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Analysis of the Effect of Project Performance Success for Construction Company Competitiveness through Customer Satisfaction

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ABSTRACT

Project performance is a work achievement obtained in the implementation of work that is reflected in the final results produced in accordance with the desired quantity and quality. Cost performance, quality performance, time performance are some of the project performance that affects customer satisfaction, while customer satisfaction affects the competitiveness of a construction company. This research aims to analyze the effect of cost performance, quality performance and time performance on customer satisfaction that implements the competitiveness of construction companies. Data collection was carried out through surveys using a questionnaire. Respondents were taken based on purposive sampling method which includes construction project stakeholders or people who are competent in the construction field that includes 200 respondents. The statistical verification analysis method in the research was conducted using the Structural Equation Modeling (SEM) analysis model and the tool used for this study was LISREL 8.80. The results of this research indicate that simultaneously the cost performance and time performance through customer satisfaction are the variables that have the strongest relative influence on competitiveness, which is equal to 1,131 (63.97%). It can be concluded that with increasing cost performance, time performance and customer satisfaction will be able to increase company competitiveness.

Keywords: Project Performance, Customer Satisfaction, Competitiveness of Construction Companies

1. INTRODUCTION

In the current era of globalization, the State of Indonesia is one of the countries that is increasing development in the field of Infrastructure. With so many developments, the construction business in Indonesia has become one of the many rapidly growing service businesses. The impact of the development of the construction business is the growing numbers of construction service companies, so that competition between companies getting tougher. Every company must be able to innovate and have advantages so that it can compete with other construction service companies. One of the things that must be achieved by the company is the ability to improve performance in completing every job given by the owner, so that the owner will feel satisfied. The criteria for project success are according to time, cost, and time (Kerzner, 1999). In the implementation, there are still problems of the three performances namely cost overruns, time delays and low quality of work which will have an impact on the level of customer satisfaction and company competitiveness. This research was conducted to examine the relationship between the success of project results on the competitiveness of construction companies through customer satisfaction.

2. LITERATURE REVIEW

2.1 Construction Project

A project activity can be interpreted as a temporary activity that takes place in a limited period of time, with the allocation of certain resources and intended to produce a product or deliverable whose quality criteria have been clearly outlined (Soeharto, 1999). Construction projects involve the organization and all sources power to complete projects on time, within budget, according to quality specified. Successful projects are projects that have far better than expected results that are usually observed in terms of cost, schedule, quality, safety and satisfaction of the parties involved (Ashley, et al. 1987).

2.2 The Success of Construction Project Performance

The success of project performance can be measured by indicators of cost, quality, time and work safety by planning carefully, thoroughly and integrated all the allocation of human resources, equipment, materials and costs according to the needs needed (Husen, 2011). So that indicators of cost, quality, time and work safety can be used as benchmarks to achieve the planned goals.

The process of achieving the objectives of a project, there are limits that must not be violated, namely the cost, quality and time constraints. These three performance constraints are factors in the implementation of projects that are often used as project targets, which are referred to as three constraints(Suharto, 2001).

In the Project Management Body of Knowledge (PMBOK 2017) describes the criteria for success of a project, which is measured from the suitability of product quality, timeliness, suitability of the budget and the level of customer satisfaction.

2.3 Customer Satisfaction

The achievement of project objectives as planned will be able to increase customer satisfaction from stakeholders, especially from the project owner. Customer satisfaction is someone's happy or disappointed feelings resulting from comparing a product/work produced to the desired expectations (Kotler, 2009). Customer satisfaction obtained for project work can increase the competitiveness of a company.

2.4 Competitiveness of Construction Companies

The concept of competitiveness can be interpreted as an ability to achieve dominance and stability in competition between individual companies and competitors at the micro level (companies) and between economies at the macroeconomic level (Markus, 2008).

The definition of competitiveness is the ability of companies in competitive advantage in the market that is determined by three aspects, namely leadership in cost, differentiation, and focus on strategy(Porter, 2003). With the increase in the company's ability, the company's competitiveness will also increase.

2.5 Research Hypothesis

Based on the conceptual framework described above, research hypotheses can be taken, namely:

H1: There is a partial influence of project cost performance on customer satisfaction.

