

# Determining the Effectiveness of Goods/Services Procurement from a Human Resource Management Perspective

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## Abstract

This study aims to examine the influence of Competence and Motivation on the Effectiveness of Goods/Services Procurement with E-Procurement Implementation as an intervening variable among employees at PT PLN (Persero) UID North Sumatra. A total of 120 employees were selected using purposive sampling. Data analysis was conducted using Partial Least Square (PLS) to test validity, reliability, and both direct and indirect effects between variables. The results indicate that Competence and Motivation have a positive and significant effect on the Effectiveness of Goods/Services Procurement, both directly and indirectly through E-Procurement Implementation. E-Procurement was proven to act as a mediating variable, strengthening the relationship between Competence, Motivation, and Procurement Effectiveness. These findings highlight the importance of enhancing competence, motivation, and utilizing E-Procurement systems to improve procurement performance at PT PLN (Persero).

**Keywords:** Competence, Motivation, Procurement Effectiveness, E-Procurement

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## **Introduction**

Effective and efficient procurement is a key factor in supporting company performance, covering electrical materials, support equipment, as well as consultancy and construction services that require timeliness, transparency, and accountability in their implementation. The implementation of E-Procurement aims to increase efficiency, effectiveness, and transparency in the procurement process. This system allows the entire process, from planning, vendor selection, to evaluation, to be conducted online and well-documented. The potential for deviations, collusion, or delays can be minimized. E-Procurement also supports the principle of good corporate governance, which is one of the main pillars in modern corporate governance. The effectiveness of E-Procurement implementation is not only determined by the quality of the technology system but also by the competence and motivation of the employees who are the main executors in the procurement process. Employees with high competence are able to understand procedures, utilize system features well, and adapt to continuously evolving technological changes. This competence includes aspects of technical knowledge, analytical skills, and understanding of applicable procurement regulations. In addition to competence, work motivation is also an important factor influencing employee performance in carrying out the procurement process. Employees with high motivation will show work enthusiasm, responsibility, and strong commitment to achieving timely and quality procurement targets. Low motivation can lead to a lack of initiative, administrative negligence, and even errors in the decision-making process. Delays in procurement, low digital literacy among some employees, and suboptimal overall system utilization. This condition indicates that the implementation of E-Procurement has not been fully effective as expected.

## **Problem Formulation**

1. Does employee Competence have a positive and significant effect on the Effectiveness of goods/services procurement at PT PLN (Persero) UID North Sumatra?
2. Does employee Motivation have a positive and significant effect on the Effectiveness of goods/services procurement at PT PLN (Persero) UID North Sumatra?
3. Does employee Competence have a positive and significant effect on the Implementation of E-Procurement at PT PLN (Persero) UID North Sumatra?
4. Does employee Motivation have a positive and significant effect on the Implementation of E-Procurement at PT PLN (Persero) UID North Sumatra?
5. Does the Implementation of E-Procurement have a positive and significant effect on the Effectiveness of goods/services procurement at PT PLN (Persero) UID North Sumatra?
6. Does employee Competence have a positive and significant effect on the Effectiveness of goods/services procurement through the Implementation of E-Procurement at PT PLN (Persero) UID North Sumatra?
7. Does employee Motivation have a positive and significant effect on the Effectiveness of goods/services procurement through the Implementation of E-Procurement at PT PLN (Persero) UID North Sumatra?

## **Research Objectives**

1. To test and analyze the influence of employee Competence on the Effectiveness of goods/services procurement at PT PLN (Persero) UID North Sumatra.
2. To test and analyze the influence of employee Motivation on the Effectiveness of goods/services procurement at PT PLN (Persero) UID North Sumatra.
3. To test and analyze the influence of employee Competence on the Implementation of E-Procurement at PT PLN (Persero) UID North Sumatra.
4. To test and analyze the influence of employee Motivation on the Implementation of E-Procurement at PT PLN (Persero) UID North Sumatra.
5. To test and analyze the influence of the Implementation of E-Procurement on the Effectiveness of goods/services procurement at PT PLN (Persero) UID North Sumatra.

