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The Correlation of Factors of Delay on the Implementation of Irrigation Construction Projects in Pidie Regency

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ABSTRACT--*The implementation of irrigation construction projects in Aceh Province experienced problems related to delays. The continued construction of dams and irrigation in Aceh Province using the 2016 Aceh Budget (APBA) until July 2017 has not yet been completed. The project delay is the main reason for the project cost overruns. This study aims to identify the factors and dominant factors that cause delays, as well as analyze the level of closeness of the correlation between the factors of delays on the implementation of irrigation construction projects in PidieRegency. This research uses quantitative methods through questionnaires. The total population in this study was 63 contracting companies that had carried out irrigation construction projects in Pidie Regency starting from 2012-2018. The results showed that the factors that caused the delay were labor, implementation method, change, material factors, time and control, equipment, financial, and contract factors. The contract factors have a very high level of closeness, also the change, labor, environmental, relations with government, and time and control factors have a high level of closeness, in addition, implementation method, material, and equipment factors have a sufficient level of closeness and, finally, financial factors have a low level of closeness to the cost of implementing irrigation construction projects.*

Keywords—*correlation, factors, implementation,Irrigation construction, projects, pidie regency*

I. INTRODUCTION

Irrigation construction projects are currently getting top priority from the Central Government. It is proven by the many irrigation projects that have been and are being worked on, proving how important the construction of irrigation infrastructure is in Indonesia. The development of irrigation construction projects in PidieRegency is quite significant from year to year. This condition can be seen from the number of funds provided by the central government from 2015 to 2018 through the Special Allocation Fund (DAK). At the same time, the number of companies is increasing, so that competition among contractors to obtain work will be tighter. Therefore companies that have excellent performance will continue to survive.

The process of implementing a project consists of many jobs, which are interrelated between one work and another. In many of these jobs, various things can happen that can lead to increased processing time, so the completion of the work becomes too late. Delays that occur in one or more jobs can cause overall project delays. As a result of the delay, the costs that have been estimated at the planning stage change. This change was seen

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when the contractor provided additional costs, both direct and indirect, to avoid higher late fees. Therefore, delays have a significant contribution to project cost overruns.

In the implementation of irrigation projects in Aceh Province, contractors faced problems related to delays. The problem was published in Serambi Indonesia online media, July 24, 2017, which reported that the Aceh House of Representatives (DPRA) criticized the irrigation project as unfinished. The continued construction of dams and irrigation in Aceh Province using the 2016 Aceh Budget (APBA) until July 2017 has not yet been completed. The delay is very detrimental to the parties concerned, contractors, and project owners themselves. Delay can be caused by various factors such as material, labor, equipment, financial, environmental, change factors, relations with government, contracts, time and control (management), and implementation method factors. To minimize delays in subsequent projects, each factor needs to be adequately considered in the early stages of starting work so that delays can be prevented or avoided,which will result in implementation costs. In connection with these problems, the researcher intends to analyze the relationship between the factors of delay on the cost of implementing the irrigation construction project in Pidie Regency.

II. RESEARCH METHODS

This research uses a quantitative method approach. Quantitative methods are used to examine samples through questionnaire data collection, then analyze data statistically. The research methodology includes the object and location of research, types,and sources of data, techniques for determining population, techniques for collecting questionnaire data, processing data, and analyzing data.

2.1 Research Objects and Locations

The objects in this study are the irrigation construction buildings in the Pidie Regency Water Resources Office,which have been built by contractors from 2012-2018. The locations of irrigation construction buildings or research sites are in the administrative area of Pidie Regency. The area of Pidie Regency reaches 3,087 km2.

2.2 Data Type and Source

Data are the form of a collection of information both in the form of oral and written that support in writing research. The types of data used in this study are primary data and secondary data. Primary data use questionnaire data obtained from respondents. Secondary data use the number of irrigation contractor companies obtained from the Department of Water Resources in Pidie Regency in 2018.

2.3 Population Technique

The population is intended for the project manager or site manager of the contracting company with SI001 sub-fields. Based on data from the Pidie Regency Irrigation Service in 2018, the number of contractor companies that have implemented irrigation projects starting from 2012-2018 totaled 63 companies. About the total population <100, this study uses population research.