H2: The influence of cost performance on competitiveness through customer satisfaction.

H3: The influence of quality performance on customer satisfaction.

H4: The influence of quality performance on competitiveness through customer satisfaction.

H5: The influence of cost performance on competitiveness through quality performance and customer satisfaction.

H6: There is an influence of time performance on customer satisfaction.

H7: The influence of time performance on competitiveness through customer satisfaction.

H8: The influence of time performance on competitiveness through quality performance and customer satisfaction.
H9: The influence of cost performance on competitiveness through time performance and customer satisfaction.
H10: The influence of cost performance affects competitiveness through time performance, quality performance and customer satisfaction

3. MATERIALS AND METHODS

3.1 Research Design

The research design was made to determine the right method to be used in a research. To determine the effect of successful construction project performance on construction company competitiveness through customer satisfaction a survey approach will be conducted to several research objects in construction companies that have ongoing and completed construction projects, then it is reviewed and analyzed the survey results from several correspondents related to the object of this research. Data collection was carried out through a survey method using a questionnaire. Respondents were selected based on the sampling method. To get quantitative data on the filling of research instruments, the measurement scale of the variables which were scored on each answer was made using a Likert scale.

3.2 Research Type

Based on the method and measurement and data analysis, this research is classified as a survey research, because it uses a questionnaire as its main source, and also as quantitative research, because it allows the researcher to collect quantitative and qualitative data on many types of research questions (Sekaran 2017, 97).

3.3 Research Variables

The variables used in this research are as follows:

a. The independent variable is cost performance (KB), quality performance (KM), time performance (KW) and customer satisfaction (KP).
b. The dependent variable is the competitiveness of construction companies (DS)

Each of these variables has indicators that will be used to compile the instrument of questions and statements from the research questionnaire, which were obtained from previous studies.
After developing the theoretical framework of the model, then illustrate the conceptualization through a path diagram. Flowchart can be seen in Figure 1.

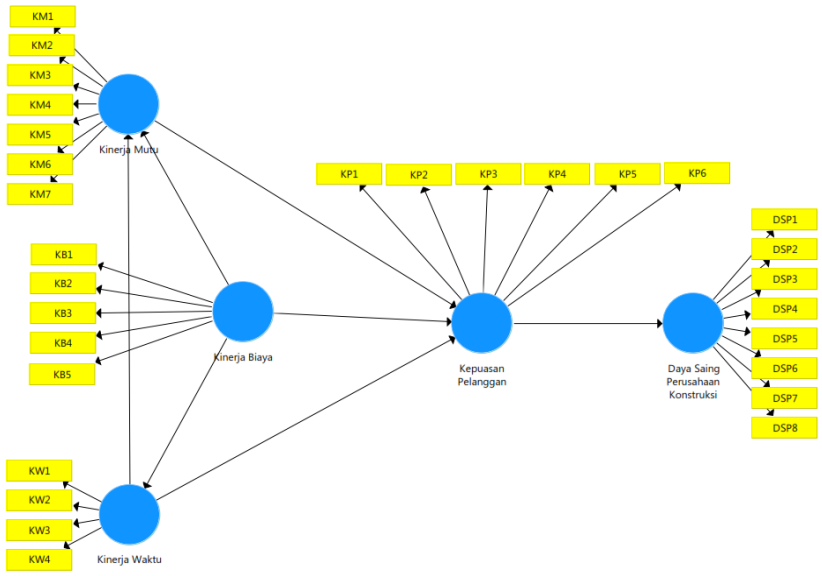

Figure 1: Model of the Effect of Project Performance Success on Construction Company Competitiveness through Customer Satisfaction.

3.4 Data Analysis Techniques

The variables that have been determined in this study, then arranged the pattern of relationships between independent variables with the dependent variable in accordance with the rules based on the theory and previous studies in a form of *structural equation modeling* (SEM). Tool for analyzing in this research using the Lisrel version 8.8 program.

Data analysis consists of testing the results of the questionnaire are:
Validity and Reliability Test
The validity and reliability test in the SEM *(Structural Equation Modeling)* model on the Lisrel program can be done using a measurement model Confirmatory Factor Analysis (CFA) which will provide results in the form of a path diagram.

