

# Influence of the Knowledge of Procurement

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# Influence of the Knowledge of Procurement Personnel on Implementation of Green Public Procurement

(Case Study: Banten, East Java, and Central Java Provinces)

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## ABSTRACT

Traditionally, public procurement practices emphasize value for money, which is carried out through competitive tenders to ensure that government agencies receive the cheapest offers of goods/services. But it should not only consider economic factors; the public procurement in Indonesia is also expected not to damage the environment. However, the weak capability and knowledge of personnel causes the implementation of green procurement in government institutions has not shown significant progress.

The purpose of this study is to find out what factors will be able to increase the performance of green procurement in government institutions. This study uses data from questionnaires distributed to 43 respondents from Banten, East Java, and Central Java Provinces and tests using multiple linear regression methods and Moderated Regression Analysis (MRA). Data processing shows that the awareness of procurement personnel regarding the implementation of green public procurement, training and individual awareness has a significant effect to the performance of green public procurement. In addition, training and the joining in procurement association strengthen the relationship between awareness of procurement personnel regarding to the implementation of green procurement toward performance of green public procurement. This is importance to develop personnel knowledge through training and joining procurement associations. In this way, personnel awareness regarding implementation of green procurement is able to further improve green public procurement performance.

## CCS CONCEPTS

• :: Social and professional topics → Computing / technology policy; Government technology policy; Governmental regulations;

## KEYWORDS

Green Public Procurement, Knowledge

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## 1 INTRODUCTION

The procurement of goods and services is a set of activities carried out by the public and private sectors. Based on the criteria written in Presidential Regulation no. 16 of 2018 concerning Government Procurement of Goods/Services, government procurement of goods and services represents no less than 50% of the State Budget [1]. With the large number of costs budgeted for procuring goods and services, the procurement process is considered to receive significant attention for its role in impacting the environment. The procurement process from operation to completion dramatically affects the background, so it is necessary to pay attention to every function in the manufacture of goods to be held.

One aspect of sustainable procurement is the environmental factor, which is referred to as green procurement. In the public sector, it is known as Green Public Procurement. Green Public Procurement is a procurement process adopted by the government to encourage all sectors to implement environmentally friendly design and manufacturing to reduce the environmental impact of purchased products throughout their life cycle. As the final buyer in government procurement of goods and services, procurement personnel play an essential role in the implementation of Green Public Procurement [2]. The low implementation of Green Public Procurement is a question because this regulation was introduced since 2010.

Therefore, improving the performance of Green Public Procurement is very important for Indonesia, especially the Bureau of Procurement of Goods and Services on the island of Java, to preserve the environment and continue to promote sustainable development. In addition, Green Public Procurement is expected to encourage and spur the private sector to be more aware of the importance of environmentally friendly procurement. This study uses a causal study research design that looks at the relationship of independent variables to the implementation of Green Public Procurement. Respondents that will be used are the tender committee at the Government Procurement Bureau in Banten, Central Java, and East Java Provinces. The tender committee was chosen as the respondent in this study because it has the authority to review the specifications of goods or services offered by PPK.

## 2 LITERATURE REVIEW

### 2.1 Green Public Procurement

Green Public Procurement is an approach used to integrate the existing criteria in environmental preservation into all aspects of procurement activities, which is expected to be a driver of product and technological innovation-oriented towards ecological protection throughout the product life cycle [3].

Environmentally friendly procurement is one of the initiatives introduced to improve sustainability. Thus, Green Public Procurement is considered a new link between environmental and economic factors in procuring goods and services. However, the process towards a more environmentally friendly procurement requires a reconceptualization of the procurement process, from the level of decision-makers who initially only considered the economy, now have to consider environmental factors as well. For this reason, Green Public Procurement is an instrument that gives the initiative to suppliers in their product offering process to prioritize ecological factors in the tender process [4].

**2.1.1 Green Public Procurement in Indonesia.** In Indonesia, goods and services that are environmentally sound are regulated by two regulations, namely the Minister of Environment Regulation no. 8 of 2010 concerning Criteria and Certification of Environmentally Friendly Buildings and Regulation of the Minister of Environment and Forestry of the Republic of Indonesia No. P.30/Menlhk/Setjen/PHLP.3/3/2016 concerning Performance Assessment of Sustainable Production Forest Management and Timber Legality Verification for Permit Holders, Rights Management, or Private Forests. In South Kalimantan Province, it has begun to issue Governor Regulation (Pergub) No. 093 concerning Green Public Procurement to support the Green Revolution in South Kalimantan Province, later abbreviated as G-PRO.

