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Analysis of Factors Affecting Performance of Rehabilitation and Reconstruction Work on Educational Facilities at Tadulako University Phase II

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ABSTRACT : *Project implementation performance is related to many things and factors such as time, cost, quality, client, satisfaction, productivity, and safety. Construction project failure is closely related to problems and failures in performance. Many construction projects fail in terms of time performance, quality performance cost performance, and other performance indicators. The success of a construction project is highly dependent on successful performance. This research aims to determine the factors that can influence the performance of construction projects at Tadulako University, resulting in undesirable things such as increased costs, time delays, non-fulfillment of specifications, or quality of work. This research method will be carried out by survey, interviews, and distributing questionnaires to 50 respondents. Analysis of this questionnaire data will be processed using SPSS software to test the validity and reliability of the data. After that, an analysis of factors that can influence the performance of construction projects at Tadulako University will be carried out. From the results of the analysis, it was obtained that 2 categories of factors had the most influence on the performance of project implementation at Tadulako University, namely materials and scope of work project management*
KEYWORDS; *performance, project, construction, material availability, time*

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I. INTRODUCTION

Project implementation performance is related to many things and factors such as time, cost, quality, client, satisfaction, productivity and safety (Abushaban, 2008). Time, cost and quality are the three most dominant dimensions of performance evaluation (Enshassi, Mohamed, & Abushaban, 2009). According to Abushaban (2008), construction project failure is closely related to problems and failures in performance. In addition, there are many reasons and factors that attribute to construction project failure. There are many construction projects that fail in terms of time performance, quality performance and cost performance and other performance indicators. The success of a construction project depends greatly on, However, to realize this, there are several factors that greatly influence the success of this activity, namely cost, time and quality during the construction activity. If the work time exceeds the specified time, it can result in increased costs incurred by the contractor and the owner. The contractor incurs additional costs (overcosts) to complete the work and also pays a fine to the owner because the completion time exceeds the agreement agreed with the owner. Meanwhile, on the part of the owner, time is lost due to setbacks or delays in completing the project, which can cause large economic losses for the owner.

Project delays are a major contribution to project cost overruns. Delays in this work can occur due to various factors, such as poor management implemented by the contractor, natural factors, estimation errors, and other causal factors. Apart from that, project delays are also influenced by the location where the project is implemented because it is directly related to access, conditions of the surrounding community, availability of materials, and geographical conditions of the project location.Project delays (construction delays) are defined as delays in completing work according to work contracts which legally involve several situations that cause claims

to arise. Project delays arise when the contractor cannot complete the project according to the time stated in the contract (Ariful Bakhtiyar et al. 2012).

Project management is the application of the best knowledge, expertise, skills and technical methods with limited resources, to achieve predetermined goals and objectives in order to obtain optimal results in terms of cost, quality and time performance, as well as work safety. The project management process starts from planning, organizing, implementing to controlling activities which are based on inputs such as project goals and objectives, information and data used, as well as the correct use of resources and in accordance with the required needs. In the actual process, leaders with existing authority in the project organization manage and direct all existing equipment and resources under limited conditions, but try to obtain maximum achievements in accordance with project performance standards in terms of cost, quality, time and work safety. has been established previously (Husen 2010).

The aim of applying project management to a development is to obtain the best method or technical means so that with limited resources maximum results can be obtained in terms of speed, savings and comprehensive work safety. Activities in the project management process are planned in detail and accurately to reduce deviations so that the maximum final product is obtained. If there are corrective actions in the next process, try not to make too many corrections.

In project management activities, it is always linked to the manager's decision-making process to achieve a goal that meets management principles, so that the allocation of the use of existing resources is needed to be carried out effectively and efficiently. Therefore, to understand the meaning of project management properly, it is necessary to know what, why, when, where, who, and how (what, why, when, where, who, and how) of management. Management can be interpreted as a process of activities that use resources effectively and efficiently to achieve a predetermined goal. Management is used because without efficiency in the process, goals will be achieved expensively, whereas without effectiveness, goals will be achieved without achieving the expected targets. Management in its functions is also used from the top (top manager), middle (middle), to the bottom (low manager) levels so that the activity process can be successful in an integrated manner.

