Successful E-Procurement Implementation: A Case Study in a Construction Industry Company

Kusuma Yudha Ramadhani[1*], Wiwiek Rabiatul Adawiyah[2], Weni Novandari[3]

[1*]Universitas Jenderal Soedirman, ramadhani.46k@gmail.com, Indonesia
[2]Universitas Jenderal Soedirman, wiwiek.adawiyah@unsoed.ac.id, Indonesia
[3]Universitas Jenderal Soedirman, weni_novandari@yahoo.co.id, Indonesia
* Kusuma Yudha Ramadhani

ABSTRACT

This study aims to determine the factors that influence of satisfaction and implementation of e-procurement users in construction industry company. The sample of this study was selected based on the purposive sampling method by selecting samples by seen the criteria of tbhe e-procurement system that had been applied in construction industry companies. The method analysis used in this study was Structural Equation Models (SEM) with Partial Least Square (PLS) approach. The results show that the factors that influence user satisfaction and the implementation of e-procurement are the quality of information and perceptions in terms of benefits. The quality of the system affects to the implementation of e-procurement, while the perception of user convenience does not give a significant affect user towards satisfaction and the implementation of e-procurement.

Keywords: Implementatio; *E-Procurement*; User Satisfaction

1. Introduction

E-procurement is a type of electronic auction used in the auction system. E-procurement is a good idea to increase efficiency in various areas. The establishment of e-procurement occur caused by the weaknesses in traditional ways of procuring products and services, such as unfair competition, signs of fraud, lack of transparency, and collusion between the parties involved.

E-procurement, also known as electronic procurement, that is the automation of the procurement process through the use of web-based tools. The purchase of products and services by an organization is called e-procurement. Procurement is usually one of the more expensive items overhead in a company's budget (Lennon, 2002). The rise and spread of e-procurement systems in enterprises has resulted in a wealth of data on their use and deployment. Many empirical studies provide anecdotal evidence to support the concept of e-procurement that can improve procurement efficiency and effectiveness and have a positive influence on company's performance. The process of quality improvement, reduced procurement costs, user satisfaction, increased responsiveness, improved customer service, product innovation, market growth, reduced purchasing cycle time, reduced staff time, and management effectiveness are some of the possible benefits that can be seen.

Availability of opportunities, resources, relationship to project processes, features, risks and competitive advantages can influence the choice to bid in a project tender (Lowe & Parvar, 2004). Contractors can understand the e-procurement service auction system by studying and understanding the procedures for adopting e-procurement in construction service tenders. This will allow the contractor to focus on the decision-making phase of preparing the bid. Contractors can create priorities, improve efficiency, and make the best judgment in e-procurement tenders after identifying the variables that influence the decision to bid in e-procurement tenders.

In fact, e-procurement still has shortcomings and obstacles in the implementation process, such as lack of financial, a number of institutions and service providers who prefer the old system (conventional procurement), lack of top-level support, lack of skills and knowledge about e-procurement support, and ensuring security system (Gunasekaran et al., 2009).

This is because the process of getting goods/services through e-procurement is still becomes the new things and requires a deep explanation so that construction service providers who follow may feel the effectiveness of the procurement process through the e-procurement method. In Indonesia, there are a little bit of studies that discussed about service providers' opinions on the good and bad aspects of e-procurement, as well as the barriers and variables that affect their participation in e-auctions. Several studies that discuss about e-procurement which have been used in the world but the main analysis for the goods and services sector are discussed in (Davila et al., 2003) in the United States, (Carayannis & Popescu, 2005) in the European Union. This study refers to the application of e-procurement in the construction industry that focus on some factors that is affecting the successful implementation of the E-Procurement System in the construction industry.

2. Literature Review

Humaisar Hasugian (Hasugian, 2016) in his research shows that the factors that influence the acceptance of existing facilities in the EPRO (Electronic Procurement Engineering Online) application to users are the user's abilities and expertise such as self-development on computers and experience using computers, perceptions of how easier to use the computer such as clear and easy to understand and easy to become the master on using that thing, the perceptions of the advantages such as working faster in improving performance and increasing productivity and the last is real system such as user satisfaction and frequency of use.