It can be concluded that the implementation of Green Public Procurement in Indonesia is still in the introduction stage. Although Green Public Procurement has started to be implemented, in reality, its absorption is still deficient. Green Public Procurement has started on paper commodities by looking for paper that already has eco-labeling. In addition, the government has made environmentally friendly procurement in the furniture sector. However, its implementation is still minimal. Stakeholders face various challenges such as lack of knowledge and awareness about the concept of green procurement [5].

**2.1.2 Implementation of Green Public Procurement at Individual Level.** The Green Public Procurement policy aims to reduce the environmental impact of services and products throughout their life cycle [6]. There are still many government procurement personnel at the city government level, especially in developing countries that do not yet have the human resources to do this, so it is necessary to use various indicators and environmentally friendly labels. But again, that stakeholders face multiple challenges such as lack of knowledge and awareness about the concept of green procurement. The lack of knowledge among procurement personnel is a significant challenge in implementing environmentally friendly procurement [3, 7–9]. The people's lack of understanding and knowledge is an obstacle in implementing green procurement [10].

### 2.2 Linear Regression Analysis and Moderate Regression Analysis

Regression analysis is an analytical tool used to see the relationship between the independent variable and the dependent variable and predict a variable [11]. Multiple linear regression analysis is the right analytical tool to use to determine the relationship or influence of two or more independent variables on the dependent variable [11].

Multiple linear regression is used when testing the effect of two or more dependent variables on the dependent variable, which is described by a mathematical equation. The purpose of doing multiple linear regression analysis is to estimate the interaction of the independent variable on the dependent variable. The following is a mathematical model of multiple linear regression:

$$Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \dots + \alpha_k X_k + e$$

refers:

$Y$  = dependent;

$\alpha_0, \dots, \alpha_k$  = regression coefficient,

$X_1, \dots, X_k$  = independent variable

$E$  = error

Moderated Regression Analysis (MRA) is carried out when testing a model that has an interaction element (multiplication of two or more independent variables) [12]. The purpose of the MRA test is to see whether a variable strengthens or weakens the relationship between the independent variable and the dependent variable [13]. The following is a mathematical model of MRA:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_1X_2 + e$$

## 3 RESEARCH METHODOLOGY

The following is the research flow in this research:

- Preliminary study (literature study and field study)
- Determination of research questions
- Research design

This research is included in the category of causal studies because the research focuses on looking at the impacts or effects that occur by looking for the cause of these impacts. In this case, the influence or effect is the dependent variable or the performance of green public procurement. In sample collection, the technique used is purposive sampling or a sampling technique that must be based on several considerations [14].

The purpose of this study is to prove the cause-and-effect relationship of several variables. The dimension used in this research is the time dimension of cross-sectional design. The single cross-sectional design is data collection that is carried out only once at a specific time. The researcher uses a single cross-sectional design type because the research will only look at the phenomenon in one research period.

- Research variable

This research variable is based on previous research taken from several journals. Research [15, 16] used all factors in the journal, including: awareness of green public procurement implementation policies, understanding of procurement personnel regarding regulations related to green public procurement, training on green

**Table 1: Characteristics of Respondents**

Characteristics	Categori	Number of Respondents
Respondent Age	26 – 30 years	2 (5%)
	31 – 35 years	8 (19%)
	36 – 40 years	16 (37%)
	41 – 45 years	10 (23%)
	46 – 50 years	5 (12%)
	51 – 55 years	2 (5%)
Length of Working Time as	1 – 5 years	11 (26%)
Procurement Personnel	6 – 10 years	13 (30%)
	11 – 15 years	9 (21%)
	16 – 20 years	8 (19%)
Workplace	>20 years	2 (5%)
	Biro PBJ Banten Province	14 (33%)
	Biro PBJ Central Java Province	13 (30%)
	Biro APBJ Jawa Tengah Province	16 (37%)

public procurement, joining procurement associations, and implementation of green public procurement. At research [17] are cross-departmental management, individual awareness, and top-level management support. And in study [18–20] the factor used is upper management support.

