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Effects Of Contractors' Delay Factors On Building Project Performance Among Kuantan Malaysian Construction Industry

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***Abstract*:-** *In Malaysia, construction companies have played a great role in the growth of the country's economy over the years. Timely completion of construction projects is a major criterion of project success. Failure to complete the project on time will ultimately result in a delay. The need to control the causes of delays during the construction process arise when the number of delay project has been increased from time to time. Hence, it is essential to identify the causes of this problem from the early stage of the construction project. Some studies in the construction field have shown that quality performance by contractors has been decreasing and affecting the organization's level of advancement in the industry. To address the issue, this paper aims to investigate the significant relationship between contractor experience and building project performance in Kuantan Malaysian construction projects, and to examine the significant relationship between effective communication and building project performance in Kuantan Malaysian construction projects. Eighty-nine (89) construction companies that registered under the CIDB Malaysia among Kuantan, Malaysia construction companies were surveyed. PLS-SEM technique was used in this research to assess both the measurement and structural models. The results showed that contractor experience and effective communication played a significant positive relationship on building project performance among construction companies operating in Kuantan, Pahang, Malaysia.*

Keywords: *Building project performance, contractor experience, effective communication, construction industry, Malaysia.*

1.0 Introduction

The construction industry is a major player in the economic growth of any nation and holds a polar position in the country's development plan. Construction projects are distinct because of the number of parties involved with their own stakes and contradictory interests. Construction contracting is a business prone to great risks and complexities which leads to a high level of uncertainty and huge susceptibility to environmental influences (Adeleke et al., 2019).

The success of a project can be described as meeting the objectives and targets within the budget, time and quality constraints (Adeleke et al., 2019; Abulhakim and Adeleke, 2019). Living in modern times, where project management tools and techniques have been developed and reinforced with technological advancement will make the project more smooth and completed on time. However, some projects still get delayed which is a point to ponder. A construction project will be considered as unsuccessful when it is incomplete and undelivered within the required time, budget, specifications and stakeholder satisfaction. It is also known as delays in construction projects. The most common problems in construction sites are delays. Delays will give a negative impact on the project that constraint on quality, cost, scope and time (Bamgbade et al., 2019; Sambasivan & Soon, 2007). So, it is important to identify the type of delays that normally occur in a construction project. There are two types of delays in a construction project which can be categorized into the client and contractor. The client is known as compensable delays while the contractor is non-excusable delays (Taofeeq et al., 2019; Hassan and Adeleke, 2019;

Saeed, 2009). It can also be identified as critical or non-critical and whether the delay is concurrent or non-concurrent.

The reasons the delays need to be identified in the early stage is to reduce the effect on construction projects. One of the reasons is the relationship between client and contractor. Inadequate early planning and not meet the project scope requirements are the main reason for the delays by the clients (Adeleke et al., 2018; Azman and Adeleke 2018). This happened when client interference in the making of the decision process resulting in a delay in the design making or changes in the design. Overambitious estimates and incorrect task assessment by a contractor can also lead to delays and affect the project (Bamgbade et al., 2019; Taofeeq et al., 2019). Lack of task clarity, lack of effective communication system, shortage of resources, inexperienced contractor or subcontractor may also delay the project.

Delays in the construction site is a global phenomenon. In Saudi Arabia, only 30% of construction projects were completed within the timely completion due to inadequately experienced contractor, lack of effective communication system and shortage of resources (Assaf & Al-Hejji, 2006). In Nigeria, the performance of the construction industry in terms of time (schedule) was poor (Ajanlekoko, 1987). An investigation by Odeyinka and Yusif (1997) shows that seven out of ten projects surveyed in Nigeria suffered delays in their execution. Normally, when the projects are delayed they are extended in the additional resources especially in terms of cost. The Malaysian construction sector also not escaped from the problem of delays. In 2015, 17.30% of government construction projects in Malaysia were faced wit one kind of delay or the other (Sambasivan & Soon, 2007).

