The Factors of Project Delay in the Construction of Mosez Kilangan International Airport

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Abstract— *Construction projects often face many obstacles, such as the case in the construction of the Mosez Kilangan International Airport in Timika, West Papua, Indonesia where the construction had been halted for one year. This study aims to identify the main factors that affect the delay in the construction project of Mosez Kilangin International Airport. The independent variables consist of Financing (X_1), Equipment (X_2), Labor (X_3), Transportation (X_4), Implementation Methods (X_5), Design Change (X_6) and Work Environment (X_7). Primary data were collected using a questionnaire distributed to research respondents, namely 46 representatives of the parties involved in the airport construction project. The sampling method applied was Disproportionate stratified random sampling, while the data analysis method including factor analysis and multiple linear regression with the Enter and Stepwise methods in the SPSS program. Based on the results, it is known that the 3 main variables that most influence the delay in the construction of Mosez Kilangin International Airport are Financing (X_1), Transportation (X_4), and Design Change (X_6), with beta coefficient values of 0.684, 0.0593. and 0.046, respectively. The three variables also have a positive and significant effect on delays in airport construction, with a magnitude of 69.5%. The project management can consider and manage better these three variables so that the next project can be completed following the deadline, cost and quality agreed in the contract.*

Keywords— *Project delay, Construction, Airport.*

I. INTRODUCTION

A construction project is a physical construction activity that continues at any time in any place. The construction project is temporary in nature and takes place in a limited period with certain resources to achieve certain results in the form of a development project. The construction project involves various parties, including the contractor, project owner, planning consultant, and supervisory consultant who are all interrelated in a work agreement (contract). The success of a construction project is determined by the suitability of time, cost, and quality as stipulated in the contract document.

A construction project requires good technical management and implementation so that all processes and activities can run according to planning, goals, and expected mechanisms. The main objective of construction management is to maintain the management function effectively and efficiently to obtain optimal results according to the agreement with the project owner. In this case, the main objectives of construction management are Cost Control, Quality Control, and Time Control. To avoid gaps or misunderstandings between the contractor and the project owner, the construction manager is responsible for managing the technical operations of the project, receiving input and/or decisions related to the technical operation of the construction project, both from the project owner and the contractors. Construction projects are required to be completed on time, on quality, and cost according to the planning and requests of the project owner.

In practice, construction projects do not always run smoothly and contractors often encounter many obstacles in the field. This happened in the Mosesz Kilangin International Airport construction project in Timika Papua, which construction had been going on for several years, and was halted for one year. The construction project of Mosez Kilangan International Airport, Kilangin, Timika, Papua

Province, is a construction project that started in 2014 and was terminated due to problems in the land release, which was not recognized by the local community and PT. Freeport Indonesia. Furthermore, development was continued in 2016 with two budget sources, namely the Regional Revenue and Expenditure Budget (APBD) and the State Revenue and Expenditure Budget (APBN). The process of building Mosez Kilangin International Airport requires 6 stages. Because the construction work has been going on for several years but has not yet shown a point of completion, the implementation of development requires reliable human resources, especially in terms of experts. In addition, development requires adequate time and money so that the project development process can be completed properly. A development project is synonymous with limited time and must run according to the wishes of the project owner.

Fig. 1. The condition of Mosez Kilangan International Airport, Timika, Indonesia

As for 2018, the Ministry of Transportation of the Republic of Indonesia disbursed a budget of IDR 77 billion (contract work of IDR 73 billion) for the continuation of the

construction process of Mosez Kilangan International Airport, namely phase four of the work which includes the construction of a passenger terminal building with an area of 42,000 m2. This terminal building consists of two units, namely one 21,000 m2 unit built by the Ministry of Transportation and another unit with the same area built by the Mimika Regency Government through the APBD. In addition to the continued construction of the passenger terminal building, the Ministry of Transportation in 2018 also allocated a budget of IDR 22 billion for the continued construction of an aircraft parking lot (apron) covering an area of 100x100 m2 which will later be used for parking areas for small pioneering planes serving flights to the interior of Papua. Furthermore, the Ministry of Transportation again disbursed a budget of Rp. 216 billion in 2019 to accelerate the airport construction process so that it can operate in 2020, where the National Sports Week (PON) event will take place in Papua.

The construction project, which had been running for several years but had not yet reached the completion point, meaning that various related parties had to think about strategies to achieve the target. This begins with analyzing the constraints in project implementation, both those that have been predicted and those that are not expected, both from a technical and non-technical perspective. Previous research conducted by Karunia et al. (2016), Suyatno (2010) and Krisnayana (2014) state that project delays can be caused by many factors, including financing, equipment, labor, transportation, implementation methods, design, the environment in which the construction project is carried out, and others. other. All factors play their respective roles in causing the delay in the construction of the Mosez Kilangan International airport construction project that was not following the targets expected by the owner. This study seeks to identify the main factors that influence the delays in the construction project of Mosez Kilangin International Airport. This analysis needs to be done so that it can be used as evaluation material and recommendations in the formulation of strategies in subsequent development projects. Thus, construction projects can be completed according to the agreed plans and contracts.