- Research Instruments
- Data Collection and Data Analysis

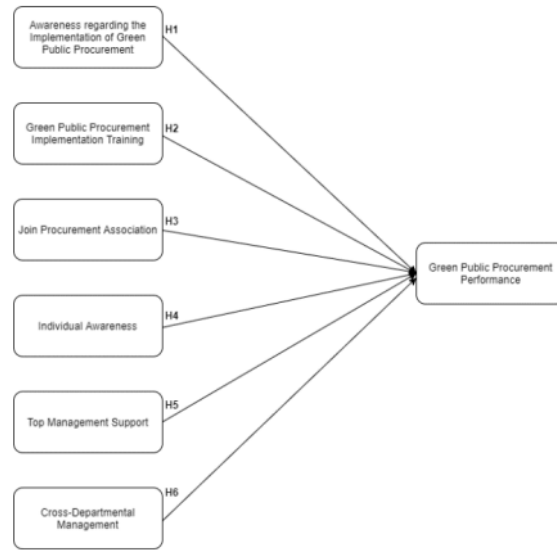
The data was obtained through filling out questionnaires directly to the respondents, namely members of the tender committee at the Bureau of Procurement of Goods and Services in the Provinces of Banten, Central Java, and East Java. The responses given by respondents through questionnaires will be the primary data in the study and processed using multiple linear regression and Moderated Regression Analysis (MRA).

- Conclusions and suggestions

## 4 ANALYSIS AND DISCUSSION

### 4.1 Characteristics of Respondents

Data collection is done by distributing online questionnaires, a list of statements regarding the knowledge factors that encourage the implementation of green public procurement. The distribution of the questionnaire was carried out using a google form. The total number of respondents who filled out the questionnaire was 43 POKJA. The main reason is that the green procurement policy is a national policy that all government institutions must implement to procure goods/services. Respondents used in this study include PBJ Banten, PBJ East Java, and APBJ Central Java. Table 1 shows the characteristics of respondents as below.

**Figure 1: Multiple Regression Analysis Model**

### 4.2 Validity and Reliability Test

Validity and reliability tests were conducted using 24 respondents. The purpose of the validity test is to ensure that the indicators of each variable used in this study are valid. The questionnaire is considered good when the value of  $r_{table} > r_{count}$  [13]. While the reliability test was conducted to determine whether the answers to each research instrument used had the same data at different times. The questionnaire is considered reliable when the Cronbach Alpha value of the device has a value of more than 0.60 [13].

In this study, the indicator is considered valid because the  $r_{count}$  results of all research indicators are above the  $r_{table}$  value. Likewise with the reliability test, all variables are considered reliable because Cronbach's Alpha value is above 0.60.

### 4.3 Hypothesis Testing

Figure 1 is the multiple regression analysis model that shows the factors that affect performance of green public procurement.

The following Table 2 shows the results of multiple linear regression:

A determination test is used to determine the contribution of the independent variables (independent) together in explaining the dependent variable (dependent) or how much influence the independent variables simultaneously have on the dependent variable. The adjusted  $r^2$  square is 0.661, which means that 66.1% of the implementation of green public procurement is influenced by awareness of procurement personnel regarding the implementation of green public procurement, training on green public procurement, joining of procurement personnel in procurement associations, individual attention, cross-departmental management, and support. top management and the other 33.9% are influenced by other variables not examined in this study.



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Table 2: Coefficient of Determination Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.842 <sup>a</sup>	.710	.661	1.145	2.468

Table 3: Multiple Linear Regression F Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	115.444	6	19.241	14.673	.000 <sup>a</sup>
	Residual	47.207	36	1.311		
	Total	162.651	42			

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Table 4: Multiple Linear Regression Hypothesis Output

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	-2.706	2.174		-1.245	0.221
Awareness	0.423	0.154	0.306	2.754	0.09
Training	0.575	0.205	0.380	2.804	0.08
Join Assoc	-0.116	0.177	-0.089	-0.656	0.516
Cross Dept	0.113	0.285	0.042	0.398	0.693
Individual awareness	0.248	0.080	0.345	3.116	0.04
Top Mgt Support	0.284	0.089	0.330	3.194	0.03

In Table 3, it is shown that the multiple regression test shows the calculated F result of 14,673 with a significance level of 0.000 which is smaller than 0.05, where the calculated F value is 14.673 greater than the F table value, which is 2.37 (f (k; nk), F = (6; 36)). This means that the variables of awareness of procurement personnel regarding the implementation of green public procurement, training on green public procurement, the joining of procurement personnel in procurement associations, individual awareness, cross-departmental management, and top-level management support together affect the implementation of green public procurement.

From the output above in Table 4, it can be concluded that the hypothesis is as follows:

- H1: Awareness of procurement personnel regarding the implementation of green public procurement has a positive and significant impact on the performance of green public procurement.