Some causes and effects of delays in construction projects can be country-specific. Identification of causes and effects helps the project managers to take appropriate preventative steps. The project managers need to understand the problems and once the problems become clear, the managers can take proactive steps to avoid such situations. Therefore, the link between the causes and effects of delays in construction projects need to be established.

2.0 Literature Review

2.1 Overview of the Malaysian Construction Industry

The Malaysian construction industry is one of the driving forces of the Malaysian economy. The Malaysian construction industry plays an important role in generating wealth and improving the quality of life for Malaysians through the transformation of the government's socio-economic policies into social and economic infrastructure and buildings. The Malaysian construction industry also has other important roles in the Malaysia economy such as providing job opportunities for approximately 800,000 people. The construction industry required much manpower such as labour, design team, developer and many more project team. The industry also creating multiple effects on other sectors of the economy such as manufacturing, financial and many more (Omer and Adeleke, 2019).

In construction, a contractor is an organization or person that is hired by the client to carry out the work that is required for the completion of a project. Contractors do not always have the expertise that is needed for completing all construction work by themselves and that is the reason they are in charge of appointing sub-contractors who would be able to complete some parts of the project. Normally, there will be a significant number of sub-contractors involved in a construction project (Adeleke et a., 2018).

Odeh, (2002) indicated that inadequate contractor experience was an important factor and this could be linked to the contract awarding procedure where most projects were awarded to the lowest bidder. A contractor with inadequate experience cannot plan and manage the projects properly and this can lead to disastrous consequences. Therefore, this study initiates this relationship by putting the following hypothesis forward:

Hypothesis 1: There is a significant relationship between contractor experience and building project performance.

Communication is the exchange of information or passing of information, ideas or thoughts from one person to the other or from one end to the other. Effective communication is a vital tool for any business owner. The success of a company depends on the communication among the team and it is crucial to communicate effectively in negotiations to ensure the achievement of the company's goals. Effective communication can help to foster a good working relationship between the team in order to improve morale and efficiency.

Sambasivan & Soon, (2007), there are many parties involved in a project such as a client, consultant, contractor and sub-contractors, the communication between the parties is very crucial for the success of the project. Proper communication channels between various parties must be established during the planning stage. Any problem with communication can lead to severe misunderstandings and delays in the execution of the project (Malik and Adeleke, 2018; Adeleke et al., 2015). Hence, it is hypothesized thus:

Hypothesis 2: There is a significant relationship between effective communication and building project performance.

2.2 Research Framework

This study has been conducted by utilizing a specific model which is the conceptual model of the study and which clearly shows the independent and dependent variables that are used. As shown in the conceptual framework (Figure 1), the dependent variable of this study is construction projects (building projects performance) and the independent variable is Contractor delay factors which are conceptualized as contractor experience and effective communication. The framework of the study is to depict the connection between independent and dependent variables of the study.

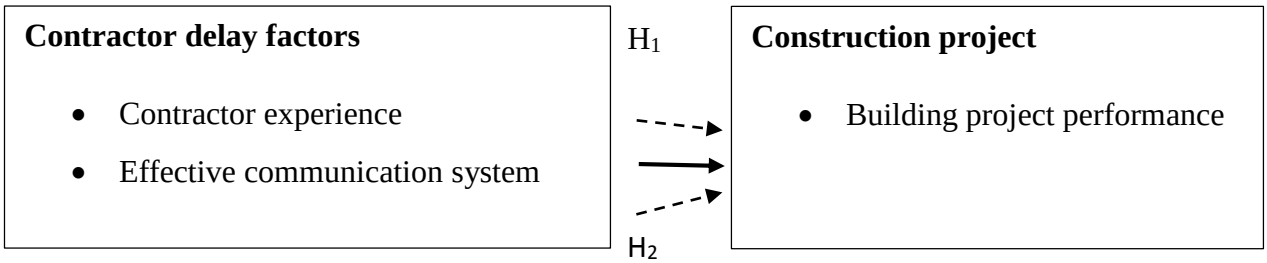

Figure 1: Research framework

2.3 Relationship between Contractor Experience and Construction Projects (Building Project Performance)

A contractor with adequate experience is important to an organization and project. The quality of a contractor and subcontractor's construction team directly affects the project quality, cost, duration and plays a decisive role in determining a project's economic performance (Hassan and Adeleke, 2019; Rahman and Adeleke, 2018).

