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The Effect of Communication on Supply Chain Management Performance on Construction Projects in Jakarta

The Effect of Communication on Supply Chain Management Performance on Construction Projects in Jakarta

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Abstract. The information flow has a positive influence on the performance of a supply chain where if there is a miss communication, it can risk causing construction delays and causing problems such as delayed delivery from suppliers, poor decision making between the two parties, and many more, where good communication and coordination are needed for all those involved in the supply chain so that the maximum results are obtained in the process. This study aims to determine the effect of communication on supply chain performance in the construction industry. The sample in this study amounted to 53 respondents who were directly involved in 4 projects classified B1 and B2 in Jakarta. Data collection was done by using a questionnaire. The data processing technique in this study is multiple regression analysis. Based on the results of research conducted using the SPSS application, where all independent variables have a significant effect either partially or simultaneously on supply chain performance. From the results of R square, the independent variable in this study has an influence of 51.7% on supply chain performance.

1. Introduction

The increasingly fierce competition in the construction world for construction service providers also increases customer expectations for maximum results so that service providers strive to improve the quality of company performance. The imbalance that occurs is caused by the increasing number of existing contractors, which is inversely proportional to the number of projects. This condition makes service providers try to defend their company from the tight competition. From these conditions trigger service users in choosing the right service provider to arrange everything needed. In this competition, a mature strategy is needed to deal with it. The strategy to deal with this competition is to create beneficial cooperation between the parties involved in the construction to achieve common goals. Using the supply chain management method can be a solution to the problem of product delivery to end users [1].

The efficiency of the supply chain can make the competitiveness of a company that is a part of it get high competitiveness, an increase in project costs can be caused by poor supply chain results [2]. In the process of construction involving various parties, if supply chain management involves various parties (contractors, subcontractors, suppliers) can create significant efficiencies in terms of cost reduction.

In the results of research conducted [3] regarding the effect of the supply chain on contractor performance in Banten and DKI Jakarta provinces, it is stated that the flow of information has a positive influence on the performance of a supply chain where if there is a communication error it can cause the project to be delayed. If an error occurs in communication, it can also cause several problems such as delayed delivery from suppliers, poor decision-making between the two parties and many more. Previous research stated that effective communication to all involved in the supply chain has helped companies to grow because product process monitoring is made fast and efficient. In addition, tracking product orders will be easier because the communication system is reliable. A series of orders are not delayed because effective communication helps the company to deliver orders on time. Also, good communication contributes to positive decision-making. Good communication has enabled companies and their partners as well as buyers to share useful information [4].

From the results of the discussion that has been discussed above, it is necessary for good communication and coordination among all those involved in the supply chain so that the process gets maximum results and can increase the success of a construction project. So the author wants to conduct research related to the effect of communication on the supply chain performance of construction projects in Jakarta.

2. Research Methodology

This study intends to determine the effect of communication on the supply chain performance of construction projects in Jakarta. This research was conducted using a survey method. The survey study design is to describe certain characteristics of a large group of people, objects or institutions, through a questionnaire [4]. Descriptive studies collect data to answer questions about the current status of a subject or topic of study. In this survey research design, it has an important role to allow data collection from respondents to be used as a representative sample of the population as a whole.

2.1. Sample

The population in this study are several construction projects with project values above 15 M with the classification of contractors B1 and B2, both private and government in Jakarta. The research sample consists of workers at contracting companies involved in supply chain management on several projects in Jakarta. The researcher used the purposive sampling technique for sampling. In this study, 53 samples were used.

2.2. Variable

In this study, variables were obtained to determine the impact of communication on supply chain management performance in construction projects. Where the independent variables of communication influence are coordination relationships, communication skills, media and technology facilities, and supply chain management performance is the dependent variable.

2.3. Data Analysis

The primary data collection tool for this study was a 5-point Likert scale questionnaire. To see the relationship or influence of the relationship between coordination, communication skills, and media and technology facilities, we can use multiple linear regression analysis. Since there are several independent variables in this study, multiple linear analysis methods will be used.