If an activity experiences obstacles in its implementation, it will have an impact on other activities. Delays in one activity will result in delays in one project, if the activity is said to be critical, if its completion is delayed it will cause delays in completing the entire project (Hutchings 1996). This triggered the birth of a facility that was able to solve the problems that occurred, namely construction management which evolved into a skill, resulting in a management system in aspects of construction projects that could accommodate the speed, accuracy and quality of project completion.

According to Harold Kerzner (1995), project management is planning, organizing, leading and controlling company resources to achieve predetermined short-term goals. Furthermore, project management uses a systems approach and a vertical and horizontal hierarchy (flow of activities). Construction management is a part of project management that specializes in the construction sector. The concept of project management, which underlies planning, is an implementation strategy for achieving goals that are priorities for implementing construction project arrangements effectively and efficiently as expected. Therefore, planned project management control will produce potential in several ways, including (Kerzner 1995) Performance comes from the words job performance or actual performance, which means work performance or actual achievements achieved by someone. The definition of performance (work achievement) is the quality and quantity of work results achieved by an employee in carrying out his functions in accordance with the responsibilities given to him. Performance is the result or output of a process (Nurlaila, 2010). According to the behavioral approach to management, performance is the quantity or quality of something produced or a service provided by someone doing the work (Luthans, 2005). Performance is work achievement, namely the comparison between work results and established standards (Dessler, 2000).

Performance is the result of work both in quality and quantity achieved by someone in carrying out tasks according to the responsibilities given (Mangkunegara, 2002). Performance is the result or overall level of success of a person during a certain period in carrying out tasks compared to various possibilities, such as standards of work results, targets or targets or predetermined criteria that have been mutually agreed upon.According to Schwalbe (2006) a project is a collection of interconnected activities. There is a starting point and an ending point and a specific outcome. Projects are usually cross-functional across organizations so they require a variety of skills from various professions and organizations. From several definitions of performance and projects, an understanding can be made that project performance is a process and work result from a set of interconnected activities, both quality and quantity, which are then compared with the expected results to obtain maximum results.

Time management in construction projects is controlling and managing time or schedules in project activities. Time performance standards are determined by referring to all stages of project activities along with the duration and use of resources. From all the data and information that has been obtained, a scheduling process

is carried out so that output regarding time progress indicators is obtained (Husen 2010). Therefore, the variables that influence it must also be monitored, for example quality, work safety, availability of equipment and materials, as well as the project stakeholders involved. In its implementation, there are problems that can hinder time performance, including ineffective allocation of resources, limited number of personnel, insufficient equipment, bad weather conditions, and incorrect work methods. So good and reliable management is needed to prevent and reduce problems that can occur (Husen 2010). A project manager controls various activities on the project site, one of the important aspects supervised is time performance. Time performance is the process of comparing work in the field (actual work) with the planned schedule (Dipuhusodo 1996).

Performance appraisal is part of the management control process which can be used as a control tool. Management control through a performance appraisal system is carried out by creating reward and punishment mechanisms. The reward and punishment system is used as a driving force for strategic planning. The performance appraisal system and reward and punishment mechanisms must be supported by adequate compensation management. Performance measurement is a systematic way to evaluate inputs and outputs in manufacturing operations or construction activities and acts as a tool for continuous improvement (Takim and Akintoye, 2002). According to Takim and Adnan (2008), project performance and project success are measured by project effectiveness, namely how well the project objectives are achieved. Criteria such as meeting the project time, budget, technical specifications and work to be performed are the main priorities of the project objectives.

To carry out performance measurements, an appropriate indicator is needed, which is used as a benchmark or standard of expected performance so that it can describe project performance accurately. Performance indicators describe specifically the measurable evidence needed to prove that planned efforts have achieved the desired results (Takim et al., 2002). Time performance standards are determined by referring to all stages of project activities along with the duration and use of resources. From all the information and data obtained, a scheduling process is carried out so that there will be output in the form of complete report formats regarding time progress indicators, such as:

1. S curve

According to Barrie (1995), the S curve shape comes from monitoring progress over time to obtain cumulative progress used in work monitoring. The measurement of progress focuses on work performance and costs. The X axis shows the time scale, while the Y axis shows the cost or work performance scale. In most projects, the expenditure of resources per unit of time tends to be slow, building to a peak, then gradually decreasing as the end approaches. That's why progress is often depicted like the letter S.