6. To test and analyze the influence of employee Competence on the Effectiveness of goods/services procurement through the Implementation of E-Procurement at PT PLN (Persero) UID North Sumatra.
7. To test and analyze the influence of employee Motivation on the Effectiveness of goods/services procurement through the Implementation of E-Procurement at PT PLN (Persero) UID North Sumatra.

### **Effectiveness of Goods/Services Procurement**

According to the OECD (2021), effectiveness in goods/services procurement refers to the level of achievement of procurement objectives by optimally utilizing available resources. In the context of budget management, effectiveness is measured through the ability to produce outputs in accordance with the initial plan. According to the Presidential Regulation on Government Goods and Services Procurement No. 16/2018. This study shows that the application of the principle of effectiveness in goods and services procurement can improve the quality of public services and accountability.

### **Indicators of Goods/Services Procurement Effectiveness**

According to the OECD (2021), indicators of Goods/Services Procurement Effectiveness:

1. Achievement of Procurement Objectives
2. Suitability of Goods/Services with Needs
3. Efficiency of Resource Use
4. Transparency of Procurement Process
5. Accountability of Procurement
6. Level of User/Stakeholder Satisfaction

### **Factors Influencing the Effectiveness of Goods/Services Procurement**

According to the OECD (2021), factors that influence the effectiveness of goods/services procurement through e-procurement include:

1. Transparency and tender access
2. Digital system integration
3. Performance evaluation
4. Human resource capacity
5. Governance and system stability
6. Utilization of advanced technology

### **Employee Competence**

According to Kaswan (2017), employee performance reflects employee behavior in the workplace as the application of skills, abilities, and knowledge, which contribute or add value to organizational goals. According to Rachmaniza (2020), competence is the underlying characteristic of a person related to the effectiveness of individual performance in their work.

### **Indicators of Employee Competence**

According to Kaswan (2017), indicators of employee competence can be detailed as follows:

1. Knowledge:
2. Skills:
3. Attitude and Behavior:

### **Motivation**

According to Hafidzi (2019), motivation is "the provision of a driving force that creates a person's enthusiasm for work so that they are able to cooperate, work effectively, and integrate with all their efforts to achieve satisfaction." According to Sudaryo et al. (2018), work

motivation is "how to mobilize power and potential so that they are willing to work together productively to successfully achieve organizational goals.

**Indicators of the Definition of Motivation**

1. Responsibility
2. Work Achievement
3. Opportunities for Advancement
4. Recognition of Performance
5. Challenging Work

**E-Procurement**

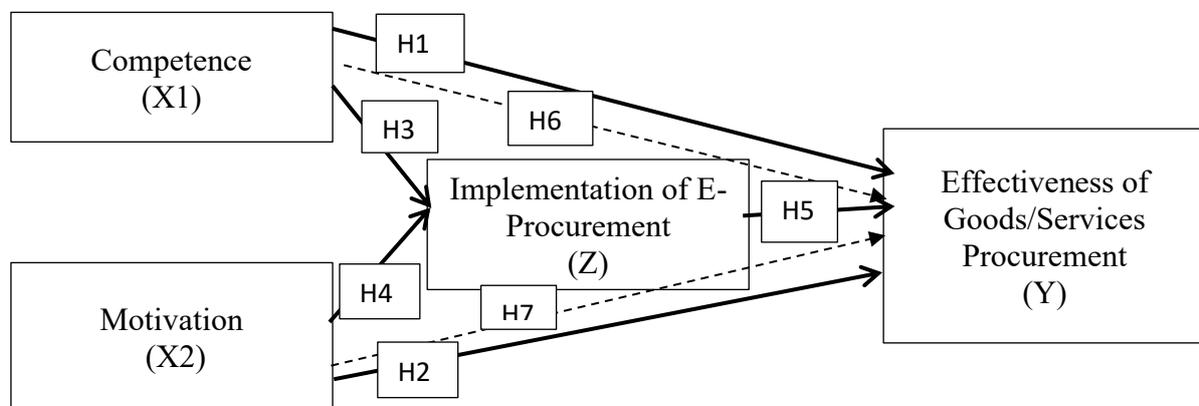
According to Andrianto (2022), the e-procurement system in goods/services procurement aims to create transparency, efficiency, effectiveness, and accountability in goods/services procurement through electronic media between committees and service providers. According to Rahayu (2022), e-procurement is an auction system in goods/services procurement that utilizes internet-based information and communication technology. With e-procurement, the auction process can take place effectively, efficiently, openly, competitively, transparently, fairly/non-discriminatory, and accountably.

