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Analysis of the Influence of Project Communication Management on Owner Decision to Improve Implementation Time Performance in High-Rise Building Construction Projects

Aris Muhaemin, Agus Suroso

Master of Civil Engineering, Mercu Buana University, Jakarta, INDONESIA

E-mail: amrih8100@gmail.com, agus.suroso66@gmail.com

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ABSTRACT

Building high-rises is one example of a property business sector construction project involving various interested parties. The issue that high-rise building construction projects frequently encounter at PT X as the property developer prevented the intended completion date from being met. In high-rise building construction projects, this study examines how owner decisions affect implementation time performance based on project communication management. This study used multiple regression analysis with SPSS and SemPLS, and the sample size consisted of 80 respondents. According to the research findings, project communication management positively and significantly influences owner decisions in high-rise building construction projects; owner decisions also positively and significantly influence contractor performance in high-rise building construction projects; and owner decisions positively and significantly influence consultant performance in building construction projects. Owner decisions about high-rise structures have a favorable and significant impact on supplier performance in high-rise building construction projects and supplier, contractor, and consultant performance. has a favorable and noteworthy impact on high-rise building construction projects' schedule performance.

Keywords: construction; communication; management; owner; decision; contractor performance.

INTRODUCTION

The property business sector such as the construction of high-rise buildings is a construction activity that involves various stakeholders. PT X is a member of the property division of one of the largest automotive component manufacturing groups in Indonesia which was established in 1973, with a business philosophy that is the key to success, namely upholding the principle of customer orientation by focusing on Quality, Cost and Delivery. The scope of PT X's activities as a member of this property division is to focus on developing office areas, infrastructure development, public facilities, providing supporting services, and making investments both directly and indirectly. With the mission of prioritizing customer satisfaction, a time management system is needed in high-rise building construction projects in order to achieve timely handover to consumers or zero delay. The problem often faced by high-rise building construction projects at PT X is the lack of coordination both in the field and written coordination between PT X as the owner and other project stakeholders such as contractors, consultants and suppliers, resulting in delays in the completion of high-rise building projects carried out by PT X as a property developer which causes the planned profit target not to be achieved. The causes of construction project delays can occur due to several factors, according to Haseeb, et al (2011) there are 4 (four) elements related to the delay of a project, namely external variables in addition to the project owner, contractor, and consultant. Then, in line with Kurniawan, et al. (2020), a number of variables that contribute to delays include weather, unforeseen events, work accidents, human resources, materials, equipment, project location, budget, and the physical characteristics of the building. Assaf and Al-Heiji (2006) state that significant issues arise for all project participants when there are delays in project completion. Project delays can result from a variety of uncontrollable factors, such as how well each project participant performs, the availability of resources, the state of the environment, the involvement of stakeholders, and the contractual communication relationships between various parties (Abd El-Razek et al, 2008; Assaf and Al-Hejji, 2006, Doloi et al, 2012)

According to Ibrahim (2011) the risk matrix of management factors of project delays is caused by poor communication in each role of the project team, lack of resources, and late decisions. In addition, according to Moungnoi et al (2001) there are several field factors that are part of the project itself that can cause project delays, one of which is the process of delivering information. Poor communication between owners, contractors, consultants and suppliers is a factor that greatly influences project completion delays (Aftab et al, 2014). A similar thing was also conveyed by Hamzah et all (2011) that poor interaction and coordination between parties can lead to poor project time performance. Unclear instructions to workers to workers at the contractor greatly affect project completion time performance in Indonesia (A. Soekiman et al, 2011).

Contractor performance can be measured by (1) Contractor financial problems (Kog, 2017) (2) Inappropriate material quality (Kog, 2017) (3) Technical constraints in the field (Mohajeri et al, 2020) (4) Improper implementation method (Agyekum-Mensah and Knight, 2016) (5) Inappropriate equipment (Idress and Shafiq, 2021) (6) Inappropriate scheduling (Alhajri and Alshibai, 2018) (7) Lack of workforce competence (Latif and Rahman, 2019) and (8) Poor work quality (Latif and Rahman, 2019)

Consultant performance is measured by (1) Delays in planning documents (Elhusseny et al, 2020) (2) Lack of quality planning documents (Elhusseny et al, 2020) (3) Incompetent consultant personnel (Zhang et al, 2020) and (5) Lack of optimal supervision (Alhajri and Alshibani, 2018) while consultant performance is measured by (1) Supplier performance in meeting delivery schedules (Wirahadikusumah et al, 2008) (2) Lead time between order and delivery (Wirahadikusumah et al, 2008) (3) Obstacles in the fabrication process that cause production to stall/stagnate (Prayoga et al, 2011) (4) Material inventory (Wirahadikusumah et al, 2008).

