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Exploring Critical Factors Affecting Delay in Construction Projects in Iraq: A review

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Abstract

The construction sector is considered an important part of improving the economy and enhance the development of the countries. Therefore, executing a construction project with the signed time in the contract is essential to fix the general plan. On this base, construction delay will obstruct the estimated plan end and start another project. This literature review studies the recent articles in Iraq ten year ago by exploring the methodologies and the most reasons of delay in construction projects in different cities such as, Baghdad and Najaf. This study analyzed 12 articles and search respective to the used method; delay causes and mitigation. The results were 31 causes of delay in construction projects were selected but the most reason of delay is financial problems by both contractor and owner which repeated five times in the study articles, however, political and management issues repeated four times in the articles. Study conclusions that financial and management represent the main cause of delay. To avoid the possible delay in completing construction project in Iraq, project owners should put suitable plan with suitable payments in project budget and selecting management plan to solve any possible problems, however, political issues cause delay in construction projects without any mitigation from both contractor and owner.

Keywords: Construction projects, Causes delay, Contractor and owner, Project management.

1. Introduction

The Implementation of any construction project accompanied with many steps to reach the final step with the same schedule time and cost is impossible achieve that [1]. Delay in executing construction process causes high magnitudes of general cost, whereas, achieving schedule program at the planning time is beneficial to all stakeholders' team either client and contractor, which is one of the reasons to project success [2].

Although delay factors are obvious, most countries either developed or non-developed face issues with these critical points [3,4]. Therefore, this review paper focused on the critical points of delay factors in construction projects, particularly in Iraq to significantly diminish these points as soon as possible by collecting various researchers who mentioned the most important issues that caused delay in construction projects. Definition of the delay in a project was referred previously as a delay in the time that effected on a selected part or parts of the project which caused an extended in schedule end time [5], or either contractor or owner contributing delay in construction project [6]. Additionally, definition of delay is time overrun beyond specified date which both contractor and owner considered it that the time of project delivery [7], other definition of the delay is an emergency event or act which extends planning time to fulfil a construction project by adding extra working days [8]. Another definition of delay in construction can be referred that the fulfillment of execution a specified project at a different date which is beyond the agreed date.

Delays in the construction field have been referred to by many researchers in different manners. Some of them mentioned deeply to the causes of delay and what the critical points could cause real issues leaded to clear delay and wide period between the planning date and the new date of a project completion, however, other studies mentioned to how avoid these reasons of construction delay. Because this article focused on the reasons of completing a project in Iraq, there are many review studies mentioned to this problem by focusing on the reasons of construction delay and trying to mitigate this problem in other countries around the world. In Egypt, [7] selected seven interviews with semi-structured person to clarify causes of construction delay respective to contractor, owner and consultant point of view, they indicated to five main reasons of construction delay such as finance, bad management and the selected unprofessional staff that depended in executing the project, whereas in Saudi Arabia, [9] selected of more than eighty consultants, contractors and clients who working in construction field, this study revealed that unqualified staff was the most cause of delay in construction sector. Similarly, a literature review study pointed to degradation in staff , poor management in site and the continuous change in design plans which caused the delay in construction project [8]. To cover the gap in the recent literature studies, this study depends on many studies that adopted different methodologies such as, questionnaire and physical interviews with different staff members particularly, executive engineers, consultants, owners and contractors to emerge the most frequently causes of delay in executive construction projects in Iraq.

2. Methodology

This article review depended on references that were published in conference proceedings in Iraq, local journal articles, particularly Journal of Baghdad university, journal of Babil University, journal of Dyala university, journal of university of technology. These resources are published with high rank of the world such as, Scopus index, google scholar and Web of Science data base. In order to shed a light on the different causes of delays in a project, Scopus data base was the majority of relevant research papers were extracted from this source, which is the perfect place to find the trusted and well-reviewed article and research papers. Also, Scopus is the wildest source for multi filed sciences, such as medicine, physics, chemistry and different types of engineering like civil, electrical, mechanics and so on. From 14 research papers, the findings of these papers are¹ illustrated in Table (1), also their methodologies and conclusions are mentioned through Table (1).

