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Analysis Of Construction Project Performance During Pandemic Covid-19 Based on Risk

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Abstract

Spreading rapidly the world, Coronavirus is becoming a worrisome issue in order to slow down the transmission of the viruses, the government is obliged to apply the health protocol to protect its citizens from getting infected. Hence, there are some regulations applied by the government to protect its citizens, such as large-scale restrictions. The restrictions restrain the working hours, and the quantity of the workers. However, to put this regulation into practice affects the economic and business sectors, especially the construction sector. To find out more, This study aims to analyze the role of construction projects in Indonesia during pandemic COVID- 19 based on the risk. Furthermore, Toll Road Tebing Tinggi-Prapat, North Sumatera, is chosen as the object of the research. Literature review and questionnaire will be used as an instrument for gaining the data. The probability and the impact matrix are the methods used to analyze the risk. Henceforth, there are 23 respondents selected to fill out. the questionnaires. Ultimately, the research found out that there were eight high risks such as : . Late payment from the employer Critical activity delay; Financial impact; additional cost ; limited working hours of the employees; Interruption of Planning and scheduling; Supply shortage. Therefore, this study is essential for the construction sector during the COVID-19 outbreak as the main purpose of it is to keep the project running.

Keywords: COVID-19, Construction Performance, PPP, Risk, Toll Road

Introduction

The world is currently going through the coronavirus disease (COVID-19). For that reason, The World Health Organisation (WHO) is entitled for the global efforts to deal with the impacts of it, and Eventually declared COVID-19 as a worldwide pandemic exactly on March 11, 2020. The unpredictable effect of Coronavirus and its outbreaks has hit the human nation. As a matter of fact , Corona virus is the primary pathogen which attacks the human respiratory system ever since it was First, identified in December 2019 it has caused the deaths of 108,837 people and The number continues to grow from time to time.

The Chinese city of Wuhan was believed to be the place for the COVID-19 pandemic resources. This virus is totally different from SARS Co V2. The spreading of this virus is through human-to-human transmission via droplets or direct contact with people who had been infected by COVID-19 [1]

It is believed that the transmission of the COVID-19 is mainly through human interaction. Therefore, in the reopening of the construction project in which many construction workers are required the interactions among construction workers will play a crucial role. Significantly, taking into account that social distancing initiatives to prevent the spread of the virus may result in minimizing the number of construction workers allowed to work on the construction field. Furthermore, improving the safety management system in order to provide a comfortable working environment for the workers, should be the main concern. Safety Management System is compulsorily required during covid-19 era.

Needles to say, There is a supply chain disruption due to the covid-19 pandemic on a global scale. In addition, the policy from the government-mandated lockdowns and strict restrictions on travel, impacted the supply chain of industrious business as there is insufficient construction material supply, especially the imported construction material. However, good planning will determine the success of a development in terms of funding, environmental impact, availability of personal protective equipment, availability of building materials, logistics, public inconvenience associated with the presence of delays in construction work, preparation of documents and financial support, and many more. For the successful implementation of a construction project, effective planning is essential [1]

In Malaysia, almost all construction projects are dismissed. Only a few important projects are still allowed to operate, such as medical facilities. However, The condition on the site must meet the terms of the health protocol standard of COVID-19 requirements and the implementation on the restriction of human movement. Hence, Construction planning and scheduling are likely to be significantly impacted during the pandemic. Consequently, the Malaysian government restricted the mobility of its citizens to prevent the rapid transmission of the virus due to workers' accessibility to the project site. Fortunately, some is used for business operations; however other tasks still require the workers to carry out their job on site. Project construction workers especially, must be involved directly on the construction site. It is statistically proven that the most impacting factors are the suspension of projects, the effects on the labor,j ob loss, additional time required, additional cost, and financial adversity. [4]

Evidently, there were Some public construction projects in Malaysia that performed badly.. In detail, there were 69 cases identified in the development of the public construction project such as the design, contract agreement, and construction projects, Out of the issue mentioned previously , closing stages of construction projects tend to be the most problematic issue . Indoubitably more attention should be given on this issue to ensure the accomplishment of the project which can be executed on schedule and simultaneously paying attention to the quality of the work performed as well as the cost spent[5]

It is a fact that poor Project risk management can increase the likelihood and impact of festive events as well as decreasing adverse effects [6]. Thus Project risk management should include anticipating risk management planning, problem identification analysis, response planning, and controlling schemes. The Risk management System has

become an essential issue for construction projects. Therefore, it is essential to accommodate Hazardous identification Method, risk assessment, and the risk control System. In consequence, Qualitative Methods and Quantitative Methods are used to deal with the assessment risk. On the other hand the risk management is the systematic process used to identify, analyze, and respond to project risk, and maximize the probability and consequences of positive attributes as well as minimize the likelihood and consequences which might occur [7]

To embark on, the first step applied is to identify the successful project and how it is measured.