According to A. Hameed et al (2014) that the delay in delivering information on decisions made by the owner to contractors, consultants and suppliers is a significant factor that causes construction time overrun. Lyer and Jha (2005) explain that poor coordination at the project site is a major factor causing failure in most projects in India. Even conflicts resulting from poor communication on the part of internal owners result in late project completion (Sadi. A, 2006). Owner decision is measured by (1) Delay in payment disbursement process (Elhusseiny et al, 2020) (2) Late appointment of contractor (Juwono, 2023) (3) Request for additional/decreased work (Alhajri and Alshibani, 2018) (4) Determination of material approval (Elhusseiny et al, 2020) (5) Slow project procedure process (Ismalia et al, 2022) (6) Lack of implementation time (Asmi et al, 2019) (7) Determination of work standards (Juwono, 2023) and (8) Problems of unclear content in the contract (Tafazzoli et al, 2017)

Communication management is one of the factors in project delays, communication effectiveness is reduced when the information received between project participants is unclear, inadequate, and does not receive a timely response. The level of experience of participants, language barriers, poor documentation, conflicts of interest, and distance between communicating parties are common communication obstacles that pose a high risk of project failure due to construction disputes (Alzeraa et al, 2018). According to the book (PMBOK, 2017), project management indicators consist of: (1) Communication Management Planning, (2) Communication Management and (3) Communication Monitoring. There is a difference in the effectiveness of the communication relationship between contractors and suppliers, owners and supervisory consultants, which was more effective before the pandemic than during the pandemic. This is also supported by several studies that emphasize that the relationship between contractors, suppliers, owners, and supervisory consultants is a crucial communication relationship and plays a very important role in the sustainability of the project (Darmawan & Prasetyo, 2023). Relevant elements for a project's success include the communication flow structure, communication routes, and plans for information management and communication (Forcada et al, 2017). The building process can be enhanced by better communication and information flow, thus it's important to create a complete strategy that will support project managers in making sure that information flows more effectively. (2020, Kania) Project goals, bureaucracy, geography, and coordination all affect how much communication occurs internally across owner entities. Clear project scope, resources, deliverables, design and technology, construction management, and design management all have an effect on the caliber of internal communication inside the design entity. According to Safapour and Kermanshachi (2020), competent field labor,

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goals, constraints, the caliber of the materials and equipment, the availability of trained project managers, and equipment turnover all affect the contractor's internal communication quality.

RESEARCH METHODS

Materials

Research Methods are procedures or stages carried out sequentially, starting from the problem identification process, data collection, analysis process to problem solving, which is depicted in the research design flow diagram which can be seen in Figure 1 below.

