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Preventing Procurement Fraud in E-purchasing for Indonesian Local Governments*

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Abstract

This study aims to investigate the effects of e-purchasing on increasing transparency, expanding market access, and the efficiency of the government procurement process. This study also investigates how transparency of the procurement process, improved market access and the efficiency of the procurement process in e-purchasing will decrease the level of fraudulent government procurement in Indonesia. The questionnaires were distributed to the Procurement Service Units (ULP) of Local Governments through email. There are currently 542 ULPs in Indonesia based on the data of the Government Procurement Policy Institute (LKPP). However, only 520 ULPs had their email addresses traced, 120 ULP returned the questionnaires and the response rate is lower than it was expected. The data research was analyzed by a structural equation model (SEM) by using WarpPLS 7.0. The results reveal that the e-purchasing effect on the transparency, the expansion of market access, and the efficiency of the government procurement process. The other findings show the negative effect between efficiency in government procurement and fraud in government procurement. The findings of this study suggest that efficiency in the process of government procurement will minimize fraud in government procurement. However, transparency in government procurement and the expansion of market access was not sufficient to minimize fraud in government procurement.

Keywords: E-purchasing, Fraud, Government Procurement, Transparency, Market Access, Efficiency

JEL Classification Code: H6, H7, H57, H83, O33

1. Introduction

The implementation of e-procurement in Indonesia has no effect in reducing the level of corruption in government procurement of goods and services. The e-procurement system should be able to prevent corruption (Vaidya et al., 2006; Adersen, 2008; Iqbal & Seo, 2008; Zahra et al., 2017). A secure e-procurement system should be capable of establishing strong internal controls to prevent fraud in government procurement of goods and services.

The results of research on the implementation of e-procurement system indicates that there is no model to illustrate how to implement a successful e-procurement system to reduce the potential for fraud in government procurement. The key issues that obstruct the procurement process are the difficulty of the procurement process and the red tape of the agencies. Besides, many firms have not been active in the market for government procurement of products and services in such a way that they continue to be exclusive or includes only a limited number of companies. For example, 150,000 out of 4,200,000 million businesses are actively engaged in government procurement.

The purpose of this study was to investigate the effects of e-purchasing on increasing transparency, expanding market access, and the efficiency of the government procurement process. The other objectives are investigating the transparency, improved market access, and the efficiency

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of the procurement process's effect on the level of fraudulent government procurement in Indonesia.

2. Literature Review and Hypothesis

2.1. Literature Review

Public procurement is the procurement of goods and services in the government public sector (Thai & Khi, 2009). Some of the advantages of introducing e-procurement that can be found from a range of studies are intended to avoid or minimize the dysfunctional actions of procurement actors (Ningsih et al., 2015; Zahra et al., 2017). The Indonesian Presidential Regulation No. 4 of 2015 defines government procurement of goods and services is an activity to obtain goods and services by ministries/institutions, whose process starts from planning needs to completing all activities to obtain goods and services. Funding for procurement activities can come from the national budget or grants. E-purchase is an invention made by the government to address big procurement problems. E-purchase is a form of procurement of goods and services, the mechanism of which is similar to an online shopping system, to supplement the method of procurement of government goods and services, which previously consisted only of sales, selective auctions, basic auctions, direct appointments, direct procurement, and competitions. Article 107 of Presidential Regulation No 4 of 2015 describes e-purchasing as part of electronic procurement to enhance transparency and accountability, improve the quality of the procurement process, increasing market access and fair competition, encouraging the monitoring and auditing process, and meeting the need for real-time access to information (Nugroho et al., 2015). Transparency, expanding market access, and the quality and efficiency of the procurement process are the three goals of the electronic market.

2.2. Hypotheses

Control beliefs are factors that individuals perceive as being present that may facilitate or impede performance of their behavior. Control beliefs can be used to control the degree of ease of behavior, including clear actions (Ajzen, 1985). The implementation of information technology is a type of control that is widely used. Information technology makes it possible for humans to act transparently by supplying the media (channels) that serves as a medium for transmitting information (Nguyen, 2019). The higher level of transparency, the greater likelihood for transparent actions to be realized. Several reports have shown that the introduction of information technology enhances transparency. The introduction of e-government technology in the United States is increasing accountability (Tolbert & Mossberger, 2006).

