

# The Influence of Price Offers for Procurement of Goods and Services on the Quality of Road Constructions

Sulfadly<sup>1</sup>, M. Wihardi Tadjaronge<sup>2</sup>, M. Asdar<sup>3</sup>

<sup>1</sup>Master Degree of Transportation Planning, Hasanuddin University,

<sup>2</sup>Professor, In the Departemen of Civil Engineering, Hasanuddin University,

<sup>3</sup>Professor, In the Department of Economic and Business, Hasanuddin University, Makassar - Indonesia

## ABSTRACT

The main purposes of construction service providers are to maximize profits. This is derived from the difference between the total contract value and the total cost used, so the lower the proposed price offers are feared to sacrifice and affect the quality of the work. This study aims to analyze what factors affect the value of the value of price offers for the service providers and how it affects the quality construction, using qualitative and quantitative methods with primary data in the form of questionnaires to construction and consulting service providers, committing officers and secondary data from the offer price of service providers and inspection reports on construction works. The result of this research shows that there are 16 variables that influence to the change of price offering value with the percentage of criteria range from 68% until 80%, and the highest is the difficulty of construction, the ability to estimate the offer and the overhead cost with the percentage criteria each 80%. The most influential indicator group on price offers is the electronic auction characteristics. The value of the supply has a significant effect on the quality of construction where the lower the value of price offers then the quality of construction will also be lower.

**Keywords:** Construction Project, Price Offers, Quality Construction

## I. INTRODUCTION

The developments of the transportation infrastructure such as roads and bridges have a very strategic role in National Development. Therefore, the process of auctioning of construction goods and services as instruments in the process of procuring infrastructure projects is expected to be implemented with the principles of efficient, open, transparent, fair and non-discriminatory as regulated in Presidential Regulation no. 4 in 2015 [1]. The main purpose of the provider of construction services and consultancy in the work is to gain profit or profits as much as possible. As stated by the Institute for Procurement of Government Goods/Services Policy (IPGGSP), that the practice of slamming the price in the procurement of goods/services procurement is still high and has the potential to decrease the quality of the work. The method of awarding contracts for construction projects submitting low price underestimate (2). One of the main disadvantages of this method is that low offers submissions are not fair.

Based on the data of Construction Services Development Agency (CSDA), the possibility of competition among contractors is very high because the number of business enterprises of construction services for contractors is not proportional to the number of existing projects. So a very low offer can always be ensured in every work package that is auctioned. The indication is that in the evaluation of traditional model suppliers (the lowest offer tender method), the contractor competes solely on the price offers and this will potentially result in the low quality of the construction [3].

## II. MATERIALS AND METHODS

### Locus of Research

This research was conducted at the local government agency of North Luwu Regency specifically to the Public Works.

### Research Design

This research is descriptive qualitative and quantitative with the intention to explain the factors that affect the value of the service provider's price offers, and its influence on the quality of construction work results.

### Identification of Research Variables

The variables used in the factor analysis that affects the price offers can be presented as follows:

**Table 1.** Factor variables that influence the price offers

No.	Variables	No.	Variables
<b>A</b>	<b>Project Characteristics</b>	<b>X1</b>	<b>D</b> Conditions of Business Competition <b>X4</b>
1	Great value project/EPA [4]	X1.1	1 Estimated number of competitors [4] X4.1
2	Project location [4]	X1.2	2 Previous auction competitions [4] X4.2
3	Road access project location [4]	X1.3	3 Concurrent auction announcement [5] X4.3
4	Implementation during the rainy season [5]	X1.4	4 Strict supervision [5] X4.4
5	Degree of construction difficulties [5]	X1.5	5 Culture deposit to officer [5] X4.5
6	Material Resources to place liquor	X1.6	<b>E</b> Economic Conditions <b>X5</b>
7	Population Characteristics Population Characteristics at Locations	X1.7	1 Project availability [4] X5.1
<b>B</b>	<b>Tender documents</b>	<b>X2</b>	2 Material price fluctuations [4] X5.2
1	The number and capacity of the tool [5]	X2.1	3 Foreign currency fluctuations (Dollars) [5] X5.3
2	Specific Material type requirements	X2.2	4 Inflation rate [5] X5.4
<b>C</b>	<b>Company Characteristics</b>	<b>X3</b>	<b>F</b> Electronic Auction Condition <b>X6</b>
1	Availability of start-up capital [4]	X3.1	1 Registration of the auction is easier [6] X6.1
2	Availability of staff with Certificates of Expertise/Certificate of Skills [4]	X3.2	2 The cost of participating in the auction is more efficient [6] X6.2
3	Worker availability [4]	X3.3	3 Secured data security [6] X6.3
4	Availability of equipment [4]	X3.4	4 No face to face [6] X6.4
5	Support sub contractor [4]	X3.5	5 Opportunities to get the project [6] X6.5
6	Abilities to estimate the offer [4]	X3.6	6 No project location limits [6] X6.6
7	Project load worked [4]	X3.7	7 The ability of staff in IT [6] X6.7
8	Experience similar projects [5]	X3.8	8 Understanding of auction rules [5] X6.8
9	Overhead Cost [5]	X3.9	9 Socialization of electronic auctions [5] X6.9
10	New or Old Company	X3.10	10 The auction process is more transparent [5] X6.10
11	Take an auction with your own company or loan	X3.11	11 Action participants can not intervene [5] X6.11