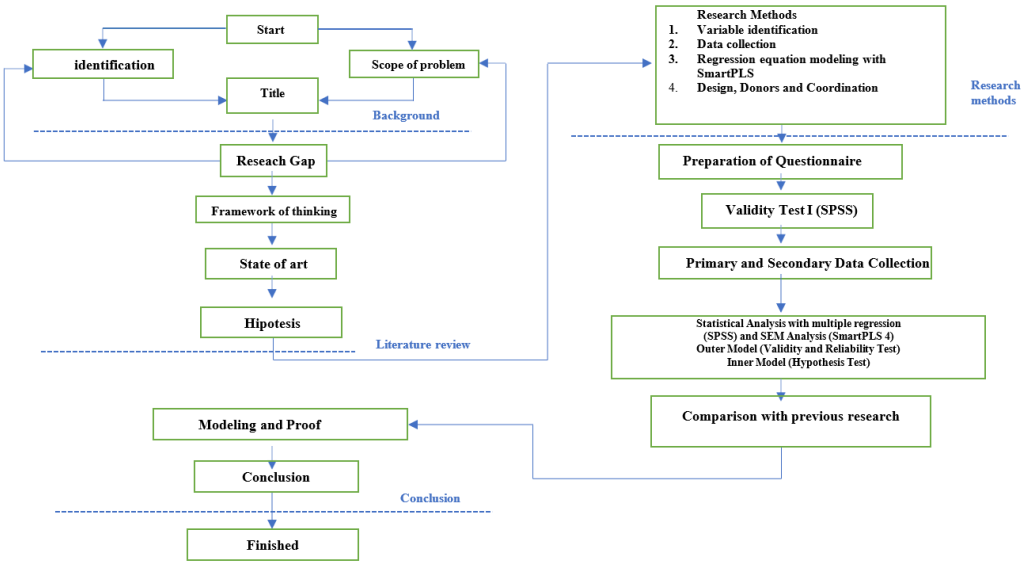

Figure 1. Flow chart

Methods

This research was conducted in May to July 2024 which was carried out on a high-rise building project currently being worked on by PT X as a developer, namely Project A (3 Towers) located in South Jakarta, Tower 1 54 Floors (225 m) functions for hotels and apartments, Tower 2 36 Floors (170 m) functions for service apartments, Tower 3 34 floors (165 m) functions for commercial offices. Project B is located in Central Jakarta, Tower 1 46 Floors functions for grade A offices. Project C, located in North Jakarta, this building is a business area which is also a shopping area. Project D is located in North Jakarta, Tower 1 30 Floors functions for Apartments, Tower 2 30 Floors Functions for Apartments, Tower 3 Functions for Offices. The research sample consisted of 80 respondents consisting of 32 contractor respondents, 21 supplier respondents, 12 consultant respondents and 12 owner respondents.

Data Analysis

Questionnaire trial with validity and reliability test with SPSS 21 research data analysis using path analysis with SemPLS 4.

RESULT AND DISCUSSION

Prior to hypothesis testing, the research data was examined for analytical requirements. The findings of the multicollinearity test showed that each variable had a tolerance value greater than 0.1 and a VIF value less than 10, indicating that there are no signs of multicollinearity. The results of the Kolmogorov-Smirnov normality test showed that the research data is normally distributed and that the study can proceed. When the results of the heteroscedasticity test show that the distribution of the data points is not patterned and the data points are distributed both above and below or around the number 0, it may be concluded that there is no heteroscedasticity problem and an optimal regression model can be created.

When determining whether or not contractors, consultants, and suppliers collectively have a major impact on the timely completion of high-rise construction projects, the F test is employed.

Table 1. F Test Results

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	539.986	3	179.995	42.587	.000[b]
	Residual	321.214	76	4.227		
	Total	861.200	79			

a. Dependent Variable: Time Performance
b. Predictors: (Constant), Supplier Performance, Contractor Performance, Consultant Performance

From the calculation results as shown in table 1 above, a significance value of 0.000 <0.05 or F count = 42.587 > F table = 2.494 was obtained. Thus, the performance of contractors, consultants and suppliers together have a significant effect on the time performance of high-rise construction projects. This means that hypothesis one (H1) which states: there is an influence between the performance of contractors, consultants and suppliers on time performance, is accepted with multiple regression equation $\widehat{Y_1} = 2,118 + 0,309X_3 + 0,472X_4 + 0,266X_5$

The outer model and inner model tests with smartPLS are described in table 2 below:

Table 2 Construct Reliability and Validity Results

Constructs	Indicators	Factor Loading	CR	CA	AVE
Communication Management (X1)	X1.1	0.934	0.918	0.913	0.852
	X1.2	0.878			
	X1.3	0.957			
Owner Decision (X2)	X2.1	0.807	0.903	0.902	0.596
	X2.2	0.832			
	X2.3	0.790			
	X2.4	0.762			
	X2.5	0.659			
	X2.6	0.769			
	X2.7	0.811			
	X2.8	0.731			
Contractor Performance (X3)	X3.1	0.764	0.912	0.905	0.603
	X3.2	0.897			
	X3.3	0.718			
	X3.4	0.730			
	X3.5	0.707			
	X3.6	0.790			
	X3.7	0.829			
	X3.8	0.758			
Consultant Performance (X4)	X4.1	0.779	0.765	0.758	0.573
	X4.2	0.736			
	X4.3	0.729			
	X4.4	0.782			
	X5.1	0.784	0.822	0.820	0.649

