A Theoretical Assessment of the Causes and Effects of Construction Project Delay

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Abstract—This study examines previous literature on construction project delays, with the specific aim of identifying the causes and effects of delays in construction projects. This is because the concept of construction project delays has attracted much attention in recent years and that researchers and research bodies, be it corporate or government that try to formulate remedies to project delays should begin with an understanding of the causes of delays and their effect to the construction industry and other sectors. The study is conducted with reference to existing theoretical literature, published and unpublished research. The study is mainly a literature review/survey on the causes and effects of construction project delays. One of the primary findings emanating from the study reveals that empirical studies have identified a number of important factors which cause project delays; such as delay in progress payments, difficulties in financing projects by the contractor, delay in approving major changes in the scope of work, delay in material delivery, equipment breakdowns, low productivity level of workers and weather effect on construction activities amongst others. Literature also revealed that extension of project time and cost overruns are the major effects of construction project delays. The study explores the causes and effects of construction project delays and presents a robust background on the theories of construction project delays.

Keywords—Delays, Construction Industry, construction projects, delay effect

I. INTRODUCTION

The construction industry is a key sector in the development and economic growth of most countries across the world. However, the industry faces a number of challenges, such as project delays. Projects or construction works that are not delivered on time to the client are referred to as delayed projects. Mohamad [1] defines delay as an act or event that extends the time to complete or perform an act under the contract. Also, Assaf and Al-Hejji [2], states that delay is the time overrun either beyond completion date specified in a contract, or beyond the date that the parties agreed upon for delivery of a project. It is basically a project slipping over its planned schedule and is considered as common problem in construction projects worldwide. Assaf and Al-Hejji [2] further illustrates that, to the owner, delay means loss of revenue through lack of production facilities and rent-able space or a dependence on present facilities. In some cases, to the contractor, delay means higher overhead costs because of longer work period, higher material costs through inflation, and due to labour cost increases.

Theodore [3] classifies delays into two, those caused by the client and those caused by the contractor. Delays caused by the client such as late submission of drawings and specifications, frequent change orders, and incorrect site information generates claims from both the main contractors and sub-contractors which many times entail lengthy court battles with huge financial repercussions [3]. Delays caused by contractors can generally be attributed to poor managerial skills. Lack of planning and a poor understanding of accounting and financial principles have led to many a contractor’s downfall [3]. Hence, this paper contains discussions on the theory of construction project delays, causes and effects of project delays. This study focuses on the completion of projects on time thus overcoming delays. The paper starts with an overview of construction delays and their effects, followed by the presentation of the methodology and the findings form literature before conclusion and recommendations are drawn.

II. THEORETICAL OVERVIEW OF CONSTRUCTION PROJECT DELAY

There are a number of activities that, when not managed properly, can lead to delays in the construction industry worldwide. Hence, Wie [4] states that the classification of delays is dependent upon the type and magnitude of the effect that an activity will have on the project and who is responsible for the delay among the stake holders. Whilst, Theodore [3] categorised delays into four groups as follows; Critical or non-critical, Excusable or non-excusable, Compensable or non-compensable and Concurrent or non-concurrent, which will elaborately discussed in the subsequent sessions.

A. Critical Versus Non-Critical Delays

Theodore [3] writes that delays that affect the project completion time or date are considered as critical delays.
Delays that do not affect the project completion time or date are noncritical delays. If certain activities are delayed in the construction project life cycle, the project completion date will be delayed. Determining which activities truly control the project completion date depends on the following: the project itself, the contractor’s plan and schedule (particularly the critical path), the requirement of the contract for sequence and phasing and the physical constraint of the project, i.e. how to build the job from a practical perspective [3].