3. Result and Discussion

Based on the results of the questionnaire distribution, there were 53 respondents from several projects in Jakarta with the number of respondents from the Becakayu Toll Road Ramp On Off Project there were 17 people , a percentage of 32%, the Cleon Park Apartment Project there were 9 people with a percentage of 17%, the HPL 4 Flats project there were 17 people with a percentage of 32%, and the IT Mandiri Tower Project there are 10 people with a percentage of 19%.

3.1. Based on Level of Education

Based on the level of education, the results are as follows, the number of respondents with high school/vocational education is 5 people with a percentage of 10%, respondents with a D3/D4 education is 1 person with a percentage of 2%, respondents with an undergraduate education are 42 people with a percentage of 79%, respondents with master's education are 5 people with a percentage of 9%.

3.2. Based on the Position

Based on the position, the results are as follows, 3 respondents with Project Manager position, 1 respondent with SE position, 1 respondent with CM position, 1 respondent with technical head position, 1 respondent with warehouse head position, 1 respondent with commercial head position, 1 respondent with project control coordination position, 8 respondents with quantity surveyor positions, 5 respondents with quality control positions, 1 respondent with ME implementing position, 3 respondents with contract administrator position, 1 junior architect position, logistics position 4 people, 11 engineering positions, 2 site engineering positions, 1 planning and monitoring position, and 7 executives.

3.3. Validity Test

The purpose of the validity test is to measure whether the data comes from a valid questionnaire or not. This validation test is carried out by measuring the correlation between each variable and the number of variables. An item can be said to be valid if the value of r value > r table (n = 53 with a significance value of 5% (0.05) obtained r table of 0.2656), other than that, it is declared invalid.

Table 1. Validity X

	Question Items	r	Significant	Category
X1	X1.1	0.854	0	Valid
	X1.2	0.845	0	Valid
X2	X2.1	0.677	0	Valid
	X2.2	0.717	0	Valid
	X2.3	0.734	0	Valid
	X2.4	0.652	0	Valid
	X2.5	0.768	0	Valid
X3	X3.1	0.813	0	Valid
	X3.2	0.813	0	Valid
	X3.3	0.444	0	Valid
	X3.4	0.594	0	Valid
	X3.5	0.547	0	Valid

Table 2. Validity Y

	Question Items	r	Significant	Category
Y	Y1	0.965	0	Valid
	Y2	0.914	0	Valid
	Y3	0.941	0	Valid
	Y4	0.903	0	Valid

The conclusion from the test results above is that the calculated r value for all question items is greater than r table (0.2656), with a significant value of less than 0.05. In this case, the communication influence variable and supply chain performance variable are said to be valid.

3.4. Reliability Test

This test function is designed to determine how stable a person's response is over time. Cronbach's Alpha coefficient is used as a reference in this test, it is considered reliable if the Cronbach's Alpha factor value is greater than 0.6.

Table 3. Reliability

Question Items	Cronbach's Alpha Values	Cronbach's Alpha Minimum Values	Category
X1	0.614	0	Reliable
X2	0.769	0	Reliable
X3	0.723	0	Reliable
Y	0.948	0	Reliable

The conclusion from the results above is that the Cronbach alpha coefficient value for all variables has a value above 0.6, indicating that the question items in this study are reliable.

3.5. Correlation Test

This test is conducted to determine whether there is a correlation between variables. Where in this study, the variables studied were Communication (X) and Supply Chain Performance (Y).

Table 4. Correlation Test

Correlations

		Communication	Supply Chain Performance
Communication	Pearson Correlation	1	.667**
	Sig. (2-tailed)		0
	N	53	53
Supply Chain Performance	Pearson Correlation	.667**	1
	Sig. (2-tailed)	0	
	N	53	53

Based on the results of the correlation test table above where the significance value obtained is 0.00, which is smaller than 0.05, the two variables are correlated. The Pearson Correlation value obtained in this study is 0.667 which means that the correlation between the two variables is strongly correlated.