1) Validity Test Results

The validity analysis of the measurement model is done by checking whether:

a) The standardized loading factors of the variables observed in the model meet good requirements, which is> 0.70. Standardized loading factors > 0.50, if an construct contains an item that has a loading factor <0.5, then the item is excluded (Hair et al., 2005).
b) The R^2 value of the variables observed in the model meets the requirements, which is not less than 0.70 or the measurement error rate of less than 0.51 or 51%. R^2> 0.70 If in a construct there are items that have R^2<0.7 or measurement error rate of less than 0.51 or 51%, then the item issued(Hair et al., 2005).

2) Reliability Test Results

The reliability analysis of the measurement model is done by calculating the value of Construct Reliability (CR) and Variance Extracted (VE) from the value of standardized loading factors and error variance.

Reliability test is done by calculating the value of Construct Reliability (CR) and Variance Extracted (VE). The observed variable fulfills good reliability requirements if the CR test value> 0.70 and VE value> 0.50. If both the CR and VE values do not meet the reliability requirements, the invalid variable must be removed / excluded.

a. Model Match Test

After the model is formed, it is necessary to analyze the model compatibility test (Wijanto, 2008). Indicators that can be used include:

Table 1 Assessment of The Fit Model

Good of Fit Index	Cutt Of value
X^2 *(Chi Square)*	Small Value Expected
Significance Probability	α = df
Root Mean Square Error of Approximation (RMSEA)	0,08 – 0,1
Goodness-Of-Fit Index (GFI)	≥0,90
Adjusted Goodness-Of-Fit Index (AGFI)	≥0,90
Comparative Fit Index(CFI)	≥0,90
Normed Fit Index (NFI)	≥0,90
Incremental Fit Index (IFI)	≥0,90

If the hypothesized model has not yet reached the fit model, the model is reasserted to achieve a good fit value. Modifications are made by removing/adding relationships between variables in the SEM model.

4. RESULTS AND DISCUSSION

4.1 Results of Validity Test And Reliability Test

The results of validity and reliability testing using the LISREL 8.8 program in detail can be explained as follows:

a. Cost Performance Variable

Table 2. The Validity and Reliability Variable

Validity and Reliability Test of Latent Cost Performance Variables				
Observable Variable	SLF (λ> 0,40)	Error (ε<0,50)	R^2> 0,70	Note
KB1	0.88	0.23	0.77	Good Validity
KB2	0.27	0.93	0.07	Bad Validity
KB3	0.82	0.33	0.67	Good Validity
KB4	0.84	0.29	0.71	Good Validity
KB5	0.77	0.41	0.59	Good Validity
Score CR > 0.70		0.85		
Score VE > .50		0.56Good Reliability		

Conclusion: There are 1 observed variable is KB1 which have bad validity

b. Quality Performance Variable

Table 3. The Validity and Reliability Variable

Observed Variables	SLF (λ> 0,50)	Error (ε<0,50)	R^2> 0,70	Note
KM1	0.59	0.65	0.35	Bad Validity
KM2	0.83	0.30	0.70	Good Validity
KM3	0.89	0.21	0.79	Good Validity
KM4	0.47	0.78	0.22	Bad Validity
KM5	0.80	0.35	0.65	Good Validity
KM6	0.83	0.31	0.69	Good Validity
KM7	0.73	0.47	0.53	Good Validity
Score CR > .70		0.90		
Score VE > .50		0.56 Good Reliability		

Conclusion: There are 2 observed variables is KM1 and KM4 which have bad validity

c. Time Performance Variable

Table 4. The Validity and Reliability Variable

Observed Variables	SLF (λ> 0,50)	Error (ε<0,50)	R^2> 0,70	Note
KW1	0.81	0.34	0.66	Good Validity
KW2	0.52	0.73	0.27	Bad Validity
KW3	0.88	0.23	0.77	Good Validity
KW4	0.75	0.43	0.57	Good Validity
Score CR > .70		0.84		
Score VE > .50		0.57 Good Reliability		