2. Progress Report

A weekly report is an accountability report in written form regarding activities that have been carried out for one week and then put into written form. This weekly report is made by the contractor or supervisory consultant to be given to the project owner. With this report, the work implementation process can be archived. Before making a weekly project report, a daily project report is first made, which is a daily report regarding the work being carried out. From the seven daily project reports, a recap can be made for one week in the form of a weekly report.

Each contractor company or supervisory consultant usually has its own standard weekly report form to be used for each project work. From the weekly project report, a recap is obtained in monthly form for the entire month. Thus, every time a progress report is completed by the contractor or supervisory consultant, the report can be sent and entered into the Primavera Project Planner program. In other words, software users do not have to be at the work location to carry out reporting into the Primavera project planner software.

II. RESERARCH METHODS

II.1. FACTOR ANALYSIS

The analysis process is based on a correlation matrix between variables. Valuable insight can be gained from an examination of this correlation matrix. For factor analysis to be appropriate, the variables collected must be correlated. If the correlation between variables is small (weak relationship) factor analysis is not appropriate. We also expect that these variables have high correlations between variables and high correlations with factors. Formal statistics are available to test the appropriateness of factor models. Bartlett's test of sphericity can be used to test the hypothesis that variables are uncorrelated in a population. The statistical test for sphericity is based on a Kaiskwer (chi-square) transformation of the determinants of the correlation matrix. Another useful statistical test is the Kaiser-Mayer Olkin (KMO) measure of sampling adequacy. This index compares the magnitude of the calculated correlation coefficient value with the magnitude of the partial correlation coefficient. A small KMO

value indicates that the correlation between a pair of variables cannot be explained by other variables and factor analysis is inappropriate.

II.2. VARIABLE OPERATIONALIZATION

2.1.1. Dependent Variable

The dependent variable (Y) in this research is "Project Work Implementation Performance". The measurement of the dependent variable is based on the results of the measurement of the independent variable.

2.1.2. Independent Variables

The independent variables (X) are factors that influence the performance of construction project implementation. The independent variable measurements were obtained from the literature development of Andi et al. 2003 and Project Management Body of Knowledge Guide (PMI, 2004). All variables will be categorized based on the relevance of their categories. To be able to measure and determine what variables will be used in research, all of these variables will be included in the preliminary survey to obtain research variables.

IIANALYSIS TECHNIQUES

Data analysis used IBM SPSS (Statistical Product and Service Solutions) software version 25.00 for Windows, which is an application program that has the ability to analyze statistical data with high accuracy. The statistical methods used for data analysis are:

a. Ranking
b. Statistical Analysis
c. Correlation
d. Data processing tabulation.

Data analysis is carried out after the data collection process, the next stage is the data analysis process. The analysis was carried out based on data originating from the results of filling out the questionnaire. The following research steps are as follows:

1. All variables that have been identified are analyzed by classifying them into groups of similar factors based on their categories
2. Questionnaire data is measured using an ordinal scale. An ordinal scale is a scale where the results will be classified in the form of rankings.
3. Validity and reliability tests are used to determine the consistency or stability of an answer.

A valid instrument means that the measuring instrument used to obtain the data is valid, meaning that the instrument can be used to measure what it should measure, and is said to be reliable if it gives consistent results when tested many times. The validity test was carried out using Bivariate Pearson correlation (Pearson Moment Product). This analysis is done by correlating each item score with the total score. The total score is the sum of all items. Question items that correlate significantly with the total score indicate that these items are able to provide support in revealing what you want to reveal. α Valid. If r count > r table (2-sided test with a significance of 0.05) then the instrument or question items are significantly correlated with the total score (declared valid). Quoted from Widiyanto (2010) the correlation coefficient in this test is carried out using the formula discovered by Karl Pearson:

$$\rho = \frac{n \sum XXi - \sum X \sum Xi \sqrt{\sum X2}}{(\sum X2).\sqrt{n \sum Xi - (\sum Xi\ 2)}} \quad \text{.....(1)}$$

with :
ρ = correlation coefficient
X = Item score
Xi = Total score
n = Number of subjects