Construction industry companies are mostly focused on the implementation of e-procurement. It has become a major part of the purchase of goods and services in organization (Puschmann & Alt, 2005) and it is one of the largest budgets for construction industry companies (Angeles, 2005). The existence of E-procurement implemented by the company will certainly help to increase the speed of sending information and reduce processes that do not provide added value (Pearcy & Giunipero, 2008), in order to achieve management efficiency which is a competitive advantage of company operations (Angeles, 2005) with a focus on efficiency of process costs and procurement costs.

Understanding the positive variables that affect the acceptance of procurement applications can assist businesses in developing strategies for implementation (Dooley & Purchase, 2006). The adoption of best practices in e-procurement has resulted in substantial cost savings and process

efficiencies. These companies or institutions, on the other hand, will move forward with the deployment of e-procurement in order to get higher value.

Based on the explanation above, the research hypothesis can be formulated as follows:

H1: The effect of system quality on user satisfaction

H2: The effect of system quality on the success of e-procurement.

H3: The effect of information quality on user satisfaction

H4: The effect of information quality on the success of e-procurement.

H5: The effect of perceived benefits on user satisfaction

H6: The effect of perception of benefits on the success of e-procurement.

H7: The effect of perception of ease of use on user satisfaction

H8: The effect of perception of ease of use on the success of e-procurement.

H9: The effect of user satisfaction on the success of e-procurement.

H10: The effect of system quality on the success of e-procurement through user satisfaction.

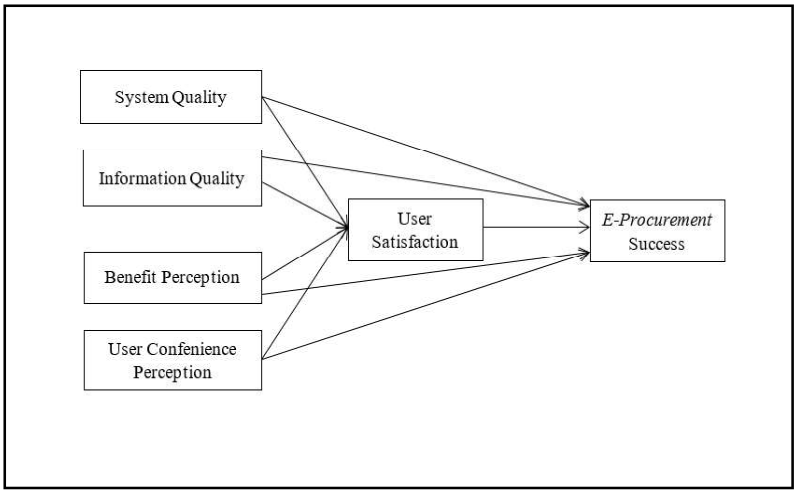
H11: The effect of information quality on the success of e-procurement through user satisfaction.

H12: The effect of perception of benefits on the success of e-procurement through user satisfaction.

H13: The effect of perception of convenience on the success of e-procurement through user satisfaction.

Figure 1 shows the research model with 13 research hypotheses as follows:

Figure 1. Research Model



3. Research Methodology

This research was conducted on employees who work in companies that focused on construction that implement e-procurement. Respondents were selected as many as 225 employees with purposive sampling technique, which means that respondents were selected with the consideration that these employees are currently or have used e-procurement. The questionnaire used in this study has a Likert scale of 5 type, where a scale of 1 means strongly disagrees and a scale of 5 means strongly agrees.