Conclusion: There are 1 observed variable is KW2 which have bad validity

d. Customer Satisfaction Variable

Table 5. The Validity and Reliability Variable

Observed Variables	SLF (λ> 0,50)	Error (ε<0,50)	R^2> 0,70	Note
KP1	0.47	0.78	0.22	Bad Validity
KP2	0.24	0.94	0.06	Bad Validity
KP3	0.68	0.54	0.46	Good Validity
KP4	0.68	0.54	0.46	Good Validity
KP5	0.62	0.62	0.38	Good Validity
KP6	0.62	0.62	0.38	Good Validity
Score CR > .70		0.91		
ScoreVE> .50		0.77 Good Reliability		

Conclusion: There are 2 observed variables is KP1 and KP2 which have bad validity

e. Competitiveness Variable

Table 6. The Validity and Reliability Variable

Observed Variables	SLF (λ> 0,50)	Error (ε<0,50)	R^2> 0,70	Note
DS1	0.57	0.68	0.32	Bad Validity
DS2	0.81	0.35	0.65	Good Validity
DS3	0.58	0.67	0.33	Bad Validity
DS4	0.55	0.70	0.30	Bad Validity
DS5	0.60	0.64	0.36	Bad Validity
DS6	0.84	0.29	0.71	Good Validity
DS7	0.83	0.31	0.69	Good Validity
DS8	0.55	0.70	0.30	Bad Validity
Score CR > .70		0.94		
Score VE > .50		0.78 Good Reliability		

Conclusion: There are 5 observed variables is DS1, DS3, DS4, DS5 and DS8 which have bad validity

4.2 Analysis of Suitable Entire Measurement Models

The measurement model is said to be fit with the data if the model can estimate the population covariance matrix Σ which is not different from the covariance matrix of the sample data. This indicates an estimate can be applied to the population. Translated according to the primary goodness of fit test (GFT), shown by Chi-square ≥ 0.05; RMSEA <0.08 and or CFI value> 0.90

Table 7. Results of Overall Fit Analysis of Measurement Models

No	Overall Fit Analysis of Measurement Models Test			
	GOF Indicator	Good Fit	Fit Test Results	Note
1.	Chi-Square	Small Score	879.96	*Good Fit*
2	Independent Degree		395	
3	P-Value	≤ 0.05	0,000	*Good Fit*
4	RMSEA	≤ 0.08	0.076	*Good Fit*
5	GFI	≥ 0.90	0,78	*Moderately Fit*
6	AGFI	≥ 0.90	0,74	*Moderately Fit*
7	NFI	≥ 0.90	0,94	*Good Fit*
8	NNFI	≥ 0.90	0,97	*Good Fit*
9	CFI	≥ 0.90	0,97	*Good Fit*

Conclusion: Model fit does not need to be modified because P = 0,000 <0.05, besides RMSEA 0.076 <0.08 and CFI = 0.97> 0.90.

Structural Model Analysis

The Standardized Loading Factor (SLF) value of the variable relationship path in the theoretical model structure in table 4.11 shows that there is an SLF value <0.4 so that trimming must be done. Trimming is done by eliminating variables that are considered not to have a significant effect. Based on the results of the Lisrel output in the structural model, the value of Standardized Loading Factor (SLF) between the cost performance variable and customer satisfaction shows a negative value that is equal to -0.06. Therefore, trimming in the structural model is done by eliminating the path that connects the cost performance variable with customersatisfaction. The following Lisrel output results are trimming the structural model. In order to obtain the results of the analysis after eliminating the relationship between the variable cost performance against customer satisfaction variables, as follows:

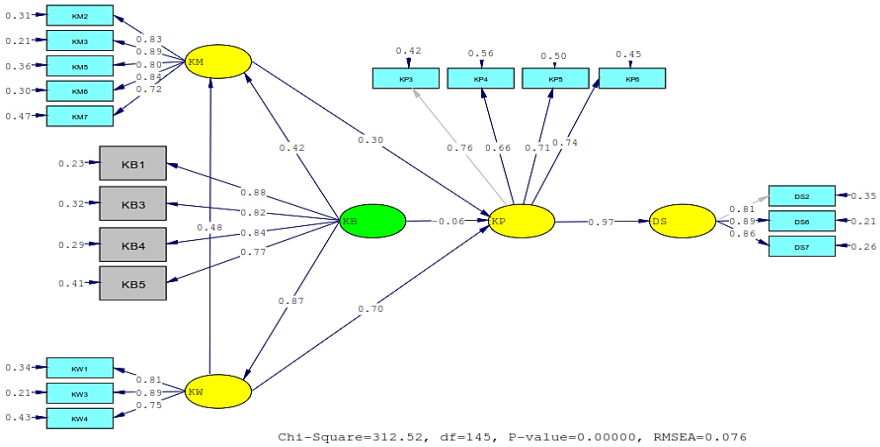

Figure 2. Analysis Results Model

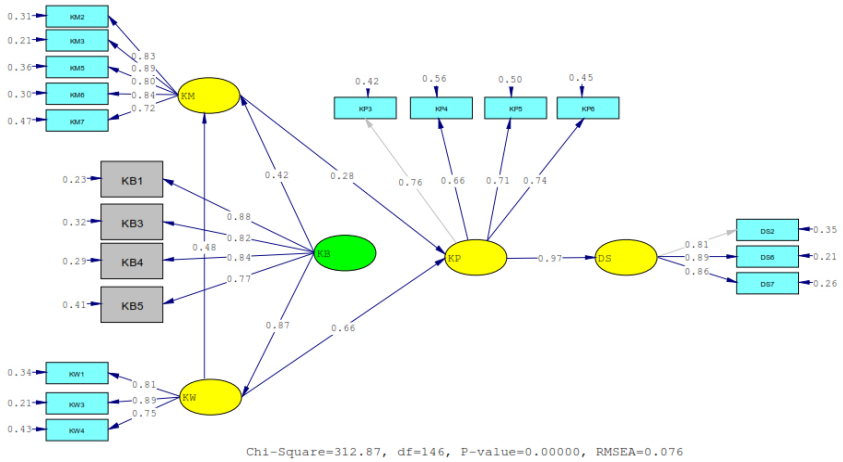

Figure 3. Trimming Results Analysis Model

Then the model fit test was conducted and the results obtained that the theoretical model in this study had fulfilled the Goodness Of Fit criteria or a model fit because P = 0,000 <0.05, besides RMSEA 0.076 <0.08 and CFI = 0.978> 0.90, so there is no need to modify the model.

4.3 Relationship Between Variables

Direct and indirect relationships between variables.

After analyzing the relationship between variables, the details can be seen in Table 8 below:

Table 8. Direct and Indirect Relations of Cost Performance, Quality Performance, Time Performance, Customer Satisfaction and e.Competitiveness Variable

No	Influence between variables	Influence								Summary
		Direct	Indirect							
			KW	KM	KP	KM - KP	KW - KP	KW-KM	KW-KM-KP	
1.	KM<--- KB	0,42								0,42
2.	KM<--- KW	0,48								0,48
3.	KW<--- KB	0,87								0,87
4.	KP<--- KM	0,28								0,28
5.	KP<--- KW	0,66								0,66
6.	DS<--- KP	0,97								0,97
7.	DS<--- KB				***					***
8.	DS<--- KM				0,272					0.272
9.	DS<--- KB			0,118		0,114				0,232
10.	DS<--- KW				0,466					0,466
11.	DS<--- KW			0,134		0,130				0,264
12.	DS<--- KB		0,574				0,557			1.131
13.	DS<---KB		0,418					0,117	0,113	0,648

From Table 8 above, data can be taken to answer hypotheses stating the existence of a direct or indirect relationship of cost performance, quality performance, time performance to competitiveness through customer satisfaction.

4.4 Hypothesis Testing

Hypothesis test results can be seen from 8 above, then explained in this research.

H1: Cost performance has a positive effect on customer satisfaction

Based on the results of the analysis of the influence of cost performance (KB) variables on customer satisfaction (KP) shown in the table above, the level of customer satisfaction (KP) is negatively affected by cost performance (KB). The magnitude of the effect of cost performance (KB) on customer satisfaction is -0.06 or equal to $(0.06)^2$ = 0.36%. The rest of (1-0.36%) = 99.64% is the influence of other variables beyond the cost performance (KB) that is not explained in the model.