The results of SPSS processing, H1 has a tcount of 2.754 with a significance value of 0.009. In this study, it can be seen that H1 is acceptable, meaning that there is a significant and positive influence between the awareness of procurement personnel regarding the implementation of green public procurement (X1) on the performance of green public procurement.

The results in this study are in line with previous research that stated that the awareness of procurement personnel regarding the implementation of green public procurement influences the performance of green public procurement [15]. This is also reinforced by a study that says that higher self-awareness of guidelines/regulation

awareness positively affects green public procurement performance [16, 21].

- H2: Training on the implementation of green public procurement has a positive and significant impact on the performance of green public procurement.

In the results of SPSS processing, H2 has a tcount value of 2.804 with a significance of 0.008. In this study, it can be seen that H2 can be accepted because there is a significant and positive effect between training on the implementation of green public procurement (X3) on the performance of green public procurement.

The results in this study are in line with previous research, which states that training on the implementation of green public procurement influences the performance of green public procurement [16, 22]. This also supports the assertion that training on green public procurement plays an essential role in promoting the implementation of green public procurement [23]. There are more training and workshops on sustainable procurement, thimplemen- tation of green public procurement will also improve.

- H3: The joining of Procurement Personnel in the Procurement Association has a positive and significant impact on the performance of green public procurement.

The results of SPSS processing, H3 have a tcount value of -0.656 with a significance of 0.516. In this study, it can be seen that H3 cannot be accepted because there is no significant effect at the 5% significance level between the joining of procurement personnel in procurement associations (X4) on the implementation of green public procurement.

The results in this study are in line with previous research, which states that the joining of procurement personnel in procurement associations does not affect the implementation of green public procurement [15]. Not all procurement personnel are members of procurement associations, thus reducing the impact of joining procurement personnel in procurement associations on the implementation of green public procurement.

- H4: Cross-departmental management has a positive and significant impact on the performance of green public procurement.

The results of SPSS processing, H4 have a tcount value of 0.398 with a significance of 0.693. In this study, it can be seen that H4 cannot be accepted because there is no significant effect at the 5% significance level between cross-departmental management (X5) on the implementation of green public procurement.

The results in this study are not in line with previous research that states that cross-departmental management influences the implementation of green public procurement [24]. Based on the results of interviews conducted in the field, the difference in results due to collaboration and formal internal communication has never been made. However, informal communication has happened to some respondents, but it only happened to the extent that it had happened but was not implemented in reality. In addition, what makes the results of this study different is that the research was conducted in Australia, where the characteristics of the country and procurement personnel are also definitely other so that different results may occur.

- H5: Individual awareness has a positive and significant impact on the performance of green public procurement.

The results of SPSS processing, H5 have a tcount value of 3.116 with a significance of 0.004. In this study, it can be seen that H5 can be accepted because there is a significant and positive influence between individual awareness (X6) on the implementation of green public procurement.

The results in this study are in line with previous research that states that individual awareness influences the implementation of green public procurement [16, 22]. The personal attitude applied will have an impact on the procurement process carried out [25], so it is excellent if procurement personnel have a tremendous individual awareness of environmentally oriented procurement.

- H6: Top management support has a positive and significant impact on the performance of green public procurement.

The results of SPSS processing, H6 have a tcount value of 3.194 with a significance of 0.003. In this study, it can be seen that H6 can be accepted because there is a significant and positive influence between top management support (X7) on the implementation of green public procurement.

H The results in this study are in line with previous research that states that upper management support influences the implementation of green public procurement [20]. By providing direct support in the form of political commitment, environmental knowledge, a better organizational structure, and a focus on regulatory interpretation will influence the implementation of green public procurement [19].

**Table 5: Output Moderated Regression Analysis (MRA)**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.349	1.802		3.524	.001
	X1	.183	.305	.132	.602	.551
	Moderasi1	.017	.011	.309	1.645	.108
	Moderasi2	.087	.025	.788	3.512	.001
	Moderasi3	-.050	.020	-.508	-2.515	.015

a. Dependent Variable: Y

Figure 2 is the moderated regression analysis model that shows the factors that moderate the affect of awareness regarding the implementation of green public procurement toward performance of green public procurement.

Table 5 shows the output of the Moderated Regression Analysis perhitungan (MRA):

- H1a: Procurement Personnel Awareness Regarding Green Public Procurement Regulations/Regulations positively moderates the effect of Procurement Personnel Awareness on Green Public Procurement Implementation.