The main contractor must carry out sub-contracting for procuring raw materials, machinery, finance, technology and the most important is human resource. Apart from the fact that these sub-contractors are used for work where the main contractor lacks expertise, this is done to enable contractors and sub-contractors to limit their risk exposure (Gould and Joyce, 2009). Since sub-contractors secure virtually all their work through general contractors, the success of the typical sub-contractor depends directly on the relationships established and maintained with main contractors (Adeleke et al., 2016; Bamgbade et al., 2019; Taofeeq and Adeleke, 2019).

According to Mccord (2010), the sub-contractors' inability to employ project managers with good administrative and management skills, the unfair transaction made by the project manager between the

main contractor and the sub-contractor will hinder the relationship.

Marzouk, El Kherbawy, & Khalifa (2013) stated that the failure of the sub-contractor in implementing good quality assurance and quality control programme and improper planning causes delays in critical activities in the delivery of construction projects. This may result in a delay in the completion of the project.

2.4 Relationship between Effective Communication and Construction Projects (Building Projects Performance)

Communication is a channel by which a sender transfers some information to the receiver. Both the sender and the receiver might be the project manager to the team members. Information can be transfer from various mediums like; email, Facebook, Telephone and face to face (Bamgbade et al., 2017; Taofeeq et al., 2020; Wang, Pauleen, & Zhang, 2016; Thompson, 2018;).

In most cases, effective communication can be seen as a hidden element for success. Reliable and frequent communication is essential for a successful project. This variable is vital for any project team or organization. It is necessary that authentic and clear information is disseminated at the appropriate time and place to the right person during the construction project. Also, the flow of information, either top-down or bottom-up communication is an essential characteristic of a project to think about. It also lessens conflicts, and improve decision making and its influence on project team member performance to their project manager (Taofeeq et al., 2019; Yap, Abdul-Rahman, & Chen, 2017). The critical issue is that, most of the time, crucial information is not available to take the right action, so it is required to make communication the most vibrant tool for a successful project (Adeleke, et al., 2015; Moe & Pathranarakul, 2006).

White & Marasini (2018) in their study stated that improper communication between the contractor and sub-contractor during different activities of the construction process could affect the progress as planned in schedule. Sub-contractor's unplanned work at the contractor's site might affect the other works going on in the site which will, in turn, affect the relationship between contractor and sub-contractor.

Effective communication increases project performance. A balanced flow of information between main contractors and sub-contractors is necessary for the smooth execution of the project activities. These results in better co-operation, better team spirit, fewer claims and litigation and fewer disputes. The behaviour of the contractor's project manager is also important for effective communication (Sabodin and Adeleke, 2018).

Ineffective communication of project requirements between the contractors, sub-contractors, project managers, and team members has been reported to be the cause of most project failures (Robertson & Robertson, 2006).

3.0 Methodology

This research is a cross-sectional research design conducted among Pahang Malaysian construction companies. Proportionate stratified random sampling technique was also employed for sample selection. The quantitative research approach was used in this study, as this is mostly adopted in social science researches (Sekaran, Robert and Brain, 2001). By using a close-ended structured questionnaire, the data were collected at a single-point-in-time (Sekaran & Bougie, 2013; Jamil and Adeleke, 2018). A total number of 100 copies of the questionnaire were personally distributed but only 89 companies took part in this research survey. So, the sample size for this study is 89 construction companies in Kuantan, Pahang.

