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Research Paper

Analysis of Factors Affecting Delays in the Construction of the KIR Building Bontang City

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Abstract
Along with the development of the industrial world, in particular, building construction projects are also increasing rapidly, and the level of difficulty in managing and running a building construction project is increasing. The higher the difficulty, the longer the duration of time needed to complete the project. The delay in carrying out the work was proven by the existence of a work package for the KIR Building Construction project in Bontang City. So this research was conducted to determine the factors that influence project delays. The data analysis method used is factor analysis and multiple linear regression analysis of the answers to the questionnaires which were distributed to 45 respondents from the Service Users, Contractors, and Consultants involved in the KIR Building Construction project in Bontang City, which experienced project delays. Based on the results of the study, the factors that significantly influence project delays are the Work Implementation Method Factor with a value of count = 3.162 > from table = 2.028, based on the t-test the most dominant factor is the Work Implementation Method factor ß = 0.646 and the strategy used to overcoming delays is that before the work starts, you have to prepare an implementation schedule according to the rational stages of work and implementation must follow the rational stages of work and implementation must follow the planned method.

Keywords: *Project Delay, Project Implementation, Project Scheduling, and Project Strategy*

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I. Introduction

Along with the development of the industrial world, in particular, building construction projects are also increasing rapidly, and the level of difficulty in managing and running a building construction project is increasing. The higher the difficulty, the longer the duration of time needed to complete the project.

Therefore, an understanding of the timing of project implementation is very much needed here, which requires increasing the efficiency and effectiveness of project management to achieve maximum results from available resources. All of that is to achieve the objectives of a building construction project that meets the criteria of time (schedule), as well as cost (budget) and quality (quality).

In addition to time management, of course, it must also be followed by good project implementation and by the plan. With time management and good implementation, the risk that a building construction project will experience delays is small. This will directly reduce the increase in the project budget, and in the end, will provide distinct benefits for the contractors as the person in charge of project implementation.

At present many building projects have poor performance for timely completion, so an analysis is needed of the factors that influence the delay in the implementation of building projects in contractor companies so that weaknesses can be identified so far, which can later become input for contractors, to be even better in implementing a building project.

In this case, the author takes the activities of the KIR Building Construction Work Project, a building project located in Bontang City, East Kalimantan Province in 2022, where this facility will function as a means of testing motorized vehicles or commonly called the KIR UJI, which is a series of testing activities, checking motorized vehicle components, trucks, pick-ups, and other public transportation. To comply with the technical requirements and roadworthy.

Because of that, an analysis of the factors that influence delays is needed to integrate all available resources to be able to arrange a schedule correctly to produce an effective and efficient schedule, so that the project is completed on time.

Analysis of these factors is necessary so that the contractor company can minimize the risk of delays in the completion of construction projects which result in penalties and termination of contracts unilaterally by the owner and even a black list. In the implementation of building projects, there are often obstacles faced by companies so far, so it is necessary to look for or examine these obstacles as input for contractors to improve better methods and avoid the possibility of non-excusable delays (delays caused by contractor errors) in their projects.

II. Research Methods

In this study, the research design to be used is quantitative research. Quantitative research according to Sugiyono, (2017) can be interpreted as a research method based on the philosophy of positivism, used to research certain populations or samples, data collection uses research instruments, data analysis is quantitative/statistical, intending to test the hypotheses that have been used. This research was conducted using associative quantitative research. Sampling was carried out in this study using a questionnaire distributed to 120 respondents. The criteria for this study are the voters of the candidates for the DPRD Kota Kediri. Questionnaires were distributed by researchers using online distribution using Google Forms which was distributed to Brightindo customers. The measurement scale used by the researcher is a five-point Likert scale which consists of several question items. This study uses data obtained from primary data, namely data obtained directly from the questionnaire. The data collection technique uses a Likert scale, namely: SS (Strongly Agree) is given a score of 5, S (Agree) is given a score of 4, and N (Neutral) is given a score of 3. TS (Disagree) is given a score of 2, and STS (Strongly Disagree) is given a score of 1.

III. Results and Discussion

1. Instrument Test and Classical Assumption Test

The results of the instrument test show that the validity test of the questionnaire is valid because it has a larger r count than the r table. While the reliability test shows that all indicators of each variable are reliable because they have a Cronbach's alpha value which is above the minimum value.