3.6. Classic Assumption Test

3.6.1 Normality Test. To test the normality assumption using standardized residual values or plotting the residual values in the P-P plot image, it is shown whether the residual plot forms a pattern that approaches the diagonal line and spreads around the straight diagonal line. This pattern indicates that the residuals have a normal distribution, as we can see in the picture below.

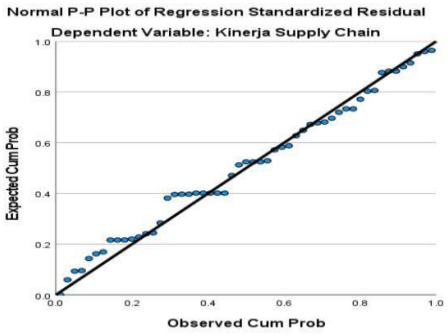

Figure 1. P-P Graph Plot Normality Assumption Test

3.6.2 Multicollinearity Test. Studies investigating whether there is multicollinearity can look at the value of the Variance Inflation Factor (VIF). A VIF value above 10 indicates the presence of multicollinearity, and conversely, a VIF value below 10 indicates the absence of multicollinearity. Also, if the tolerance is greater than 0.1, there is no multicollinearity.

Table 5. Multicollinearity Test
Coefficients[a]

Model	Unstandardized Coefficients Beta	Std Error	Standardized Coefficients Beta	t	Sig
1 (constant)	-2.480	3.020		-0.821	0.416
X1	0.768	0.260	0.347	2.953	0.005
X2	0.404	0.116	0.415	3.480	0.001
X3	0.231	0.101	0.237	2.300	0.006

The conclusion from the results of the multicollinearity test above is that the relationship between coordination, communication skills, media facilities, and technology has a Tolerance Value above 0.1 and the VIF value for each indicator is less than 10. So the assumption of no multicollinearity has been met.

3.6.3 Heteroscedasticity Test. The heteroscedasticity test in this study uses the glejser test method, which is free from heteroscedasticity problems if the significance value is greater than 0.05

Table 6. Glejser Test

	Unstandardized Coefficients		Standardized Coefficients		
Model	Beta	Std Error	Beta	t	Sig
1 (constant)	-0.271	1.963		-0.138	0.891
X1	0.179	0.169	0.177	1.059	0.295
X2	-0.022	0.075	-0.049	-0.290	0.773
X3	0.007	0.065	0.017	0.114	0.910

The conclusion from the results of the glejser test above, obtained a significant value for each variable indicator is worth above 0.05. So it can be concluded that this research does not have heteroscedasticity problems in the regression model.

3.7. Multiple Linear Regression Analysis

Table 7. Coefficient of Determination
Model Summary[b]

Model	R	R Square	Adjust B Square	Std Error of the Estimate
1	0.719[a]	0.517	0.488	1.43513

From the value in the coefficient of determination table above, it is known that the R.-squared value of 0.517 means that the independent variables are coordination relationships (X1), communication skills (X2), media technology and technology (X3) on the dependent variable supply chain performance (Y)

effect of 51.7%, then the remaining 48.3% is influenced by variables other than the independent variables used in this study.

Table 8. Multiple Linear Regression Analysis
Coefficients[a]

Model	Unstandardized Coefficients Beta	Std Error	Standardized Coefficients Beta	t	Sig
1 (constant)	-2.480	3.020		-0.821	0.416
X1	0.768	0.260	0.347	2.953	0.005
X2	0.404	0.116	0.415	3.480	0.001
X3	0.231	0.101	0.237	2.300	0.006

In the results of the study above, the regression equation obtained is

$$Y= -2.480 + 0.768\ X1 + 0.404\ X2 + 0.231\ X3$$

The constant value is -2.480, meaning that if there is no change in the communication variable (X1, X2, X3 is 0) then the performance of the Supply Chain construction project in Jakarta is negative at 2.480. The regression equation above shows the relationship between the dependent variable and the independent variable, from the equation regression coefficient with a positive sign indicates that communication has a positive effect on the supply chain performance of a construction project. Good communication will make supply chain performance will also increase.

