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Determining the Root Causes of Project Delay: A Case Study

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Abstract: The study aims to identify and analyze the reason for the project delay in ABC Company located in the heart of Malaysia specializing in oil and gas and oil and gas-related products. The study utilized observation techniques and data from an official report. The observation was done on an ongoing project and the assessment of record was done on previously completed projects. The outcome of such observation was analysed and simplified using a tool namely the Cause and Effect Diagram or Fishbone Diagram. The study found that shortage of manpower, local authority approval, improper planning, and the COVID-19 pandemic as the root causes that led to project delay.

Keywords: *Fishbone diagram, cause and effect diagram, project delay, project management, root causes of delay*

1. Introduction

General project planning, coordination, and control from beginning to end are all included in the definition of construction project management, which also embraces innovation, growth, and modification in operational activities (Al Jashaami, 2021). Its goal is to satisfy the client's requirements by producing a physically usable construction project, finished within the project's allotted time, and compliant with established costing, quality, and standards (Romzi & Doh, 2022, Khahro & Memon, 2018). Construction delays cost money, therefore completing projects on schedule benefits both the project and the construction crew. Along with cost and quality, project scheduling is commonly acknowledged as a critical element of the construction management life cycle and one of the criteria that determines a project's success (Hamzah et al., 2011). Despite its significance, project delays affect most construction projects (in both developed and developing countries), which is a serious issue (Tariq & Shujaa Safdar Gardezi, 2022). Thus, this paper's goal is to pinpoint the different reasons behind project delays and recommend preventative measures that should be taken. Another way to describe construction delays is when a project is completed after its scheduled completion date (Yap et al., 2021). Researchers have examined construction delays in a variety of ways. While other research clarified the numerous approaches to mitigate it, some studies explored the various reasons for delay in various parts of the world and various project formats (Khahro & Memon, 2018).

Hamzah et al. (2011) outlined the main reasons behind project delays in Malaysia's construction sector. These include subpar site management, poor planning, a lack of labor, insufficient client financing and payments for finished work, issues with subcontractors, insufficient contractor experience, a shortage of materials, the availability and malfunction of construction equipment, a breakdown in communication between parties, and mistakes made during the building stage. Likewise, Ansari et al (2019) determined the main reasons for building project delays in Saudi Arabia, a questionnaire survey was done. Lack of funding to complete the job and red tape were found to be the two main factors contributing to project delays. In Pakistan, Wahdan, Abu Yousef, and Farid (2019) conducted a similar analysis, and the following conclusions were deemed to be the most significant: problems with finances and payments, poor planning, a natural disaster, bad site management, a shortage of supplies and equipment, and contractors with insufficient experience. Conversely, there have also been delays in construction projects due to the COVID-19 pandemic. A few of the projects are getting postponed and terminated (Romzi & Doh, 2022). Similarly, Gara et al. (2022) said that projects are suspended, and delays are unavoidable due to lockdowns and restriction controls in the majority of countries. Due to the requirement for construction workers to maintain social distancing to prevent viral illnesses, production will also be restricted (Yin et al., 2022).

2. Literature Review

Project delay

One of the main issues that project managers frequently face is delay. Delays in construction projects usually have negative consequences for the parties involved (Serrador & Turner, 2015). Additionally, it's believed that the consequences of construction delays are what follows when a project's delays have unclear causes (de Almeida et al., 2021). These outcomes usually have a significant impact on a project's end (Nabilla et al., n.d.).

A delay can be defined as a time overrun or extension of time to complete the project (Shah Ali et al., n.d.). It is impossible to completely prevent construction delays, particularly when they are caused by events outside of our control. As a result, a delay occurs when a construction project's actual progress lags its anticipated timeline or when it is completed later than expected. Delays can occur for a variety of reasons and events (Al-Mohammad & Jamaludin, 2018a).

Delays can be frustrating and costly (Ren et al., 2008). There are several reasons why projects veer off course and miss their deadlines. Therefore, before beginning to address the delays, managers and the project management team must comprehend the reasons behind project delays.
For this study, the authors identified four common causes that can be applied to the company's project:

Manpower: Some can focus on a task for longer than necessary. Alternatively, they might lack knowledge and expertise (Al-Mohammad & Jamaludin, 2018b).
Planning: The dynamic nature of a project creates flexible planning that requires some alterations. Time is always the arch enemies of a project manager especially in the distribution of tasks (Agyekum-Mensah & Knight, 2017).
Third-party factors: Most projects include outside parties, and although these parties typically don't have complete knowledge of your objectives, strategies, or crucial project milestones at this point, they are often the ones who hold the key to making the project happen. They do not participate in discussions that happen in your team (Nabilla et al., n.d.).
Unforeseen circumstances: Natural catastrophes or weather-related interruptions might occur at any time. They could put your project behind schedule. Do not forget the political and investment environment as well (Yin et al., 2022a).