3.1 Instrument Design

The quantitative method was used in this research as it is more suitable to this research than the qualitative method of data collection. Hence, the data was collected using the questionnaire as stated above. This is because it is found to be easier for the collection of data from the respondents. The answers to the questions were recorded by taking input from the respondents and without the need for an interview. In analyzing the data, SPSS software

version 22.0 was used for respondents' demographics such as gender, position, years of working experience, company's area of specialization, type of company ownership, company class of contractor, number of years for company existence and number of full-time workers in the company. The data analysis adopted for both independent and dependent variables was Smart PLS version 3.0. Five-point Likert scale was adopted to measure the independent and dependent variables which range from (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, to (5) strongly agree. According to Sekaran (2003) and Sekaran & Bougie (2009), to compute the standard deviation and the mean feedback on the variables and the mid-point of the scale, a researcher must adopt the rating scale. All the variables in this research are multidimensional as presented in Table 1.

Table 1: Source of measurement

S/N	Constructs	Dimension	Source	Remarks
1	Contractor delay factors	Contractor experience Effective communication system	(Sambasivan & Soon, 2007)	Adapted
2	Construction project	Building project performance	(Alaghbari, Kadir, Salim, & Ernawati, 2007)	Adapted

4.0 Results and Discussions

4.1 Data Collection and Sample

In Kuantan, Pahang construction companies were given about 100 copies of the questionnaire. The number of copies of the questionnaires filled and returned was 89, thereby making the sample size for this research to be 89 respondents. Table 2 shows a summary of the demographic features of respondents for this research.

Table 2: Summary of Demographic Scales of Respondents

Type	Items	Frequency (N)	Percentage (%)
Gender	Male	58	65.20
	Female	31	34.80
Position	Manager	19	21.30
	Contractor	18	20.20
	Worker	24	27.00
	Project manager	12	13.50
	Other	16	18.00
Working Experience	1-3 years	36	40.40
	4-6 years	12	13.50
	7-9 years	5	5.60
	More than 10 years	36	40.40
Type of Project	Residential Building	45	50.60
	Educational Building	4	4.50
	Commercial Building	27	30.30
	Other	13	14.60
Company Ownership	Local	76	85.40
	National	12	13.50
	Other	1	1.10
Class of Contractor	1	23	25.80
	2	6	6.70
	3	6	6.70

	4	4	4.50
	5	9	10.10
	6	7	7.90
	7	34	38.20
Company Existence	1-3 years	19	21.30
	More than 10 years	70	78.70
No. of Employees	0-50	38	42.70
	50-100	20	22.50
	100-150	9	10.10
	More than 150	22	24.70

4.2 Measurement Model

Before examining the hypothesis, the technique that was used to test and measure the inner and outer model is Partial Least Square Structure Equation Modelling (PLS-SEM). Figure 2 shows the model of this research with the structural dimensions.