**Source:** Results of the Analysis, 2017

Based on the Regulation of the Minister of Public Works No. 06/PRT/M/2008 [7] on guidelines on supervision of construction implementations inspections by the Departments of Public Works, the variables used in construction inspection especially construction quality measurements (see in Table 2)

**Table 2.** Quality Measurement Research Variables

No.	Variables	No.	Variables
<b>A</b>	<b>Aspects of personnel</b>	<b>C</b>	<b>Material Aspects</b>
1	Certificate of Experts / Certificate of Skills X1	1	Raw Material Requirements X11
2	Availability of Manpower X2	2	Availability of Raw Materials X12
3	Schedule of Personnel Supply X3	<b>D</b>	<b>Product Quality (Laboratory Test) X13</b>
4	Worker Effectiveness X4	<b>E</b>	<b>Volume Aspects (Quantity)</b>
<b>B</b>	<b>Aspects of Equipment</b>	1	Examination Procedure (MC) X14
1	Type of Tools X5	2	Volume Measurement Methods X15
2	Number of Tools X6	3	Time Measurement Volumes X16
3	Tool Capacities X7	<b>F</b>	<b>Aspects of Administration</b>
4	Condition of Tools X8	1	Back Up Data X17
5	Schedule of Tool Supplies X9	2	Reports X18
6	Effectiveness of the Tool Utilizing X10		

**Source:** Results of the Analysis, 2017

### Data collection

Factors data affecting the price offers are obtained through a questionnaire to the construction and consulting service providers. Construction quality is obtained through haunted to the Committing Officer or Technical Activity Officer (CO/TAO) of Public Works Department of North Utara Regency, physical job report, data backup of measurement results, physical and financial realization report, procurement plan, contract document and procurement document.

### Data analysis

This study uses a questionnaire instrument to the parties involved in the procurement process. The data obtained i.e.: 1) Respondent profile data, 2) Offer value in auction of goods and services procurement, 3) Variables that affect the contractual offer value in following the auction, and 3) Variables that affect the quality of construction results.

The criteria scores determined in this paper are as follows:

- 84,0% - 100% = Very Influential/Excellent
- 67,9% - 83,9% = Influence/Good
- 51,8% - 67,8% = Less Influence/Fair
- 35,7% - 51,7% = Not Impact/Poor
- 19,6% - 35,6% = Not Influential/Very Poor

Furthermore, a statistical analysis of each variable is performed. Validity test and reliability test of factor instrument affecting price offers, multiple linear regression analysis of partial indicators, interpretation of the model followed by statistical test of the regression model consisting of F-test, t-test, and Coefficient of Determination ( $R^2$ ) [8], tested regression models with normality and Multi co- linearity tests. The effect of price offers on construction quality is tested by simple linear of the regression methods, and re-interpretation of the regression model that is formed.

## III. RESULTS

### An Analysis of the Factors Affecting the Price Offers of Values

#### 1. Test Validity

Validity test is done by testing 30 results of questionnaires from respondents with a significance level of 5%. The test criterion is, if  $R_{arithmetic} > R_{table}$ , then the instrument or item question correlated significantly to total score or declared valid, if  $R_{arithmetic} < R_{table}$  then instrument or item statement not correlated significantly to total score or declared invalid. The result of the validity test shows that from 40 variables studied, for the factors that influence the value of the price offers, yielding the smallest correlation of 0.053 and the largest correlation is 0.758.  $R_{table}$  sought at significance 0.05 with the amount of data (n) counted 30, then got  $R_{table}$  equal to 0,361.

