023)
Organization (X3)	Government regulations Collaborate ICT Management	(Al-Osaimi et al., 2008); (Nani & Ali, 2020); (Prasetyo, 2019); (Luo et al., 2023)
People (X4)	Awareness Education and training Qualifications and employment Skills management	(Al-Osaimi et al., 2008); (Nani & Ali, 2020); (Prasetyo, 2019)
Environment (X5)	Knowledge Infrastructure Resources	(Al-Osaimi et al., 2008); (Nani & Ali, 2020); (Prasetyo, 2019); (Luo et al., 2023)

Data Analysis

Data analysis was carried out using Structural Equation Modeling (SEM) based on Partial Least Square (PLS) with the help of SmartPLS 4 software. The data analysis technique in this study uses the Structural Equation Modeling (SEM) approach with the Partial Least Square (PLS) method through SmartPLS 4 software. SEM-PLS was chosen because it can handle complex models with many constructs and indicators and is suitable for data analysis with moderate sample counts. The analysis steps start with evaluating the measurement model (outer model) to test the validity and reliability of the construct, then continue with the evaluation of the structural model (inner model) to test the relationship between variables.

The evaluation of the outer model was carried out by assessing the indicators through the loading factor value (>0.7), the Average Variance Extracted (AVE >0.5) value for convergent validity, and the Composite Reliability (CR) and Cronbach Alpha values (both >0.7) for the reliability test. After the measurement model is declared valid and reliable, the analysis is continued to the inner model to assess the path coefficient, the significance of the relationship between variables (using t-statistical and p-

value), and the R-square value to measure the contribution of independent variables to the dependent variables. The hypothesis test was carried out at a significance level of 5%.

RESULTS AND DISCUSSION

Description of Research Object

Data was collected by distributing a questionnaire in a Google form from April 28 to May 9, 2025. The questionnaire was distributed online via the WhatsApp application to e-catalog users. Of the total 144 respondents who filled out the questionnaire, 14 questionnaires were not used because the researcher considered the existence of a biased response style, namely extreme response style (ERS), which means the tendency of respondents to choose extreme responses on a scale of 1 or 5, for example strongly disagree or strongly agree as many as 12 respondents, the second response style bias is the middle response style (MRS) which means that respondents tend to choose responses in the middle of the scale (e.g. neutral or scale 3) as many as two respondents, so that the total number of respondents to be used in this study is 130 respondents.

Table 2. Respondent Demographics

No	Information	Sum	Percentage
1	**Position**	**130**	**100%**
	Commitment Making Officer (PPK)	38	29%
	Head of Work Unit	28	22%
	Procurement Office	25	19%
	Implementation Team of the Internal Compliance Unit (UKI) Prevention and Complaints Working Group on Prevention Sub-Working Group	1	1%
	E-Purchasing E-Purchasing E-Catalog Companion Team	4	3%
	Other Technical Teams	34	26%
2	**Organizational Units**	**130**	**100%**
	Directorate General of Water Resources	18	14%
	Directorate General of Highways	74	57%
	Directorate General of Creative Work	38	29%
3	**Gender**	**130**	**100%**
	Man	88	68%
	Woman	42	32%
4	**Final Education**	**130**	**100%**
	S3	0	-
	S2	66	51%
	S1/D4	61	47%
	D3/SMA/SMK	3	2%

The number of male respondents was greater than that of women, with 88 people (68%) and 42 people (32%), respectively. Respondents were spread across various organizational units in the Ministry of Public Works, where the most significant number of respondents came from the Directorate General of Highways, which had 74 respondents (57%). More than half of the total number of respondents had

51% of the last education of S2, followed by S1/D4 as much as 47% and D3/SMA/SMK as much as 2%.

Testing Measurement Model (Outer Model)

Table 3. Average Variance Extracted (AVE) Value

Variable	Indicators	AVE	Result
The Effectiveness of the Implementation of Sectoral E-Catalog in the Procurement of Government Goods and Services (EK)	EK1	0,660	Valid
	EK2		Valid
	EK3		Valid
	EK4		Valid
	EK5		Valid
	EK6		Valid
	EK7		Valid
	EK8		Valid
	EK9		Valid
Strategy (STR)	STR1	0,671	Valid
	STR2		Valid
	STR3		Valid
	STR4		Valid
	STR5		Valid
	STR6		Valid
	STR7		Valid
Technology (TECH)	TECH1	0,647	Valid
	TECH2		Valid
	TECH3		Valid
	TECH4		Valid
	TECH5		Valid
	TECH6		Valid
	TECH7		Valid
	TECH8		Valid
Organization (ORG)	ORG1	0,727	Valid
	ORG2		Valid
	ORG3		Valid
	ORG4		Valid
	ORG5		Valid
	ORG6		Valid
People (PEO)	PEO1	0,624	Valid
	PEO2		Valid
	PEO3		Valid
	PEO4		Valid
	PEO5		Valid

Variable	Indicators	AVE	Result
Environment (ENV)	ENV1	**0,684**	Valid
	ENV2		Valid
	ENV3		Valid
	ENV4		Valid
	ENV5		Valid

The results of the convergent validity test in Table 3 show that the AVE value of all variables used is above 0.50. Thus, the magnitude of the variation of the variable measurement indicator is greater than 0.50, which has met the convergent validity test.

