

THE INFLUENCE OF E-PURCHASING IN IMPROVING THE EFFICIENCY OF GOVERNMENT CONSTRUCTION PROJECTS IN BIAK NUMFOR AND SUPIORI DISTRICTS

Abstract:

Government construction projects in Papua Province continue to face challenges related to lengthy procurement processes, high administrative costs, and complex procedures that reduce project efficiency. This study examines the effect of E-Purchasing on project efficiency and identifies the supporting and inhibiting factors affecting its implementation. A mixed methods approach with a sequential exploratory design was employed, involving qualitative interviews with 20 informants followed by a quantitative survey of 35 respondents. Data were analyzed using SEM-PLS with SmartPLS. The findings indicate that E-Purchasing has a positive and significant effect on project time efficiency (path coefficient = 0.754; $R^2 = 0.569$; $f^2 = 1.321$). The system improves procurement efficiency by accelerating procurement processes, reducing administrative and transaction costs, and simplifying procedures. Key supporting factors include procurement transparency, system accessibility, and regulatory compliance, while limited internet infrastructure, low participation of local suppliers, Papua's geographical conditions, and limited human resource capacity remain the primary implementation challenges.

Key words:-

E-Purchasing, Project Time Efficiency, Government Construction Projects, SEM-PLS, Papua.

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Introduction:-

Government procurement of goods and services is one of the main instruments in supporting the success of national development because it plays a role in ensuring the availability of goods, services, and infrastructure needed by the community in a timely, efficient, and accountable manner. In the government construction sector, the effectiveness of the procurement process is a factor that greatly determines the success of the project in terms of cost, quality, and completion time. However, conventional procurement mechanisms still face various problems, including long bureaucratic processes, low transparency, administrative delays, and high potential for irregularities in the procurement process. The development of information technology encourages the transformation of the procurement system towards digitalization through the implementation of *electronic procurement* as an effort to increase the efficiency, transparency, and accountability of government procurement (Paraskeva & Tsoulfas, 2025)

In Indonesia, this transformation is realized through the implementation of *e-purchasing* based on electronic catalogs (*e-catalogs*) developed by the Government Goods/Services Procurement Policy Institute (LKPP). The system is designed to simplify the process of purchasing government goods and services through a faster, open, and digitally documented mechanism (Sa'adah, 2020). Implementasi *e-purchasing* telah menjadi kebijakan nasional yang diterapkan pada kementerian, lembaga, maupun pemerintah daerah (Firmansyah et al., 2024). Meskipun demikian, tingkat keberhasilan implementasinya belum merata karena dipengaruhi oleh kesiapan sumber daya manusia, kualitas infrastruktur teknologi informasi, kapasitas kelembagaan, serta karakteristik wilayah. Kondisi tersebut menjadi tantangan yang lebih kompleks di Provinsi Papua yang memiliki kondisi geografis sulit dijangkau, persebaran penduduk yang tidak merata, dan keterbatasan infrastruktur pendukung.

A number of previous studies have shown that the implementation of *e-purchasing* is able to increase the efficiency of government procurement through accelerating the procurement process, reducing transaction costs, increasing transparency, and strengthening accountability in procurement governance. Electronic-based systems also provide convenience in supervision because all processes are recorded digitally so as to minimize the chance of irregular practices. In addition, the use of *e-catalogs* is considered to be able to accelerate the procurement of goods and services needed in the implementation of construction projects so as to support the achievement of infrastructure development targets (Hochstetter et al., 2023; Puspita & Gultom, 2024).

Other research suggests that the success of the implementation of *e-purchasing* is not only determined by the existence of electronic systems, but also influenced by organizational readiness, user competence, leadership commitment, regulatory support, and the availability of providers of goods and services listed in the electronic catalog. The development of *local e-catalogs* is also considered to be able to increase the effectiveness of procurement in the regions through expanding the participation of local providers and increasing the competitiveness of regional businesses. Therefore, strengthening the *e-purchasing ecosystem* is one of the important strategies in increasing the efficiency of government construction project implementation, especially in areas that are accelerating infrastructure development (Lestari, 2023; Hidayat, 2024).

Although various studies have discussed the implementation of *e-purchasing* in government procurement, most of the research still focuses on aspects of procurement governance, regulatory compliance, or system evaluation in general. The study specifically analyzes the effect of the implementation of *e-purchasing* on the efficiency of government construction project implementation in terms of time, cost, and procurement procedures in areas with special geographical characteristics such as Papua Province is still relatively limited. In addition, research that simultaneously identifies the factors supporting and inhibiting the implementation of *e-purchasing* in government construction projects is also still not widely conducted.