**Table 3.** Test results of validity of research instruments

No.	Variable	$R_{tabel}$	$R_{arithmetic}$	$R_{hitung}$	Explanation	No.	Variable	$R_{tabel}$	$R_{hitung}$	nOTE
1	X1.1	0,361		0,647	Valid	21	X4.1	0,361	0,613	Valid
2	X1.2	0,361		0,758	Valid	22	X4.2	0,361	0,619	Valid
3	X1.3	0,361		0,501	Valid	23	X4.3	0,361	0,394	Valid
4	X1.4	0,361		0,647	Valid	24	X4.4	0,361	0,671	Valid
5	X1.5	0,361		0,457	Valid	25	X4.5	0,361	0,622	Valid
6	X1.6	0,361		0,555	Valid	26	X5.1	0,361	0,426	Valid
7	X1.7	0,361		0,758	Valid	27	X5.2	0,361	0,657	Valid
8	X2.1	0,361		0,647	Valid	28	X5.3	0,361	0,662	Valid
9	X2.2	0,361		0,418	Valid	29	X5.4	0,361	0,567	Valid
10	X3.1	0,361		0,555	Valid	30	X6.1	0,361	0,593	Valid
11	X3.2	0,361		0,511	Valid	31	X6.2	0,361	0,053	Invalid
12	X3.3	0,361		0,663	Valid	32	X6.3	0,361	0,471	Valid
13	X3.4	0,361		0,402	Valid	33	X6.4	0,361	0,319	Invalid
14	X3.5	0,361		0,647	Valid	34	X6.5	0,361	0,62	Valid
15	X3.6	0,361		0,457	Valid	35	X6.6	0,361	0,656	Valid
16	X3.7	0,361		0,758	Valid	36	X6.7	0,361	0,641	Valid
17	X3.8	0,361		0,248	Invalid	37	X6.8	0,361	0,578	Valid
18	X3.9	0,361		0,095	Invalid	38	X6.9	0,361	0,697	Valid
19	X3.10	0,361		0,647	Valid	39	X6.10	0,361	0,108	Invalid
20	X3.11	0,361		0,457	Valid	40	X6.11	0,361	0,531	Valid

Source: Results of the Analysis, 2017

## 2. Test Reliability

Reliability test is to measure the reliability of an instrument by using *Alpha Cronbach* coefficients, stating that the value of an instrument is said to be reliably if the value of *Alpha Cronbach* >  $R_{table}$ . The results obtained are *Alpha Cronbach* coefficient of 0.750 while  $R_{table}$  values for respondent is 30 and 5% significance level is 0.361, thus  $R_{arithmetic} > R_{table}$  (0,750 > 0,361). This indicates that the measuring tool in this study is reliable or in other words the measurement can give consistent results if the re-measurement of the same subject.

### An Analysis of the Factors Affecting the Value of Price Offers

Based on the description of the results of data processing of each variable to measure what factors affect the value of price offers, it appears that the influence of each variable varies according to the results of the criteria obtained. The variables that enter the category "no effect" on the change of the offer value of the procurement price of goods and services is the deposit cultural variables to the official (X4.5) with the criterion percentage of 43.74% and the material price fluctuation variable (X5.2) with the percentage of criterion of 50.32%. Variables that are categorized as "influential" to the value of the price offers, there are 16 variables with percentage range criteria from 68% to 80%. The most influential variables of the value of offerings are the difficulty level of construction (X1.5), the ability variables in the estimation of offering (X3.6) and the overhead variable (X3.11) with the percentage criteria respectively 80%.

**Table 4.** Factors Criterion that affects the offer value

No.	Variable	Percentage Criteria	Criteria					
			5	4	3	2	1	
1	Great values of the project/ EPA	X1.1	62,74%			√		
2	Project location	X1.2	61,89%			√		
3	Condition of road access	X1.3	75,16%		√			
4	Implementation during the rainy season	X1.4	62,11%			√		
5	Degree of construction difficulty	X1.5	80,00%		√			
6	Material Source Distance	X1.6	70,11%			√		
7	Characteristics of Population	X1.7	61,89%			√		
8	Number, capacities and type of tools	X2.1	62,74%			√		
9	Material Type Requirements	X2.2	72,21%		√			
10	Availability of start-up capital	X3.1	70,11%		√			
11	Availability of staff with Certificate of Experts and Certificate of Skills	X3.2	72,63%		√			
12	Worker availability	X3.3	72,00%		√			
13	Availability of equipment	X3.4	76,63%		√			
14	Support subcontractor	X3.5	62,74%			√		
15	The abilities to estimate the offering	X3.6	80,00%		√			
16	The need for work	X3.7	61,89%			√		
17	Experience similar projects	X3.10	62,74%			√		
18	Overhead Cost	X3.11	80,00%		√			
19	Estimated number of competitors	X4.1	68,84%		√			
20	The level of the previous auction competition	X4.2	58,11%			√		
21	Similar auction announcements	X4.3	72,84%		√			
22	Strict supervision	X4.4	60,21%			√		
23	Culture of deposit to officials	X4.5	43,79%					√
24	Project availability	X5.1	53,68%			√		
25	Material price fluctuations	X5.2	50,32%					√
26	Fluctuations in foreign exchange rates (Dollars)	X5.3	55,79%			√		
27	Inflation rate	X5.4	54,11%			√		
28	The auction registration process is easier	X6.1	68,84%		√			
29	Secured data security	X6.3	75,79%		√			
30	The opportunities to get bigger project	X6.5	68,00%		√			
31	No project location limits	X6.6	65,47%			√		
32	The ability of staff in the field of IT	X6.7	67,16%			√		
33	Understanding of electronic auction	X6.8	75,16%		√			
34	Training and socialization of electronic auctions	X6.9	64,42%			√		
35	Participants of the auction can not intervene	X6.11	67,58%		√			