Then based on the factor analysis carried out for all variables declared can be used for this study. While the classical assumption test consists of a normality test, non-multicollinearity test, homoscedasticity test, and non-autocorrelation. The normality test results show that the research data is normally distributed because it has an asymp value greater than 0.000. While the non-multicollinearity test shows that there is no multicollinearity in this model because each independent variable in the study has a VIF value < 10 and a tolerance value > 0.10.

The homoscedasticity test in this study can be said to have no homoscedasticity problem if each independent variable has a Sig value > 0.05. Based on the results of the homoscedasticity test, *a p-value* of 1,000 was obtained, this indicates that the assumption of homoscedasticity has been fulfilled. the Durbin-Watson statistical value (dW) of 2,215 is between dU = 1,776 and 4-dU = 2,224 so it can be concluded that there is no autocorrelation, meaning that the assumption of non-autocorrelation in the regression has been fulfilled. (Ghozali, 2013: 105) .

a. Multiple Linear Regression

The hypothesis test consists of multiple linear regression tests, T-tests, F-tests, and the coefficient of determination.

Table 1. Multiple Linear Regression

Variable	β coefficient	t_{count}	*P-values*	Information
Constant	1,351	1,816	0.078	Not significant
Finance (X1)	0.148	.451	.655	Not significant
HR (X2)	0.102	0.219	0.828	Not significant
Job Scheduling Method (X3)	- 0.368	-0,730	.470	Not significant
Work Implementation Method (X4)	0.646	3,162	0.003	Significant
Design Changes (X5)	0.325	0.695	0.491	Not significant
Materials (X6)	0.0 01	0.001	0.999	Not significant
Equipment (X7)	-0.125	-0,277	0.783	Not significant
Construction K3 Control (X8)	0.006	0.013	.990	Not significant
α = 0.05				
R^2 = 0.303				
R = 0.550				
F-count = 2, 954				
F-table (0.05, 8,3 6) = 2. 210				
p-value = 0.0 81				
t-table (0.05,3 6) = 2.028				

Source: Processed Primary Data, 2022

Based on the table above it can be explained that with the regression model, the results of multiple regression can be explained as follows:

a. Constant value (a) = 1.351 If the independent variable is 0 (zero), then the value of the dependent variable, namely the delay (Y) in the construction of the Bontang City KIR building is 0.855 and the independent variable is 0 (zero).

b. b1 = 0.148 The regression coefficient is positive, which means that if the Financial Method Factor is getting worse, there will be an increase in project delays.

c. b2 = 0.102 The regression coefficient is positive, which means that if the HR factor is getting worse, there will be an increase in project delays.

d. b3 = 0.368 The regression coefficient is negative, which means that if the Worker Scheduling Method Factor gets better, there will be a decrease in project delays.

e. b4 = 0.646 The regression coefficient is positive, which means that if the Employee Implementation Method Factor is getting worse, there will be an increase in project delays.

f. b5 = 0.325 The regression coefficient is positive, which means that if the Design Change Factor is slower, there will be an increase in project delays.

g. b6 = 0.001 The regression coefficient is positive, which means that if the material factors are good and available, there will be a decrease in project delays.

h. b7 = -0.125 The regression coefficient is negative, which means that if the Equipment Factor is getting better, there will be a decrease in project delays.

i. b8 = 0.006 The regression coefficient is positive, which means that if the K3 Construction Control Factor is available according to its function, there will be a decrease in project delays.

The value of R 2 is the coefficient of determination which measures how far the regression model's ability to explain the diversity of the dependent variable (Y) is equal to 0.303. This means that the regression model obtained can explain 30.3% of the variety of project delay variables (Y). The R-value is a correlation that explains the closeness of the relationship between the independent variable (X) and the dependent variable (Y) of 0.550. Then, to determine the independent variable (factor) that has the most dominant influence on the influencing factors and the most dominant factors influencing delay, it can be done by comparing the value of the coefficient β of each independent variable (factor) on delay. The variable that has the most dominant effect on delay is the variable that has the greatest influence and has the greatest β coefficient value.

b. Test F

Table 2. Test F

Test the Regression Model Simultaneously

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1.	Regression	10.658	8	1.332	2.954	.081[a]
	Residual	24.542	36	0.682		
	Total	35.200	44			

a. Predictors : (Constans), Peralatan, Keuangan, Metode Penjadwalan Pek., SDM, Metode Pelaksanaan Pek., Perubahan desain, Material, Pengendalian K3 Konstruksi

b. Dependent variabel : Keterlambatan Proyek

Source: SPSS analysis

Source: Processed Primary Data, 2022

The hypothesis used in testing the regression model coefficients simultaneously can be seen in Table 2 as follows:

c. T-test

Table 3. Test T

Test the Regression Model Hypothesis Simultaneously

hypothesis	Mark	Decision
$H_{0:} \beta_{i=} 0$ (there is no significant effect between X1, X2, X3, X4, X5, X6 , X7 and X8 on delay) $H_{a:} \beta_{I} \neq 0$ (there is a significant influence between X1, X2, X3, X4, X5, X6, X7, and X8 delay) $\alpha = 0.05$	F = 2.954 _ *p-value* = 0.0 81 F_{table} = 2, 21 0	Reject $_{H0}$