B. Excusable versus Non-Excusable Delays

Behboudi [5] States that excusable delays are caused owners actions or responsibilities, hence, the contractor is entitled to extension of time. Whereas, non-excusable delays are caused by the contractors actions or responsibilities and the client is compensated. However, Theodore [3] studies that all delays are either excusable or non-excusable. An excusable delay is a delay that is due to an unforeseeable event beyond the contractor’s or the subcontractor’s control. Delays resulting from the following events would be considered excusable: General labour strikes, Fires, Floods, Acts of God, Owner-directed changes, Errors and omissions in the plans and specifications, Differing site conditions or concealed conditions, unusually severe weather, Intervention by outside agencies and Lack of action by government bodies [3].

Non-excusable delays are events that are within the contractor’s control or that are foreseeable. Non-excusable delays include: Late performance of sub-contractors, Untimely performance by suppliers and Faulty workmanship by the contractor or sub-contractors [3].

C. Compensable Delays versus Non-Compensable Delays

The work of Mohammed and Isah [6] shows that non-compensable delay is caused by third parties or incidents beyond the control of both the owner and the contractor where the contractor is normally entitled to a time extension but no compensation for delay damages and Compensable delay is caused by the owner or the owner's agents. A compensable delay is a delay where the contractor is entitled to a time extension and to additional compensation such as payment for the delay. Relating back to the excusable and non-excusable delays, only excusable delays can be compensable [6].

Non-compensable delays mean that although an excusable delay may have occurred, the contractor is not entitled to any additional compensation resulting from the excusable delay [3].

D. Concurrent Delays

Rider and Long [7] defines concurrent delays as two or more parallel and independent delays to the critical path of a project. Concurrent delays can be on the same critical path or on a parallel critical path.

III. CONSTRUCTION PROJECT DELAY – CAUSES AND EFFECTS

Causes of delays are factors or events that occur before and during the construction process that will affect the time of completing a project. Ali et al. [8] states that here are primarily four factors of delay categorized in broad categories, namely contractor-related factors, consultant-related factors, client-related factors and external factors.

Motaleb and Kishk [9] identifies at least five factors that can cause time overrun and these include change orders, slow decision making by client, lack of capability of client representative, construction financial difficulties and late delivery of materials. Further, Sambasivan and Soon [10], Assaf and Al-Hejji [3], Wei [4] and Theodore [3] identified seven categories of causes of construction project delays and grouped them as follows; owner related, contractor related, consultant related, material related, equipment related, labour related and causes by eternal factors. Literature reviewed showed that the scholars identified individual causes of delays in each of the seven categories. In the owner related category of causes of delays, Wie [4] found that delay in revising and approving design documents is the major cause of client related causes of delays in Malaysia. However, Hasseb et al [11], Assaf and Al-Hejji [2] and Sambasivan and Soon [10] found that delay in progress payments by owner as the major cause of client related causes of delays. Further, Motaleb and Kishk [9] found the major cause of delays in the UAE related to the client was Change orders. In the contractor related category, Wie [4] and Hasseb et al [11] found that delays in sub-contractors work was the major cause of delays related to the contractor. However, Assaf and Al-Hejji [2] found that difficulties in financing project by contractor was the major cause of delays. Further, in the consultant category of causes of delays, Sambasivan and Soon [10] found that poor contract management was the major cause of delays by consultants in Malaysia. However, the study of Wie [4] in Malaysia showed that delay in approving major changes in the scope of work was the major cause of delays. In the material related category, Motaleb and Kishk [9] found that late delivery of materials was the major cause of delays, but Assaf and Al-Hejji [2] found Shortage of construction materials in market as the major cause of delays.