**Indicators of E-Procurement**

Indicators of e-procurement implementation according to Rahayu (2022) are as follows:

1. System Quality Refers to how well the e-procurement system is designed and implemented, including ease of use, access speed, and system reliability.
2. Information Quality Assesses the extent to which the information provided by the system is accurate, timely, and relevant to users.
3. User Satisfaction Measures the level of user satisfaction with the e-procurement system, including ease of use and perceived benefits.
4. System Use Frequency and intensity of system use by users in the goods/services procurement process.
5. Organizational Impact Evaluation of the positive impact caused by e-procurement implementation on organizational performance, such as increased efficiency, transparency, and accountability in procurement.

**Conceptual Framework**



**Figure 1.** Conceptual Framework

**Research Hypotheses**

1. Employee Competence has a positive and significant effect on the Effectiveness of goods/services procurement at PT PLN (Persero) UID North Sumatra.

2. Employee Motivation has a positive and significant effect on the Effectiveness of goods/services procurement at PT PLN (Persero) UID North Sumatra.
3. Employee Competence has a positive and significant effect on the Implementation of E-Procurement at PT PLN (Persero) UID North Sumatra.
4. Employee Motivation has a positive and significant effect on the Implementation of E-Procurement at PT PLN (Persero) UID North Sumatra.
5. Implementation of E-Procurement has a positive and significant effect on the Effectiveness of goods/services procurement at PT PLN (Persero) UID North Sumatra.
6. Employee Competence has a positive and significant effect on the Effectiveness of goods/services procurement through the Implementation of E-Procurement at PT PLN (Persero) UID North Sumatra.
7. Employee Motivation has a positive and significant effect on the Effectiveness of goods/services procurement through the Implementation of E-Procurement at PT PLN (Persero) UID North Sumatra.

### **Research Type**

According to Sugiyono (2018), quantitative research is a deductive research method, focusing on hypothesis testing using numerical data and statistical analysis.

### **Research Time and Place**

The research was conducted from November to December 2025, at the PLN UID North Sumatra Office, located at Jl. KL. Yos Sudarso No.284, Glugur Kota, Medan Barat District, Medan City, North Sumatra 20238. The selection of this location was based on the relevance of the research object to the research objectives, which is to determine the factors that influence employee performance.

### **Population and Sample**

The population of this study were all employees of PLN UID North Sumatra, totaling 120 people. The study used a saturated sample, so the entire population was used as a sample. Thus, the number of respondents is 120 people. According to Nazir (2017), a saturated sample is used when the population size is relatively small and allows all population members to be used as a sample.

### **Data Analysis Technique**

Data analysis in this study used Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 3 software. PLS-SEM was chosen because it is able to test complex relationships between latent variables with indicators, and can work with small samples and non-normal data (Hair et al., 2019; Chin, 2010). Analysis was carried out through several stages, namely evaluation of the outer model, inner model, and testing the significance of paths with bootstrapping.

### **Conceptual Model**

In the initial stage, the conceptual model was built based on theory and research hypotheses. The latent variables and their indicators were identified, then depicted in a path diagram.

- a. Independent, dependent, and intervening latent variables were determined according to the hypothesis formulation.
- b. The model used can be reflective (indicators reflect the variable) or formative (indicators form the variable).

According to Chin (2010), PLS-SEM is suitable for exploratory research and theory development because it can test relationships between variables even if the theory is not fully developed.