3.7.1 F-Test. To test the significance of the independent variable on the effect of the dependent variable, a simultaneous test was carried out. The F test was conducted to determine the effect of the variables simultaneously.

Table 9. F-Test
ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	108.062	3.000	36.021	17.489	<.001[b]
Residual	100.920	49.000	2.060		
Total	208.981	52.000			

The F table value is 2.79. Compared to table F, the calculated result of F is greater than that of table F (17.89 > 2.79). Compared with α = 0.05, the result of sig value is 0.000, the result is lower than α = 0.05. Based on the calculated F value and the significance value, it can be seen that H0 is rejected. So there is a simultaneous influence between the influence of communication and supply chain performance.

3.7.2 t-Test. Partial variable influence testing was carried out to find out how each independent variable which is an individual regression model has a significant effect on the dependent variable. The t table value is 2.00958.

Table 10. t-Test

Model	Unstandardized Coefficients Beta	Std Error	Standardized Coefficients Beta	t	Sig
1 (constant)	-2.480	3.020		-0.821	0.416
X1	0.768	0.260	0.347	2.953	0.005
X2	0.404	0.116	0.415	3.480	0.001
X3	0.231	0.101	0.237	2.300	0.006

• the Coordination Relationship (X1)

For the results of data processing, the value of the t count is 2,953. This value is higher than the t table value of 2.0958 (2.953 > 2.00958), for a significant value it is 0.005 lower than 0.05. This test concludes that H0 is rejected and Ha is accepted, so the Coordination Relationship has a significant effect on Supply Chain Performance.

• Communication Ability (X2)

For the results of data processing, the t-count value is 3.48. This value is higher than the t table value of 2.0958 (3.48 > 2.00958), for a significant value it is 0.000 which is lower than 0.05. This test concludes that H0 is rejected and Ha is accepted, so Communication Ability has a significant effect on Supply Chain Performance

• Media and Technology Facilities (X3)

The results of data processing obtained a t-value of 2,300. This value is higher than the t table value of 2.00958 (2.300 > 2.00958), for a significant value it is 0.025 which is lower than 0.05. This test concludes that H0 is rejected and Ha is accepted, so Media and Technology Facilities have a significant effect on supply chain performance.

3.8. Dominant Variable

To find out the communication influence variable with the most dominant influence on the supply chain performance of a construction project, we need to compare the regression coefficients (Beta) between each variable.

Table 11. Dominant Variable

Variable	Standardized Coefficients Beta	Category
X1	0.347	
X2	0.415	Dominant
X3	0.237	

The conclusion is that Communication Ability (X2) is the most dominant aspect of communication influence in influencing the supply chain performance of construction projects.

4. Conclusion

The multiple linear regression analysis that has been done proves that all communication variables have a significant effect on supply chain performance (Y), as evidenced by the regression coefficient obtained was greater than the T table (1.675). The R Square value of 0.517 means that the independent variables of coordination relationship (X1), communication skills (X2), media and technology facilities (X3) on supply chain performance (Y) are 51.7% and the remaining 48.3% influenced by other variables apart from the independent variables of this study. In simultaneous testing, it can be concluded that there is a significant influence between communication and supply chain performance on a construction project in Jakarta, where this is evidenced by the calculated F value which has a value greater than the F table value (17.489 > 2.79), and significance value below than 0.05. Partially it is known that each independent communication variable (coordination relationship, communication ability, and media and technology facilities) forms an individual linear regression model on supply chain performance on construction projects in Jakarta. So it can be concluded from this study that there is an influence between communication on the supply chain performance of a construction project in Jakarta, either simultaneously or partially. The results of this study are in line with previous research and are more complete where there are other independent variables added so that it strengthens that communication has a positive influence on supply chain performance. Where the better or the effectiveness of communication, both in terms of coordination relationships, communication skills, or in terms of communication technology, the better the performance of the supply chain of a construction project.