Based on these gaps, this study offers a contribution by examining the implementation of *e-purchasing* more comprehensively in government construction projects in Papua Province. This study not only evaluates the influence of *e-purchasing* on project efficiency based on the dimensions of time, cost, and procurement procedures, but also identifies factors that support and hinder its implementation according to the characteristics of the Papua region. The results of the research are expected to make an empirical contribution to the development of government procurement management studies as well as the basis for the preparation of strategies to increase the effectiveness of electronic procurement systems in areas with limited infrastructure.

Therefore, this study aims to analyze the implementation of *e-purchasing* in the implementation of government construction projects in Papua Province, evaluate its influence on the efficiency of project implementation which includes time efficiency, cost efficiency, and procurement procedural efficiency, and identify factors that support and hinder the implementation of *e-purchasing*. Through this goal, this research is expected to be able to provide an empirical picture of the effectiveness of the electronic procurement system in supporting the success of government infrastructure development in Papua Province.

This article is compiled in several parts. The first section describes an introduction that includes background, literature review, research gaps, and research objectives. The next section describes the research method, then continues with the presentation of the results and discussion. The last part conveys conclusions along with theoretical and practical implications that can be input for local governments and stakeholders in improving the quality of government procurement of goods and services governance through the implementation of *e-purchasing*.

Theory

Procurement of Government Goods/Services

Government procurement of goods and services is a series of activities that start from planning needs to completing contracts to obtain goods or services needed in government administration. In construction projects, the procurement process has a strategic role because it determines the smooth implementation of the project in terms of time, cost, and quality of work. Therefore, the procurement system must be implemented based on the principles of efficiency, effectiveness, transparency, openness, competitiveness, fairness, and accountability in order to be able to produce quality development. The development of information technology encourages procurement reform towards electronic procurement systems that aim to increase transparency, speed up administrative processes, and reduce potential irregularities. This transformation is the basis for the implementation of *e-purchasing* as one of the government procurement methods that supports the digitalization of procurement governance.

E-Purchasing Concept

E-purchasing is a method of procurement of government goods and services through an electronic catalog (*e-catalog*) managed by LKPP. This system allows the purchase process to be carried out directly without going through a tender mechanism so that it can speed up the procurement process, increase transparency, and provide certainty in the prices and specifications of goods and services. In this study, the implementation of *e-purchasing* is measured through five main dimensions, namely ease of use of the system, quality of information, transparency and accountability, human resource support, and technological infrastructure. The five dimensions were chosen because they are considered to represent the factors that determine the success of the implementation of the electronic procurement system, especially in government construction projects in Papua Province.

Construction Project Efficiency

Construction project efficiency shows the ability of a project to optimally utilize resources to achieve preset targets. In this study, efficiency was measured through three main indicators, namely time efficiency, cost efficiency, and procedural efficiency. These three aspects are commonly used indicators in evaluating the success of government construction project implementation. The implementation of *e-purchasing* is expected to be able to increase this efficiency through accelerating the procurement process, reducing administrative costs, and simplifying bureaucratic procedures. Thus, the electronic procurement system not only supports the acceleration of project implementation but also increases the effectiveness of government procurement governance.

Policy Implementation Theory

This study uses Edward III's policy implementation theory as a basis to explain the success of the implementation of *e-purchasing*. According to this theory, the successful implementation of a policy is influenced by four main factors, namely communication, resources, the disposition of the implementer, and the bureaucratic structure. These four factors interact with each other in determining the effectiveness of policy implementation in the field. In the context of *e-purchasing*, clear communication, the availability of competent human resources, organizational support, and an adaptive bureaucratic structure are important factors that determine the success of the implementation of electronic procurement systems in the local government environment.

Technology Adoption Theory

In addition to policy implementation theory, this study also uses technology adoption theory to explain user acceptance of the *e-purchasing* system. This theory states that the success of technology implementation is influenced by the perception of *perceived ease of use*, system benefits (*perceived usefulness*), organizational readiness, and support of technological infrastructure. In this study, the theory of technology adoption is used to explain that the effectiveness of *e-purchasing* does not only depend on the quality of the system, but also on the readiness of users and the environmental conditions of the organization. Therefore, the success of the implementation of *e-purchasing* in Papua Province is influenced by the ability of human resources, the availability of information technology infrastructure, and adequate institutional support.