### **Evaluation of the Outer Model (Measurement Model)**

The outer model assesses the **validity and reliability** of the indicators that measure each latent variable. The evaluation stages include:

- a. Convergent Validity
- b. Composite Reliability
- c. Cronbach's Alpha

### **Evaluation of the Inner Model (Structural Model)**

The inner model assesses the relationships between latent variables, namely the strength and direction of the influence of independent variables on dependent or intervening variables. The stages of inner model analysis include:

- a.  $R^2$  (Coefficient of Determination):
- b. Path Coefficients
- c. Effect Size ( $f^2$ )
- d. Predictive Relevance ( $Q^2$ )

According to Henseler et al. (2019), the inner model is used to test research hypotheses and assess the strength of relationships between constructs, thereby confirming the developed theory.

### **Bootstrapping**

Bootstrapping is a resampling technique used to generate a sampling distribution of paths and test statistical significance.

- a. Resampling is usually done 5,000-10,000 times to obtain stable estimates.
- b. From bootstrapping, t-values, p-values, and confidence intervals are obtained to assess whether each path of influence is significant or not.

According to Hair et al. (2019), bootstrapping is an important part of PLS-SEM because PLS does not rely on normal data distribution.

## **Results and Discussion**

### **Outer Model Analysis**

#### **Convergent Validity**

This test is seen from the loading factor, the threshold value is 0.7, as well as the threshold value for Average Variance Extracted (AVE) which is 0.5. If above these values, it is said to be valid. This means that the value for an indicator is said to be valid if the indicator explains its construct variable with a value  $> 0.7$ . The structural model in this study is shown in the following figure:

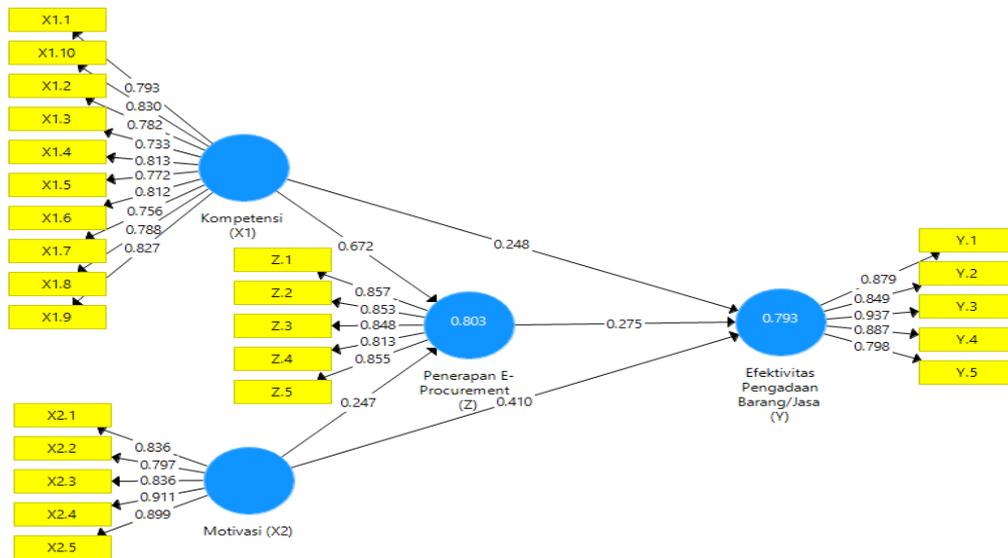


Figure 2. Outer Model

Source : SmartPLS 3.3.3

Smart PLS output for loading factor provides results in the following table: Outer Loadings In this study, there is an equation and that equation consists of two substructures. For substructure 1:

$$Z = b1X1 + b2X2 + e1$$

$$Z = 0,672 + 0,247 + e1$$

For substructure 2:

$$Y = b2X1 + b3X2 + b4Z + e2$$

$$Y = 0,248 + 0,410 + 0,275 + e2$$

Table 1.Outer Loadings

	Effectiveness of Goods/Services Procurement (Y)	Competence (X1)	Motivation (X2)	Implementation of E-Procurement (Z)
X1.1		0,793		
X1.10		0,830		
X1.2		0,782		
X1.3		0,733		
X1.4		0,813		
X1.5		0,772		
X1.6		0,812		
X1.7		0,756		
X1.8		0,788		
X1.9		0,827		
X2.1			0,836	
X2.2			0,797	
X2.3			0,836	
X2.4			0,911	
X2.5			0,899	
Y.1	0,879			
Y.2	0,849			