Source: Results of the Analysis, 2017



### **F-test**

F-test is a test to determine the magnitude of the effect of independent variables on the dependent variable simultaneously. The value of F-arithmetic is obtained at 816,400 and F-table for  $N(1) = 6$  and  $N(2) = 94$  of 2.20. Based on these results, it is found that the value of F-arithmetic is greater than F-table values ( $816,400 > 2.20$ ), with probability values for F-statistic of significance is  $0,000 < \alpha = 0,05$ . So the decision taken is rejected  $H_0$  and  $H_1$  are received. This means that all independent variables, i.e. Project Characteristics, Auction Documents, Company Characteristics, Business Competition Conditions, Economic Conditions and Electronic Auction Conditions simultaneously significantly affect the dependent variables i.e. price offerings with significance level  $\alpha = 5\%$ .

### **T-Test**

T-test is an individual test of all regression coefficients that aims to determine the magnitude of the influence of each independent variable to the dependent variable. Where t table with a significant level of 0.05 testing two sides with degrees of freedom ( $df = (n - k) = (94 - 6) = 88$ ) then obtained t-table = 1.6623. Based on t-test results obtained t-arithmetic of each variable is greater than t-table, thus all independent variables significantly influence partially on the dependent variable that is the price offers.

### **Coefficient of Determination ( $R^2$ )**

The coefficient of determination is used to find out what percentage of the change in the independent variable can explain the change of the dependent variable. From the test, the value of  $R^2$  adjusted is 0.981 so that it can be said that 98.1% of the dependent variable variation (in this case the supply value) can be explained by the independent variables Project Characteristics, Auction Documents, Company Characteristics, Competition Conditions, Economic Conditions and Electronic Auction Condition. While the rest of 2.9% explained by other variables outside the models.

### **An Analysis of the Influence of Price Offers on the Quality of Construction**

The calculation method used to determine the effect of price offers on the quality of construction results partially is the method of Simple Linear Regression Analysis with the help of SPSS version 22 program.

Model of simple linear regression equations which formed as follows:

$$Y = 18,621 + 0,575X$$

Notes:

Y = Quality Construction

X = Value of the Price Offers

Interpretation of the regression model obtained is the value variables of the price offers give a positive influence on the quality of road construction. An increase in the value of the price offers of 1 unit will increase the construction quality by 0.575 units.

Test statistics on the results of data processing i.e.:

### **F-Test**

F-test is a test to determine the magnitude of the effect of independent variables on the dependent variable simultaneously. The value of F-arithmetic is 77,296, and F-table with 5% significance for  $N(1) = 1$  and  $N(2) = 57$  is obtained by 4.01. Based on the results of the calculation, then the value of F-arithmetic is greater than the value of F-table ( $77.296 > 4.01$ ), with probability values for F-statistic of significance is  $0,000 < \alpha = 0.05$ . So the decision taken is  $H_0$  rejected and  $H_1$  received. This means that the independent variable that is the price offer values significantly affects the dependent variable of Construction Quality with significance level  $\alpha = 5\%$ .

### **The coefficient of determination ( $R^2$ )**

The coefficient of determination is used to find out what percentage of the change in the independent variable can explain the change of the dependent variable. From the tests performed, the value of  $R^2$  adjusted by 0.572 so that it can be said that 57.2% of the variable is bound (in this case the quality of construction) can be explained by the independent variable i.e., the values of the price offers. While the rest of 42.8% explained by other variables outside the model.