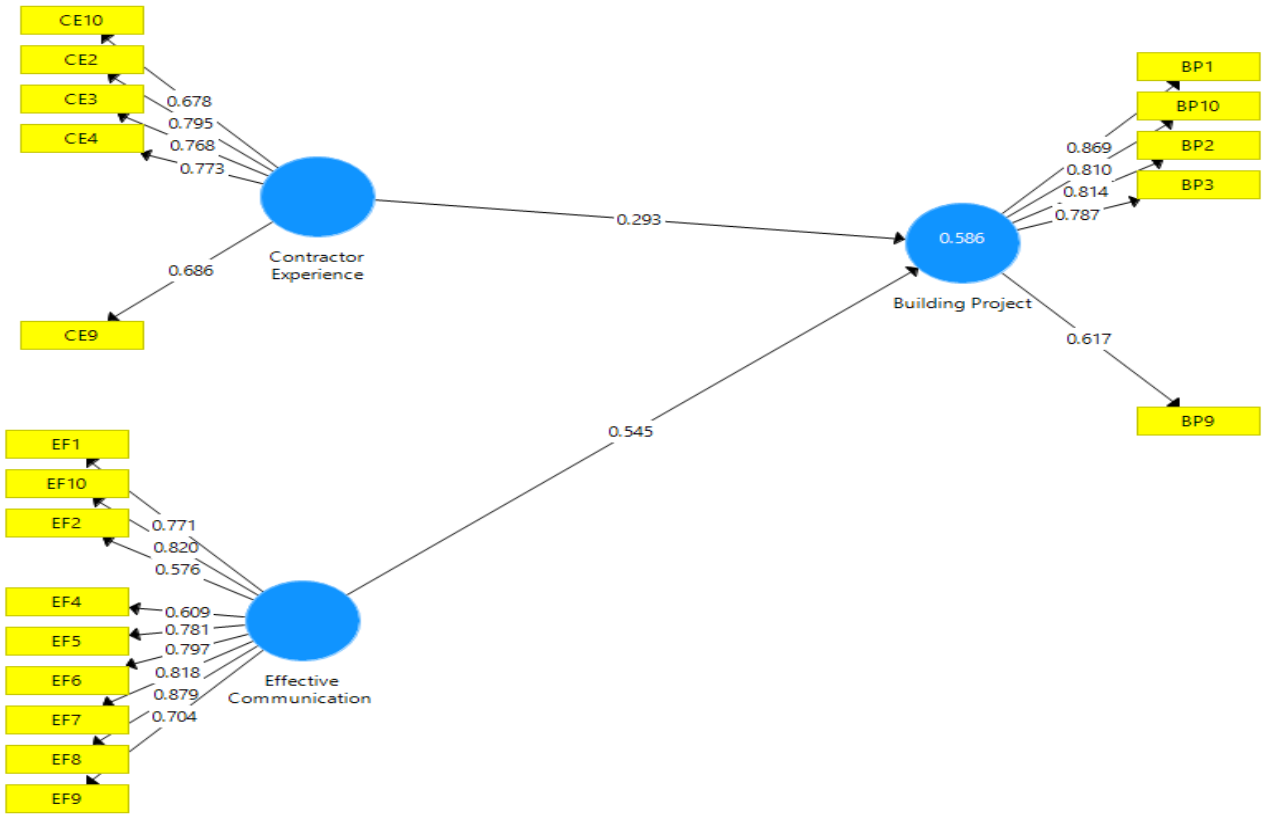

Figure 2: Measurement model

The measured content validity (Table 3) was explained using two different manners. The first was through high loading in the items on their corresponding constructs in relation to other constructs. The second way was through the loading of items that were significantly loading on their corresponding constructs by confirming the content validity of the measures utilized in the study (Chow and Chan, 2008). The following three (3) criteria were adopted for the purpose of establishing the convergent analysis: Composite Reliability (CR), Average Variance Extracted (AVE), and Factor Loadings (FL). The loadings of all items were tested and those that their values were more than 0.5 were accepted. CR is the degree to which a group of items shows latent constructs of the model (Hair et. al, 2010).

Table 3: Factor Analysis and Loading of the items (Cross-Loading)

	BP	CE	EF
BP1	**0.869**	0.578	0.673
BP10	**0.810**	0.470	0.590
BP2	**0.814**	0.567	0.586
BP3	**0.787**	0.483	0.425
BP9	**0.617**	0.386	0.552
CE10	0.526	**0.678**	0.465
CE2	0.458	**0.795**	0.423
CE3	0.376	**0.768**	0.442
CE4	0.487	**0.773**	0.492
CE9	0.485	**0.686**	0.516
EF1	0.589	0.598	**0.771**
EF10	0.596	0.439	**0.820**
EF2	0.339	0.322	**0.576**
EF4	0.434	0.285	**0.609**
EF5	0.530	0.455	**0.781**
EF6	0.631	0.438	**0.797**
EF7	0.580	0.454	**0.818**
EF8	0.658	0.653	**0.879**
EF9	0.538	0.618	**0.704**

Converge validity can be explained as the degree to which a bunch of variables is converged to measure a particular concept. The loadings of all items were tested and those that their values were more than 0.5 were accepted. CR is the degree to which a group of items shows latent constructs of the model (Hari, 2010). The value of CR and AVE are presented in Table 4.