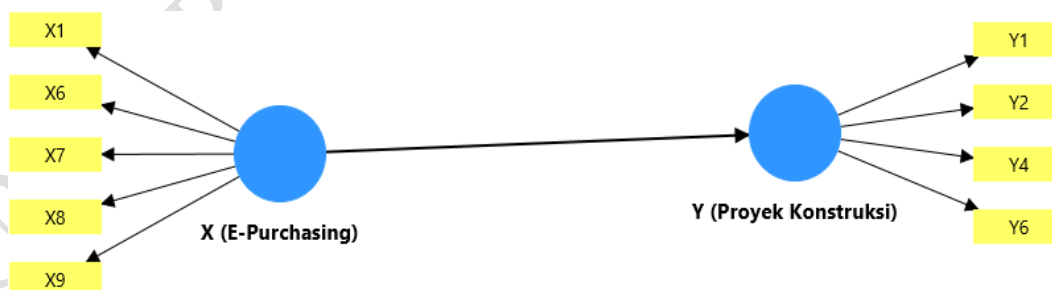
Method

This study uses a mixed methods method with an exploratory sequential approach, namely research begins with a qualitative stage to identify research variables and indicators, then continues with a quantitative stage to test the relationship between variables. The research will be carried out in Biak Numfor Regency and Supiori Regency, Papua Province in 2026. The research population consists of parties involved in the procurement of government goods/services in construction projects, including Commitment Making Officials (PPK), Procurement Service Unit Working Group (ULP), and technical staff of related agencies. The sampling technique uses purposive sampling because respondents are selected based on experience and direct involvement in the implementation of *e-purchasing*. The sample consisted of 20 informants at the qualitative stage and 35 respondents at the quantitative stage.

Data collection was carried out through observation, questionnaire distribution, semi-structured interviews, and literature studies. The research instrument used a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. The variable indicators of *e-purchasing implementation* are compiled based on the concepts of *electronic procurement*, policy implementation, and technology adoption, while the project efficiency indicators include time efficiency, cost efficiency, and procedural efficiency adapted from previous research. Data analysis was carried out in stages, namely thematic analysis on qualitative data to formulate research indicators, then quantitative analysis using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with the help of SmartPLS 4. The analysis stages include descriptive statistics, external model evaluation (validity and reliability), inner model evaluation (R^2 and f^2), and hypothesis testing through a bootstrapping procedure.

Result and Discussion

This study involved 35 respondents consisting of Commitment Making Officials (PPK), Procurement Service Unit Working Group (ULP), and technical staff who were directly involved in the procurement of government goods/services in Biak Numfor and Supiori Regencies. Based on the characteristics of the respondents, most of them have experience in the implementation of government construction projects as well as understand the implementation of *e-purchasing*. The composition of respondents from various positions and agencies provides a representative picture of the application of *e-purchasing* in government construction projects in Papua Province.



Sumber: Analisis DataSmartPLS, 2026

The model above consists of Variable X (E-Purchasing) which is used in this study using 5 indicators, namely X1 (Procurement is easily accessible), X6 (Ease of supplier selection), X7 (Procurement transparency), X8 (Transactions are easy to trace), X9 (Implementation according to the Constitution). While Y (Construction Project) where the indicators are Y1 (Acceleration of administrative completion), Y2 (Reduction of procurement time), Y3 (Timeliness of project start), Y4 (Smooth implementation schedule).

Tabel 1 Nilai Path Coefficients					
	Originalsample (O)	Samplemean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
X (E-Purchasing) -> Y (Construction Project)	0.754	0.768	0.074	10.170	0.000

Sumber: Analisis Data, 2026

The results of the Path Coefficient test show that the implementation of *e-purchasing* has a positive influence on the efficiency of the implementation of government construction projects in Papua Province with a path coefficient value of 0.754. The positive coefficient value shows that the better the implementation of *e-purchasing*, the higher the efficiency level of the construction project. The magnitude of the coefficient indicates a strong relationship between independent variables and dependent variables, so that the implementation of *e-purchasing* makes a real contribution to improving the efficiency of project implementation.

This positive influence shows that the digitalization of the procurement process is able to accelerate the procurement process of goods and services, reduce repetitive administrative stages, and increase transparency in the selection of providers. This condition allows the needs of construction materials and services to be met faster so that the implementation of work becomes more effective. In addition, the use of electronic systems also simplifies the monitoring and documentation process so that it can reduce the potential for delays due to administrative obstacles.