II. METHOD

This research uses quantitative methods with a descriptive approach. Data analysis was conducted to analyze the factors that influence the delay in the implementation of the Mosez Kilangan International Airport development project, Timika. Data collection was carried out using the survey method which was conducted on research respondents, namely 46 people. The details of the respondents in this study are described in table 1.

The type of data studied is primary data obtained directly from respondents using a questionnaire. The questionnaire consists of question items about the factors that affect the delay in the implementation of the Mosez Kilangin International Airport development project on a 1-4 Likert scale. Respondents involved as research samples were collected from various stakeholders involved in airport development projects.

Table 1. Research respondents

No.	Position	Number (Person)
1.	Project Owner	3
2.	Ministry of Public Works	4
3.	Development Planning Agency	3
4.	Field Supervisor	3
5.	Assistant and Administration Staff	4
6.	Contractor	7
7.	Head of Project	1
8.	Technique	2
9.	Field Executive	5
10.	Supervising Consultant	2
11.	Site Engineer	2
12.	Quality Engineer	3
13.	Chief Inspector	2
14.	Department of Transportation	5
Total		46

In this study, samples were taken randomly using the Disproportionate stratified random sampling method (Sugiyono, 2006). Furthermore, the data analysis method used is factor analysis and multiple linear regression. Regression analysis uses basic equations of $Y=b_0+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5+b_6X_6+b_7X_{7i}$. The variables studied are explained as follows:

Table 2. Research variables

No.	Variable	Position
1.	Financing (X_1)	Independent
2.	Equipment (X_2)	
3.	Labor (X_3)	
4.	Transportation Constraints (X_4)	
5.	Implementation Method (X_5)	
6.	Design Change (X_6)	
7.	Work Environment (X_7)	
8.	Project Delay (Y)	Dependent

The determination of the independent variables that affect the delay in the completion of construction projects is based on the results of field studies and refers to previous research conducted by Karunia et al. (2016), Suyatno (2010), and Krisnayana (2014).

III. RESULT AND DISCUSSION

This study applies two methods of data analysis, namely Factor analysis and Multiple Regression to determine the effect of variable financing (X1), equipment (X2), Labor (X3), Transportation (X4), Implementation Methods (X5), Design Change (X6). And Work Environment (X7) on Delay in Completion (Y) on the Mosez Kilangin International Airport development project.

A. Factor Analysis

The results of the factor analysis are described in table 3. The analysis is carried out with the help of the SPSS 21 statistical program. Factor analysis is carried out to test the feasibility of the variables to be used as independent variables that affect the delay in the completion of a development project.

Table 3. Result of factor analysis

Variable	Indicator	MSA	Loading factor	KMO	Bartlett's test (sig.)	Initial Eigenvalues	% of Variance
X_1 (Financing)	X1.1	0.906	0.578	0.795	68.086 (0.000)	2.932	58.633
	X1.2	0.747	0.839				
	X1.3	0.838	0.769				
	X1.4	0.845	0.766				
	X1.5	0.743	0.846				
X_2 (Contractor Equipment)	X2.1	0.871	0.718	0.871	121.725 (0.000)	3.917	65.275
	X2.2	0.850	0.880				
	X2.3	0.841	0.797				
	X2.4	0.881	0.759				
	X2.5	0.885	0.861				
	X2.6	0.903	0.820				
X_3 (Labor)	X3.1	0.765	0.806	0.780	44.950 (0.000)	2.509	62.731
	X3.2	0.764	0.808				
	X3.3	0.806	0.758				
	X3.4	0.790	0.795				
X_4 (Transportation)	X4.1	0.658	0.843	0.644	44.837 (0.000)	2.204	73.460
	X4.2	0.595	0.919				
	X4.3	0.712	0.805				
X_5 (Implementation method)	X5.1	0.622	0.895	0.662	43.719 (0.000)	2.178	72.604
	X5.2	0.621	0.895				
	X5.3	0.843	0.759				
X_6 (Design Change)	X6.1	0.711	0.756	0.639	29.489 (0.000)	2.011	67.025
	X6.2	0.596	0.882				
	X6.3	0.644	0.813				
X_7 (Work Environment)	X7.1	0.733	0.813	0.685	35.666 (0.000)	2.134	71.119
	X7.2	0.640	0.884				
	X7.3	0.701	0.832				

In general, it can be stated that the variables of Financing (X_1), Equipment (X_2), Labor (X_3), Transportation (X_4), Implementation Methods (X_5), Design Change (X_6) and Work Environment (X_7) have met the factor feasibility test. , which is indicated by the KMO value that is greater than 0.5. Thus, all variables can be used as independent variables on the dependent variable, namely the delay in completing the Mosez Kilangan International Airport development project.

