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Effect of heavy equipment productivity and project manager skills on construction service company performance in Humbang Hasundutan

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Abstract. The development of the world of construction in Humbang Hasundutan Regency in North Sumatra Province, development is the community's top priority in facing the era of globalization. There are various kinds of tools used in construction work, including bulldozers, loaders, excavators, dumptruck. Analysing the skills of a project manager for a construction service company is one way of measuring the quality of a project. Company performance can be used as a measure of a company's ability to achieve its goals. The purpose of this study was to analyse the effect of heavy equipment productivity and project manager skills on the performance of construction service companies in Humbang Hasundutan Regency. The research was conducted using quantitative methods. Data collection was carried out by means of a questionnaire. Literature study is carried out by searching through journals, research, the internet regarding theories related to the problems being studied. From the results of the analysis obtained 45 respondents, the results of the value of r of 0.061 indicate the variable has a strong influence, the distribution of the value of r table significance of 5% (0.05) to 45 respondents of 0.294, normality test of 45 respondents mean=0.00, significance value of 0.200 > 0.05 so that the regression model is normally distributed, the results of the hypothesis test with a significance value of 0.000 < 0.05, it can be concluded that $\text{sig} < 0.05$ then H_0 is rejected and H_a is accepted, which means there is a relationship between X and Y .

1. Introduction

Over time, the development of the construction industry is currently experiencing rapid progress, and this development is also happening globally. With this development, of course, there are also many construction services that have contributed to the development of the construction industry. The participation of these construction services also requires a high level of quality from its human resources in managing and carrying out construction work. Where human resources are expected to have high abilities at all structural positions or levels of the company. Therefore, construction actors in this country must be able to prepare themselves to become construction actors who have the ability or high quality and professional attitude, both at the regional, national and international levels [1].

Heavy equipment is an important factor in large scale construction projects. The purpose of using heavy equipment is to make it easier for humans to do work so that the expected results can be achieved more easily in a relatively shorter time. Tools commonly used in construction projects include dozers,



digging tools including backhoes, front shovels, dumshells, loaders including loaders, transportation equipment such as trucks. Soil compactors include rollers and compactors, and others [2].

In increasing the professionalism of the manager's performance, of course the handling cannot be done partially, but this process requires thorough handling. This performance improvement effort must be based on the right vision, mission and strategy. The factors that are thought to influence the project manager's performance on the quality of his work include motivation, skills, discipline, education, experience, wages, age and skills in leading projects [3].

The number of construction companies continues to grow. This can be seen in the data in the Construction Services Development Agency (LPJK) according to the database at the Association of Construction Services Companies. Law \pm Law of the Republic of Indonesia No. 18 of 1999, states that construction services are one of the activities in the economic, social and cultural fields that have an important role in the achievement of various targets in order to support the realization of the national development goals. To achieve these goals, the Construction Implementation Services Company must have good performance. Companies need to assess what factors affect performance. A company is said to have good performance if it is superior in indicators of profitability, growth, sustainability and competitiveness [4]. In a construction project, three important things must be considered, namely time, cost and quality [5].

In the development of the world of construction, especially in Humbang Hasundutan Regency, the role of construction companies is very important in supporting the success of development where in fact development is the top priority of society in facing the current era of globalization, thus spurring existing business entities or companies to continuously make improvements. To achieve these goals, the construction company must have good performance. The performance of a company can be used as a measure of the ability of an organization or company to achieve its goals. Performance measurement is one of the most important factors for an organization or company, because performance measurement is a process of measuring the extent to which a company does work to achieve its goals.

2. Methods

The Data collection methods that are valid in this study are data obtained directly from respondents. The data obtained directly is called primary data. Primary data in this study were obtained directly from the respondents by distributing questions or questionnaires with multiple choice types of questions with a variety of choices Strongly Agree (SS), Agree (S), Neutral (N), Disagree (TS), and Strongly Disagree (STS). The data analysis method used in this research is quantitative analysis, which is used to analyze the data obtained from the numbers. Because data processing uses statistics, the data must be classified into certain categories using certain tables to make it easier to analyze using a data analysis program (SPSS) [6].