Source: Processed Primary Data, 2022

Based on Table 3, testing the regression model hypothesis simultaneously or simultaneously using the F test. In the F distribution table, the $F_{table\ values}$ with *degrees of freedom* (df) n1 = 8 and n2 = 36 are 2 . 21 0. If the calculated F value in Table 4.20 is compared with the F_{table}, then $F_{calculated}$ calculation result is greater than the F_{table} (2,954 > 2.21 0). In addition, table 4.20 also obtained a *p-value* of 0.0 81. If *the p-value* is compared to *a* = 0.05 then *the p-value* is less than *a* = 0.05. From the two comparisons, it can be concluded that Ho is rejected at the level of *a* = 0.05. So it can be concluded that there is a significant effect simultaneously between Xl, X2, X3, X4, X5, X6, X7, and X8 on project delays.

Based on Table 3 it can be explained that the results of the T-test are as follows:

a. Financial Factors (Xl)

Based on the table above, the Finance variable (X1) has a regression coefficient of 0.148. With the help of SPSS software, a t-test statistic of 0.451 was obtained with a p-value of 0.081. The value of the t-test statistic is greater than the t_{table} (0.451 <2.028) and also the p-value is greater than $\alpha = 0.05$. So it can be concluded that the financial variable (X1) has no significant effect on delays in the construction of the KIR Building in Bontang City

b. HR Factor (X2)

Based on the table above, the HR variable (X2) has a regression coefficient of 0.102. With the help of SPSS software, a t-test statistic of 0.219 was obtained with a p-value of 0.081. The value of the t-test statistic is greater than the t_{table} (0.219 <2.028) and also the p-value is greater than $\alpha = 0.05$. So it can be concluded that the HR variable (X2) has no significant effect on the delay in the KIR Building Construction project in Bontang City.

c. Job Scheduling Method Factor (X3)

Based on the table above, the Job Scheduling Method variable (X3) has a regression coefficient of -0.368. With the help of SPSS software, the t-test statistic was -0.730 with a p-value of 0.081. The value of the t-test statistic is greater than the t_{table} (-0.730 <2.028) and also the p-value is greater than $\alpha = 0.05$. So it can be concluded that the Job Scheduling Method variable (X3) has no significant effect on the delay in the KIR Building Construction project in Bontang City.

d. Work Implementation Method Factor (X4)

Based on the table above, the Job Implementation Method variable (X 4) has a regression coefficient of 0.646. With the help of SPSS software, a t-test statistic of 3.162 was obtained with a p-value of 0.081. The value of the t-test statistic is greater than the t_{table} (3.162 > 2.028) and also the p-value is greater than $\alpha = 0.05$. So it can be concluded that the variable Work Implementation Method (X 4) has a significant effect on delays in the construction of the KIR Building in Bontang City.

e. Design Change Factor (X5)

Based on the table above, the variable Design Change (X 5) has a regression coefficient of 0.325. With the help of SPSS software, the t-test statistic was 0.695 with a p-value of 0.081. The value of the t-test statistic is greater than the t_{table} (0.695 <2.028) and also the p-value is greater than $\alpha = 0.05$. So it can be concluded that the variable Design Change (X 5) has no significant effect on the delay in the KIR Building Construction project in Bontang City.

f. Material Factor (X6)

Based on the table above, the material variable (X 6) has a regression coefficient of 0.001. With the help of SPSS software, a t-test statistic of 0.001 was obtained with a p-value of 0.081. The value of the t-test statistic is greater than the t_{table} (0.001 <2.028) and also the p-value is greater than $\alpha = 0.05$. So it can be concluded that the material variables (X 6) have no significant effect on the delay in the KIR Building Construction project in Bontang City.

g. Equipment Factor (X7)

Based on the table above, the equipment variable (X 7) has a regression coefficient of -0.125. By using SPSS software, a t-test statistic was -0.114 with a p-value of 0.081. The value of the t-test statistic is greater than the t_{table} (-0.114 <2.028) and also the p-value is greater than $\alpha = 0.05$. So it can be concluded that the material variable (X 6) has no significant effect on the delay in the KIR Building Construction project in Bontang City.

h. Construction K3 Control Factor (X 8)

Based on the table above, the variable K3 Construction Control (X 8) has a regression coefficient of 0.006. With the help of SPSS software, a t-test statistic of 0.013 was obtained with a p-value of 0.081. The value of the t-test statistic is greater than the t_{table} 0.013 <2.028) and also the p-value is greater than $\alpha = 0.05$. So it can be concluded that the variable K3 Construction Control (X 8) has no significant effect on delays in the KIR Building Construction project in Bontang City.