Table 4: Convergent Validity Analysis

Construct Dimensions	Items	Loading	Composite Reliability	AVE	Cronbach's Alpha
Contractor Experience	**CE10**	0.678	0.859	0.550	0.795
	CE2	0.795			
	CE3	0.768			
	CE4	0.773			
	CE9	0.686			
Effective Communication	**EF1**	0.771	0.922	0.572	0.904
	EF10	0.820			
	EF2	0.576			
	EF4	0.609			
	EF5	0.781			
	EF6	0.797			
	EF7	0.818			
	EF8	0.879			
	EF9	0.704			
Building Project Performance	**BP1**	0.869	0.887	0.615	0.839

	BP10	0.810			
	BP2	0.814			
	BP3	0.787			
	BP9	0.617			

The discriminant validity is necessary for the construct validity of the outer model. It is essential to be tested before examining the hypothesis through path analysis. It shows the extent to which items differs between constructs. Moreover, it indicates that items that are used in different constructs do not overlap. As shown in Table 5, the square root of AVE for all the constructs was used to replace the diagonal elements on the correlation matrix. The diagonal elements are higher than the other elements of the same row and column where they are placed in the table. Therefore, the outer model's discriminant validity of this study was confirmed. As indicated in Table 5, a satisfactory discriminant validity was also achieved when the value representing the square root of the AVE (appearing bold on the diagonal) was all loaded above the recommended threshold value of 0.5 and greater than the off-diagonal correlations.

Table 5: Validity Analysis

	BP	**CE**	**EF**
Building Project Performance	**0.784**		
Contractor Experience	0.64	**0.741**	
Effective Communication	0.731	0.637	**0.757**

After confirming the goodness of the outer model, the next step was to investigate the relationships that were hypothesized in the study. PLS Algorithm was run to investigate the hypothesized model through Smart PLS. The path coefficient was gained through running PLS Algorithm which is depicted in the Figure below. Table 6 below showed the hypothesis testing. The results showed that contractor experience variable had a positive relationship on building project performance (β= 0.293, t = 2.287, p <0.05). The second hypothesis H_2, effective communication, also had a positive relationship on building project performance (β=-0.545, t = 4.116, p <0.05).

Table 6: Results of the Inner Structural Model

Items	**Constructs/variables**	**Beta**	**S/E**	**T-value**	**P-value**	**Findings**
H_1	Contractor Experience → Building Projects Performance	0.293	0.128	2.287	0.011	**Supported**
H_2	Effective Communication → Building Projects Performance	0.545	0.132	4.116	0.0	**Supported**

As for effect size, when its value is less than 0.02 it is considered as small, less than 0.15 is considered as medium and less than 0.35 is considered as high effects respectively (Cohen,1988). Based on Table 7 below, the effect size of contractor experience was small and effective communication can be considered as large.

Effect size is calculated using the below formula:

$$\textbf{Effect size: } f^2 = \frac{R^{2\,Included} - R^{2\,Exclude}}{1 - R^{2\,Included}}$$

Table.7 Direct Effect IV-DV

R-squared	Included	Excluded	f-squared	Effect size
Contractor Experience	0.586	0.542	0.106	Small
Effective Communication	0.586	0.410	0.425	Large

5.0 Conclusion

This study focused on contractor experience and effective communication as factors responsible for delay in a construction project by contractors among the construction companies in Kuantan, Pahang, Malaysia. The findings of this study will serve as a benchmark for future researchers who want to conduct research regarding the delay in the construction project. Also, it is essential (when construction companies register under CIDB) to ensure the contractors possess adequate experience and knowledge in handling projects.

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