These findings are in line with the research of Althabatah et al. (2023) which states that the digitization of the procurement process improves operational efficiency through automation and the use of information technology. The results of this study also strengthen the findings of Hochstetter et al. (2023) and Lestari (2023) who show that the implementation of *e-purchasing* is able to accelerate the procurement process and increase transparency in the implementation of government projects. However, this study makes a different empirical contribution because it was carried out in the Papua Province area which has geographical challenges and limited technological infrastructure compared to other regions in Indonesia.

Tabel 2 Nilai F square

192

	f-square
X (E-Purchasing) -> Y (Proyek Konstruksi)	1.321

Sumber: Analisis Data, 2026

The results of F-Square's analysis showed a value of 1,321, which indicates that the implementation of *e-purchasing* has a very large *effect size* on the efficiency of government construction project implementation. This value shows that the existence of *e-purchasing variables* makes a dominant contribution in shaping the research model, so that improving the quality of the implementation of electronic procurement systems has the potential to have a significant impact on improving project efficiency

Tabel 3 Nilai R-Square

	R-square	R-squareadjusted
Y (Construction Projects)	0.569	0.556

Source: Data Analytics, 2026

The R-Square value of 0.569 shows that the implementation of *e-purchasing* is able to explain 56.9% variation in the efficiency of government construction project implementation in Papua Province. Meanwhile, the remaining

43.1% of the variation was influenced by factors outside the research model that were not analyzed in this study. Based on the evaluation criteria of the SEM-PLS model, this value shows that the model has a fairly good explanatory ability in explaining the relationship between the variables studied.

These results show that the implementation of *e-purchasing* is able to increase project efficiency through accelerating the procurement process, simplifying administrative procedures, and increasing transparency in the selection of suppliers of goods and services. Digitization of the procurement process reduces bureaucratic stages that previously took longer so that project implementation can start faster. These findings support Edward III's policy implementation theory which emphasizes the importance of system, resource, and communication support in the successful implementation of public policy.

The results of the analysis show that the factors that most support the implementation of *e-purchasing* are procurement transparency with a contribution of 23.21%, followed by ease of access to the system at 22.64%, and compliance with procurement regulations at 20.41%. These three factors are the main aspects that encourage the successful implementation of *e-purchasing* in government construction projects in Papua Province. Transparency in the *e-purchasing* system makes it easier for users to obtain information about prices, specifications, and suppliers of goods openly, thereby increasing the objectivity of the procurement process. On the other hand, the ease of access to the system speeds up the administrative process, while compliance with regulations ensures that all stages of procurement are carried out in accordance with applicable regulations. These results support the research of Firmansyah et al. (2024) and Hochstetter et al. (2023) who stated that transparency and digitalization are the main factors in improving government procurement performance.

Although the implementation of *e-purchasing* provides various benefits, the study also found several factors that still hinder its implementation. The main obstacles include limited internet networks, low participation of local providers in *e-catalogues*, geographical conditions in Papua Province, and limited human resource capacity in operating the *e-purchasing* system. The limitation of technological infrastructure causes the electronic procurement process to not be able to run optimally in all research areas. In addition, the limited number of local providers reduces the variety of choices of goods and services available in the *e-catalogue*. This condition shows that the successful implementation of *e-purchasing* does not only depend on the quality of the system, but is also influenced by the readiness of infrastructure, human resource capacity, and institutional support. These findings are in line with the research of Kadhila et al. (2025) and Hidayat (2024) which affirmed that technological readiness and user competence are important factors in the successful implementation of electronic procurement.

Table 4 Rank Squared Loading

Indicator	Outer Loading	Squared Loading (Loading ²)	Percentage of Variance Explained
X1	0,871	$0,871^2 = 0,759$	75,9%
X6	0,773	$0,773^2 = 0,598$	59,8%
X7	0,882	$0,882^2 = 0,778$	77,8%
X8	0,730	$0,730^2 = 0,533$	53,3%
X9	0,827	$0,827^2 = 0,684$	68,4%

Source: Data Analytics, 2026

Based on Table 0.10, the *Squared Loading* value indicates the large percentage of variance of each indicator that can be explained by the latent construct of the *e-purchasing* implementation. The X7 indicator has the *highest Squared Loading* value of 0.778 (77.8%), which shows that it is the most powerful representation of the *e-purchasing* variable. Furthermore, the X1 indicator has a value of 0.759 (75.9%), followed by X9 of 0.684 (68.4%), X6 of 0.598 (59.8%), and X8 of 0.533 (53.3%). The entire *Squared Loading* value is above 0.50, so each indicator is able to explain more than 50% of the variance of the measured construct. These results show that all indicators have a good ability to represent the variables of *e-purchasing implementation*, although the contribution of each

indicator is different. The X7 indicator makes the largest contribution to the formation of the construct, while the X8 indicator makes the least contribution, but it still meets the acceptable criteria in the SEM-PLS analysis.