The instrument of this study was a questionnaire that has function to gain the responses from respondents in the form of statements with a Likert scale. The responses measured in this study are the effect of system quality, information quality, perception of benefits and perception of how easy the respondents use it on the success of e-procurement with user satisfaction as a mediating variable. In analyzing and processing the data in this research, the researcher use the statistical tool which is SmartPLS. The first stages in data analysis are designing a structural model in advance of each variable. Then, designing a measurement model of each indicator used in the study.

4. Results

4.1 Validity and Reliability Analysis

An indicator will be able to explain its construct if it has a loading factor, AVE (average variance extracted) and communality value which is greater than the recommended critical value which is 0.5.

Figure 2. Validity Test

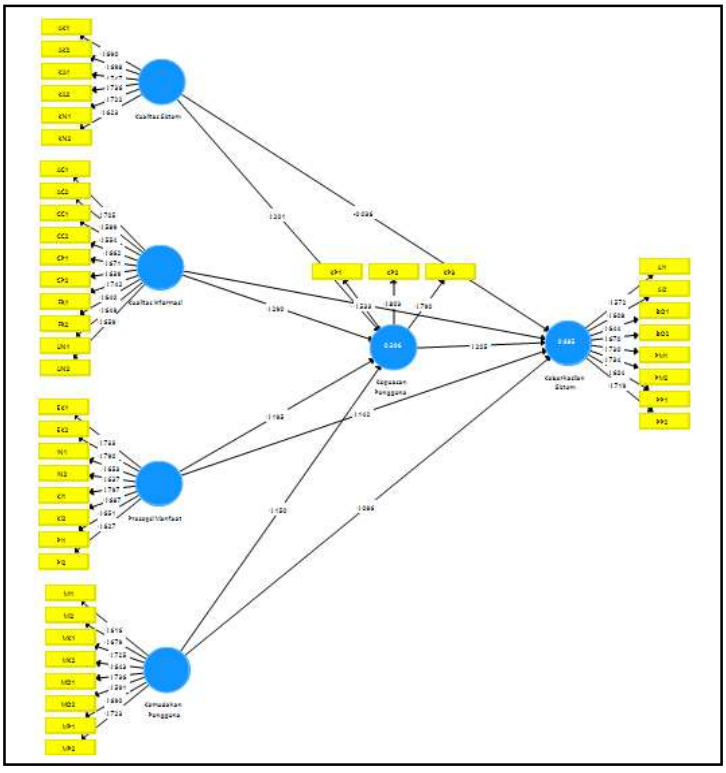
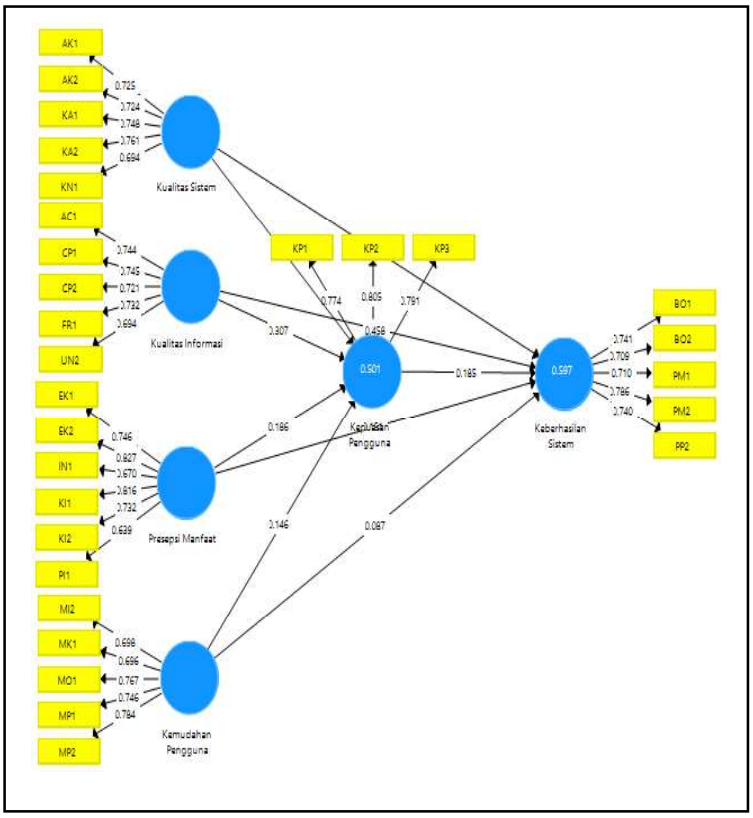


