

ASSESSING THE CAUSES AND EFFECTS OF DELAY AND DISRUPTION IN CONSTRUCTION PROJECTS IN MALAYSIA

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ABSTRACT:

Construction projects often face challenges while execution such as delays and disruptions. Thus, Research studies are being carried out to managing the potential risks such as technical, economical, legal, social, commercial, financial, resource and construction that might arise from delays as well as from disruptions. The prime aim of this research is to identify the causes and effects on construction projects due to delays and disruptions. For the data collection, a descriptive study designed to obtain causes that effected construction projects due to delays and disruptions from regulatory bodies clients, consulting and construction firms. Relative importance index (RII) methodology is utilized for identification of important parameters related to delay and disruptions. In this study random sampling technique are utilized for selection of respondents. For data collection literature review and questionnaires survey techniques are received from respondents. The results obtained from this research study revealed that poor project management, funding problems, design changes, delay in payment to contractors, information delays, disagreement on the valuation of work done and compensation issues are identified as main causes for delays and disruptions. In addition to that, the results mentioned that, major effects include cost overrun, time overrun, negative social impact, disputes and idling resources due to delays and disruptions. The study summarizes that there are few causes that effected delays and disruptions that put projects at risk and impacted on project performance. Therefore, it is suggested that prime focus should be kept on sufficient budget of construction, timely issuing of information, design completion and rational project management skills during procurement processes for betterment.

1. INTRODUCTION

In construction industry delay is referred as extended period of construction and disruptions that hinder the construction process. Delays and disruptions in construction process are potential challenges faced by the industry considered as risks that hinder construction process. Hence studies are being conducted by scholars for finding the ways to manage the challenges and associated risks. Research conducted by different scholars has identified major sources of risks associated with delays and disruptions that must be managed in the project management plan, Tiong et al (March 2023). The causes of delays that hinder project delivery on time in construction are considered as risks which are identified as factors for delays. Such studies are conducted in different countries around the world such as Malaysia, Saudi Arabia, Jordon and Iran, Rahim et al (2023), Shash et al (2021), Arabiat et al (2023) and Ghanbari et al (2023). The results show that some similarities and dissimilarities in the delay causes in the construction processes.

Delays and disruptions during construction have some effects such as time and cost overrun, disputes and their arbitration, project desertion and litigation Egwim et al (2021). The goal of this research study is to assess the delay causes and their effects in construction industry of Malaysia.

2. LITERATURE REVIEW

2.1 Theories on Delays and Disruptions

2.1.1 Delays

When something happens later than planned, scheduled, specified in a contract, or after the parties mutually agreed-upon date for project delivery, it is referred to as a "delay" in the construction industry Sanni-Anibire et al (2020). According to Jeffrey Boon Hui et al (2021), a delay is when construction slows down but doesn't completely halt; this might result in time overruns that happen after the termination date of the contract or after the parties' agreed-upon timeframe for project delivery.

Delays are classified as non-excusable, excusable non-compensable, excusable compensable, and concurrent by Ahmed Gondia et al (2020). Non-excusable delays are those for which the contractor has liability or causes the delay. Delays that result from unanticipated occurrences that are outside the appropriate jurisdiction of the contractor and are not attributable to the contractor's error or carelessness are considered non-compensable delays. Excusable delays that can be compensated are those that come from the owner's act or delay in the event that the owner violates a contract provision, whether explicit or implicit. These delays can include suspensions or delays of either all or some of the work. When the owner and the contractor are fairly liable for the delay, it is referred to as a concurrent delay Abbasi Omid et al (2020).

2.1.2 Disruptions: Disruptions refer to occurrences that interrupt the scheduled construction activities. It is usual for project movement to encounter disruptions, hindering the smooth workflow. According to Elisabeth et al (2019), these disruptions are often anticipated and accounted for during the bidding stage of complex projects. For instance, a certain amount of work is generally anticipated, even under optimal conditions, due to the unavoidable occurrence of "normal" faults and blunders from the builder and customer.

2.2 Risks in Construction Projects and Delays

The "Risk Management" is a key component of construction project management. Planning, recognizing, evaluating, creating risk-handling plans, monitoring, and control are all part of risk management. While performing their specific duties, members of the project team, in particular clients, consultants, and contractors, should avoid or minimize delays in any projects. Sources of construction risk are outlined by Ahmed Gondia et al (2020), namely: changes to the project's requirements and scope; errors and inaccuracies in the design; insufficiently defined roles and duties; a lack of skilled workforce; force majeure; and new technologies. Construction risks are classified by Sameh M et al (2018), including technical, socioeconomic, fiscal, legal, inevitable, commercial, operational, and political. In the same way Ifeanyi Okpala et al (2020), identified the weather, labour and plant productivity, and material quality as the three primary risks.