Table 4. Criterion Heterotrait-Monotrait Ratio (HTMT) Value

Variable	OAK	ENV	ORG	PEO	STR	TECH	Result
The Effectiveness of the Implementation of Sectoral E-Catalog in the Procurement of Government Goods and Services (EK)							Valid
Environment (ENV)	0,408						Valid
Organization (ORG)	0,715	0,223					Valid
People (PEO)	0,808	0,380	0,641				Valid
Strategy (STR)	0,685	0,347	0,500	0,565			Valid
Technology (TECH)	0,707	0,327	0,438	0,610	0,550		Valid

The test of discriminant validity can be seen from the value of the heterotrait-monotrait ratio (HTMT). The minimum acceptable HTMT is below 0.85. The results of the discriminant validity test in Table 4 indicate that the HTMT value for all variable pairs is below 0.85. This indicates that all the variables are different and shows all the valid variables.

Table 5. Outer Loading Value

Variable	Indicators	Outer Loading	Result
The Effectiveness of the Implementation of Sectoral E-Catalog in the Procurement of Government Goods and Services (EK)	EK1	0,749	Reliable
	EK2	0,795	Reliable
	EK3	0,845	Reliable
	EK4	0,784	Reliable
	EK5	0,842	Reliable
	EK6	0,870	Reliable
	EK7	0,795	Reliable
	EK8	0,825	Reliable
	EK9	0,798	Reliable
Strategy (STR)	STR1	0,807	Reliable
	STR2	0,834	Reliable
	STR3	0,765	Reliable
	STR4	0,785	Reliable
	STR5	0,787	Reliable

Variable	Indicators	Outer Loading	Result
	STR6	0,814	Reliable
	STR7	0,734	Reliable
Technology (TECH)	TECH1	0,815	Reliable
	TECH2	0,808	Reliable
	TECH3	0,838	Reliable
	TECH4	0,740	Reliable
	TECH5	0,839	Reliable
	TECH6	0,851	Reliable
	TECH7	0,886	Reliable
	TECH8	0,833	Reliable
Organization (ORG)	ORG1	0,831	Reliable
	ORG2	0,772	Reliable
	ORG3	0,831	Reliable
	ORG4	0,789	Reliable
	ORG5	0,865	Reliable
	ORG6	0,732	Reliable
People (PEO)	PEO1	0,823	Reliable
	PEO2	0,863	Reliable
	PEO3	0,830	Reliable
	PEO4	0,870	Reliable
	PEO5	0,875	Reliable
Environment (ENV)	ENV1	0,846	Reliable
	ENV2	0,802	Reliable
	ENV3	0,834	Reliable
	ENV4	0,846	Reliable
	ENV5	0,767	Reliable

The results of the indicator reliability test are in Table 5. show that the outer loading value of all indicators is above 0.70, so the indicators on each variable can be used as a research instrument.

Table 6. Cronbach's Alpha and Composite Reability Values

Variable	Cronbach's Alpha	Composite Reability	Result
The Effectiveness of the Implementation of Sectoral E-Catalog in the Procurement of Government Goods and Services	0,935	0,946	Reliable
Strategy	0,880	0,911	Reliable
Technology	0,891	0,917	Reliable
Organization	0,906	0,930	Reliable
Browse	0,899	0,921	Reliable

Variable	Cronbach's Alpha	Composite Reability	Result
Environment	0,934	0,945	Reliable

The internal consistency reliability test results in Table 6. above show Cronbach's Alpha and Composite reliability values for all variables above 0.7. This indicates that all variables have met the minimum threshold value of internal consistency reliability. Based on the evaluation of the measurement model (outer model), the variables and indicators have met the tests of convergent validity, discriminant validity, and reliability so that it can be concluded that the measurement model built has been well demonstrated with valid and reliable measurement results.