3. Methodology

Data Collection

Research data is the collection of data that has been condensed into a narrative and is then interpreted to yield insights. It makes sense that the data analysis method helps to divide large amounts of data into more manageable chunks (de Almeida et al., 2021). Three key processes occur during the data analysis process: data organization, summarization, and categorization, which together make up the second best-known technique for data reduction. It facilitates the identification and connecting of data by assisting in the discovery of patterns and themes. Data analysis is the third and final method that researchers use. They can perform it both top-down and bottom-up (Ren et al., 2008). This study focuses on 20 completed projects and 5 ongoing projects that have been marked delayed ranging from 2019-2021. The policy of the company stated that project delivery that exceeds 30 days of projected progress will be marked as late, and thus considered delayed. The reason behind the delay is reported in the project progress report and classified into common causes of project delay.

Cause and Effect Diagram

When problems develop and their underlying causes are identified, the Ishikawa diagram also called the Fishbone diagram, is a visual aid that may be utilized in any kind of work to help with the mental organization and processing of concepts, points of view, and conclusions (Liliana, 2016). The aforementioned chart serves as a useful tool for the rational and methodical analysis of the causes and sub-causes of specific issues or impacts that impact a certain activity, irrespective of its nature (Satya, 2016). Ishikawa diagrams, also known as fishbone diagrams, herringbone diagrams, cause-and-effect diagrams, or Fishikawa, are causal diagrams that illustrate the reasons behind a particular event that were made by Kaoru Ishikawa in 1968. The Ishikawa diagram is often used to identify the sources of an overall effect in product design and quality fault avoidance. Every imperfection's cause or source offers diversity. To discover these sources of variance, causes are typically

divided into broad groups. For this study, the data is further analyzed to find the root causes of project delay to fulfill the objective of the study.

4. Findings

Table 1, presents a list of 25 ABC Company projects from 2019 to 2021 that had a marked delay, indicating that the project was not completed on the anticipated or contractually required date.

Table 1: Project Delay and Causes for Company ABC

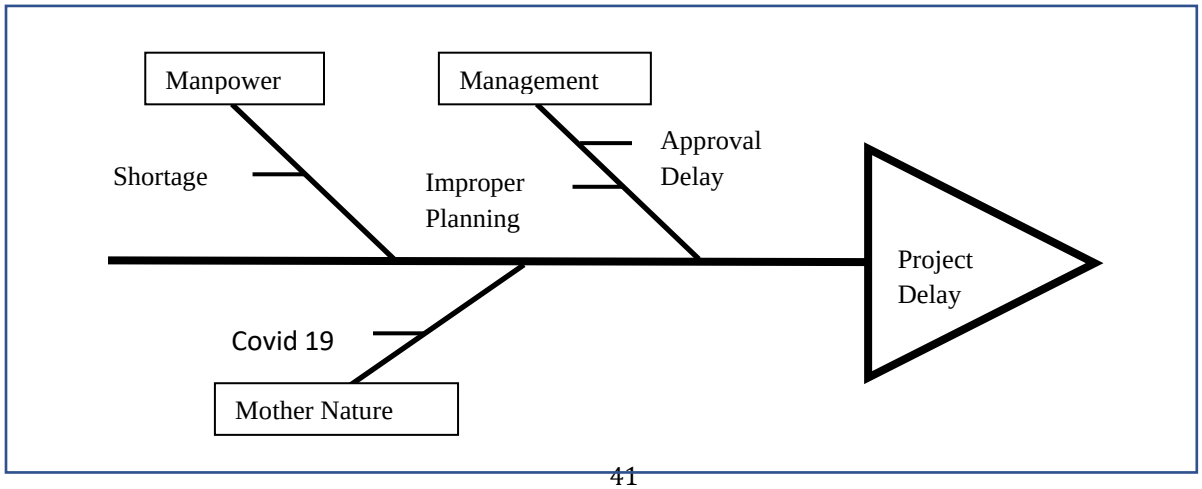
Types of projects	No of delays	Cause of delay	Causes frequency
Distribution Pipe Replacement	11 times	1. Approval from the local authority for digging and road closure	5 times
		2. Delayed work tender and authorization	3 times
		3. Different project scopes issued	2 times
		4. Late progress report submission	1 time
Valve and sensor replacement	7 times	1. Delayed work tender and authorization	4 times
		2. Incorrect product specification	2 times
		3. Late progress report submission	1 time
Leakage and pipe pressure maintenance	5 times	1. Shortage of vendor's manpower	2 times
		2. Lockdown	2 times
		3. Approval from local authority	1 time
Distribution Pump replacement	2 times	1. Product delivery delayed due to lockdown	2 times

An analysis of the causes of delays is performed so that this matter can be monitored more effectively and help the Project Control Team make more accurate forecasts so that the project can be delivered on time.