H2: Cost performance has a positive effect on competitiveness through customer satisfaction

Based on the results of the analysis of the effect of cost performance variables (KB) on competitiveness (DS) through customer satisfaction (KP) shown in the table above, there is no significant effect between the cost performance variables (KB) on competitiveness through customer satisfaction variables (KP) significantly.

H3: Quality performance has a positive effect on customer satisfaction

Based on the results of the analysis of the effect of quality performance variables (KM) on customer satisfaction (KP) shown in the table above, the level of customer satisfaction is positively influenced by quality performance. The magnitude of the effect of quality performance (KM) on customer satisfaction (KP) of 0.28 or equal to $(0.28)^2$ = 7.84%. The rest of (1-7.84%) = 92.16% is the influence of other variables beyond the quality performance (KM) that is not explained.

H4: Quality performance positively influences competitiveness through customer satisfaction

Based on the results of the analysis of the influence of table 4.16 above, the competitiveness is indirectly affected by quality performance (KM). these indirect effects are mediated or channeled through customer satisfaction (KP). The magnitude of the indirect effect of quality performance (KM) on competitiveness (DS) is 0.28 x 0.97 = 0.272 or (0.28) 2 (0.97) 2 = 7.38%. The rest of (1-7.38%) = 92.62% is the influence of other variables beyond the quality performance that is not explained.

H5: Cost performance has a positive effect on competitiveness through quality performance and customer satisfaction

Based on the results of the analysis of the influence of table 4.16 above, the competitiveness is indirectly affected by cost performance (KB) and quality performance (KM). These indirect effects are mediated or channeled through customer satisfaction (KP). The magnitude of the indirect effect of quality performance (KM) on competitiveness (DS) is:

Through quality performance (KM) of: (0.42) (0.28) = 0.118 or $(0.42)^2$ $(0.28)^2$ = 1.38%.

Through quality performance (KM) and customer satisfaction (KP) is: (0.118) x (0.97) = 0.114 or $(0.118)^2$ $(0.97)^2$ = 1.31%.

The total effect: 0.118 + 0.114 = 0.232 or 1.38% + 1.31% = 2.69%.

H6: Time performance has a positive effect on customer satisfaction

Based on the results of the analysis of the influence of time performance variables on customer satisfaction shown in table 4.16 above, the level of customer satisfaction is positively influenced by time performance. The magnitude of the effect of time performance on customer satisfaction is 0.66 or $(0.66)^2$ = 43.56%. The rest of (1-43.56%) = 56.44% is the influence of other variables beyond the time performance that is not explained.

H7: Time performance has a positive effect on competitiveness through customer satisfaction

Based on the results of the analysis of the influence of table 4.16 above, the competitiveness is indirectly affected by time performance (KW). These indirect effects are mediated or channeled through customer satisfaction (KP). The indirect effect of time performance (KW) on competitiveness (DS) is 0.66x 0.97 = 0.466 or $(0.66)^2$ $(0.97)^2$ = 40.99%. The rest of (1-40.99%) = 59.01% is the influence of other variables beyond the quality performance that is not explained.

H8: Time performance has a positive effect on competitiveness through quality performance and customer satisfaction

Based on the results of the analysis of the influence of table 4.16 above, the competitiveness is affected indirectly by time performance (KW) and quality performance (KM). These indirect effects are mediated or channeled through customer satisfaction (KP). The magnitude of the indirect effect of time performance (KW) and quality performance (KM) on competitiveness (DS) are:

Through quality performance (KM) is :(0.48) (0.28) = 0.134 or $(0.48)^2(0.28)^2$ = 1.81%.

Through quality performance (KM) and customer satisfaction (KP) is :(0.134) (0.97) = 0.130 or $(0.134)^2$ $(0.97)^2$ = 1.69%.

Thus the total effect: 0.181 + 0.130 = 0.264 or 1.81% + 1.69% = 3.5%.

H9: Cost performance has a positive effect on competitiveness through time performance and customer satisfaction

Based on the results of the analysis of the influence of table 4.16 above, the competitiveness is indirectly affected by cost performance (KB) and time performance (KW). These indirect effects are mediated or channeled through customer satisfaction (KP). The indirect effects of cost performance (KB) and time performance (KW) on competitiveness (DS) are:

Through quality performance (KW) =(0.87) (0.66) = 0.574 or $(0.87)^2(0.66)^2$ = 32.97%.