The level of transparency of procurement through electronic auctioning is reasonably strong (Nugroho et al., 2015; Nasution, 2012: Balasa, 2015; Zahra et al., 2017) since all information and procurement regulations are released online such that anyone can access them (more transparently).

Hence, this study examined every domain of e-purchasing to investigate whether e-purchasing would be directly affecting the transparency of government procurement. The investigation is based on the following hypotheses:

H1: *E-Purchasing is significantly and positively related to transparency of government procurement*

Negative behavior is made as difficult as possible to implement, so that the behavior will be less likely to be realized (Ajzen, 1985). One example of negative behavior is limiting market access only to groups. Control beliefs in the form of implementation of information technology can be used to control these negative behaviors. With control beliefs in the form of information technology, limiting of market access by humans are made difficult because they are monitored by many parties such that they voluntarily or are forced to only have the option to open the widest possible market access. The higher level of difficulty in limiting market access, the greater tendency for human (behavior) to open market access.

Previous studies have provided evidence that the implementation of information technology improves market access. The implementation of e-government technology in the United States increases accessibility (Tolbert & Mossberger, 2006). The implementation of e-tendering at the Ministry of Finance increases market access and fair business competition (Nasution, 2012) and (Balasa, 2015) concluded that the implementation of e-tendering in the Pontianak City Government increases market access and fair business competition. Market access and healthy business competition after the implementation of e-purchasing is better than market access and the healthy business competition before e-purchasing according to provider perceptions (Rizkiani, 2017).

Hence, this study examined every domain of e-purchasing to investigate whether e-purchasing would be directly affecting the market access to government procurement. The investigation is based on the following hypotheses:

H2: *E-Purchasing is significantly and positively related to market access to government procurement*

Positive behavior must be made as easy as possible to implement so that there is a greater tendency for the behaviour to be realized (Ajzen, 1985). Control beliefs in the form of implementation of information technology can be used to control efficient behavior. With control beliefs in the form of information technology, efficient behaviour by humans is

made easier because several jobs are automated by the system, thereby reducing the risk of errors and inaccuracy due to fatigue. With the increase in the ease of behaving efficiently, the greater the tendency for efficient behavior to be realized.

Several studies have provided evidence that the implementation of information technology increases efficiency. The implementation of electronic procurement technology in the UK reduces the total acquisition cost (Croom & Brandon-Jones, 2007). E-tendering at the Ministry of Finance increases time efficiency, advertising cost efficiency, auction cost efficiency, and procurement efficiency (Bawono, 2011). The Pontianak City Government increases the efficiency of procurement time and costs in e-tendering (Balasa, 2015). The efficiency of the procurement process after the implementation of e-purchasing is better than the efficiency of the procurement process before e-purchasing according to supplier perceptions (Rizkiani, 2017).

Hence, this study examined every domain of e-purchasing to investigate whether e-purchasing would be directly affecting the efficiency of government procurement. The investigation is based on the following hypotheses:

H3: E-Purchasing is significantly and positively related to the efficiency of government procurement

According to the fraud diamond theory, there are four elements that influence a person to commit fraud, namely pressure, opportunity, rationalization and capability. Fraud diamond theory explains several indicators that trigger people to commit fraud, including challenges to defeat the system, for the good of the organization, weaknesses of the board of directors, inadequate internal control, the ability to obscure fraud, lack of controls to prevent fraudulent behavior, lack of access to information and lack of audit trail. In the process of procuring government goods and services through e-purchasing, increasing access to information can increase the transparency of the procurement process, thereby increasing internal control in the procurement process, which in turn will prevent fraudulent behavior in the process of procuring goods and services.

Access to information that encourages the expansion of market access can also reduce the capability to commit fraud in procurement. Besides, the high level of control in the procurement process which increases the efficiency of the procurement process is also a factor in preventing fraudulent acts in the procurement of government goods and services

Hence, this study examined every domain of transparency, market access, and efficiency to investigate whether they would be directly affecting the level of fraud in government procurement. The investigation is based on the following hypotheses:

H4: Transparency is significantly and negatively related to fraud in government procurement

H5: Market access is significantly and negatively related to fraud in government procurement

H6: Efficiency is significantly and negatively related to fraud in government procurement

3. Research Methods and Materials

This study collects opinions from respondents using a questionnaire related to the procurement process of the local government in Indonesia. The questionnaires were distributed to the Procurement Service Units (ULP) of Local Governments through email. The questionnaire. There are currently 542 ULPs in Indonesia based on the data of the Government Procurement Policy Institute (LKPP). However, only 520 ULPs had their email addresses traced, and anticipating a low response, the researcher resent the questionnaires. Then, 120 ULP returned the questionnaires and the response rate was lower than it was expected. The data analysis used in this study is a structural equation model (SEM) with the WarpPLS 7.0 application.