Root causes of delay

A further investigation was made to determine the real reason that triggered the cause of delay. The information is analyzed from various records on the projects that have been marked delayed. The researcher examines all the records accessible to establish the root causes for the delay. The process of determining the underlying reasons for unfavorable occurrences and preventing them from recurring in the future is known as root cause analysis (Yap et al., 2021). The root cause is the most profound underlying reason (or causes) for any process's positive or negative symptoms that, if addressed, would result in the elimination or considerable decrease of the symptom (Hamzah et al., 2011). We have to dig the deepest to uncover most of the roots. Often, they are not the closest, most evident, or most direct reasons. They usually exist i). The structure at three, four, or five layers deep (Ansari et al., 2019). The root causes are then recategorized into a proper group and summarized using Fishbone diagrams shown in Figure 1.

Figure 1: Fishbone diagram of root causes for project delay



Shortage of Manpower

Due to the labor-intensive nature of the construction sector, a labor shortage directly affects project performance (Mohd-Rahim et al., 2016). Many managers and supervisors mistakenly believe that a worker's size and degree of performance on the job are inversely related. Work commitments are making up a larger portion of the workload, which is typical in many organizations these days. Workload inside an organization rises when employees perform and finish more tasks than is expected of them. A staffing shortage causes an organization to have more work and less supervision.

The company won about 600 projects from 2019 to 2021. One project engineer is expected to manage 10 projects each year with the help of a team of project engineers that has roughly 20 members. Since all projects take a very long time to finish, this is seen as being quite taxing on the personnel. This problem is exacerbated by the fact that several projects that were awarded in 2021 were postponed until 2022 due to unanticipated circumstances, such as obtaining municipal approval, and were not completed in that year. The problems get worse when the team, which usually has 5 to 7 people, is reduced to 3 or 5 because there is an increase in projects during certain times. Due to the labor-intensive nature of the construction sector, a labor shortage directly affects project performance (Głuszak & Leśniak, 2015). Referring to Table 1, when the client side is experiencing a labor shortage, the situation sometimes becomes beyond the company's control. Even though it has only happened once, it is important to pay attention to the problems to reduce the likelihood that they may return at a later date.

Local Authority Approval Delay

Delays in obtaining authority approval have become a major issue for the management of the company. The COVID-19 viral pandemic is currently affecting the entire planet, which is making this issue worse and out of control. This has a big effect on how well all of the company's initiatives perform. Routine approval has taken a little bit more time thus contributing to the overall performance of the company's projects. While the number of occurrences is considered small, projects have a critical impact on the profit and the company's image which are the two most important elements of sustainability (Azli Mohd-Rahim et al., 2016). The table below compares the time taken takes to obtain each type of approval from the local authority as of October 2021.

Table 2: Forecasted and actual period of acquiring approval from local authorities

Type of Approval	Forecast Duration	Actual Duration
Minor Work Permit	Min: 56 days Max: 70 days	Min: 20 days Max: 156 days
Building Layout	Min: 70 days Max: 140 days	Min: 31 days Max: 180 days
Approval to Plan and Design Layout for Building	Min: 117 days Max: 140 days	Min: 88 days Max: 172 days

From table 2, it displays the anticipated and actual length of the local authorities' approval process. The number of working days needed to process the approval guidance and release from the local government is used as the minimum projected duration. However, it will take less time to approve a project if it has already been approved in the past. A small percentage of projects are new and take longer than expected, increasing the number of working days needed for approval and approving a small number of projects after the allotted number of working days has passed. The project management team must find a solution so that the delay in getting authority approval to carry out the project cannot negatively impact the project and does not become a recurring issue in project management, even though it is impossible to control the delay in getting authority approval to carry out the project. This is because project management success is measured in terms of three main objectives: time, cost, and technical results (Haseeb et al., 2011). Failure to plan the correct time for project completion forecasting will hurt an organization's performance, particularly in organizations whose operational nature is project management (Głuszak & Leśniak, 2015).

Improper Planning

The manner the company's project managers conducted themselves demonstrates this problem. It may be challenging for them to spend time working in the office and interacting with other teams since they have too many projects to manage. They routinely visit the job site to keep an eye on their projects, based on observation. As a result, they had little opportunity to establish more effective communication, and these chances were lost. There may be four to five projects operating concurrently for a project manager over four to six months. Sometimes a more important project will receive considerably more attention, which causes errors and delays for other initiatives. This can be seen from Table 1 where 11 projects were delayed due to different product specifications, late submission of progress reports, and delayed work tender progress. Time is essentially critical for success in project management and the burden on the one in charge may help to jeopardize the issue (Mofleh, 2021).