IV. Discussion

Based on the results of the regression analysis, it was found that the Job Scheduling Method Factor and the Work Implementation Method Factor were factors that had a significant effect according to (Table 4. 20), while the factors that had an insignificant effect were Financial Factors, HR Factors, Change Factors Design, Material Factors, Equipment Factors, and K3 Construction Control. Furthermore, the factors that significantly influence the delay are the Factors of the Work Implementation Method which are the result of the reduction of the manifest variables which consist of Implementation Stages not by the provisions (X4.1), Work implementation approaching the end of the year (X4.2) and Implementation work does not comply with technical specifications (X4.3).

Next, we will discuss the strategies used against these factors t h a t significantly affect the delay.

The Strategy Used Against Factors Implementation Methods works n.

Factor Method Implementation Work is a variable Whose own β coefficient value is the second largest after the Implementation Method factor Work. That is, the delay is also influenced by the Work Implementation Method Factor. Sequences of indicators Which most affecting delays in the Work Implementation Method Factor can be seen in Table 4.2 1 . as follows

Table 4.2 1
Community Test on Job Scheduling Method Factors

Manifest Variable	Information	Communal Value
X4.1	The stages of implementation are not by the provisions	0.300 _
X4. 2	The execution of the work does not comply with the technical specifications	0.521 _
X4. 3	The implementation of the work is approaching the end of the year	.458 _

Source: Processed Primary Data, 2022

From Table 4.2 1 it is known that the indicator of the factor of the Work Implementation Method that most dominantly influences Delay is the execution of work not according to technical specifications (X4 . 2) with communal value as big 0 . 521, so strategy Which used to overcome this are technical Directors, supervisory consultants, Quality Control must be careful in each stage of implementation with the correct administrative procedures, contractors must use requests in each stage of work.

Table 4.2 2
Summary of Strategies for Overcoming Delays Bontang City KIR Building Project

Factor	Problem	Strategy
Work Implementation Methods	The stages of implementation are not by the provisions	The stages of implementation must follow the planned schedule so that there is no excess or shortage of workload, and continue to control the progress of the work planned in the implementation schedule
	The implementation of the work is approaching the end of the year	Before announcing the government jobs package should take into account that the implementation period will be carried out carefully and measurably so that there are no delays due to the implementation time being adjusted to the remaining time until the final budget deadline.
	The implementation of the work is not by technical standards	Contractors generally seek big profits so they often ignore quality and quality, so technical Directors, supervisory consultants, and *Quality Control* must be careful at each stage of implementation with correct administrative procedures, and contractors must use requests at each stage of work.

Source: Processed Primary Data, 2022

V. Conclusion

Based on the results of the research and discussion that have been described in the previous chapter, it can be concluded that from the results of the F test, it was found that factors simultaneously affected the delay in the implementation of the KIR Building Construction project in Bontang City, F count $_{=}$ 2.954 > F $_{table}$ = 2.028. However, from the partial results of the t-test, the factors that affect the delay in the implementation of the KIR Building Construction project in Bontang City are the Work Implementation Method Factor with a coefficient value of t $_{count}$ = 3.162 > t $_{table}$ = 2.028.

1. The most dominant factor affecting the delay in the implementation of the KIR Building Construction project in Bontang City is the Work Implementation Method with a Coefficient value β of 0.646.
2. The strategies used to overcome delays in the implementation of the KIR Building Construction project in Bontang City are:

a. The stages of implementation must follow the planned schedule so that there is no excess or shortage of workload, and continue to control the progress of the work planned in the implementation schedule.

b. Technical directors, supervisory consultants, and *Quality Control* must be careful in every stage of implementation with correct administrative procedures, contactors must use requests in each stage of work.

Before announcing the work package, the government should take into account the implementation period to be carried out carefully and measurably, so that there are no delays because the implementation time is adjusted to the remaining time until the final budget deadline.

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