2.3 Causes of Delays and Disruptions

Construction projects must be completed in a specific period of time, which requires effective time management specifically, eliminating all potential sources of delays and disruptions. A number of participants in building and civil engineering works have varying views of the reasons for delays, according to a study by Fashina, Adebayo et al. (2021), about the reasons of Hong Kong's development delays. They claimed that different industry groups' biases might cause delays to be attributed to other parties. After looking into the reasons behind Pakistani highway construction delays, Sohu Samiullah et al. (2024) concluded to the conclusion that any party participating in the project might be the source of the delays, such as the primary causes are unfit subcontractors, inadequately funded organizations, unclear and incomplete drawings, and inadequate communication between consultants and contractors.

Mohammed et al (2020), reported that a shortage of skilled labour is the primary reason for the delays in the Saudi Arabian construction industry for government projects.

Rahman et al (2020), has identified important causes of delays in the Malaysian construction industry which includes improper planning, incompetent site management, a lack of experience, unsuitable client funding and transactions for finished work, problems with subcontractors, a lack of resources and labor, equipment failure and access, a breakdown in communication between stakeholders, and mistakes made during the execution stage. A study conducted by Koulinas Georgios (2020), in which researcher identified the main causes of cost overrun due to a level of complexity, faulty material evaluation, and inflation-related spikes in material cost. On the contrary, under time overrun, design changes, poor worker productivity, insufficient planning, and resource scarcity are the main causes of delays. According to Ifeanyi Okpala et al (2020), determined that most frequent causes of delay in construction projects in Pakistan which were natural disasters such as floods and earthquakes, supply of material, frequent design changes and also delay in payment to contractor.

2.4 Effects of Delays and Disruptions

Egwim et al (2021), revealed that six consequences of delays in the construction project delivery process in Nigeria. These consequences include time overruns, funds overruns, disputes, arbitration, outright abandonment, and litigation. The same effects of delays are identified in the Malaysian industry revealed by Rahman et al (2020), which are conflict, claims, complete desertion, and a slowdown in the construction sector's growth are some of the repercussions of delays. According to Sohu Samiullah et al (2024), that alterations in the scope of work on project site, inadequate design at the stage of tender, legal claims (elongation time frame with the cost), inadequate preparation and evaluation of funds, interruptions in estimation changes, and additional costs are all significant factors in construction industry of Pakistan.

3. RESEARCH METHODOLOGY

3.1 Research Design

This descriptive study aims to determine the perception of causes and effects of delays and disruptions in construction projects of Malaysia. A comprehensive literature review was conducted to find out 26 common causes and 14 common effects of delay and disruptions in the construction industry. A questionnaire was designed having demographic data of the respondents and also includes 26 common causes and 14 common effects of delay and disruption. A randomly respondents were selected from clients, regulatory boards, consulting firms, and construction companies. A total 90 respondents were selected, majority of having more than 10 years' experience in dealing of all kinds of construction projects in Malaysia. About 81 respondents completed the questionnaire with all required data which were valid for further analysis process.

3.2 Analysis and Findings

Relative Importance Index (RII) (table 1) calculations and frequency analysis were used to analyse the data. The Relative Importance Index (RII) is determined as:

$$RII = \frac{\sum W}{(A \times N)} \quad (1)$$

Where:

W = The weight each factor received from respondents

A = Highest weight

N = N is the total number of responders.

A=4 and N=81 represent the study's sample sizes.

Average Score	RII	Ranking
1.0 to 3.0	0.20 to 0.60	Low (L)
3.0 to 4.0	0.60 to 0.80	Medium (M)
4.0 to 5.0	0.80 to 1.00	High (H)

Table 1. Relative Importance Index (RII)

The value of RII varied from 0 to 1, with the greater the value of RII, more powerful the variable (Gündüz, Nielsen and Özdemir, 2013).

3.3 Respondents Profiles

3.3.1 Organization of Respondents

The proportion of the responses submitted, the outcomes revealed that 42% were contractors, 33% were consulting firms, 10% were regulatory bodies, and 15% were clients. Figure 1 shows the highest responded the survey is contractors.