Quoted from Arikunto (2010), reliability tests are used to determine the stability of a measuring instrument, if the instrument remains reliable and consistent when used again. Testing was carried out by looking at the Cronbach's alpha value. The formula discovered by Lee Cronbach used to find this value is:

$$\alpha = \left[\frac{k}{k-1}\right]\left[1 - \frac{\sum a_{b^2}}{a_{1^2}}\right] \quad \text{.....(2)}$$

with :

α = instrument reliability
$\sum ab\ 2$ = number of item variants
K = number of questions
$a1\ 2$ = total variance

Correlation analysis is used to study the relationship between two variables, namely the expectation variable (predictor) which is the dependent variable and the measurement criterion variables which are the independent variables. Correlation analysis is an analytical tool used to measure the correlation between the dependent variable (Y) and the independent variable (X) which produces positive or negative values with the correlation coefficient value being 1 for a positive relationship and -1 for a negative relationship (Siegel, 1990) . Correlation analysis uses the formula:

$$\rho = \frac{n \sum XY - \sum X \sum Y}{\sqrt{\sum X2 - (\sum X2)}.\sqrt{n \sum Y - (\sum Y\ 2\ )}} \quad \text{.....(3)}$$

with :
ρ = correlation coefficient
X = Item score X
Y= Total score Y
n = Number of subjects

4. Reliability analysis is data testing carried out to determine how far the measurement results remain consistent if two or more measurements are carried out on problems or cases using the same measuring instrument.
5. Mean value analysis is the average of each question item in the questionnaire. To find the mean value, the standard deviation results will also appear. Standard deviation is the standard deviation from the mean value or the average deviation distance of data points which is measured from the average value of the question items from the questionnaire.Factor analysis is reducing the factors that have been statistically analyzed by ordering the dominant factors that are directly related to project performance.

III. RESULT AND DISCUSISION

III.1. RELIABILITY TEST

After all the instruments in this study were declared valid, reliability testing was then carried out to determine the level of accuracy, accuracy or reliability of this research instrument. After the reliability test was carried out, all statements in this study were declared reliable with a Cronbach Alpha value greater than 0.60 . The reliability test in this research was carried out with the help of the SPSS for Windows version 25.0 computer program. The results of the reliability test for all variables can be seen in the following table:

Table .1. Reliability Test Results

Number	Variabel	Number of Items Statement Item	*Cronbach Alpha*	Information
1.	Cost	6	0, 878	Reliabel
2.	Construction	4	0, 737	Reliabel
3.	Management	10	0, 934	Reliabel
4.	Material	5	0, 905	Reliabel

Based on Table 1, it can be seen that the Cronbach Alpha value for each variable of implementing accrual-based government accounting standards, human resource competency, and financial report quality has a value greater than 0.60 with a nominal value of 0.878, 0.737, 0.934 and 0.905, so the total The construct or variable in this research can be said to be reliable because it has a Cronbach Alpha of more than 0.60 referring to (Ghozali,2013)

III.2. KMO AND BARTLETT'S TEST

The KMO and Bartlett's Test tests are useful for determining the suitability of a variable, whether it can be processed further using this factor analysis technique or not. The way to do this is by looking at the KMO MSA (Kaiser-Meyer-Olkin Measure of Sampling Adequacy) value. If the KMO MSA value is greater than 0.50 then the factor analysis technique can be continued. Based on the output from table 10 below, it is known that the KMO MSA value is 0.716 > 0.50 and the Bartlett's Test of Sphericity (Sig.) value is 0.00 < 0.05, so the factor analysis in this research can be continued because it meets the first requirement.