4. Results and Discussion

4.1. Reliability, Validity, and Model Fit Measurements

The results of data processing for reliability can be seen in Table 1 below.

Composite reliability (CR) is a measure of internal consistency in scale items. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. A general accepted rule is that α of 0.6–0.7 indicates an acceptable level of reliability, and 0.8 or greater a very good level. The general rule of thumb is that a Cronbach's alpha of 0.70 and above is good. The CR value for each construct is greater than 0.70 and Cronbach's alpha above 0.70. This indicates that the instrument used to measure the variables has good reliability. Reliability reflects that the instrument used to measure the variables in this study has consistently produced the same results every time a measurement is made.

Convergent validity refers to how closely the new scale is related to other variables and other measures of the same construct. Not only should the construct correlate with related variables but it should not correlate with dissimilar, unrelated ones. Factor loadings are correlation coefficients between observed variables and latent common factors. Factor loading is basically the correlation coefficient for the variable and factor. Factor loading shows the variance explained by the variable on that particular factor. In the SEM approach, as a rule of thumb, 0.7 or higher factor loading represents that the factor extracts

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sufficient variance from that variable. A *p*-value is a measure of the probability that an observed difference could have occurred just by random chance. The lower the *p*-value, the greater the statistical significance of the observed difference. *P*-value can be used as an alternative to or in addition to pre-selected confidence levels for hypothesis testing.

There are two criteria to assess whether the outer model meets the convergent validity requirements for a reflective construct, namely (1) the loading must be above 0.70 and (2) the p-value is significant (> 0.05) (Hair et al., 2014). However, the loading factor from 0.60 to 0.70 is still acceptable (Ghozali & Latan, 2014). Based on the convergent results, the validity shows that all the construct indicators of fraud (F1, F2, F3, F4, F5, F6, F7, and F8), all the indicators of the e-purchasing construct (EP1, EP2, EP3, EP4 EP5, EP6, EP7, EP8), EP9 and EP10), all transparency construct indicators (T1, T2, T3, T4, T5, T6, T7, AND T8), all market aspect construct indicators (AP1, AP2, AP3, and AP4) and all efficiency construct indicators (EF1 , EF2, EF3) have a loading value greater than 0.60.

These results indicate that these indicators have good convergent validity with a significance of <0.01. Research instruments that have met the elements of convergent validity indicate that the instrument is able to collect data with the same pattern to measure the same construct. Discriminant validity is demonstrated by evidence that measures of constructs that theoretically should not be highly related to each other are, in fact, not found to be highly correlated to each other. The discriminant validity can be evaluated by using cross-loading of indicator. To see the discriminant validity of this study, the following are the results of data processing in Table 2 below:

Table 2 shows that the cross-loading value is lower than the construct loading value. The cross-loading value indicates that the discriminant validity criteria have been met. Average variance extracted (AVE) is a measure of the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error. An indication of the fulfillment of discriminant validity can also be seen from the results of the root AVE value which is greater than the correlation of other constructs (Lee et al., 2006; Cholanova et al., 2019; Pham, 2020) The result of the AVE root in the diagonal column shows that all variables have higher AVE roots than the correlation of other constructs. The cross-loading value of the AVE root indicates that the discriminant validity of the instrument in this study is fulfilled.

Structural model analysis with WarpPLS 7.0 shows the results of the full measurement of the structural equation model as follows:

Variance inflation factor (VIF) is a measure of the amount of multicollinearity in a set of multiple regression variables. VIF score of an independent variable represents how well the variable is explained by other independent variables. So, the closer the R^2 value to 1, the higher the value of VIF and the higher the multicollinearity with the particular independent variable. The adjusted R-squared is a modified version of R-squared that has been adjusted for the number of predictors in the model. A path coefficient indicates the direct effect of a variable assumed to be a cause on another variable assumed to be an effect. Path coefficients are standardized because they are estimated from correlations. R^2 value 0.12 or below indicate low, between .13 to .25 values indicate medium, 0.26 or above and above values indicate high effect size.