B. Regression Analysis

Regression analysis was carried out in two stages. The first stage was carried out using the Enter method, while the second stage was carried out using the Stepwise method to test the influence of the most dominant independent variables among the 7 independent variables used in this study. The results of the Multiple Regression analysis are explained as follows:

Table 4. Result of Regression Analysis (Enter)

Variable	B	$t_{statistics}$	p-value	Interpretation
Constant	0.729			
Financing (X_1)	0.321	1.600	0.119	Not Significant
Construction Equipment (X_2)	-0.192	-1.303	0.202	Not Significant
Labor (X_3)	0.806	0.780	0.209	Not Significant
Transportation (X_4)	0.046	0.288	0.775	Not Significant
Implementation Method (X_5)	-0.033	-0.274	0.786	Not Significant
Design Change (X_6)	0.191	1.213	0.234	Not Significant
Work Environment (X_7)	0.134	0.991	0.329	Not Significant
α		= 0.050		
Coefficient of Determination (R^2)		= 0.611		
$F_{statistics}$		= 8.629		
$F_{table\ (6,33,0.05)}$		= 2.389		
$t_{statistics}$		= 1.228		
$t_{table\ (33,0.05)}$		= 2.035		

Based on table 4, the regression model produced by the Enter method is $\ln Y = 0.729 + 0.321 X1 - 0.192 X2 + 0.046 X4 - 0.033 X5 + 0.191 X6 + 0.134 X7 + e_i$. Overall, it can be seen that financing, transportation, changes in design, and work environment have a positive influence on delays in completing airport construction projects. In other words, the higher or greater (increasing) these factors, the potential delay in the completion of a development project will be even higher. Besides, the results of the analysis show that financing, contractor equipment, transportation, implementation methods, design changes, and work environment have insignificant effects on delays in the completion of development projects, either partially or simultaneously ($p > 0.05$). The magnitude of the influence of all independent variables on the delay in completing the Mosez Kilangin International Airport development project is 61.1%.

Furthermore, the results of the Multiple Regression analysis using the Stepwise method are described in Table 5. The final variables used here are Financing (X_1), Transportation (X_4), and Design Change (X_6).

Table 5. Result of Regression Analysis (Stepwise)

Variable	B	$t_{statistics}$	p-value	Interpretation
Constant	2.450			
Financing (X_1)	0.684	3.188	0.003	Significant
Transportation (X_4)	0.046	0.288	0.005	Significant
Design Change (X_6)	0.593	2.766	0.009	Significant
α		= 0.050		
Coefficient of Determination (R^2)		= 0.695		
$F_{statistics}$		= 42.156		
$F_{table\ (2,37,0.05)}$		= 3.252		
$t_{statistics}$		= 0.017		
$t_{table\ (37,0.05)}$		= 2.026		

Based on the results of the regression analysis using the Stepwise method, it can be seen that financing constraints have a positive and significant effect (p-value <0.05) on delays in completing airport construction projects. If the constraints in financing are higher, the potential delay in project completion will also be higher. This is none other than because financing is the main factor that makes the project run, namely as capital for spending on building tools and materials, as well as the salaries of all workers involved in construction projects. Furthermore, transportation and design changes also have a positive and significant effect on delays in development projects. The resulting regression equation is $Y = 2.450 + 0.684 X_1 + 0.593 X_2 + 0.046 X_4 + e_i$. The magnitude of the influence of the main variables, namely financing, transportation and design changes on delays in completion of development projects is 69.5%. The independent variable that most dominantly affects the delay in the development process of Mosez Kilangin International Airport is financing. In other words, non-current financing will have the greatest impact on the airport construction project completion process.

IV. CONCLUSION

The main factors of project delay on the Mosez Kilangan International Airport construction are the delay in financing from the project owner, in this case, the Regional Government. This was due to a conflict between the DPRD and the Regent which caused the project to stop for one year. The second factor is the design change from the south side to the north side because the first design was not recognized by PT. Freeport Indonesia with the local community. The third factor is the difficulty of transporting goods from the dock to the project site, which often causes delays. Delivery of goods and loading and unloading of materials must be done at high tide. Furthermore, the fourth factor is the work environment, which is synonymous with extreme weather (high heat and high rainfall), so that many workers experience malaria. Of the four main factors, most influencing is the design change.

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