Structural Model Testing (Inner Model)

Table 7. Inner VIF (Variance Inflated Factor) Value

Variable	OAK	ENV	ORG	PEO	STR	TECH
The Effectiveness of the Implementation of Sectoral E-Catalog in the Procurement of Government Goods and Services						
Environment	1,182					
Organization	1,581					
Browse	2,016					
Strategy	1,598					
Technology	1,633					

Multicollinearity is a statistical phenomenon often found in which two or more independent variables in a multiple regression model have a very high correlation (Bougie & Sekaran, 2020). The common limit value is a tolerance value of 0.10, equivalent to a VIF of 10. Based on Table 7, the variables used in this study were found to have multicollinearity.

Table 8. R-Square Value

Variable	R-Square	R-Square Adjusted
The Effectiveness of the Implementation of Sectoral E-Catalog in the Procurement of Government Goods and Services	0,742	0,732

The R-Square Adjusted value on the dependent variable of the effectiveness of implementing sectoral e-catalogs in procuring government goods and services shown in Table 8 is 0.732. This indicates that the variables of strategy, technology, organization, human resources, and the environment can explain the dependent variables by 73.2%.

Hypothesis Testing

Hypothesis testing was carried out through bootstrapping analysis on SmartPLS by looking at the p-value (≤ 5%) and t-statistics (> 1.65) for the one-way test. The relationships between variables are judged from the path coefficient, where values close to -1 or 1 indicate a strong negative or positive relationship.

Table 9. Path Coefficients, T-Statistic and P-Value Values

Hypothesis	Line	Path Coefficients	T-value	p-value	Decision
H1	STR → EK	0,182	2,380	0,017	Accepted
H2	TECH → EK	0,262	2,397	0,017	Accepted
H3	ORG → EK	0,273	3,023	0,003	Accepted
H4	PEO → EK	0,315	2,603	0,009	Accepted
H5	ENV → EK	0,093	1,771	0,077	**Rejected**

Discussion

Strategies Have a Positive Effect on the Effectiveness of the Implementation of Sectoral E-Catalogs in the Procurement of Government Goods and Services

The results of the first hypothesis test prove that the strategy has a positive effect on the effectiveness of the implementation of sectoral e-catalogs in the procurement of government goods and services. This aligns with the research by Choi et al. (2016) and Nani and Ali (2020), which found that the right strategy is critical in successfully implementing e-procurement. Government procurement activities are carried out as effectively as possible to account for public funds so that the government can plan clear strategies and objectives to run effectively for goods/services procurement activities. The Government of Indonesia has formulated the strategy and objectives for procuring goods/services as outlined in Presidential Regulation Number 16 of 2018.

Implementing the system of E-procurement in public sector organizations is heavily influenced by strategic factors, including effective leadership and the development of future ICT infrastructure. Strong leadership is essential for the successful adoption and implementation of the system of E-procurement. Leadership commitment has been identified as a critical factor that drives staff engagement and aligns organizational goals with strategy E-procurement. Research shows that a top management orientation focusing on strategic views and decision-making significantly impacts E-procurement performance in the organization (Haryono, 2022; Issah et al., 2024). Effective leaders create a culture that supports technological innovation, which is essential to overcome resistance and increase the overall success of initiatives in E-procurement (Jama et al., 2024).

Future ICT development plans also play an important role in determining the effectiveness of E-procurement. Strategic allocation of resources to improve ICT infrastructure facilitates a smoother integration of the system E-procurement. Comprehensive planning is needed to address critical areas such as human resource readiness, improved technology infrastructure, and establishing a supportive regulatory framework (Mahuwi & Israel, 2024; Nani & Ali, 2020). Implementation of E-procurement depends on organizations that establish clear development plans that prioritize ICT capabilities, thereby promoting transparency and accountability in the procurement process (Mahuwi & Israel, 2024; Osir, 2016).

The results of this study support the concept of New Public Management (NPM), which emphasizes the importance of applying modern management principles in the public sector to improve service effectiveness and efficiency. NPM encourages using a planned and measurable strategic approach so that government organizations can provide better, more responsive, and more accountable public services.

In implementing sectoral e-catalogs, a mature strategy includes systematic planning, optimal use of information technology, and effective coordination between units to accelerate the procurement process of goods and services and increase transparency and accountability. Thus, the strategies

implemented support achieving efficiency and effectiveness goals in government procurement management, which are at the core of the NPM principles. Therefore, the results of this study strengthen empirical evidence that implementing a good strategy is a key factor in optimizing the effectiveness of sectoral e-catalogs, as well as supporting the transformation of public management towards a more modern model by the NPM paradigm.