Literature showed, in the equipment related category, that lack of high-technology mechanical equipment was the major cause of delays in Malaysia [4]. The study of Hasseb et al [11] showed that use of improper equipment was the major cause of delays. However, in the study of Assaf and Al-Hejji [2], Equipment breakdowns was identified as the major cause of delays on construction projects. Further, in the labour related category of causes of delays, Hasseb et al [11], Wei [4], Assaf and Al-Hejji [2] and Sambasivan and Soon [10] all found that labour supply was the major cause of delays in the labour related category. In the last category which is delays caused by external factors, the study by Theodore [3] agrees with the studies by Wei [4], Assaf and Al-Hejji [2] and Sambasivan and Soon [10] where effects of subsurface and ground conditions was identified and ranked as the major external factor cause of delays in construction projects.
A. Effects of construction project delays

Effects of delays are the consequences that will occur when the causes of delays are not identified and worked on effectively. The study of Pourrostam and Ismail [12] identified and ranks the effects of construction delays as follows; time overrun; cost overrun; dispute; arbitration; litigation; and total abandonment of projects. These findings are in general agreement with other studies as carried out by Aibinu and Jagboro [13] and Motaleb and Kishk [9]. However, the study of Baki [14] brings in the aspect of claims as one of the effects of delays in construction projects. Further, the study of Sunjka & Jacob [15] identified the effects of delays and tabulated them as follows; Time overrun: When the stipulated completion time is pushed forward, the project is said to have experienced time overrun; Budget overrun: When a project is completed at a cost higher than what was budgeted, it is said to experience a budget overrun; Poor quality completed project: inferior workmanship and/or inferior quality materials, can lead to issues of project quality; Bad Public Relations: When projects are delayed, contractors, consultants and clients could put their public reputations at risk; Litigation: Disputes can lead to court cases for resolution especially when large penalties are at stake; Arbitration: The project will have extra cost and time related to the engagement of professional arbitrators; Disputes and claims: Disputes and claims arise from the losses incurred through delays by either party in the contract; and Total abandonment: Delays in project execution could lead to total abandonment if issues leading to the delays are not resolved timeously. Kikwasi [16] identified 14 effects of delays in Tanzania and ranked them as follows; time overrun, cost overrun, negative social impact, idling resources, disputes, arbitration, delaying by the client to return the loans, poor quality of work due to hurrying the projects, delaying in getting profit by clients, bankruptcy, litigation, create stress on contractors, total abandonment and acceleration losses.

IV. RESEARCH METHODOLOGY

The research was conducted with reference to existing theoretical literature, published and unpublished literatures. The study is mainly a literature survey/review and looks at the literatures relating to construction project delays. This is because the concept of project delays has attracted much attention in recent years and that researchers and research bodies, be it corporate or government that try to formulate remedies to construction project delays should begin with an understanding of the causes and there effect. The current methodology falls within the qualitative research methodology.

V. LESSON LEARNT FROM LITERATURE REVIEW

Literature revealed that’s that causes of delays can be categorised into seven groups namely: owner related, contractor related, consultant related, material related, equipment related, labour related and causes by eternal factors [3]. Further, literature showed that there in independent causes of delays in each of the seven groups. In the owner related category of delays, Delay in progress payments by owner was identified by most scholars as the major cause of delays associated with the client [11] [2] [10]. Further, in the contractor related category, delays in sub-contractors work was identified as the major cause of delays [4]. Sambasivan and Soon [10] found that poor contract management was the major cause of delays by consultants. However, prompt approvals of changes in the scope of works by consultants was also identified as a major cause of delays. Late deliveries of materials to site showed to be the major cause of delays related to materials as shown in the study of Motaleb and Kishk [9]. Further, in the equipment related causes of delays, equipment breakdowns was identified as the major cause of delays as evidenced in the study of Assaf and Al-Hejji [2]. Labour supply and effects of subsurface and ground conditions were identified by the scholars as the major causes of delays in the labour related category and causes of delays by external factors category respectively.

VI. CONCLUSION

This article has examined literature relating to construction project delays. Literature review showed that the causes of delays are at different level ranging from those caused by the client or owner to those that are caused by other external factors. Literature also showed that each category of causes of delays had different factors that can lead to delays on construction projects. This paper examined causes of construction project delays from the seven identified categories as compiled from an extensive literature review. Further, literature revealed that there are corresponding negative effects to the professionals of construction project delays.

REFERENCES