Additionally, some of them must go a great distance from the Kuala Lumpur office because the company's project encompasses the entirety of Malaysia. Project managers should step in at this point to keep the executive engineers and site supervisors motivated to complete their work. The team's assignments were made according to first come, first served, which required some employees to go to other states two or three times each week when it might have been given to someone already overseeing the project in that area to cut down on travel time and eventually decrease costs. The majority of the projects were unexpected, therefore without appropriate preparation, their job may not be productive, and their current workload may cause them stress. This is also being commented on by (Haseeb et al., 2011) which essentially emphasizes that planning is essential for a business that manages multiple tasks at once. They must consider the complexity of the execution, not just the project's scope but also the associated activities.

Covid19 Pandemic

The COVID-19 pandemic has affected all sectors of society, sparing no one and permanently altering how we live, interact, and work (Gara et al., 2022). While some of us now work from home or telecommute, others have lost their jobs and faced protracted layoffs. In one way or another, we have all felt the devastating impact of businesses collapsing because of unstable economic conditions. For project managers, COVID-19's consequences on operations have been catastrophic. Reliance on remote work has hampered the collaborative tactics that are commonly employed in a traditional team setting (Haas & Markovič, 2021). Lockdowns and border closures have significantly interrupted supply chains, while project management and corporate operations have become riskier (Alenezi, 2020).

Due to two key factors, the Covid-19 lockout has had a significant negative impact on the business. The project that was started has been suspended, which is the first factor. This indicates that all processes were put on pause and all actions ceased, regardless of the project's stage. The failure to finish the projects also shows that project delivery and progress payment are inevitable. This will influence both the contractor and the project owner. Due to lockdowns, all projects were at a standstill making the supply chain of the network completely halted (Yin et al., 2022b). The second reason is the suspension of all incoming projects. Contractors and clients are waiting to see how long the lockdown will last because of this uncertainty (Gara et al., 2022). Even though the organization only had a few active projects at the time, losing a future project is still considered a missed opportunity. The impact was not only felt during the lockdown; when it was lifted and normal operations resumed, problems including a lack of face masks or other facial coverings caused further delays. The completion date has been delayed due to material shortages for the projects and the affected border control strategy.

5. Conclusion and Implications of the study

Determining the root causes of project delays has profound implications for both companies and nations. For companies, addressing these causes is crucial for mitigating financial impacts such as increased costs and penalties that arise from extended timelines. By identifying inefficiencies and systemic issues, companies can streamline operations, enhance productivity, and improve resource allocation, ultimately boosting profitability and operational efficiency. Additionally, understanding the root causes helps safeguard a company's reputation, as persistent delays can damage client trust and stakeholder relationships (Yin et al., 2022b). Improved project management practices foster better employee morale by reducing the stress associated with

delays, which in turn enhances overall productivity. Furthermore, a thorough analysis of delays strengthens risk management strategies, helping companies anticipate and mitigate future risks more effectively.

On a national level, project delays can significantly impede economic growth, particularly when they involve critical infrastructure or development projects. Efficient project execution is vital for supporting economic activities and enhancing national competitiveness. Delays in public projects, such as those related to transportation or healthcare, can negatively affect the quality of essential services and infrastructure, impacting public well-being. By resolving the root causes of these delays, nations can ensure the timely delivery of crucial projects and improve the overall investment climate, attracting both domestic and international investors. Moreover, addressing delays reflects positively on government efficiency and governance, leading to better public sector performance and contributing to strategic development goals (Głuszak & Leśniak, 2015). In essence, tackling project delays helps both companies and nations achieve their objectives more effectively, fostering overall progress and development.

Conclusion

According to the report, there are four main reasons why projects are delayed for the company: a lack of labor, a delay in receiving approval from the local government, poor planning, and the COVID-19 pandemic. According to the data above, delays could happen frequently in every construction project and turn into the most frequent problems that have detrimental effects on the organization and its participants. A construction limitation will have an impact on the three main project components of cost, scope of work, and time, which will result in a low productivity rate. To assist the teams in completing a project successfully, the project management process includes the monitoring and controlling phases. This study also effectively showed that, even if management faced the issue of uncontrollable delays, the source of the delays could still be determined from the management side of the organization itself. As a result, it should not be left to management to inquire about uncontrollable concerns. A major and well-known corporation needs improvement measures badly if it wants to increase performance. This can benefit the business's reputation, enable it to continue to be competitive in its job, and serve as an example for consultants and contractors.

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