The result of SPSS processing, H1a has a significance value of 0.108, more significant than 0.05. In this study, it can be seen that H1a cannot be accepted because there is no significant effect at the 5% significance level that Procurement Personnel Awareness Regarding Regulations/Regulations of Green public procurement (X2) does not have a positive impact/does not strengthen the relationship Awareness of procurement personnel regarding the implementation of green public procurement on the performance of green public procurement. The results in this study are in line with previous research, which states that Awareness of Procurement Personnel Regarding Regulations/Regulations of green public procurement does not have a positive effect/does not strengthen the relationship between green public procurement implementation [26]. This means that knowledge of regulations and regulations on green public procurement is not an essential factor in the performance of environmentally friendly procurement.

- H1b: Training on Green public procurement positively moderates the effect of Procurement Personnel Awareness on the Implementation of green public procurement.

The result of SPSS processing, H1b has a significance value of 0.001. This indicates that H1b is acceptable. In this study, it can be seen that the training on green public procurement (X3) has a positive effect/strengthens the relationship between training on green public procurement and the implementation of green public procurement. The results in this study are in line with previous research, which states that training on green public procurement has a positive moderating effect on the relationship between awareness of procurement personnel and implementation of green public procurement [15]. It also verifies that the lack of training on green public procurement is an essential obstacle in implementing green public procurement [3].

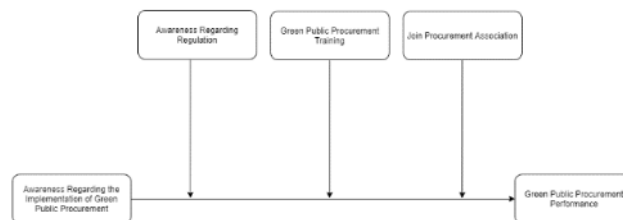


Figure 2: Moderated Regression Analysis Model (MRA)

- H1c: The inclusion of Procurement Personnel in the Procurement Association positively moderates the effect of Procurement Personnel Awareness on the implementation of green public procurement.

The result of SPSS processing, H1c has a significance value of 0.016. In this study, it can be seen that H1c is acceptable. The joining of procurement personnel in the procurement association strengthens the relationship of the procurement personnel in the procurement association to the implementation of green public procurement. The results in this study are in line with previous research, which states that the joining of procurement personnel in procurement associations has a positive moderating effect on the relationship between awareness of procurement personnel and the implementation of green public procurement [15]. This shows that procurement personnel are not only focused on implementing green public procurement but also view associations as a guide in implementing procurement.

## 5 CONCLUSION

Internal factors of procurement personnel include awareness of procurement personnel regarding the implementation of green public procurement, training on green public procurement, joining procurement personnel in procurement associations, understanding of individuals who encourage the implementation of green public procurement. Data analysis shows that awareness of procurement personnel regarding green implementation public procurement, training on green public procurement, and individual attention significantly influence the performance of green public procurement.

Internal factors of the procurement bureau include support from top management and cross-departmental management that encourage the implementation of green public procurement after data analysis, indicating that upper management support has a significant effect on the performance of green public procurement.

Awareness of procurement personnel regarding green public procurement regulations, training on green public procurement, and the joining of procurement personnel in procurement associations, besides acting as a driving factor, also acts as a moderator in the relationship of awareness of procurement personnel regarding the implementation of green public procurement to the performance of green public procurement. After data analysis, it shows that training on green public procurement and the joining of procurement personnel in procurement associations strengthens the relationship

between awareness of procurement personnel regarding the implementation of green public procurement towards the performance of green public procurement.

Many steps can be taken both in the short and long term [27], 1) Bureau/Central Government can improve capacity and quality for education and accreditation of procurement personnel, 2) development of regulations that are consistent and so that they can be applied in the procurement process, 3) The government can also specify the criteria used to determine the need for green public procurement instruments. In addition, it can also be done (4) provide a minimum standard of procurement (in percentage) for each Bureau to encourage procurement personnel to carry out environmentally oriented procurement, and 5) can impose sanctions on Bureaus that do not reach the standards set and provide awards to the Bureau that achieves the standard. Based on the study results, it is also concluded that top management support has a significant effect on the implementation of green public procurement. Things that top management can do are a) intensify information on GPP in strategic meetings, b) present green auditors focusing on environmentally friendly procurement processes, and c) build a special team to carry out sustainable procurement [28].

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