Table 1: Reliability

Construct	Criteria	Composite Reliability	Cronbach's alpha	Result
Fraud	>0.70	0.898	0.865	Reliable
E-Purchasing	>0.70	0.866	0.821	Reliable
Transparency	>0.70	0.863	0.817	Reliable
Market Access	>0.70	0.883	0.821	Reliable
Efficiency	>0.70	0.928	0.883	Reliable

Table 2: Discriminant Validity

	Fraud	E-Purchasing	Transparency	Market Access	Efficiency
Fraud	0.732	−0.159	−0.143	−0.188	−0378
E-Purchasing	−0.159	0.646	0.482	0.416	0.316316
Transparency	−0.143	0.482	0.667	0.719	0.492
Market Access	−0.188	0.416	0.719	0.81	0.614
Efficiency	−0378	0.316	0.492	0.614	0.9
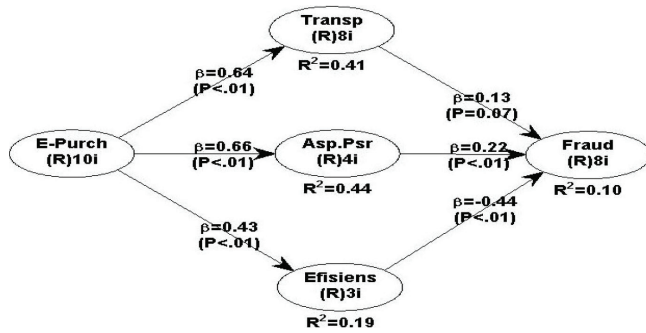
Figure 1: Output WarpPLS 7.0-Full Model

Table 3: Model Fit Measurements

Parameter	Value	P-value	Result
Average Path Coefficient (APC)	0.422, p < 0.001	P < 0.05	Model fit
Average R-square (ARS)	0.285, P < 0.001	P < 0.05	Model fit
Average adjusted R-squared (AARS)	0.275, P < 0.001	P < 0.05	Model fit
Average Variance Inflation Factor (AVIF)	1.311	Acceptable if <= 5, Ideally <= 3.3	Model fit
Average full collinearity (AFVIF)	1.835	Acceptable if <= 5, ideally <= 3.3	Model fit

Based on the output, the fit model has a value of Average Path Coefficient (APC) = 0.422, $p < 0.001$, Average R-square (ARS) = 0.285, $p < 0.001$, Average adjusted R-squared (AARS) = 0.275, $p < 0.001$, Average Variance Inflation Factor = 1.311, (acceptable if <= 5, ideally <= 3.3) and Average full collinearity VIF (AFVIF) = 1,835, (acceptable if <= 5, ideally <= 3.3). AVIF and AFVIF values as indicators of multicollinearity must be less than 5. Referring to these provisions, it can be concluded that this research model is fit.

4.2. Hypotheses Testing

Based on the WarpPLS 7.0 output as presented in Figure 1, the path coefficient value of E-Purchasing → Transparency is 0.64 and is significant with a value of $\rho < 0.01$; so, it can be concluded that e-purchasing capability has a positive effect on the transparency of government procurement of goods and services. Based on the description above, it can be concluded that hypothesis 1 (H1) is accepted with a coefficient of determination of 0.41. The results of this study indicate that the procurement of government goods and services using the e-purchasing system can increase transparency of government goods and services procurement.

Based on the WarpPLS 7.0 output as presented in Figure 1, the path coefficient value of E-Purchasing → Market access path is 0.66 and is significant with a value of $\rho < 0.01$; so, it can be concluded that e-purchasing capability has a positive effect on market access for government procurement of goods and services. Based on the description above, it can be concluded that hypothesis 2 (H2) is accepted with a coefficient of determination of 0.44. The results of this study indicate that the procurement of government goods and services using the e-purchasing system can increase market access for government goods and services procurement.

Based on the WarpPLS 7.0 output as presented in Figure 1, the path coefficient value of E-Purchasing → Efficiency is 0.43 and significant with a value of $\rho < 0.01$; so, it can be concluded that e-purchasing capability has a positive effect on the efficiency of the government procurement process. Based on the description above, it can be concluded that hypothesis 3 (H3) is accepted with a coefficient of determination of 0.19. The results of this study indicate that the procurement of government goods and services using the e-purchasing system can increase the level of efficiency in the process of procuring government goods and services.