Tabel .2. KMO & Bartlett's Test Results

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.716
Bartlett's Test of Sphericity	Approx. Chi-Square	1276.288
	df	300
	Sig.	.000

III.3. ANTI-IMAGE CORRELATION MATRIX

The Anti-Image Matrix is useful for knowing and determining which variables are suitable for use in factor analysis. Anti-image Correlation in the following output table can be seen through the Measure of Sampling Adequacy (MSA) value. The MSA test is carried out to measure the sampling adequacy of each variable. The condition for accepting the MSA test is that if the MSA value is above 0.5, then the variable can be predicted and can be analyzed further. Meanwhile, if the MSA value obtained is below 0.5, then this variable cannot be predicted and analyzed further so this variable must be eliminated. Extraction Process AnalysisThe extraction method used in this research is principal component analysis (PCA).

This extraction process is used to determine the number of factors that will be formed. The communalities value in the extraction results table explains the variance of the variables that can be explained by the formed factors. Based on the communalities value, it can be seen that the extraction value obtained by each variable is above 0.5. This means that each factor can explain more than 50% of the variance of each variable. This shows that each variable has a very close relationship with the factors formed. The ability of the factors formed for the variables explained based on the results of the extraction values are as follows

Based on the extraction results obtained, it can be determined that the number of factors formed is 3 factors because there are 3 components that have an eigenvalue of more than 1, namely factor 1 with an eigenvalue of 12,215, factor 2 with an eigenvalue of 3,384 and factor 3 with an eigenvalue of 12,215. 1,839..Based on the percentage of variance, it can be seen that factor 1 has a variance of 48,860, meaning it is able to explain 48,860%, factor 2 has a variance of 13,537, meaning it is able to explain 13,537%, and factor 3 has a variance of 7,354, meaning it is able to explain 7,354%. The cumulative variance of all the factors formed is 69,750. This value is less than 100% because there are only 3 factors that are considered to have differences and the remaining factors are considered the same based on the extraction results so they are not included in the factors formed.

In the PCA extraction results table you can see the eigenvalue of each existing component. This value is used to determine the number of factors formed. Determining the number of factors formed is done by looking at the eigenvalue of each component, where those selected to be a factor are components that have an eigenvalue greater than 1. The eigenvalue of each component can be seen in table 3 as follows:

Table.3. PCA Extraction Test Results Total Variance Explained

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.215	48.860	48.860	12.215	48.860	48.860	7.011	28.044	28.044
2	3.384	13.537	62.396	3.384	13.537	62.396	6.372	25.486	53.531
3	1.839	7.354	69.750	1.839	7.354	69.750	4.055	16.220	69.750
4	.972	3.890	73.640						
5	.912	3.647	77.287						
6	.797	3.188	80.475						
7	.704	2.816	83.291						
8	.612	2.448	85.739						
9	.530	2.121	87.860						
10	.485	1.938	89.798						
11	.431	1.725	91.523						
12	.381	1.524	93.047						
13	.326	1.302	94.350						
14	.293	1.173	95.523						
15	.268	1.071	96.594						
16	.203	.813	97.407						
17	.148	.591	97.998						
18	.140	.560	98.558						
19	.099	.395	98.953						
20	.094	.378	99.330						
21	.062	.248	99.579						
22	.057	.227	99.806						
23	.023	.094	99.900						
24	.015	.061	99.960						
25	.010	.040	100.000						

Extraction Method: Principal Component Analysis.

Based on the extraction results obtained, it can be determined that the number of factors formed is 3 factors because there are 3 components that have an eigenvalue of more than 1, namely factor 1 with an eigenvalue of 12,215, factor 2 with an eigenvalue of 3,384 and factor 3 with an eigenvalue of 12,215. 1,839. The number of factors formed can also be seen in the scree plot. In the resulting scree plot, it can be seen that there are only 3 components with eigenvalues that are above 1. Meanwhile, the other components have eigenvalues that are smaller than 1, so the number of factors formed is 3 factors.