Y.3	0,937			
Y.4	0,887			
Y.5	0,798			
Z.1				0,857
Z.2				0,853
Z.3				0,848
Z.4				0,813
Z.5				0,855

Source : SmartPLS 3.3.3

The results of the outer loadings test in Table 2 show that all indicators for the variables Competence (X1), Motivation (X2), Effectiveness of Goods/Services Procurement (Y), and Implementation of E-Procurement (Z) have outer loading values above 0.70. This indicates that each indicator has met the convergent validity criteria, so it is able to reflect its respective construct well. Thus, all indicators can be declared valid and suitable for use in further research analysis.

## 2.Discriminat Validity

The next research is to determine data that is valid in terms of Discriminant Validity, aiming to determine whether the cross-loading value is greater than that of other latent variables, thereby determining the result that the indicator correlates highly with its construct. The following table shows the cross-loading results from the validity test as follows:

**Table 2.** Discriminant Validity

	Effectiveness of Goods/Services Procurement (Y)	Competence (X1)	Motivation (X2)	Implementation of E-Procurement (Z)
X1.1	0,680	0,793	0,745	0,745
X1.10	0,749	0,830	0,727	0,720
X1.2	0,651	0,782	0,712	0,743
X1.3	0,608	0,733	0,653	0,683
X1.4	0,648	0,813	0,678	0,684
X1.5	0,604	0,772	0,635	0,625
X1.6	0,689	0,812	0,716	0,745
X1.7	0,672	0,756	0,695	0,697
X1.8	0,737	0,788	0,723	0,679
X1.9	0,684	0,827	0,654	0,696
X2.1	0,719	0,740	0,836	0,619
X2.2	0,655	0,649	0,797	0,615
X2.3	0,685	0,688	0,836	0,703
X2.4	0,806	0,849	0,911	0,820
X2.5	0,793	0,816	0,899	0,799
Y.1	0,879	0,724	0,698	0,698
Y.2	0,849	0,699	0,666	0,707
Y.3	0,937	0,830	0,838	0,837
Y.4	0,887	0,735	0,769	0,710
Y.5	0,798	0,712	0,748	0,684
Z.1	0,620	0,708	0,686	0,857
Z.2	0,643	0,711	0,696	0,853

<b>Z.3</b>	0,735	0,789	0,684	0,848
<b>Z.4</b>	0,691	0,718	0,676	0,813
<b>Z.5</b>	0,825	0,812	0,782	0,855

Source : SmartPLS 3.3.3

Based on Table 2, all indicators show the highest loading on the construct they measure compared to other constructs. This indicates that the variables Competence (X1), Motivation (X2), Effectiveness of Goods/Services Procurement (Y), and Implementation of E-Procurement (Z) have met the discriminant validity criteria. Thus, each construct is empirically distinct and able to measure the intended concept accurately, making them valid for use in further analysis.

### Composite reliability

In the study, composite reliability is used to see each variable with its reliability value. If the variable value is greater than 0.60, the research is considered reliable, and if it is below 0.60 and 0.7, it is not reliable. There are several blocks to determine whether the research is reliable or not and valid or not, including Cronbach's alpha value, composite reliability, and AVE value, which can be seen in the table below:

**Table 3.**Construct Reliability and Validity

	<b>Cronbach's Alpha</b>	<b>Composite Reliability</b>	<b>Average Variance Extracted (AVE)</b>
<b>Effectiveness of Goods/Services Procurement (Y)</b>	<b>0,920</b>	<b>0,940</b>	<b>0,759</b>
<b>Competence (X1)</b>	<b>0,933</b>	<b>0,943</b>	<b>0,626</b>
<b>Motivation (X2)</b>	<b>0,909</b>	<b>0,932</b>	<b>0,734</b>
<b>Implementation of E-Procurement (Z)</b>	<b>0,900</b>	<b>0,926</b>	<b>0,715</b>

Source : SmartPLS 3.3.3

The results in Table 3 show that all constructs have Cronbach's Alpha and Composite Reliability above 0.70, and AVE values above 0.50. This indicates that the variables Competence (X1), Motivation (X2), Effectiveness of Goods/Services Procurement (Y), and Implementation of E-Procurement (Z) have met the construct reliability and validity criteria, so the research instrument is declared reliable and valid for use in further analysis.