Table 5 Weight calculation Square Loading

Indikator	Bobot (%)
X1	22,64%
X6	17,84%
X7	23,21%
X8	15,90%
X9	20,41%

Based on the results of the *Squared Loading* analysis, all indicators that make up the *E-Purchasing* variable have good ability to represent the construct because they are able to explain more than 50% of the variance of the indicator. The contribution weight analysis showed that procurement transparency (X7) was the most dominant factor with a contribution of 23.21%, followed by ease of system access (X1) of 22.64%, compliance with procurement regulations (X9) of 20.41%, ease of supplier selection (X6) of 17.84%, and ease of transaction tracing (X8) of 15.90%. These findings show that the success of the implementation of *E-Purchasing* is mainly determined by the level of information disclosure, ease of use of the system, and compliance with government procurement provisions.

The dominance of procurement transparency indicators shows that the *E-Purchasing system* is able to increase information disclosure regarding prices, specifications, and goods/service providers so that the procurement process becomes more objective, accountable, and easy to supervise. In addition, easy access to the system and compliance with regulations also support the acceleration of the procurement process and provide legal certainty in the implementation of construction projects. These results are in line with the research of Althabatah et al. (2023), Hochstetter et al. (2023), and Firmansyah et al. (2024) which states that procurement digitalization improves efficiency through transparency, simplification of procedures, and strengthening government procurement governance.

On the other hand, the results of the interviews show that the implementation of *E-Purchasing* in Papua Province still faces several obstacles. The main obstacles include limited internet networks in some regions, the low number of local providers registered in the *e-catalogue*, and the geographical conditions of Papua that cause the distribution of goods and construction materials to be less than optimal. In addition, the internal administration process which still takes a relatively long time and the limited competence of some users in operating the system are also factors that reduce the effectiveness of the implementation of *E-Purchasing*.

The findings show that the success of the implementation of *E-Purchasing* is not only determined by the quality of the electronic system, but also influenced by the readiness of the technological infrastructure, the capacity of human resources, and institutional support. Therefore, improving the quality of telecommunication networks, expanding the participation of local providers in the *e-catalogue*, simplifying administrative processes, and implementing training on an ongoing basis are strategic steps to optimize the implementation of *E-Purchasing* in government construction projects in Papua Province.

Conclusion

The implementation of E-Purchasing has proven to have a positive and significant effect on improving the efficiency of government construction projects in Biak Numfor and Supiori Regencies. The results of the SEM-PLS analysis showed an effect size value (f^2) of 1.321, indicating a very large influence, as well as an R^2 value of 56.9%, which suggests that more than half of the variation in the efficiency of construction projects can be explained by the implementation of E-Purchasing. These findings confirm that procurement digitalization makes a real contribution to improving the efficiency of government construction project implementation.

The implementation of E-Purchasing improves the efficiency of construction projects through three main aspects, namely time efficiency, cost efficiency, and procedural efficiency. From the time aspect, this system accelerates the completion of the administration and procurement process so that the implementation of the project becomes faster. In terms of cost, E-Purchasing is able to reduce administrative, operational, and transaction costs through a simpler and more transparent electronic procurement process. Meanwhile, from a procedural aspect, this system increases accountability, facilitates supervision and traceability of transactions, and ensures the implementation of procurement in accordance with the provisions of applicable regulations.

The main supporting factors for the implementation of E-Purchasing in government construction projects in Papua Province include procurement transparency, ease of system access, and compliance with procurement regulations, which together strengthen the effectiveness of the implementation of electronic procurement. On the contrary, its implementation still faces several obstacles, namely limited internet networks, the low number of local providers registered in the E-Catalog, Papua's challenging geographical conditions, and administrative constraints and human resource capacity. Therefore, improving technology infrastructure, developing user competencies, and expanding the participation of local providers are important steps to optimize the implementation of E-Purchasing in the future.

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