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# Assessing factors towards construction project delays in Indonesia

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**Abstract.** Time delay in construction projects causing not only extended duration but also excessive project costs. It is needed by both owner and contractors to have good understanding to delay factors in construction project. The research aim is assessing delay factors in construction project from owner and contractors point of view. Questionnaire was used in this research and data were analyzed through Kendall's W test using SPSS programme. This research has analyzed 15 delay factors in construction project i.e land acquisition delay, location, social, contract change order (CCO), rework, quality of subcontractor, delay in permits, poor planning, unstable material price, law and regulation, owner required, inflation, payment delay, cash flow and bad weather. The research finding land acquisition delay as the top of delay factors in construction project in Indonesia.

## 1. Introduction

Infrastructure sector has been bourgeon in developing countries. A large number of construction projects both government's and private's project in each year causes the construction become one of the most influential industry in developing countries. The previous study show that construction project can provide a significant contribution to national economic growth [1].

Critical success factors in construction project is completing project on time and cost as planned [2][3]. However, most of construction project in developing countries was facing delay in completing the project. Previous research analyzed that in every year in Iran there was an average of 5.9 months of project delay[4]. In India, during 2010-2015, 95% projects were delayed [5]. Another research related delay by Senouci show during 2000-2013, the state of Qatar had a 75% construction project was delay [6]. Construction projects delay was also experienced in Indonesia as developing country. In mid-December 2017 as many as 460 government-owned single year projects in Aceh-Indonesia only have progressed below 75%.

Delay in project is caused by the uncertainty during activities that causing unexpected time performance in construction project [2]. It can happen in either a phase or along the life cycle project. Delay in a phase of life cycle project is potentially have an impact not only to the following phase but also to the overall project duration. On a larger scale delay will taking back the development of construction industry [6].

Some researchs have studied the factors causing construction project delay. In study by Al-Hazim [7], 20 major factors causing time delay were indentified and the analysis show location as the most importance delay factor with importance value of 22,22%, the 2nd place is weather condition with



importance value 15,30% and the 3rd most importance factor is variation orders with 10,20% importance value. Similar research related time delay by Venkateswaran [5], has identified 29 delay factors perceived by consultant, owner and contractor. The result of study show land acquisition delay as the most delay factor in construction project. Another research related time delay by Callegari [8] focus on how to avoid time delays in megaprojects and the result show some critical success project: (1) developing the project planning by external team; (2) not tied to the promoters; (3) reduces unclear estimates; (4) specific scope of works; (5) good internal and external communication along the project.

The research background is some previous research have studied delay in construction project in developing countries, however, lack of study which having focus on specific factors causing delay in Indonesia. The aim research is to analyze the causes of time delay in construction projects in Indonesia from the perspective of owner and contractors. Generally, the research finding were divided in 2 output (1) Delay factors in construction project, (2) The most delay factor in construction project.

## 2. Method

Quantitative method was used in this research. Generally, analyzing data in this research was conducted in two phases: (1) identifying delay factors and (2) analysing the most factors delay factor in construction project.

Phase (1) Started with brainstorming to representative of the project to identify delay factors. The factors that have been identified as a result of this brainstorming are factors that are considered influential since the planning and implementation stages on the occurrence of delays in the project. Then the result of discussion is compared with a number of previous study with similar topic related delay. Table 1 below shows comparison between delay factors as a result of discussion with several research related delay.

**Table 1.** Identifying factors on construction project delay

No	Factors	Researcher
1.	Land Acquisition Delay	Saiful et al (2019) [9]
2.	Location	Al-Hazim et al (2017); Venkateswaran et al (2017); Renuka et al (2018); Saiful et al (2019)
3.	Social	Renuka et al (2018)
4.	Contract Change Order	Samarghandi Et al (2016); Venkateswaran et al (2017); Saiful et al (2019)
5.	Rework	Al-Hazim et al (2017); Renuka et al (2018)
6.	Quality of subcontractors	Renuka et al (2018)
7.	Delay In Permits	Samarghandi Et al (2016); Renuka et al (2018); Saiful et al (2019)
8.	Poor planning	Samarghandi Et al (2016); Venkateswaran et al (2017)
9.	Unstable materials Price	Al-Hazim et al (2017); Venkateswaran et al (2017); Renuka et al (2018)
10.	Law and regulation	Samarghandi Et al (2016); Renuka et al (2018)
11.	Owners Required	Al-Hazim et al (2017); Saiful et al (2019)
12.	Inflation	Samarghandi Et al (2016)
13.	Payment Delay	Al-Hazim et al (2017); Saiful et al (2019)
14.	Cash Flow	Samarghandi Et al (2016); Renuka et al (2018); Saiful et al (2019)
15.	Bad weather	Samarghandi Et al (2016); Al-Hazim et al (2017); Venkateswaran et al (2017); Renuka et al (2018)

Based on the discussion and literature review, 15 factors have been identified and used in this study i.e land acquisition delay, location, social, contract change order (CCO), rework, quality of subcontractor, delay in permits, poor planning, unstable material price, law and regulation, owner

required, inflation, payment delay, cash flow and bad weather. The research finding land acquisition delay as the top of delay factors in construction project in Indonesia.

Phase (2) was starting with collecting the data through questionnaire to 40 respondents as 15 owner and 25 contractors with most of respondent were having 6-10 years experience in construction project. The questionnaire used is containing 3 parts: (1) Common information of respondent (2) Common project information (3) Factors causing delay in construction project. In part 3, respondents were asked to assess whether a factor had an influence on the delay in the project or not. Each factor is containing five option in likert scale (1=strongly disagree; 2=disagree; 3=neither agree nor disagree; 4= agree; 5=strongly agree). The likert scale is usefull to digging the opinions of respondents towards factor causing time delay in construction project in Indonesia while the analysis of the data is using kendall's w test using SPSS programme. The factor with the highest mean rank value based on the results of the analysis using the Kendall's W test is the most potential delay factors in construction projects.