### Inner Model Analysis

Evaluation of the structural model (inner model) is conducted to ensure that the base model built is robust and appropriate. The stages of examination carried out in the primary model assessment are seen from several markers, namely:

#### Coefficient of Determination (R<sup>2</sup>)

Based on data processing that has been carried out using SmartPLS 3.0, the R Square values are obtained as follows:

**Table 4.** R Square Results

	<b>R Square</b>	<b>Adjusted R Square</b>
<b>Effectiveness of Goods/Services Procurement (Y)</b>	0,793	0,787

<b>Implementation of E-Procurement (Z)</b>	0,803	0,800
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Source : SmartPLS 3.3.3

Based on Table 4, the R Square value shows that the Implementation of E-Procurement (Z) variable can be explained by the independent variables by 80.3%, while the remaining 19.7% is influenced by other factors outside the model. Meanwhile, the Effectiveness of Goods/Services Procurement (Y) can be explained by 79.3%, with 20.7% influenced by other variables outside the research. The Adjusted R Square value close to R Square indicates that the model has strong and stable explanatory power.

### Hypothesis Testing

As suggested by this review, the next step is to evaluate the relationship between constructs after evaluating the inner model. To test the hypotheses in this study, T-Statistics and P-Values are examined. It is declared open whether P-Values are less than 0.05 and T-Statistics values are greater than 1.96. The direct effect of the Path Coefficients is as follows:

**Table 5.** Path Coefficients (Direct Effects)

	<b>Original Sample (O)</b>	<b>T Statistics ( O/STDEV )</b>	<b>P Values</b>	<b>Results</b>
<b>Competence (X1) -&gt; Effectiveness of Goods/Services Procurement (Y)</b>	0,248	2,839	<b>0,002</b>	<b>Accepted</b>
<b>Competence (X1) -&gt; Implementation of E-Procurement (Z)</b>	0,672	8,169	<b>0,000</b>	<b>Accepted</b>
<b>Motivation (X2) -&gt; Effectiveness of Goods/Services Procurement (Y)</b>	0,410	4,083	<b>0,000</b>	<b>Accepted</b>
<b>Motivation (X2) -&gt; Implementation of E-Procurement (Z)</b>	0,247	2,819	<b>0,003</b>	<b>Accepted</b>
<b>Implementation of E-Procurement (Z) -&gt; Effectiveness of Goods/Services Procurement (Y)</b>	0,275	2,864	<b>0,002</b>	<b>Accepted</b>

Source : SmartPLS 3.3.3

1. The Effect of Competence (X1) on Effectiveness of Goods/Services Procurement (Y): The analysis results show that Competence has a positive and significant effect on the Effectiveness of Goods/Services Procurement with a coefficient of 0.248, T-statistic 2.839, and p-value 0.002. Therefore, the hypothesis is accepted.
2. The Effect of Competence (X1) on Implementation of E-Procurement (Z): Competence is proven to have a positive and significant effect on the Implementation of E-Procurement with a coefficient of 0.672, T-statistic 8.169, and p-value 0.000, so the hypothesis is accepted.
3. The Effect of Motivation (X2) on Effectiveness of Goods/Services Procurement (Y): Motivation has a positive and significant effect on the Effectiveness of Goods/Services

Procurement with a coefficient of 0.410, T-statistic 4.083, and p-value 0.000. The hypothesis is accepted.