Figure 2 shows that there are still some indicators that are not valid because the loading factor value is < 0.5, the indicators are Ai1, Ai2, pp1, mo2, ac2, cc1, Pi2, in2, kn2, un1, cc2, fr2, mi1, mk2. So that the model needs to be re-specified by eliminating invalid indicators.

Figure 3. Respecific Validity Test



In Figure 3. it has been shown that all the loading factor on the indicator are > 0.5. so it can be concluded that the construct is valid.

Table 1 shows the AVE (average variance extracted) value and the communality value > 0.5, so it can be concluded that the construct is reliable.

Table 1. Reliable Test Results

	Composite Reliability	Average Variance Extracted (AVE)
Successful of the system	0.856	0.544
User convenience	0.857	0.546
User satisfaction	0.832	0.624
Quality of information	0.849	0.529
Quality of system	0.851	0.534
Perception of benefits	0.879	0.550

4.2 *Structural Model Testing*

The structural model testing (inner model) can be seen from the correlation value and R-Square for each endogenous variable as the predictive power of the structural model. Based on the coefficient of determination in table 2, it can be seen that the determinants of user satisfaction contributed 50.1% to user satisfaction, and 59.7% contributed to the e-procurement system implementation. While the remaining 30.3% are other factors that were not studied.

Table 2. Coefficient of Determination

	R Square
Succesfull of the system	0.597
User satisfaction	0.501

4.3 Hypothesis Testing

In table 3, it can be seen that for the effect of system quality on user satisfaction, the value of T count (3.158) > T table (1.96) has a significant effect. Then, for the effect of system quality on the success of e-procurement, the value of T count (1.076) < T table (1.96) so that there is no significant effect. The effect of information quality on user satisfaction is obtained by the value of T arithmetic (3.146) > T table (1.96) so that there is a significant effect. Then, the effect of information quality on the success of e-procurement is obtained by the value of T arithmetic (6.298) > T table (1.96) so that there is a significant effect. The effect of perception of the benefits on user satisfaction is obtained by the value of T arithmetic (2.284) > T table (1.96) so that there is a significant effect. Then the effect of perceived benefits on the success of e-procurement is obtained by the value of T arithmetic (2.278) > T table (1.96) so that there is a significant effect. The effect of perceived ease of use on user satisfaction is obtained by the value of T count (1.93) < T table (1.96) so that there is no significant effect. Then, the effect of perception of ease of use on the success of e-procurement is obtained by the calculated T value (1.472) < T table (1.96) so that there is no significant effect.

User satisfaction as a mediating variable for the effect of system quality on the success of e-procurement obtained the value of T count (1.754) < T table (1.96) so that user satisfaction is not significant in mediating the effect of system quality on the success of e-procurement. The effect of information quality on the success of e-procurement is obtained by the value of T count (1.732) < T table (1.96) so that user satisfaction is not significant in mediating the effect of information quality on the success of e-procurement. The effect of perception of benefits on the success of e-procurement is obtained by the value of T count (1.614) < T table (1.96) so that user satisfaction is not significant in mediating the effect of perceived benefits on the success of e-procurement. The effect of perception of ease of use on the success of e-procurement is obtained by the value of T count (1.433) < T table (1.96) so that user satisfaction is not significant in mediating the effect of perception of ease of use on the success of e-procurement.