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Constructs	Indicators	Factor Loading	CR	CA	AVE
Supplier Performance (X5)	X5.2	0.851	0.887	0.885	0.593
	X5.3	0.761			
	X5.4	0.824			
Time Performance (Y)	Y1.1	0.720			
	Y1.2	0.723			
	Y1.3	0.765			
	Y1.4	0.851			
	Y1.5	0.773			
	Y1.6	0.753			
	Y1.7	0.798			

The loading factor value in Table 2 above appears to be greater than 0.6, suggesting that the model satisfies the criterion for convergent validity. Thus, it follows that all indicators should. Since each variable's AVE value is more than 0.5, the generated model meets the convergent validity criteria (valid). The results of the construct reliability test are shown in Table 2 as the Composite Reliability and Cronbach's Alpha values of all latent variables > 0.70. for the manifest variables of the estimated model to be considered reliable when assessing latent variables.

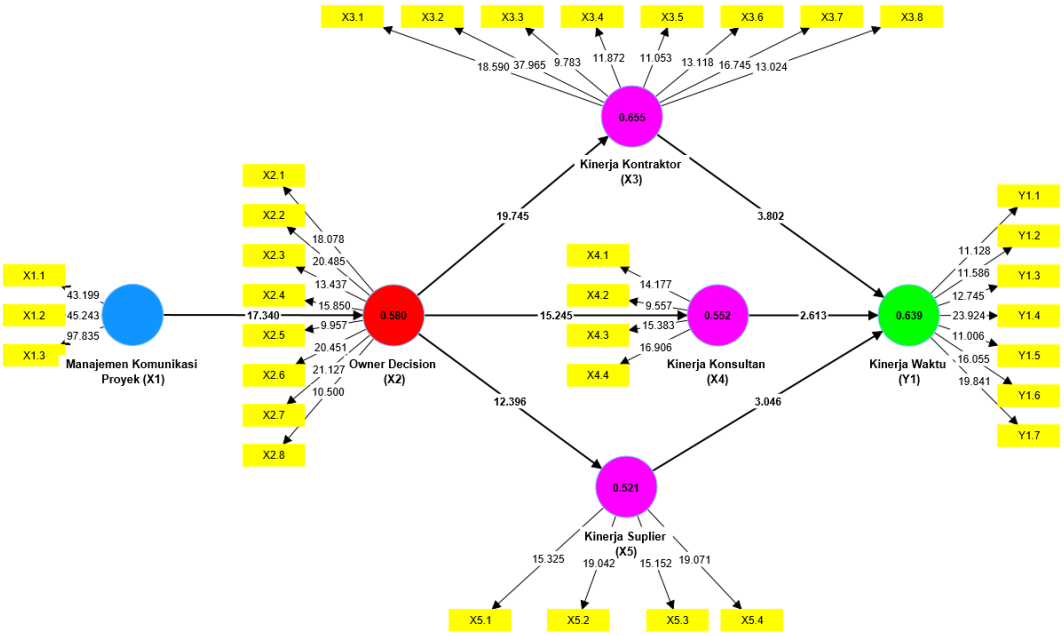

Figure 2. Path T value results

Table 3. Hypothesis Testing

Hypothesis	Original sample (O)	T statistics (|O/STDEV|)	P values	Information
Direct Influence				
Project Communication Management (X1) -> Owner Decision _(X2)	0.762	17.34	0.000	Supported
Owner Decision _(X2) -> Contractor Performance _(X3)	0.809	19.745	0.000	Supported