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2.4 Data Collection Technique

The questionnaire distribution was carried out within one month. Respondents were only asked to choose the answers provided by giving a checklist (√) to the questionnaire. The research questionnaire was designed in two parts, that is, part A and part B. Part A questionnaireasks questions about the characteristics of respondents ranging from company qualifications, experience in the field of irrigation construction, number of work packages during 2012-2018, and company status. The measurement of partA questionnaire answers according to the characteristics of each respondent. Part B questionnaire asks about the delay factors as the independent variable (X) and the cost of implementing the project as the dependent variable (Y). Measurement of the answer to the questionnaire part B uses a Likert scale. The questionnaire data collection began by preparing a questionnaire of 63 copies. Then look for information on the right time to distribute questionnaires to respondents. Questionnaires that have been filled in entirely by respondents have then collected again within a certain period.

2.5 Data Processing Technique

This data processing is intended to test the research instruments through validity and reliability tests. Research instruments must meet the criteria of validity and reliability so that their use can produce data or information that is accurate and objective.A validity test is carried out to determine the validity or invalidity of a questionnaire statement based on the answer data received from all respondents. If the value of $R_{count} > R_{table}$,then the statement will be valid, whereas if the value of $R_{count} < R_{table}$, then the statement is invalid. If there are invalid statement items, the statement is aborted,and the valid statement is continued at the reliability test stage.The reliability test is conducted to find out which variables on the questionnaire are reliable or not, based on the answer data received from all respondents. If the Cronbach Alpha value>0.6, then the variable is reliable, and vice versa,if the Cronbach Alpha value <0.6,then the variable is not reliable. If there is an unreliable variable, then refine the indicator on the variable, then redistribute the questionnaire to the respondent to be answered again, and the reliable variable can proceed to the data analysis stage.

2.6 Data Analysis Technique

Data analysis is a process of simplifying data into a form that is easy to read, understand,and interpret. This data analysis uses descriptive analysis and simple correlation.Descriptive statistics are used to describe the characteristics of the contracting company and respondents' perceptions of the factors and dominant factors that cause delays in the implementation of irrigation construction projects in PidieRegency.Simple correlation analysis is used to determine the level of closeness of the relationship between the factors of delay to the cost of implementing irrigation construction projects in Pidie partially.

III. RESULTS AND DISCUSSION

3.1 Validity Test

A validity test is used to determine whether the questionnaire questions are valid or not based on the answer data received from 63 respondents. The validity test results that have been processed through SPSS software are presented in Table 1.

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Table 1: Validity Test.

No.	Statement Item on Variable	R_{count}	R_{table}	Remarks
1	Material Factor (X_1)			
a	Lack of construction materials	0.524		Valid
b	Material delivery delays	0.470		Valid
c	Material damage in storage	0.757		Valid
d	Inaccurate ordering time	0.389		Valid
e	Poor Material quality	0.302		Valid
f	Increasing Price	0.275	0.248	Valid
g	Difficulties in obtaining official prices from material suppliers	0.685		Valid
h	Inaccurate Estimated use of material	0.636		Valid
i	Material damage during shipping	0.311		Valid
j	Materials and materials sent do not meet the specifications specified by the contract	0.730		Valid
k	Much material lost at the project site	0.704		Valid
l	Poor material quality control	0.822	0.248	Valid
2	Labor factor (X_2)			
a	Shortage of labor	0.560		Valid
b	Lack of Human resources capabilities	0.791		Valid
c	Lack of engineering, management and supervision personnel from contractors	0.744		Valid
d	Poor contractor personnel experience	0.858	0,248	Valid
e	Late paying workers' wages	0.608		Valid
f	Figures for absenteeism	0.714		Valid
g	Lack of labor discipline	0.486		Valid
h	Low labor productivity	0.369		Valid
3	Equipment factor (X_3)			
a	KekurEquipment shortage	0.558		Valid
b	The poor foreman or operator capability	0.273		Valid
c	Equipment delivery delays	0.847		Valid
d	Equipment productivity	0.836	0.248	Valid
e	Equipment management error	0.879		Valid
f	Equipment often gets damaged	0.904		Valid
g	Loss of equipment during implementation	0.925		Valid
h	Destruction of equipment occurred by an irresponsible party	0.837		Valid
4	Financial Factor (X_4)			
a	Late payment process by owner	0.265		Valid
b	National economic situation	0.482	0.248	Valid
c	Financial difficulties for the contractor	0.367		Valid