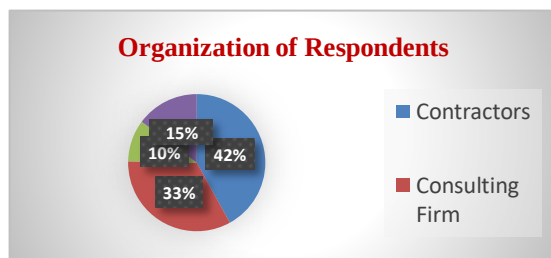


Figure 1. Organization of Respondents

3.3.2 Experience of Respondents: The respondents are considered as experiences in the construction sector. As indicated in Figure 2, their experience ranges from 0 to a maximum of 25 years. The majority 85% of responders have between 10 and 25 years of experience. Figure 2 shows that the bulk of the respondents i-e, 31, have 11-15 years of experience, followed by 25 respondents have 16-20 years of experience, and 13 respondents have 21-25 years of experience. Twelve of the respondents have range between 5-10 years of experience.

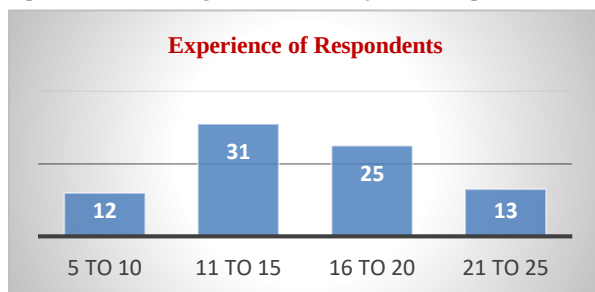


Figure 2. Experience of Respondents

3.3.3 Experience of Project Delays: Projects experiencing delays have become the norm nowadays. Based on the respondents, the projects they were involved varied from degrees, likewise: clients, consultants, and contractors have all reported experiencing delays. Specifically, 78% of clients, 70% of consultants, and 56% of contractors reported experienced delayed in their projects. From below, figure 3 shows that majority of project delays experienced by Client side with 78%.

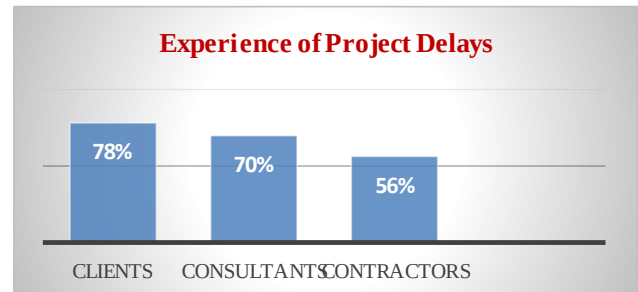


Figure 3. Experience of Project Delays

4. CAUSES OF DELAYS AND DISRUPTIONS

From the survey, the respondents had to rank different causes-of delays and disruptions in construction projects. Respondents were asked to rank these causes on a 5-point Likert scale, where 1 represents not at all important and 5 represents most importance. Table 2 below illustrates the results. The results indicate that the main reason of delay is poor project management. Following that the results revealed other delayed of projects due to, Funding problems, Design changes, Delays in payment to contractors, Information delays, Conflict over the value of the completed task and Compensation issues. Other medium-ranked factors include Conflicts among the involved parties, Incompetent contractors, supply / procurement problems, Multiple projects by contractors, Bureaucracy and Project schedule changes.

S.No	Causes	N	RII	Rank
1	Poor project management	81	0.91	1
2	Funding problems	81	0.88	2
3	Design changes	81	0.87	3
4	Delays in payment to contractors	81	0.86	4
5	Information delays	81	0.84	5
6	Disagreement on the valuation of work done	81	0.83	6
7	Compensation issues	81	0.82	7
8	Conflicts among the involved parties	81	0.76	8
9	Incompetent contractors	81	0.72	9
10	Supply / procurement problems	81	0.70	10
11	Multiple projects by contractors	81	0.68	11
12	Bureaucracy	81	0.63	12
13	Project schedule changes	81	0.61	13
14	Unexpected ground conditions	81	0.56	14
15	Shortage / lack of equipment	81	0.53	15
16	Government interference	81	0.49	16
17	Poor understanding of the project	81	0.48	17
18	Contractual claims	81	0.46	18
19	Incompetent sub-contractors	81	0.43	19