Hypothesis	Original sample (O)	T statistics (|O/STDEV|)	P values	Information
Owner Decision _(X2) -> Consultant Performance _(X4)	0.743	15.245	0.000	Supported
Owner Decision _(X2) -> Supplier Performance _(X5)	0.722	12.396	0.000	Supported
Contractor Performance _(X3) -> Time Performance _(Y1)	0.366	3.802	0.000	Supported
Consultant Performance _(X4) -> Time Performance _(Y1)	0.306	2.613	0.009	Supported
Supplier Performance _(X5) -> Time Performance _(Y1)	0.275	3.046	0.002	Supported
Indirect Influence				
Communication Management _Project (X1) -> Owner Decision _(X2) -> Supplier Performance _(X5)	0.55	9.258	0.000	Supported
Communication Management _Project (X1) -> Owner Decision _(X2) -> Supplier Performance _(X5) -> Time Performance _(Y1)	0.151	3.15	0.002	Supported
Owner Decision _(X2) -> Consultant Performance _(X4) -> Time Performance _(Y1)	0.228	2.696	0.007	Supported
Communication Management _Project (X1) -> Owner Decision _(X2) -> Contractor Performance _(X3) -> Time Performance _(Y1)	0.225	3.524	0.000	Supported
Owner Decision _(X2) -> Contractor Performance _(X3) -> Time Performance _(Y1)	0.296	3.739	0.000	Supported
Communication Management _Project (X1) -> Owner Decision _(X2) -> Consultant Performance _(X4)	0.566	10.437	0.000	Supported
Communication Management _Project (X1) -> Owner Decision _(X2) -> Contractor Performance _(X3)	0.616	10.44	0.000	Supported
Owner Decision _(X2) -> Supplier Performance _(X5) -> Time Performance _(Y1)	0.198	3.161	0.002	Supported
Project Communication Management (X1) -> Owner Decision _(X2) -> Consultant Performance _(X4) -> Time Performance _(Y1)	0.173	2.604	0.009	Supported

According to the test requirements, an exogenous variable is said to have a substantial influence on an endogenous variable if the t-statistic value > t-table (1.96) or the p-value < significant alpha 5% or 0.05 (Hair, 2019).

Project communication management has a significant effect on owner decision

Simple regression analysis obtained the equation of communication management on owner decision $\boldsymbol{X_2 = 6,112 + 0,741X_1}$, this shows that if project communication management increases, there is a tendency for owner decision to increase. The study's findings demonstrated that the path coefficient value of project communication management on owner decision was 0.762, and that at the p-value t-table (17.34 > 1.96), it can be concluded that project communication management significantly

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and favorably influences owner decision. These findings are consistent with Gumolili & Rantung's research from 2021. Owners make choices too late due to poor communication.

Project communication management is a key element in the success of a construction project. Effective project communication management can improve the quality of decisions made by the project owner, which ultimately contributes to the overall success of the project. Without good communication, decisions can be made based on incomplete or inaccurate information, which can negatively impact the progress of the project.

Owner Decision has a significant effect on contractor performance

Simple regression analysis obtained the equation of owner decision on contractor performance $\boldsymbol{X_3 = 7,631 + 0,824X_2}$, this shows that if the owner decision increases, there is a tendency for contractor performance to increase. The results of the study showed that the path coefficient value of owner decision on contractor performance was 0.809, then the t-statistic value> t-table (19.745> 1.96) and at p-value <significance level (0.000 <0.05), it can be concluded that owner decision has a positive and significant effect on contractor performance, the results of this study are in line with Martanti's research (2019) Improving communication and collaboration between project stakeholders, including owners, contractors, and designers, to minimize differences between project requirements and site conditions that can lead to Counter Change Orders.

The project owner's initial decision regarding the project delivery method (such as Design-Bid-Build or Design-Build) and procurement method (such as open bid or negotiated bid) can affect contractor performance. For example, the use of the Design-Build method often reduces schedule growth compared to the Design-Bid-Build method, which ultimately improves contractor performance in terms of schedule adherence. Project owners who set clear and measurable performance standards help contractors understand expectations and work to achieve them. These standards can include timeliness, quality of work, and work safety. Research shows that the project owner's view of the conformity of the project report to actual conditions in the field (accuracy) greatly influences the contractor's performance assessment (Ruci, 2019). The project owner's decision to manage risks and resolve disputes also has a significant impact. Owners who are proactive in identifying and managing risks and who use innovative dispute resolution methods can help contractors overcome obstacles and maintain optimal project performance. Project owners who routinely monitor project progress and conduct periodic evaluations of contractor performance can provide constructive feedback. This allows contractors to make necessary improvements and improve their overall performance. The level of project owner satisfaction with contractor performance is also an important indicator. Satisfied project owners tend to give positive assessments and may provide additional projects in the future, which motivates contractors to maintain or improve their performance

Owner Decision has a significant effect on consultant performance

Simple regression analysis obtained the equation owner decision on consultant performance $\boldsymbol{X_4 = 3,731 + 0,369X_2}$ this shows that if the owner decision increases then there is a tendency for consultant performance to increase. Based on the study's findings, which included a path coefficient value of 0.743 for owner decisions on consultant performance, a t-statistic value > t-table (15.245 > 1.96), and a p-value