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d	The owner's financial difficulties	0.450		Valid
e	Fluctuations in the prices of goods or materials	0.598		Valid
f	Changes in government policies, for example, the increase in fuel prices and currency exchange rates	0.259		Valid
g	High equipment maintenance costs	0.630		Valid
5	Environmental factors(X_5)			
a	Social and culture	0.495		Valid
b	Effect of rain on construction activities	0.253		Valid
c	Effect of environmental security on project development	0.529		Valid
d	The conflict between contractor and consultant	0.509		Valid
e	Problems with neighbors	0.868		Valid
f	Fraud and bribery practices	0.565	0.248	Valid
g	The number of obstacles leading to the project site	0.390		Valid
h	Predictions on the field or geographic location of the project	0.340		Valid
i	Unexpected events occur, such as riots and natural disasters at the project site	0.735		Valid
j	Work accident	0.667		Valid
k	Traffic congestion	0.408		Valid
6	Change factor(X_6)			
a	There was a design change by the owner	0.820	0.248	Valid
b	Design changes by the planner	0.830		Valid
c	Changes in material type and specifications	0.330		Valid
d	The occurrence of additional work	0.261	0.248	Valid
e	The occurrence ofchange order	0.663		Valid
f	Changes in implementation schedule	0.662		Valid
7	Government relations factor(X_7)			
a	Obtaining permission from the government	0.507		Valid
b	Convoluted bureaucracy in project operations	0.711		Valid
c	Interference or owner intervention	0.257		Valid
d	Lack of coordination between related agencies in making decisions that can affect the construction of construction projects	0.823		Valid
e	There are inputs from other agencies that result in changes in design and artistry	0.734	0.248	Valid
f	There is a conflict of interest between the agencies related to the project	0.422		Valid
g	There are changes in the structure of government agencies in handling ongoing projects	0.506		Valid
h	Communication problem	0.456		Valid
8	Contract Factor(X_8)			
a	Negotiation and licensing of contracts	0.417	0.248	Valid

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b	The contractor handles the project in various places	0.767		Valid
c	Uncommon payment methods / withdrawals	0.899		Valid
d	Non-compliance with the contract	0.751		Valid
e	Error in understanding contract documents	0.855		Valid
9	Time and control factor(X_9)			
a	Main contractor control over subcontractors	0.334		Valid
b	Poor monitoring and control	0.692		Valid
c	Difference in product quality assessment	0.419		Valid
d	Weak implementation time control system	0.664		Valid
e	No job specification evaluation was carried out before implementation	0.625	0.248	Valid
f	The absence of operating procedures for each job	0.837		Valid
g	Poor K3 management	0.663		Valid
h	The project team is slow to respond to the problems	0.503		Valid
i	There is no commitment of the project manager to cost and time	0.300		Valid
10	Implementation method Factor(X_{10})			
a	The inability of the contracting project team to implement the project implementation methods	0.316		Valid
b	Field manager experience	0.711		Valid
c	Contractor competence	0.797	0.248	Valid
d	Subcontractors or business partners are not experts in their fields	0.841		Valid
e	Incorrect method of implementation	0.381		Valid
f	The supervisory function is weak even without supervision	0.561		Valid
11	Project implementation costs (Y)			
a	The cost of human resources incurred does not exceed the limit	0.875		Valid
b	Equipment costs incurred did not exceed the limit	0.894		Valid
c	Material costs incurred did not exceed the limit	0.997	0.248	Valid
d	Project implementation costs do not exceed the budget limit provided	0.875		Valid

Table 1 shows that all items of the questionnaire statements given to 63 respondents have a value of $R_{count}>R_{table}$, so that all statements were valid. In connection with the validity of all statements on the questionnaire, it can be continued with the reliability test.

3.2 Reliability Test

The reliability test was used to find out which questionnaire variables were reliable or not, based on the answer data received from 63 respondents. Reliable shows the meaning that the indicators on a variable reflect the variable itself. The reliability test results that have been processed through SPSS software are presented in Table 2.

Table 2: Reliability Test

No.	Variable	Cronbach Alpha> 0.6	Remarks
1	Material factor (X_1)	0.816	Reliable
2	Labor factor (X_2)	0.891	Reliable
3	Equipment factor(X_3)	0.952	Reliable
4	Financial factor (X_4)	0.670	Reliable
5	Environmental factors(X_5)	0.818	Reliable
6	Change factor(X_6)	0.714	Reliable
7	Government relations factor(X_7)	0.615	Reliable
8	Contract factor(X8)	0.856	Reliable
9	Time and control factor(X_9)	0.887	Reliable
10	Implementation method factor(X_{10})	0.777	Reliable
11	Project implementation costs (Y)	0.989	Reliable

Table 2 shows that all of the questionnaire variables given to 63 respondents had a Cronbach Alpha value of>0.6 so that all the variables were reliable. In connection with the reliability of all variables, it can be continued with data analysis.