## **IV. DISCUSSION**

Based on the research results, the most influential variables of the value of offerings are the difficulty level of construction (X1.5), the variable of capability in the offer estimate (X3.6) and the overhead cost variable (X3.11) with the percentage of each criterion by 80%. The higher the difficulty level of construction (complexity) of a project, the greater the level of risk is guaranteed by the construction project, because the items must be done by the service provider, using equipment and materials with certain specifications. Such type of project necessarily



requires the planning and special calculation when preparing the price bidding document in order to be implemented properly. These risks have a major impact on the success of a construction project [9].

The capability of project financing estimation is very important to support the success of a project. The input elements in the construction project include labor, cost, methods, equipment and materials, all of which need to be arranged in such a way that the proportion of need in the project is appropriate for its use and the project can work effectively and efficiently. The accuracy of the calculation of these needs is needed in planning. Improper calculations will lead to cost swelling so that project efficiency is difficult to achieve [10].

Overhead costs are costs that are categorized as product costs in addition to raw material costs and direct labor costs [11]. Overhead costs are sometimes defined as rescue costs, indirect labor costs, and all other production costs that may not be identified or charged directly to an order And certain products.

Overhead costs in the preparation of the EPA are usually combined with profit calculations for service providers whose level of reasonableness is a maximum of 15% of total costs excluding the National Income Tax (NIT). For service providers who bid at a low price, surely taking into account the high or low overhead costs incurred by the Committing Officer (CO) into the EPA submitted at the time of the auction.

The influence of offering value on the construction quality is positively correlated with 0,575 units, which means that the smaller the offering price of the service offering price, the quality of the resulting construction will also be low. Similarly the contrary, the higher the value of the offering to the EPA then the quality of construction will also be better.

## V. CONCLUSION

The most influential factors on the value of the price offers of construction service providers as well as consultancy in North Luwu Regency are the difficulty level of construction, the ability to estimate supply and overhead cost, with the influence level of 80%. Indicators that most influence the value of the offering price of construction service providers and consultancy in North Luwu Regency are electronic auction conditions.

The level of achievement of the quality of work package construction carried out by service providers in good categories when measured from the type of construction equipment used, and also from the aspect of the material requirements of raw materials used, with the percentage criteria of 86%. The influence of offering value on the quality construction, especially road and bridge in North Luwu Regence is positively correlated by 0,575 units, which means that the smaller the value of price offering the service provider, the quality of the construction will be smaller.

## REFERENCES

- [1]. Anonymous. (2015), Presidential Regulation No. 04 of 2015 on Procurement of Goods/ services owned by the Government. Bappenas, Jakarta
- [2]. Wei Chih Wang, Han Hsiang Wang, YuTing Lai, & John Chien Chung Li, (2006) "Unit-price-based model for evaluating competitive bids," *International Journal of Project Management*, 24(2)
- [3]. Hatush. Z and Skitmore. M. (1998). Contractor selection using multi-criteria utility theory: an additive model. *Build Environ*, 33
- [4]. Yuniawaty, S. and Yessy, (2005), *Factors Influencing Contractors to Follow Tender*, Surabaya, Christian University of Petra
- [5]. Respawan, Made. (2015). Factor analysis that influences the participation and value of Electronic Offers (E-Procurement) Offering for construction services in Buleleng Regence. Thesis. Essay. Study Program Civil Engineering. Udayana University Bali
- [6]. Suciaptapura I, Made. I.G.A. Adnyana Putera. Mayun Nadiasa (2013). Participation of Contractor in Denpasar City in Government Electronic Goods Procurement Auction. *Spectra Journal*. Vol. 2 No. 2 July 2013. Denpasar: Master's Degree Program in Civil Engineering. Udayana University.
- [7]. Anonymous. (2008), Regulation of the Minister of Public Works No. 06/PRT/M/2008 concerning Guidelines on the Supervision of the Implementation and Construction Inspection of the Ministry of Public Works
- [8]. Santoso, S. (2012). *SPSS Application of the Multivariate Statistics*. PT. Elex Komputindo, Jakarta
- [9]. Priscillia S and Patrick T, (2014), "Risk Factor Causes Model of Successful Construction Project" Civil Engineering Program Universitas Kristen Petra Surabaya
- [10]. Hermiaty, Dessy. (2007), "Modeling and Analysis of Proportion of Wages of Labor on Construction Projects", Thesis Master of Construction Management, UII, 2007
- [11]. Anonymous. (2007), Regulation of the Minister of Public Works No. 43/PRT/M/2007 on Standards and Guidelines of Procurement of Construction Services, Ministry of Public Works, Jakarta.