Technology Has a Positive Effect on the Effectiveness of the Implementation of Sectoral E-Catalogs in the Procurement of Government Goods and Services

The results of the second hypothesis test prove that technology has a positive effect on the effectiveness of the implementation of sectoral e-catalogs in the procurement of government goods and services. This is in line with the research by Choi et al. (2016), Afolabi et al. (2019), and Ofori & Fuseini (2020), explaining that the quality of technological infrastructure, such as the reliability and speed of the internet, as well as the organizational culture that supports innovation and change also contribute to the successful implementation e-procurement. E-procurement requires a reliable communication network and fast and stable internet access to function correctly (Ofori & Fuseini, 2020). These findings are consistent with Mohungoo's view et al. (2020), which confirms that the success of E-procurement is greatly influenced by technical factors such as system compatibility, ease of use (user-friendliness), system security, and the availability of digital infrastructure.

The results of this study support the concept of New Public Management (NPM), which emphasizes the importance of efficiency, effectiveness, innovation, and the adoption of private-sector managerial practices in public-sector governance. Within the framework of NPM, ICT is the main instrument in encouraging bureaucratic reform towards a more modern, adaptive, and accountable system. Implementing sectoral e-catalogs as part of a digital-based procurement system is a tangible manifestation of technology-based bureaucratic transformation. Technology supports the acceleration of the procurement process, improves time and cost efficiency, strengthens transparency, and minimizes potential irregularities. In addition, technology also allows the monitoring and evaluation process to be carried out in a more real-time and integrated manner. Thus, these findings confirm that technology is a crucial factor in supporting the effectiveness of sectoral e-catalog implementation, as well as showing that implementing digitalization in the bureaucracy aligns with NPM principles in realizing better, professional, and result-oriented governance.

Organizations Have a Positive Effect on the Effectiveness of the Implementation of Sectoral E-Catalogs in the Procurement of Government Goods and Services

The results of the third hypothesis test prove that organizations have a positive effect on the effectiveness of the implementation of sectoral e-catalogs in the procurement of government goods and services. These findings indicate that the better the organization's management, including regulations, technical team structures, and procurement integrity management, the more effective the implementation of sectoral e-catalogs. The results of this study support the concept of New Public Management (NPM), which emphasizes the importance of efficiency, transparency, accountability, and the application of private-sector managerial practices in public-sector governance. In this context, organizations that implement a clear regulatory system, encourage collaboration between work units, and manage ICT resources professionally support the creation of a procurement process that is more open, efficient, and free from KKN practices. Thus, strong organizational support is important in realizing NPM principles in procurement bureaucratic reform through digital technologies such as sectoral e-catalogs.

Research results are in line with the research by Choi et al. (2016), Nani & Ali (2020), and Mohungoo et al. (2020), which explain that organizations, especially those related to ICT regulation and

management, have a significant impact on the implementation of E-procurement. Research by Alim and Akhmadi (2021) demonstrates that clear and systematic regulations are important in improving the performance of goods and services procurement, especially in emergencies. Regulations facilitate E-procurement implementation and define the limits and guidelines that organizations must follow in drafting bids and contracts. Good government regulation can help create the transparent and accountable environment desperately needed in the public procurement system.

In implementing sectoral e-catalogs at the Ministry of Public Works and Public Housing, organizational aspects that include institutional structures, internal policies, and decision-making processes play a central role. Based on the descriptive results of organizational variables, respondents assessed that the success of the implementation of the system was highly determined by the availability of implementation guidelines, consistency in the implementation of regulations, and adequate coordination between work units. This is in line with the argument of Mohungoo et al. (2020), which states that failure to manage organizational structures and resources often leads to resistance to new systems and a lack of optimal use of technology.

Organizations with clear regulations, a supportive management structure, and the ability to build synergy between units will be better able to adopt an e-catalog system effectively. On the other hand, if institutional fragmentation and processes are still not fully digitized, the system's effectiveness will be hampered (Mohungoo et al., 2020). Thus, public organizations such as the Ministry of Public Works and Public Housing need to continue strengthening their institutional capacity and internal governance through policy updates, improving the competence of e-catalog management units, and adjusting work processes to align with the principles of procurement digitalization. This institutional reform is an important prerequisite for the success of e-procurement as an instrument for modernizing governance.

People Positively Affect The Effectiveness of Implementing Sectoral E-Catalogs in Procuring Government Goods and Services

The results of the fourth hypothesis test prove that human resources have a positive effect on the effectiveness of the implementation of sectoral e-catalogs in the procurement of government goods and services. Research results align with the research of Choi et al. (2016) and Nani & Ali (2020), which explain that human resources is one of the determining factors for the success of E-procurement implementation. If the human resources involved in innovation have sufficient competence, innovation will succeed. In the electronic procurement of goods/services, human resource support such as awareness, understanding, and training is needed so that the government can further improve its services to the community.