3.3 The Factors that Cause Delay

Factors that were suspected as the cause of delays in the irrigation construction project in Pidie Regency were material, labor, equipment, financial, environmental, change, relations with the government, contracts, time and control, and implementation method factors. To prove the allegation, the risk factors have been identified by descriptive statistics, which obtained the output in the form of a mean value. The mean values range from 1 to 5, which is a representation of the Likert scale used in the questionnaire. A mean 1 indicates no effect, mean 2 indicates a profound influence, mean 3 indicates a moderate effect, mean 4 indicates an effect, and mean 5 indicates a significant effect.

The results of the identification of the mean factors indicate that of the ten factors reviewed, there were eight influential factors and two influential factors that were delays in the implementation of irrigation construction projects in Pidie Regency. The mean value on the labor factor is 4.470, the mean factor of the implementation method is 4.259, the mean change factor is 4.164, the material means factor is 4.045, the time factor and control factor is 4.039, the mean equipment factor is 4.022, the mean factor is finance obtained at 3.952, and the mean contract factor obtained at 3.933. It means that overall respondents perceive that labor, implementation, change, material, time and control, equipment, financial, and contract factors influence the delay in the implementation of irrigation construction projects in the Pidie Regency. The mean value on environmental factors was obtained at 3.397, and the mean factor of relations with the government obtained at 2.687. It means that overall respondents perceive that environmental factors and relationship factors with government influence are being delayed in the implementation of irrigation construction projects in Pidie Regency.

3.4 Relationship of delay factors to implementation costs

In the implementation of construction projects, there is often a mismatch between progress in the schedule and realization in the field. Realizations that do not equal or do not exceed the progress of the plan are called delays. Delays in the project can occur at certain times and can also occur at the end of the project. Delays that occur at a particular time, then the contractor needs to provide additional costs to overcome the delay. This delay can be overcome by holding overtime, increasing the number of workers, and holding work shifts, all of which are intended to accelerate the life of the project. Contractors at certain times need to accelerate to avoid late fees. The magnitude of the cost of a late workday fine on the project is the contract value multiplied (1/1000) and multiplied by the number of days of delay. Delays that occur at the end time, the contractor must pay late fees. This phenomenon shows that the delay has a level of closeness to the increase in project implementation costs.

Since theoretically, there is a level of closeness, the delay factors have been analyzed against the cost of implementing the project with a simple correlation. The Spearman correlation coefficient on contract factors is 0.828, change factor is 0.759, labor factor is 0.691, environmental factor is 0.676, government relationship factor is 0.676, time and control factor is 0.612, implementation method is 0.584, material factor is 0.580 , equipment factor 0.420, and financial factors 0.334. This simple correlation analysis shows that contract factors have a very high level of closeness, change factors, labor factors, environmental factors, relations with government factors, and time and control factors have a high level of closeness, implementation method factors, material factors, and factors equipment has a sufficient level of closeness, while financial factors have a low level of closeness to the cost of implementing irrigation construction projects in Pidie Regency.

The delay factors that were reviewed all have a significant relationship to the cost of implementing irrigation construction projects in PidieRegency partially. Significant relationships are marked on factors that have a significant value <0.05 (5%). The value of Sig. on material factors, labor factors, environmental factors, change factors, relations with government factors, contract factors, time and control factors, and partial implementation method factors obtained by the Sig. 0.000 <0.05, the equipment factor is obtained by Sig. 0.001 <0.05, while the financial factors obtained by the value of Sig. 0.007 <0.05. Simple correlation analysis also shows that the initial hypothesis is proven, where all the delay factors that are reviewed partially have a significant relationship to the costs of implementing the irrigation construction project in Pidie Regency

IV. CONCLUSIONS

Based on the results and discussion of the analysis of the relationship of the delay factors to the cost of implementing the irrigation construction project in Pidie Regency, the following conclusions can be drawn:

1. Factors causing delays in the implementation of irrigation construction projects in Pidie Regency were labor factors with a mean of 4.470, a method of implementation method with a mean of 4.259, a change factor with a mean of 4.164, a material factor with a mean of 4.045, a time factor and a control factor with a mean of 4.039, a factor equipment with a mean of 4.022, a financial factor with a mean of 3.952, and a contractual factor with a mean of 3,933.

2. Contract factors have a very high level of closeness, change factors, labor factors, environmental factors, relations with government factors, and time and control factors have a high level of closeness, implementation method factors, material factors, and equipment factors have a sufficient level of closeness , while financial factors have a low level of closeness to the cost of implementing irrigation construction projects in Pidie Regency, with Spearman correlation coefficients each obtained 0.828, 0.759, 0.691, 0.676, 0.676, 0.612, 0.512, 0.580, 0.520, and 0.334.

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