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1. Introduction

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The primary data collection tool for this study was a 5-point Likert scale questionnaire. To see the relationship or influence of the relationship between coordination, communication skills, and media and technology facilities, we can use multiple linear regression analysis. Since there are several independent variables in this study, multiple linear analysis methods will be used.

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	X3.4	0.594	0	Valid
	X3.5	0.547	0	Valid

Table 2. Validity Y

	Question Items	r	Significant	Category
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	Y2	0.914	0	Valid
	Y3	0.941	0	Valid
	Y4	0.903	0	Valid

The conclusion from the test results above is that the calculated r value for all question items is greater than r table (0.2656), with a significant value of less than 0.05. In this case, the communication influence variable and supply chain performance variable are said to be valid.

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Based on the results of the correlation test table above where the significance value obtained is 0.00, which is smaller than 0.05, the two variables are correlated. The Pearson Correlation value obtained in this study is 0.667 which means that the correlation between the two variables is strongly correlated.

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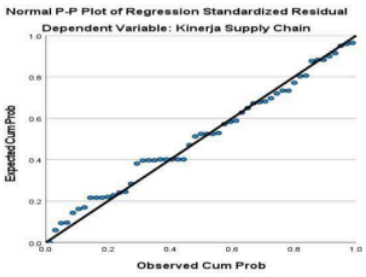

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The conclusion from the results of the multicollinearity test above is that the relationship between coordination, communication skills, media facilities, and technology has a Tolerance Value above 0.1 and the VIF value for each indicator is less than 10. So the assumption of no multicollinearity has been met.

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X1	0.179	0.169	0.177	1.059	0.295
X2	-0.022	0.075	-0.049	-0.290	0.773
X3	0.007	0.065	0.017	0.114	0.910

The conclusion from the results of the glejser test above, obtained a significant value for each variable indicator is worth above 0.05. So it can be concluded that this research does not have heteroscedasticity problems in the regression model.

3.7. Multiple Linear Regression Analysis

Table 7. Coefficient of Determination
Model Summary[b]

Model	R	R Square	Adjust B Square	Std Error of the Estimate
1	0.719[a]	0.517	0.488	1.43513

From the value in the coefficient of determination table above, it is known that the R.-squared value of 0.517 means that the independent variables are coordination relationships (X1), communication skills (X2), media technology and technology (X3) on the dependent variable supply chain performance (Y)

effect of 51.7%, then the remaining 48.3% is influenced by variables other than the independent variables used in this study.

Table 8. Multiple Linear Regression Analysis
Coefficients[a]

Model	Unstandardized Coefficients Beta	Std Error	Standardized Coefficients Beta	t	Sig
1 (constant)	-2.480	3.020		-0.821	0.416
X1	0.768	0.260	0.347	2.953	0.005
X2	0.404	0.116	0.415	3.480	0.001
X3	0.231	0.101	0.237	2.300	0.006

In the results of the study above, the regression equation obtained is

$$Y= -2.480 + 0.768\ X1 + 0.404\ X2 + 0.231\ X3$$

The constant value is -2.480, meaning that if there is no change in the communication variable (X1, X2, X3 is 0) then the performance of the Supply Chain construction project in Jakarta is negative at 2.480. The regression equation above shows the relationship between the dependent variable and the independent variable, from the equation regression coefficient with a positive sign indicates that communication has a positive effect on the supply chain performance of a construction project. Good communication will make supply chain performance will also increase.