Based on the WarpPLS 7.0 output as presented in Figure 1, the path coefficient value of Transparency → Fraud is 0.13 with a value of $\rho = 0.07$; so, it can be concluded that the transparency of the procurement of goods and services has no negative effect on fraud. Based on the description above, it can be concluded that hypothesis 4 (H4) is rejected with a coefficient of determination of 0.10. The results of this study indicate that transparency in the process of procuring government goods and services has not been sufficient to reduce fraud in government procurement of goods and services.

Based on the WarpPLS 7.0 output as presented in Figure 1, the path coefficient value of Market Access → Fraud path is 0.22 with a value of $\rho < 0.01$; so, it can be concluded that market access for the procurement of goods and services has a positive effect on fraud. Based on the description above, it can be concluded that hypothesis 5 (H5) is rejected with a coefficient of determination of 0.10. . The results of this study indicate that market access in the process of procuring government goods and services has not been sufficient to reduce fraud in government procurement of goods and services.

Based on the WarpPLS 7.0 output as presented in Figure 1, the path coefficient value of Efficiency → Fraud is −0.44 and significant at a value of $\rho < 0.01$; so, it can be concluded that efficiency in the process of government procurement of goods and services has a negative effect on fraud. Based on the description above, it can be concluded that hypothesis 6 (H6) is accepted with a coefficient of determination of 0.10. The results of this study indicate that efficiency in the process of procuring government goods and services is able to reduce fraud in the procurement of government goods and services.

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4.3. Discussion

The results of this study found that the procurement of government goods and services using the e-purchasing system can increase transparency in the process of procuring government goods and services. This finding is consistent with the previous studies (Nugroho et al., 2015; Nasution, 2012,; Balasa, 2015; Zahra et al., 2017) that suggest that the e-purchasing system of procurement has the consequence of disclosing information to all providers about the specifications of goods and services needed by the government, as well as providing information to the government about the price levels offered by providers related to goods and services to be purchased by the government.

The results of this study found that the procurement of government goods and services using the e-purchasing system can increase market access for government goods and services procurement. This finding is consistent with the previous studies (Balasa, 2015; Rizkiani, 2017). This finding suggests that e-purchasing opens market access opportunities for those who want to become providers of government goods and services in accordance with predetermined conditions. This opportunity can be utilized maximally by people who want to be involved in the procurement of government goods and services.

The results of this study found that the procurement of government goods and services using the e-purchasing system can increase the level of efficiency in the process of procuring government goods and services. This finding is consistent with the previous studies (Croon & Brandon-Jones, 2007; Bawono, 2011; Balasa, 2015; Rizkiani, 2017). This finding suggests that e-purchasing is an online application that brings together governments who need goods and services and providers who will offer goods and services to the government virtually. This application has implications for summarizing several stages of procurement to reduce procurement costs.

The other finding of this study describes that transparency in the process of procuring government goods and services has not been sufficient to reduce fraud in government procurement of goods and services. The results of this study are reversed from the hypothesis that market access for government goods and services has a negative effect on fraud in government procurement of goods and services (fraud). The results of the research show a positive direction indicating that high market access in the process of procuring government goods and services has not been sufficient to reduce fraud in government procurement of goods and services. This finding is very interesting and could be of concern in the study of government procurement of goods and services because even though market access has expanded, it has not been able to reduce fraud in government procurement of goods and services.

The other finding of this study also describes that efficiency in the process of procuring government goods and services is able to reduce fraud in the procurement of government goods and services. The high control system in the procurement process increases the efficiency of the procurement process so that it has implications for preventing fraud in the procurement of government goods and services.

5. Conclusion

Based on the testing and discussion presented in the previous chapters, it can be concluded that a number of findings are related to the research hypothesis. Procurement of government goods and services using an e-purchasing system can increase transparency in the process of procuring government goods and services. Government procurement of goods and services using an e-purchasing system can increase market access for government procurement of goods and services. Procurement of government goods and services using the e-purchasing system can increase the level of efficiency in the process of procuring government goods and services. Transparency in the process of procuring government goods and services has not been sufficient to reduce fraud in the procurement of government goods and services. Broad market access in the process of procuring government goods and services has not been sufficient to reduce fraud in the procurement of government goods and services. The level of efficiency in the process of procuring government goods and services is able to reduce fraud in the procurement of government goods and services.

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