Through time performance (KW) and customer satisfaction (KP) = (0.574) (0.97) = 0.557 or $(0.574)^2$ $(0.97)^2$ = 31%.

The total effect: 0.574 + 0.557 = 1.131 or 32, 97% + 31% = 63.97%

H10: Cost performance has a positive effect on competitiveness through time performance, quality performance and customer satisfaction

Based on the results of the analysis of the influence of table 4.16 above, the competitiveness is indirectly affected by cost performance (KB), quality performance (KM) and time performance (KW). These indirect effects are mediated or channeled through customer satisfaction (KP). The magnitude of the indirect effect of cost performance (KB), quality performance (KM), and time performance (KW) on competitiveness (DS) are:

Through quality performance (KM) of: (0.87) (0.48) = 0.418 or $(0.87)^2(0.48)^2$ = 17.44%.

Through quality performance (KM) and time performance (KW) of:(0.418) (0.28) = 0.117 or $(0.418)^2$ $(0.28)^2$ = 1.37%.

Through quality performance (KM), time performance (KW) and customer satisfaction by:(0.117) (0.97) = 0.113 or $(0.117)^2$ $(0.97)^2$ = 1.29%.

Thus the total effect: 0.418 + 0.117 + 0.113 = 0.648 or 17, 44% + 1.37% + 1.29% = 46.66%.

The rest of (1-46.66%) = 53.34% is the influence of other variables beyond the cost performance, quality performance, time performance and customer satisfaction that is not explained.

Judging from the total effect, the cost performance (KB) and time performance (KW) through customer satisfaction (KP) are the variables that have the strongest relative influence on competitiveness (DS), which is 1,131 (63.97%); then followed by the variable cost performance (KB), quality performance (KM), time performance (KW) with

mediation of customer satisfaction (KP) of 0.648 (46.66%); and time performance variable (KW) through customer satisfaction (KP) that is equal to 0.466 (40.99%).

CONCLUSIONS AND SUGGESTIONS

Conclusion

The results of this study provide an overview of the relationship between cost performance, quality performance and time performance to the competitiveness of construction companies through customer satisfaction, as follows:

(a) Competitiveness is indirectly affected by cost performance (KB) and time performance (KW). These indirect effects are mediated or channeled through customer satisfaction (KP). The magnitude of the total indirect effect of cost performance (KB) and time performance (KW) on competitiveness (DS) is 0.574 + 0.557 = 1.131 or 32,97% + 31% = 63.97%.

(b) Competitiveness is indirectly affected by cost performance (KB), quality performance (KM) and time performance (KW). The total amount of indirect effect is mediated or channeled through customer satisfaction (KP). The magnitude of the indirect effect of cost performance (KB), quality performance (KM), and time performance (KW) on competitiveness (DS) is 0.418 + 0.117 + 0.113 = 0.648 or 17, 44% + 1.37% + 1.29% = 46.66%,

(c) Based on the total effect, the cost performance (KB) and time performance (KW) through customer satisfaction (KP) are the variables that have the strongest relative influence on competitiveness (DS), which is equal to 1,131 (63.97%); then followed by the variable cost performance (KB), quality performance (KM), time performance (KW) with mediation of customer satisfaction (KP) of 0.648 (46.66%); and time performance variable (KW) through customer satisfaction (KP) that is equal to 0.466 (40.99%), and (e) The influence of cost performance (KB) has a negative effect on customer satisfaction. This means that by increasing cost performance it does not directly affect customer satisfaction on a construction project

Recommendation

Base on analysis result, the conclusion of this research is:

(a) This research was necessary to develop research by reviewing other factors that affect the competitiveness of construction companies, so it is expected that contracting companies are able to create competitive advantages.

(b) This research was is recommended for future researchers to look separately at the variable cost performance, quality performance and time performance as independent variables to determine the direct effect on company competitiveness.

(c) This research was recommended in further research to choose the owner as the respondent because the owner is part of the stakeholders who tend to have diverse assessments of satisfaction variables in the implementation of construction projects.

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