Furthermore project managers should focus on knowledge sharing and building communication WITH those who are in charge in order to minimize the cost, make use of the time, and obtain the standard quality of the working performance. Subsequently, Owners, consultants, and contractors should work hand in hand for knowledge sharing and enhancing mutual communication as it is the most critical focus of a subject. Improving the communication system and knowledge sharing will reduce the risk of project failure and increase the likelihood of

project success [8], [9]. It is obviously noticeable that The construction industry is at risk that is why the term force majeure is widely applied in construction contracts agreement. [10] As a matter of fact, 50% of construction companies ceased in Indonesia due to the dismissal of projects. In addition to that, a 40% construction budget has been allocated for combating the Corona Virus.

Conversely, the vital projects which polish up the national economic conditions are still in progress. As an illustration, Toba lake, one of the ten famous tourism destinations in Indonesia, has been so much affected due to the pandemic situation . As a result, the infrastructure should be improved so that easy accessibility can be made available. Thus, Toll road Kuala Tanjung Tebing Tinggi-Parapat located in North Sumatera province will be able to connect to Tebing Tinggi city, Batubara District, Simalungun District, and Toba Samosir with a total length of 143,25 km and four-two-way lines, reconstructing the toll road will require the total budget IDR 13 Billion. To execute the plan, the Project private partnership (PPP) scheme is applied for this project with 70% loans, 30% equity, and a concession plan for 30 years. The business scheme in Toll Road Tebing Tinggi-Parapat designed by PT Hutama Karya (Persero) joined with PT. Jasa Marga (Persero)Tbk dan PT Waskita Toll Road an established joint company of PT. Haka Marga Waskita as Toll Road Business Entities (BUJT).

This project was started in June 2017, and there were some problems encountered such as land acquisition and the budget to fund it. During pandemic Covid-19, the situation is worsening the project performance. Additional issues such as limited access, shortage of material and workers also contributed to the above issue. As a result, delays in construction progress occurred and more effort were required for this project to keep on going. This study will explore the risks and the impact of project performance on Toll Road Tebing Tinggi-Parapat during pandemic COVID-19.Obviously, Mitigation of the action for unpredictable conditions is essential for the project outcome.

The Objective of the study are:

1. To identify the risks in the construction project Toll Road Kuala Tanjung Tebing Tinggi-
Parapat during pandemic COVID-19
2. To detect the dominant risks

Method

Interviews and Questionnaires were used for collecting the data; the probability and the impact matrix are the method used to analyze the risk. The respondent criteria were determined based on their experience on the project. There are 23 respondents who completed the questionnaire. In detail Figure 1 defines the research flow as follows :

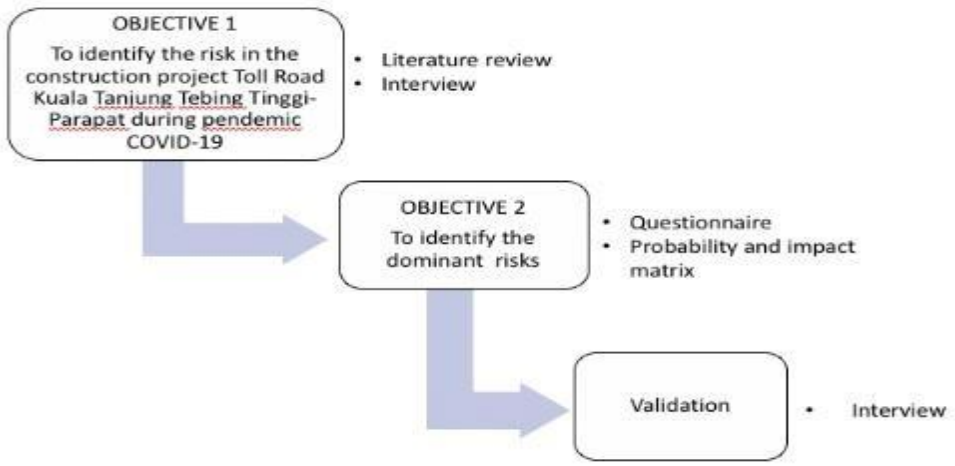

Fig 1. *Research Flow*

Results And Discussion

To answer RQ 1 , a qualitative method with the literature review approach is used. Sampled articles are collected from Google Scholar, Research gates, and Scopus. From the literature review, there are 17 variables found on the impacts on the pandemic construction projects. Those 17 variables are as follow :

1. Suspension of projects
2. Labor impact and unemployment
3. Manpower shortage
4. Extended time.
5. Additional cost
6. Financial Adversity
7. Supply shortage
8 Interruption of Planning and scheduling
9. Restriction of movement on the work site and travel bans
10. Shortage of materials to support ongoing projects
11. Sudden fluctuation of construction material
12. Interruption of contractual terms (legal issues)
13. Rearrangement in the the existing accomplished activities
14. Delayed payment from the employer