20	Acts of God	81	0.41	20
21	Skills shortage / unavailability	81	0.38	21
22	Poor quality of construction	81	0.36	22
23	Poor project management by contractor	81	0.33	23
24	Poor supervision at site	81	0.32	24
25	Shortage of materials	81	0.29	25
26	Disputes at sites	81	0.25	26

Table 2. Respondents Ranking of Causes of Delays and Disruptions

5. EFFECTS OF DELAYS AND DISRUPTIONS

Construction projects have suffered from delays and disruptions. The respondents were asked to rank a 4-point ranking to these effects, where 4 represented the most important and 1 was of the least important. The results of the study are presented in Table 3 below. The results indicate that cost overrun is the effect of delays and disruptions. Studies indicates that another effect of delays and disruptions are time overrun, negative social impact, disputes and idling resources are the five most highly ranked effects.

S.No	Effects	N	RII	Rank
1	Cost overrun	81	0.91	1
2	Time overrun	81	0.87	2
3	Negative social impact	81	0.84	3
4	Disputes	81	0.82	4
5	Idling resources	81	0.81	5
6	Bankruptcy	81	0.72	6
7	Arbitration	81	0.67	7
8	Delaying by the client to return the loans	81	0.65	8
9	Litigation	81	0.54	9
10	Delaying in getting profit by clients	81	0.53	10
11	Create stress on contractors	81	0.51	11
12	Acceleration losses	81	0.47	12
13	Poor quality of work due to hurry	81	0.43	13
14	Total abandonment	81	0.40	14

Table 3. Respondents Ranking of Effects of Delays and Disruptions

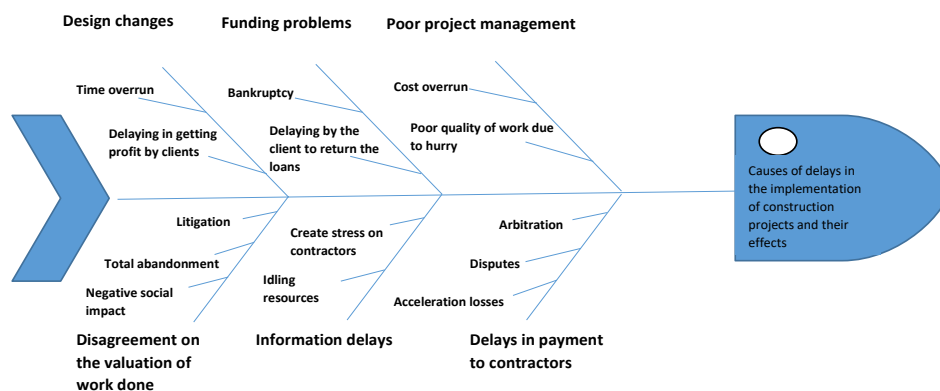


Diagram.1 The Cause-Effect Diagram

6. CONCLUSIONS

This study identified the causes and effects of Delays and Disruptions in construction projects of Malaysia. Via survey this research identified the causes and effects of delay and disruption by using relative importance index (RII) technique. In this study, a total of 26 causes of delays and disruptions were identified. About top 7 causes in terms of their relative importance index (RII) are identified based on questionnaire survey responses as (i) Poor project management, (ii) Funding problems, (iii) Design changes, (iv) Delays in payment to contractors, (v) Information delays, (vi) Disagreement on the valuation of work, and (vii) Compensation issues. Moreover, current study found that 14 effects of delays and disruptions and, the top 5 effects in terms of their relative importance index (RII) are (i) Cost overrun, (ii) Time overrun, (iii) Negative social impact, (iv) Disputes and (v) Idling resources.

Despite whereas of experiences, it is recommended that the parties/stakeholder's involved in the project procurement process should focus on sufficient construction budget, providing information on time, finalization of the design, and having project management expertise. In important by such as effective communication and management does lay role in construction activities mainly in Malaysia.

6.1 Recommendations

This research study is conducted in the general aspect of the construction industry of Malaysia.

1. Future research can be conducted separately among the major stakeholders of the construction industry: Client, Contractor, and consultant.
2. Further researchers can compare studies to determine the differences and reasons among their perspectives.
3. In addition, further study can be conducted among public and private sectors to find out differences on causes and effects of delayed or disrupted in both aspects.

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