Table 3. Hypothesis Testing

	Original Sample	Tcount	Ttable	Conclusion
System quality -> The successful of *e-procurement*	0.060	1.076	1.960	Not signifcant
System quality -> User satisfaction	0.213	3.158	1.960	Significant
Information quality -> The successful of *e-procurement*	0.515	6.298	1.960	Significant
Information quality -> User satisfaction	0.307	3.146	1.960	Significant
Perception of benefits -> The successful of *e-procurement*	0.185	2.278	1.960	Significant
Perception of benefits -> User satisfaction	0.186	2.284	1.960	Significant
User convenience -> The successful of e-procurement	0.114	1.472	1.960	Not significant
User convenience -> User satisfaction	0.146	1.930	1.960	Not significant
System quality -> User satisfaction -> The successful of e-procurement	0.039	1.754	1.960	Not significant
Information quality -> User satisfaction -> The succesfsful of e-procurement	0.057	1.732	1.960	Not significant
Perception of benefits -> User satisfaction -> Successful of e-procurement	0.034	1.614	1.960	Not significant
User convenience -> User satisfaction -> Successful of e-procurement	0.027	1.433	1.960	Not significant

5. Discussion

The quality of the system affects user satisfaction but does not affect the implementation of e-procurement in industrial construction companies. A good system quality should be supported by good information technology conditions. In this case, in order to produce good quality e-procurement services, it must be supported by good quality of computer equipment. It also has an impact on users by feeling satisfaction in using the system. Due to the continuous use of e-procurement systems for input and output of data and information, a tool is needed that can help carry out this activity without interruption. Research (Beldad et al., 2012) suggests that trust in e-government websites is influenced by individual factors of users and government organizations that provide services through e-government. The individual factor is a person's tendency to trust easily and the extent of user experience in using the internet.

The quality of information affects on user satisfaction as well as on the implementation of e-procurement in companies engaged in industrial construction. This is because the quality of information is a major factor in customer happiness (Sompotan et al., 2021)). The quality of

information reflects the results of the implementation of e-procurement in terms of the value, usefulness, and relevance of the information generated for system users, thereby providing quality information that is useful, complete, accurate, up to date, and reliable, so that users are more satisfied with information obtained. The data quality of an e-procurement system that may be used for procurement of goods and services in the study has been shown to have an impact on system confidence. In this study, the ease of understanding information, completeness, accuracy of information, concise and clear content and presentation of information. The findings of this study indicate that the higher the quality of the information produced by the e-procurement system, so the user's trust in the system also higher. Therefore, if construction industry company wants to increase user confidence in the e-procurement system, they must improve the quality of information that includes information that easy to understand, complete, accurate, concise and well presented.

The perception of benefits affects on user satisfaction as well as on the implementation of e-procurement in companies engaged in industrial construction. This is because the perception of benefits is a belief about the decision-making process. If the respondent feels that the system is useful, then the respondent will tend to continue to use it. So, it can achieve the implementation of e-procurement in construction industry company. Therefore, if construction industry company wants to provide more benefits to users, definitly the use of the system can increase individual performance, individual productivity levels and individual performance effectiveness.

The perception of user convenience does not affect user satisfaction as well as on the implementation of e-procurement in construction industry company. This is because the level of easiness of a person are in varies in using a system (Alamanda, 2015). Of course, an easy system model is needed so that it can be used by users in implementing e-procurement in construction industry company without making an effort to find out how the system is used, so that it can lead to deeper intentions to use the e-procurement system. Therefore, if a construction industry company wants to provide user satisfaction in implementing e-procurement, it is necessary to implement a system that is easy to learn, can be done easily, the skills were increase with the increase of using the system and easy to operate.

6. Conclusion

Based on the results of the research above, it can be seen that there is an effect of system quality on user satisfaction but not on the implementation of e-procurement in construction industry company. The quality of information affects on user satisfaction and the implementation of e-procurement in construction industry company. The perception of benefits has an effect on user satisfaction and the implementation of e-procurement in construction industry company. Perception of user convenience has no effect on user satisfaction and the implementation of e-procurement in construction industry company.

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