Questionnaire testing is done by testing the validity. Validity is a characteristic that indicates the ability of a measuring instrument to reveal something that is the main objective of the research. The higher the validity of a measuring instrument, the higher the likelihood of hitting the target. To calculate valid or not with the help of a computer using SPSS. The real level used is 5%. [7] and the reliability test of this analysis is used to show the relative extent to which a measurement result is consistent if the measurement is repeated two or more times. If alpha shows more than 60% (0.6), then the questionnaire as a measuring tool for this research can be declared reliable. The real level used is 5% [7].

3. Results and discussions

The data in this study include data on heavy equipment productivity, project manager skills and construction company performance in Humbang Hasundutan Regency. The data were collected by distributing questionnaires to 45 employees. The number of returned questionnaires totalled 45 questionnaires, in other words the rate of return of questionnaires distributed was 100%. All of these returned questionnaires were used for data processing purposes.

3.1. Validity test

Valid means that the instrument can be used to measure what should be measured [8]. The instrument validity test can use the correlation formula calculated through the help of the SPSS system, so the results can be seen, as follows.

Table 1. Correlation test results.

		Correlations		
		Heavy Equipment Productivity	Project Manager Skills	Construction Company Performance
Heavy Equipment Productivity	Pearson	1	.017	.601**
	Correlation			
	Sig. (2-tailed)		.910	.000
	N	45	45	45
Project Manager Skills	Pearson	.017	1	-.004
	Correlation			
	Sig. (2-tailed)	.910		.978
	N	45	45	45
Construction Company Performance	Pearson	.601**	-.004	1
	Correlation			
	Sig. (2-tailed)	.000	.978	
	N	45	45	45

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Results of Data Processing through SPSS version 23.0 2020.

The SPSS output results in table 1 are not shown r table but with sig. or p = then to find out the result is $r_{xy} = 0.601$; $p = 0.05$ is greater than sig. ($p >$) or significant. Thus the interpretation "between variables X1, X2 and Y has a strong influence.

3.2. Reliability test

Giving interpretation of variable reliability can be said to be reliable if the variable coefficient is more than 0.60 (Nunnally in Ghozali [9]) and generally used benchmarks, as follows.

- The reliability of the trial > 0.60 means that the test results have good reliability.
- Test reliability < 0.60 means that the test results have poor reliability.

According to Arikunto [10], the critical value of this reliability can also be compared to the value of the reliability coefficient with the r-table. If the value of the reliability coefficient is greater than the value of r-table, then an instrument is reliable.

Table 2. Reliability test results.

Variable		Cronbach's Alpha	N of Items
Heavy Equipment Productivity		0.832	15
Project Manager Skills		0.835	15
Construction Company Performance		0.880	15

Source: Results of Data Processing through SPSS version 23.0 2020.

In the table, the Cronbach's Alpha value is listed in accordance with the reliability scale category in Table 2, so the instrument used in this study has a high reliability or level of reliability so that it can be used as a research instrument.

3.3. Normality test

The normal data distribution test was carried out with one sample Kolmogorov-Smirnov Test Decision:

- If Asymp.Sig. <0.05 then the regression model is not normally distributed.
- If Asymp.Sig.> 0.05 then the regression model is normally distributed.

Table 3. Normality test results.

One-Sample Kolmogorov-Smirnov Test			
			Unstandardized Residual
N			45
Normal Parameters ^{a,b}		Mean	.0000000
		Std. Deviation	4.60850661
Most Differences	Extreme	Absolute	.084
		Positive	.084
		Negative	-.076
Test Statistic			.084
Asymp. Sig. (2-tailed)			.200 ^{c,d}

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Source: Results of Data Processing Through SPSS Version 23.0 2020.

The output table in Table 3 above shows $n = 45$, which means that the number of samples taken is 45, mean = 0.00 regression normally distributed.

3.4. Test of the coefficient of determination (R^2)

The coefficient of determination (R^2) aims to measure how far the model is able to explain the variation in the dependent variable.

The coefficient of determination ranges between zero and one.

Table 4. Test of the coefficient of determination.