Project owner decisions regarding resource allocation, budget, and technical support are critical to consultant performance. Adequate support from the project owner allows consultants to work more efficiently and effectively, thereby improving the quality of their work. Project owners are usually involved in the supervision and evaluation of consultant performance. Decisions regarding the supervision method and performance evaluation criteria can motivate consultants to improve their performance. For example, using the Analytic Hierarchy Process (AHP) method to assess consultant performance can help project owners make more informed and data-driven decisions. Clear and targeted project owner decisions help align goals and expectations between the owner and consultant. This creates a shared understanding that is essential to achieving the desired results. Consultants who understand the project owner's expectations well are more likely to be able to meet or even exceed those expectations. Project owner decisions in responding to problems and risks that

arise during the project also affect consultant performance. Quick and accurate decisions from project owners can help consultants overcome obstacles and keep projects on track

Owner Decision has a significant effect on supplier performance

Simple regression analysis obtained the equation of owner decision on supplier performance $\boldsymbol{X_5 = 3,722 + 0,398X_2}$, this shows that if the owner decision increases, there is a tendency for supplier performance to increase. The results of the study showed that Owner decisions have a positive and significant impact on supplier performance, as indicated by the path coefficient value of 0.722, the t-statistic value > t-table (3.802 > 1.96), and the p-value .

The project owner's decision in managing supply chain risk also affects supplier performance. An effective risk mitigation strategy can help suppliers overcome challenges and maintain consistent performance, even in unexpected situations. Project owner decisions have a significant impact on supplier performance through various aspects of supply chain management. Project owners who make the right strategic and operational decisions can drive improved supplier performance, which ultimately contributes to the overall success of the project.

Contractor, consultant and supplier performance has a significant effect on time performance

Multiple regression analysis obtained the equation of contractor, consultant and supplier performance has a significant effect on performance $\boldsymbol{\widehat{Y_1} = 2,118 + 0,309X_3 + 0,472X_4 + 0,266X_5}$this shows that if the performance of contractors, consultants and suppliers increases then there is a tendency for time performance to increase. The calculation results as shown in table 4.12 above obtained a significance value of 0.000 <0.05 or F count = 42.587> F table = 2.494. Thus, the performance of contractors, consultants and suppliers together has a significant effect on the time performance of high-rise construction projects

The contractor's managerial ability in planning, organizing, and supervising work is also very important. Good decisions in project management can reduce wasted time and increase efficiency (Maisie et al 2020). The contractor's managerial ability in planning, organizing, and supervising work is also very important. Good decisions in project management can reduce wasted time and increase efficiency. Effective supervision and good coordination between project teams can reduce delays and ensure that work is on schedule.

The performance of consultants, especially construction management consultants, also has a significant impact on project timeliness. Experienced and competent consultants can provide appropriate advice and identify potential problems before they become major obstacles. The consultant's ability to coordinate various aspects of the project and manage internal resources is essential to keeping the project on schedule. The availability of adequate human resources on the consultant's side also affects their ability to complete tasks on time.

Supplier performance also plays an important role in determining project time performance. Suppliers who can deliver materials on time help ensure that construction work can proceed on schedule without delays caused by material shortages. High-quality materials reduce the possibility of rework that can cause delays. Suppliers who are responsive to changes in project needs and are able to adapt quickly can help overcome unexpected obstacles.

Overall, the performance of contractors, consultants, and suppliers has a significant impact on the time performance of construction projects. The success of a project in completing work on schedule depends heavily on the synergy and optimal performance of the three parties. Effective supervision, good management, and strong coordination between contractors, consultants, and suppliers are the keys to achieving good time performance in construction projects.

CONCLUSION

Owner decisions in high-rise construction projects are positively and significantly impacted by project communication management. On high-rise construction projects, contractor performance is positively and significantly impacted by owner decisions. In high-rise construction projects, decisions made by the owners have a positive and considerable impact on the performance of consultants. In high-rise building projects, supplier performance is positively and significantly

impacted by owner decisions. In high-rise construction projects, the performance of contractors, consultants, and suppliers has a positive and considerable impact on time performance.

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