### 3. Result and Discussion

The analysis data in this research was used kendall's w test using SPSS programme. This research has identified a total number of 15 factors causing construction project delay i.e land acquisition delay, location, social, contract change order (CCO), rework, quality of subcontractor, delay in permits, poor planning, unstable material price, law and regulation, owner required, inflation, payment delay, cash flow and bad weather through review of related literature. The results of delay factors analysis as given by the questionnaire to respondents, are shown in Table 2 to Table 4 below.

**Table 2.** Descriptive analysis delay factors in construction project

No	Factors	N	Minimum	Maximum	Std. Deviation
1.	Land Acquisition Delay	40	2.00	5.00	.81492
2.	Location	40	2.00	5.00	.98058
3.	Social	40	2.00	5.00	.87669
4.	Contract Change Order	40	2.00	5.00	.91147
5.	Rework	40	1.00	5.00	.90263
6.	Quality of subcontractors	40	2.00	5.00	.98189
7.	Delay In Permits	40	1.00	5.00	.93883
8.	Poor planning	40	3.00	5.00	.83972
9.	Unstable materials Price	40	2.00	5.00	.93060
10.	Law and regulation	40	2.00	5.00	.91111
11.	Owners Required	40	2.00	5.00	.74722
12.	Inflation	40	1.00	5.00	.83359
13.	Payment Delay	40	1.00	5.00	1.21713
14.	Cash Flow	40	2.00	5.00	.93883
15.	Bad weather	40	2.00	5.00	.93233

Table 3 shown, descriptive analysis of delay factors in construction project. Then the analysis is continuing using Kendal's W tes to determine the significance of delay factors in construction project. Hypothesis used in this research were null hypothesis (Ho) and alternative hypothesis (H1), Ho stated there was no relation in parameters used, vice versa. In this research Ho and H1 used were stated below:

Ho : Delay factors have no significant impact construction project

H1 : Delay factors have significant impact to delay in construction projects

While the hypothesis used to analysis was comparing the value of asymptotic significance (asyp sig), when Ho was accepted if value of asyp sig is  $> 0.05$ , vice versa. The research finding value of asyp sig (0.000) is smaller that alpha 0.05 ( $0.000 < 0.05$ ). It means Ho is rejected and these delay factors have significant impact to construction projects.

Analysis also continuing with comparing value of chi-square. In comparing value of chi square analysis, Ho was accepted if value of statistics calculated was less than  $<$  table, vice versa. While Table 3 shown the value of Calculate Chi square using Kendal's W test is 197.283. However based on the chi-square table, for df (degree of freedom) =  $k-1 = 15-1 = 14$  with level significance = 5% (means the level of trust 95%) then from the table statistics are obtained = 23.68. It means count statistic  $>$  table ( $197.283 > 23.68$ ), then Ho is rejected and it means all delay factors have significant impact to construction projects.

**Table 3.** Kendal's W test analysis

<b>Test Result</b>	
N	40
Kendall's W(a)	.352
Chi-Square	197.283
df	14
Asymp. Sig.	.000

Source: a Kendall's Coefficient of Concordance

Furthermore, Table 3 also shown Kendall's W value was 0.352. It means all factors identified only had 35% impact as delay factors in construction project. The first finding of this research was 15 factors identified i.e land acquisition delay, location, social, contract change order (CCO), rework, quality of subcontractor, delay in permits, poor planning, unstable material price, law and regulation, owner required, inflation, payment delay, cash flow and bad weather. From the result of SPSS ouput, the result finding 15 factors identified in this research was had significant impact as delay factors but only had 35% impact on the occurrence of delay in construction project.

Furthermore, the analysis is continuing to gain the mean rank from each factors using non parametrik analysis Kendal's W test and the result of the analysis is shown in Table 4 below.

**Table 4.** Ranks factors

<b>No</b>	<b>Factors</b>	<b>Mean Rank</b>
1.	Land Acquisition Delay	11.33
2.	Rework	10.20
3.	Poor Planning	10.19
4.	Owners Required	9.84
5.	Quality of subcontractor	9.73
6.	Delay In Permits	9.49
7.	Bad weather	8.79
8.	Cash Flow	8.41
9.	Contract Change Order	8.16
10.	Location	7.85
11.	Payment Delay	7.24
12.	Social	6.91
13.	Law and Regulations	4.54
14.	Unstable Materials Price	3.91
15.	Inflation	3.43

Table 4 shown, top three of delay factors in construction project were i.e Land acquisition delay, rework and poor planning. Table 4 also shown both parties agreed land acquisition delay as the most delay factor in construction project.

The 2nd finding of this research was from a total 15 factor identified, land acquisition delay as the most significant factor causing construction project delay. This result is similar with previous study by Venkateswaran [5] that from a total 29 delay factors, factor delay due to land acquisition process as the most factor causing construction project delay. Result analysis also show rework and inaccurate planning as most delay factors. This result also similar with previous study that agreed rework and inaccurate planning have significant effect to construction project delay [3][5][6][8].

#### 4. Conclusion

This research finding 15 delay factors in construction project i.e land acquisition delay, location, social, contract change order (CCO), rework, quality of subcontractor, delay in permits, poor planning, unstable material price, law and regulation, owner required, inflation, payment delay, cash flow and bad weather. However, From 15 factors identified, land acquisition delay as the most significant delay factor in construction project.

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