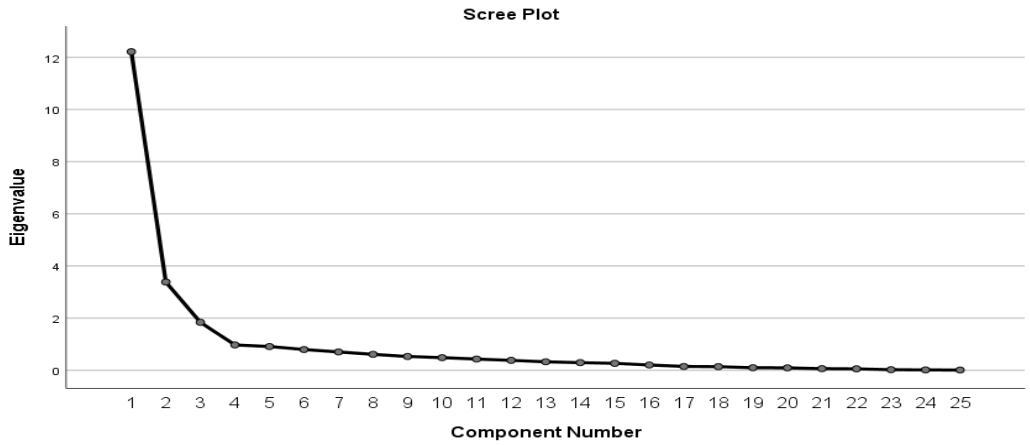

Fig.1. Secret Plot

Based on the tables and diagrams, there are categories of factors that influence performance in the Rehabilitation and Reconstruction of Educational Facilities project at Tadulako University Phase II, namely the effectiveness of communication and field productivity in decision making, especially material delays, the relationship between management and labor, availability of materials and design. which changes frequently. The most dominant factor is the delay in materials/materials. Procurement of construction materials to be used must be imported from outside the Palu City area. Delivery of these materials can only use sea transportation, which requires quite a long travel time. In this case, it will certainly result in a temporary cessation of construction activities and ultimately result in delays in work which will have an impact on project implementation performance, especially in terms of time.

The second factor that has an influence on project performance is financial management, availability of materials and project quality control, in this case there are material price fluctuations, high cost machines, changes in work scope, project complexity, poor quality control, lack of efficient use of equipment. , Delivery of materials, availability of materials and poor quality of materials are considered to have an influence on project performance, especially cost and time performance.The third factor is the design change management factor and unexpected cost estimates. In a project work, there are repeated design changes and the increase in implementation costs due to additional work and rework/redesign, resulting in delayed project implementation, when project work should continue as a result of delays.

III.4. STRATEGY ON PROJECT PERFORMANC

To minimize these obstacles, a strategy was formulated through a Focus Group Discussion (FGD) using the SWOT method and in-depth interviews to explore more in-depth information to support the SWOT analysis which aims to improve management performance through the organization's potential. This FGD was carried out with PPK and related parties as top management who can provide solutions to discuss obstacles and identify and evaluate internal factors, namely aspects of strengths and weaknesses, and external factors, namely Opportunities and Threats. owned by the organization to later obtain a strategy using SWOT analysis. Opportunities for improving the management performance of the rehabilitation and reconstruction project for educational facilities at Tadulako University phase II can be implemented taking into account all organizational strengths/potentials. Based on the utilization of superior resources owned by the organization as a key success factor, it is used as an approach in formulating management strategies using the SWOT matrix and strength maps, then a strategy formulation is prepared that integrates key strength factors from internal and external factors which generally give birth to four strategies, namely the SO Strategy (strengths). -opportunities), ST Strategy (strengths-threats), WO Strategy (weaknesses-opportunities) and WT Strategy (weaknesses-threats).

IV. CONCLUSION

Based on the results of the analysis of the dominant factors that influence the performance of construction projects in the Rehabilitation and Reconstruction of Educational Facilities Work Project at Tadulako University Phase II, there are 3 most dominant factors, namely the variable that has a big influence on project performance is factor X3, namely the management factor. In particular, sub-factor X3.2, namely the material procurement factor, is considered to have a major influence on project performance. Apart from that, the factor of shortage of project workers X3.8 is ranked second and the factor of poor supervision and management of contractors in the field The strategy needed to improve the implementation performance of the Rehabilitation and Reconstruction of Educational Facilities Project at Tadulako University Phase II is to formulate a strategy through Focus Group Discussions (FGD) using the SWOT method and in-depth interviews to dig up more in-depth information to support the SWOT analysis which aims to improve management performance through the potential of the organization

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