3.7.1 F-Test. To test the significance of the independent variable on the effect of the dependent variable, a simultaneous test was carried out. The F test was conducted to determine the effect of the variables simultaneously.

Table 9. F-Test
ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	108.062	3.000	36.021	17.489	<.001[b]
Residual	100.920	49.000	2.060		
Total	208.981	52.000			

The F table value is 2.79. Compared to table F, the calculated result of F is greater than that of table F (17.89 > 2.79). Compared with $\alpha = 0.05$, the result of sig value is 0.000, the result is lower than $\alpha = 0.05$. Based on the calculated F value and the significance value, it can be seen that H0 is rejected. So there is a simultaneous influence between the influence of communication and supply chain performance.

3.7.2 t-Test. Partial variable influence testing was carried out to find out how each independent variable which is an individual regression model has a significant effect on the dependent variable. The t table value is 2.00958.

Table 10. t-Test

Model	Unstandardized Coefficients Beta	Std Error	Standardized Coefficients Beta	t	Sig
1 (constant)	-2.480	3.020		-0.821	0.416
X1	0.768	0.260	0.347	2.953	0.005
X2	0.404	0.116	0.415	3.480	0.001
X3	0.231	0.101	0.237	2.300	0.006

• the Coordination Relationship (X1)

For the results of data processing, the value of the t count is 2,953. This value is higher than the t table value of 2.0958 (2.953 > 2.00958), for a significant value it is 0.005 lower than 0.05. This test concludes that H0 is rejected and Ha is accepted, so the Coordination Relationship has a significant effect on Supply Chain Performance.

• Communication Ability (X2)

For the results of data processing, the t-count value is 3.48. This value is higher than the t table value of 2.0958 (3.48 > 2.00958), for a significant value it is 0.000 which is lower than 0.05. This test concludes that H0 is rejected and Ha is accepted, so Communication Ability has a significant effect on Supply Chain Performance

• Media and Technology Facilities (X3)

The results of data processing obtained a t-value of 2,300. This value is higher than the t table value of 2.00958 (2.300 > 2.00958), for a significant value it is 0.025 which is lower than 0.05. This test concludes that H0 is rejected and Ha is accepted, so Media and Technology Facilities have a significant effect on supply chain performance.

3.8. Dominant Variable

To find out the communication influence variable with the most dominant influence on the supply chain performance of a construction project, we need to compare the regression coefficients (Beta) between each variable.

Table 11. Dominant Variable

Variable	Standardized Coefficients Beta	Category
X1	0.347	
X2	0.415	Dominant
X3	0.237	

The conclusion is that Communication Ability (X2) is the most dominant aspect of communication influence in influencing the supply chain performance of construction projects.

4. Conclusion

The multiple linear regression analysis that has been done proves that all communication variables have a significant effect on supply chain performance (Y), as evidenced by the regression coefficient obtained was greater than the T table (1.675). The R Square value of 0.517 means that the independent variables of coordination relationship (X1), communication skills (X2), media and technology facilities (X3) on supply chain performance (Y) are 51.7% and the remaining 48.3% influenced by other variables apart from the independent variables of this study. In simultaneous testing, it can be concluded that there is a significant influence between communication and supply chain performance on a construction project in Jakarta, where this is evidenced by the calculated F value which has a value greater than the F table value (17.489 > 2.79), and significance value below than 0.05. Partially it is known that each independent communication variable (coordination relationship, communication ability, and media and technology facilities) forms an individual linear regression model on supply chain performance on construction projects in Jakarta. So it can be concluded from this study that there is an influence between communication on the supply chain performance of a construction project in Jakarta, either simultaneously or partially. The results of this study are in line with previous research and are more complete where there are other independent variables added so that it strengthens that communication has a positive influence on supply chain performance. Where the better or the effectiveness of communication, both in terms of coordination relationships, communication skills, or in terms of communication technology, the better the performance of the supply chain of a construction project.

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