Model Summary										
Model	R	R Square	Adjusted R Square	Std. Error of Estimate	Change Statistics	R Square Change	F Change	df1	df2	Sig. F Change
1	.601 ^a	.547	.547	4.660	.547	11.881	2	42	.000	

a. Predictors: (Constant), Project Manager Skills, Heavy Equipment Productivity

Source: Results of Data Processing Through SPSS Version 23.0 2020.

From the output above (See in Table 4), the adjusted R square value (coefficient of determination) is 0.547, which means that the effect of the independent variable (X) on the dependent variable (Y) is 54.7%.

3.5. Hypothesis testing

The Hypothesis Test Comparing the Sig Value with 0.05. The basis for decision making in regression analysis by looking at the significance value (Sig.) Of the SPSS output results is:

- If the significance value (Sig.) < 0.05 means that there is an influence between Heavy Equipment Productivity (X1), Project Manager Management Skills (X2) on Construction Company Performance (Y).
- Conversely, if the significance value (Sig.) > 0.05 means that there is no effect of Heavy Equipment Productivity (X1), Project Manager Management Skills (X2) on Construction Company Performance (Y).

Table 5. Comparison results of Sig.

		Coefficients ^a				
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	32.267	12.590		2.563	.014
	Heavy Equipment Productivity	.545	.112	.601	4.874	.000
	Project Manager Skills	.320	.168	.515	4.119	

a. Dependent Variable: Performance of a construction company.

Source: Results of Data Processing Through SPSS Version 23.0 2020.

Based on the table 5 above, it is known that the significance value (Sig.) of 0.000 is smaller than < 0.05 probability, so it can be concluded that H_0 is rejected and H_a is accepted, which means, "There is an influence between Heavy Equipment Productivity (X1), Manager Management Skills. Project (X2) on Construction Company Performance (Y).

Table 6. Comparison results t_count.

		Coefficients ^a				
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	32.267	12.590		2.563	.014
	Heavy Equipment Productivity	.545	.112	.601	4.874	.000
	Project Manager Skills	.320	.168	.515	4.119	

a. Dependent Variable: Performance of a construction company.

Based on table 6, it is known that the t value is 4.874. Because the calculated t value has been found, the next step will be to find the t table. The formula for finding t table is:

$$\begin{aligned}
 t_{\text{table}} &= (\alpha ; n-k-1) \\
 &= (0,05 ; 45-3-1) \\
 &= (0,05 ; 41) = \mathbf{2,01954}
 \end{aligned}$$

- H_0 = There is no influence between Heavy Equipment Productivity (X1), Project Manager Management Skills X2) on Construction Company Performance (Y).
- H_a = There is an influence between Heavy Equipment Productivity (X1), Project Manager Management Skills X2) on Construction Company Performance (Y).

Because the t value of 4,874 is greater than $> 1,998$, so it can be concluded that H_0 is rejected and H_a is accepted, which means, "There is an influence between Heavy Equipment Productivity (X1), Project Manager Management Skills X2) on Construction Company Performance (Y).

4. Conclusion

Based on the analysis, it can be concluded that: From the results of the reliability test that $0.601 > 0.05$ is significant. Thus the interpretation "between the variable productivity of heavy equipment (X1), project manager management skills (X2) with the performance of the construction company (Y) has a strong influence. The results of the validation test of the per-item calculation technique seen from the basis of decision making $r_{count} > r_{table}$ were declared valid because in this study using the distribution of the rtable significance value of 5% (0.05) to 45 respondents namely 0.294 and all questions were declared valid. From the results of all test reliability variables > 0.60 , which states the test results, have good reliability. The results of the management of the normality test through SPSS, the number of samples taken was 45, mean = 0.00 in the table of normality test results obtained a significance value of $0.200 > 0.05$ so that the regression model was normally distributed. The coefficient of determination (R^2) is 0.547, which means that the effect of the independent variable (X) on the dependent variable (Y) is 54.7%. Hypothesis testing comparing the sig value with a value of $0.000 < 0.05$ means that there is an influence between the variable productivity of heavy equipment (X1), project manager management skills (X2) and construction company performance (Y). Hypothesis testing comparing the value of T count with the T table with the results $4.874 > 2, 01954$ states that H_0 is rejected and H_a is accepted.

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