15. Critical activity delayed
16. Limited working hour
17. The Benefit of the Contract Agreement.

Consequently the 17 variables were implemented after being validated by 3 experts with the criteria mentioned below the participants in the project should hold minimum S1 Engineering degree; Experienced as a Manager/supervisor /. Out of 17 variables, 9 variables were accommodated in questionnaires form and spread to the respondents (Table 1)

Table 1. *Valid variables for Questionnaire*

No	Variable
1	time extension
2	additional cost
3	Financial Adversity
4	Supply shortage
5	Interruption of Planning and scheduling
6	Sudden fluctuation of material price
7	Delayed payment from employer
8	Critical activity delay
9	limited working hours

To answer Objective 2:

Questionnaires will be used to collect data on how often these variables occur. Selected respondents will be given the questionnaire to fill out to get their opinions . The scale used is the 5 Linkert scale, and the option which is Never occurs is 1 and Frequently occurs is 5. All the 23 respondents are entitled to fill out the questionnaire provided by giving tick to the statements written on the questionnaire.

Table 2 shows that 12.5 % of the respondents are managers , 16.7% are Supervisors, and 70.8%

are ordinary staff. Thus, it's shown that the result of the survey is conducted from a different perspective and job position. Analysis of working experience shows that 37.5% of the respondents are those with 5-10 years of working experience; 33.3% > 10 years working experience and 29.2% < 5 years working experience. All the selected respondents have adequate experience in construction sectors so the data completed are truly valid taken from the survey

Table 2. *Demographic respondents*

Demographic respondent	Total	Percent (%)
Work Position Level		
Manager	3	12.5
Supervisor	4	16.7
Reguler staff	17	70.8
Working Experience		
>10 years	8	33.3%
5-10 years	9	37.5%
<5 years	7	29.2%

Furthermore, the outcome will be accommodated on tabulation and processed through the data analysis to analyze the risk of the *probability and the impact matrix* (PMBOK) by determining Risk Factor (FR).FR = F XR

Table 3 illustrates the risk level on the project during the Pandemic COVID-19.

Table 3 *The Risk Level*

No	Risks	The Frequencies Average	The avg of Impact	fxr	Risk Level
1	Delayed payment from owner	0,713	0,400	0,285	High
2	Additional cost	0,652	0,404	0,263	High
3	Financial impact	0,622	0,430	0,268	High
4	limited working hours	0,622	0,404	0,251	High
5	Time extension	0,609	0,470	0,286	High
6	Interruption of Planning & schedulling	0,596	0,387	0,230	High
7	Supply shortage	0,587	0,335	0,197	High
8	Critical activity delay	0,578	0,478	0,277	High
9	Sudden fluctuation of Construction material price.	0,535	0,270	0,144	Moderat

The data in table 3,clearly shows that from the results obtained, eight high risks and one moderate risk are detected.

The next stage is to take up the a response for each type of risk. For high risks, the suggested step that must be taken is to avoid/exploit it. Afterward High risks have a major negative impact on the project. The next step is getting the validation of the results from the experts and accommodating them on table 5

Table 5, *The Expert Validation*

Rank Risk	Risks	Expert Validation
1	Time extension	Expert A, B √
2	Delayed payment from the owner	Expert A, B√
3	Critical activitiy delay	Expert A, B,C√
4	Financial impact	Expert A, B,C √
5	Additional cost	Expert A, B,C√
6	limited working hours	Expert A,B,C√
7	Interruption of Planning and scheduling	Expert A, B,C√
8	Supply shortage	Expert A, B,C√

Based on data tabulation exemplified in table 5, the expert concurred with the risks and suggests on the improvement project performance occurredin the Pandemic Covid-19 era., as follows:

1. Altering the times' schedule of the project
2. Amending the construction contracts agreement
3. Team up and build up communication among stakeholders in order to overcome the financial adversity, Implement safety environment in construction sites predominating with the rapid transmission of CoronaVirus.

Conclusion

Overall, there are nine variables that occur in the construction project Toll Road Kuala Tanjung Tebing Tinggi-Parapat during COVID-19 such as : Time extension, Additional cost, Financial adversity impact, Supply shortage, Interruption of planning and scheduling, Sudden fluctuation of construction material price, constant Changing of the existing accomplished activities, Critical activity delay, the quality of the workers can not fulfill the contract agreement. Evidently There are eight high risks such as : Late payment from the owner; Critical activity delay; Financial adversity impact; Additional cost; Limited working hours; Interruption of Planning and scheduling; Supply shortage. The outcome of the research is similar to the research conducted by T.Alenezi (2020) who pointed out that critical activity delay will lead to project delays during COVID-19. In addition, Y.Gamil (2020) states that supply shortage is the most affected factor in the pandemic era.

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