The results of this study support the concept of New Public Management (NPM), which emphasizes the importance of efficiency, effectiveness, and performance of the public sector through increasing the capacity of human resources, the use of information technology, and the application of private sector managerial practices into the government bureaucracy. In this context, competent, trained, and aware human resources of the importance of procurement digitalization will be able to drive increased efficiency and transparency in the procurement process, which is a key principle in NPM. Thus, these results reinforce the view that bureaucratic reform through modern management approaches such as NPM is highly dependent on the quality and readiness of its human resources.

Based on the results of a descriptive analysis of HR variables, most respondents stated that the level of understanding, technical skills, and participation in e-purchasing training directly contributed to the success of using the system. On the other hand, respondents also noted that the availability of special technical personnel who control the operation of the e-catalog application in each work unit is still limited. This causes some procurement processes to still depend on specific individuals (person

dependent), which can hinder the smooth and continuous process. These findings align with the results of the study by Mohungoo et al. (2020), which states that low digital literacy and lack of user training are some of the main obstacles to implementing e-procurement in the public sector. A lack of trained personnel not only hinders operational processes but also has the potential to increase the risk of errors in data input and provider selection.

In addition to the technical competency aspect, the dimension of employee awareness and attitude towards digital change also affects the effectiveness of the implementation of the system. In bureaucratic organizations, resistance to the new system often arises from discomfort or fear of changing roles and responsibilities. For this reason, increasing the effectiveness of implementing sectoral e-catalogs needs to be accompanied by a systematic and sustainable human resource development strategy. The Ministry of Public Works and Public Housing needs to strengthen technical training and direct assistance to procurement officials, improve digital literacy at all levels of positions, and ensure that there are special units or personnel who are fully responsible for the management of e-catalog applications in each task force. Thus, it can be concluded that human resources are a key element in bridging the gap between the system that has been prepared and the procurement practices that take place in the field. Implementing a sectoral e-catalog system will only be effective if it is supported by competent human resources, adaptive to technology, and committed to transparency and procurement efficiency.

Environment Does Not Affect the Effectiveness of the Implementation of Sectoral E-Catalogs in the Procurement of Government Goods and Services

The results of the fifth hypothesis test show that environmental variables do not affect the effectiveness of the implementation of sectoral e-catalogs in the procurement of government goods and services. In the context of this study, changes or conditions in the external environment, such as supporting infrastructure, regulations, or equitable access for service providers, have not contributed sufficiently to increasing the effectiveness of implementing sectoral e-catalogs. These findings are not in line with research by Choi et al. (2016), Mohungoo et al. (2020), and Nani & Ali (2020).

Mohungoo et al. (2020) explain that external pressures—including regulations, public accountability, and stakeholder expectations—are the main drivers of adopting e-procurement systems in the public sector. In the context of the Ministry of Public Works and Public Housing, regulations such as Presidential Regulation Number 12 of 2021 and the Circular Letter of the Ministry of Public Works and Public Housing Number 18/SE/M/2022 have provided a strong legal framework for the implementation of sectoral e-catalogs. However, implementing policies in the field has not been entirely consistent. Regulations have not fully reached the technical level of operations in the work unit, so they are not strong enough to be a driving factor for the system's effectiveness.

Furthermore, external environmental aspects such as provider readiness have also not run optimally. Some providers still experience obstacles in understanding the system, uploading products, or following the e-catalog procedures. Even in some cases, deviant practices such as product manipulation and price fixing still occur. This can create negative perceptions and minimize the environment's positive influence on the system's effectiveness. Considering the above factors, it can be understood that although normatively, the environment is considered a supporting factor for the digital transformation of procurement, in practice, this influence is not significant enough in the context of sectoral e-catalogs in the Ministry of Public Works and Public Housing. Therefore, improving the external environment requires strengthening the implementation of more operational regulations, improving education and provider capabilities, and creating a more effective monitoring system to impact the system's effectiveness.

CONCLUSION

This study concludes that the implementation effectiveness of sectoral e-catalogs at the Ministry of Public

Works and Public Housing is significantly influenced by internal factors such as strategy, technology, organization, and human resources, while environmental factors do not show a significant impact. These results underscore the importance of organizational readiness and internal governance in digital procurement initiatives, while also highlighting the need to improve external environmental pressures to enhance system accountability and resilience. Given the study's limitation to one ministry and the use of cross-sectional data, future research should broaden the scope to include multiple public institutions and consider longitudinal or mixed-method approaches to better capture the dynamics and sustainability of e-catalog implementation over time.

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