4. The Effect of Motivation (X2) on Implementation of E-Procurement (Z): Motivation is proven to have a positive and significant effect on the Implementation of E-Procurement with a coefficient of 0.247, T-statistic 2.819, and p-value 0.003, so the hypothesis is accepted.
5. The Effect of Implementation of E-Procurement (Z) on Effectiveness of Goods/Services Procurement (Y): Implementation of E-Procurement has a positive and significant effect on the Effectiveness of Goods/Services Procurement with a coefficient of 0.275, T-statistic 2.864, and p-value 0.002, so the hypothesis is accepted.

**Table 6.** Path Coefficients (Indirect Effects)

	Original Sample (O)	T Statistics ( O/STDEV )	P Values	Results
Competence (X1) -> Implementation of E-Procurement (Z) -> Effectiveness of Goods/Services Procurement (Y)	0,184	2,693	0,004	Accepted
Motivation (X2) -> Implementation of E-Procurement (Z) -> Effectiveness of Goods/Services Procurement (Y)	0,068	1,907	0,029	Accepted

Source : SmartPLS 3.3.3

6. The Effect of Competence (X1) on Effectiveness of Goods/Services Procurement (Y) through Implementation of E-Procurement (Z): The test results show that Competence has a positive and significant indirect effect on the Effectiveness of Goods/Services Procurement through the Implementation of E-Procurement, with a coefficient of 0.184, T-statistic 2.693, and p-value 0.004. This indicates that the Implementation of E-Procurement plays a role as a mediating variable, so the hypothesis is accepted.
7. The Effect of Motivation (X2) on Effectiveness of Goods/Services Procurement (Y) through Implementation of E-Procurement (Z): Motivation is proven to have a positive and significant indirect effect on the Effectiveness of Goods/Services Procurement through the Implementation of E-Procurement, with a coefficient of 0.068, T-statistic 1.907, and p-value 0.029. Thus, the Implementation of E-Procurement also mediates the effect of Motivation on the Effectiveness of Goods/Services Procurement, so the hypothesis is accepted.

## Conclusion

1. Competence (X1) has a positive and significant effect on the Effectiveness of Goods/Services Procurement (Y), so the hypothesis is accepted.
2. Competence (X1) has a positive and significant effect on the Implementation of E-Procurement (Z), so the hypothesis is accepted.
3. Motivation (X2) has a positive and significant effect on the Effectiveness of Goods/Services Procurement (Y), so the hypothesis is accepted.
4. Motivation (X2) has a positive and significant effect on the Implementation of E-Procurement (Z), so the hypothesis is accepted.
5. Implementation of E-Procurement (Z) has a positive and significant effect on the Effectiveness of Goods/Services Procurement (Y), so the hypothesis is accepted.

6. Competence (X1) has a positive and significant indirect effect on the Effectiveness of Goods/Services Procurement (Y) through the Implementation of E-Procurement (Z), so the hypothesis is accepted.
7. Motivation (X2) has a positive and significant indirect effect on the Effectiveness of Goods/Services Procurement (Y) through the Implementation of E-Procurement (Z), so the hypothesis is accepted.

### Suggestions

1. Organizational management should improve employee competence through training, certification, and coaching so that they can operate E-Procurement effectively and improve procurement performance.
2. Employee motivation needs to be strengthened through providing incentives, performance recognition, and reward systems, so that the implementation of E-Procurement is more optimal and has a positive impact on procurement effectiveness.
3. Companies or institutions need to ensure that the implementation of E-Procurement runs smoothly and is supported by adequate technology, as this system has been proven to be an important link between competence, motivation, and procurement effectiveness.
4. It is recommended to develop an integrated HR and technology program so that employee competence and motivation can more maximally support the effectiveness of goods/services procurement through the utilization of E-Procurement.
5. This study confirms that Competence and Motivation play an important role in increasing the Effectiveness of Goods/Services Procurement, both directly and indirectly through the Implementation of E-Procurement. These findings strengthen human resource management theory and modern procurement, especially regarding the relationship between competence, motivation, and technology use.
6. The research results show that the Implementation of E-Procurement functions as a mediating variable, so this research can be a reference for further studies that want to develop mediation models in the context of goods/services procurement.

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