Table 1. Exploring causes of construction delay in studies ten years ago

No.	Reference	Delay causes	Mitigation	Construction project	methodology
1	[10]	Financial – Contractor	Introduce data base to decision makers	6 projects in Iraq	Questionnaire survey
2	[11]	Financial issues, political problems, technical and legal then organizational aspects	----	car parks, realization projects- Baghdad	Questionnaire survey
3	[12]	political issues, economic problems, test of materials, completing the results, payments by a contractor, executing process failure, climate effects	Increasing number of special laboratories	Projects of highway construction - Iraq	Statistical analysis- Frequency index with Spearman's rank correlation
4	[13]	lab testing, specifications of accepted bidder, financial by contractor, and high prices of buildings material.	-----	Iraq	Questionnaire survey
5	[14]	Financial issues, technical problems, legal processes, management issues, political issues, economic, and other external reasons.	-----	Public projects - Iraq	Questionnaire survey and relative importance index (RII) – 62 questionnaires
6	[15]	client, contractor, consultant and external factors	-----	Public projects - Iraq	Questionnaire survey – 134 participants
7	[16]	Contractor – finance issues, accept the lowest bids	-----	Najaf buildings - Iraq	Analytic Network Process (ANP) method,

					questionnaire survey 33 participants, five-point Likert scale with two rounds
8	[17]	cost, design and implementation stages, change orders, management process, payment process by the contractor.	-----	public projects particularly buildings, bridges and roads	Collected and analyzed data from Iraqi official projects, and other sources
9	[18]	economic issues, bureaucracy and corruption, many public holidays, delay in obtaining official permits, and big change orders by owners.	-----	Najaf city - Iraq	questionnaire survey with 115 participants (clients, consultants, project managers, contractors, and engineers) – 45 questioners item
10	[19]	Using of measurement systems which satisfaction of the client, project profits, project viability, contentment of the project's users, and project quality.	-----	Iraq	survey questionnaire- 97 participants
11	[21]	Safety process, risk management, financial issues, management of supply chain, payment process, use of the update technology, increasing of price items	-----	Iraq	quantitative and qualitative approaches - survey data by 205 experts - a fuzzy inference system
12	[22]	bureaucracy and corruption, political issues, poor in three sectors management, planning and scheduling	-----	Najaf - Iraq	Online survey questionnaire - 213 participants

Table 2. Causes factors and number of repeated times in recent articles

No.	Causes of construction delay	Number of sources
1	Financial issues from both contractor and owner	5
2	Political issues	4
3	Technical problems	2
4	Legal process	2
5	Organizational issues	1
6	Economic problems	3

7	Test of materials	1
8	Completing the results	1
9	Payments by contractor side	1
10	Failure in executing project processes	2
11	Climate effects	2
12	Laboratory testing	1
13	Specifications of accepted bidder	2
14	Buildings materials	1
15	Management issues	4
16	External reasons	2
17	Consultant delay	1
18	Cost problems	1
19	Design stage	1
20	Change orders	2
21	measurement systems	1
22	project profits	1
23	project viability	1
24	contentment of the project's users	1
25	project quality	1
26	planning issues	1
27	security problems	1
28	Safety process	1
29	management of supply chain	1
30	use of the update technology	1
31	Change of price items	1

3. Results and Discussion:

By exploring the delay reasons as mentioned in Table 1, there are thirty-two reasons illustrated by twelve articles published between 2011 to 2024. These studies were selected case studies for different projects in Iraq.

The reasons for delay were repeated for many times as mentioned in Table 2, whereas some reasons repeated two times, and the others showed many times till five times were caused in the recent studies. The most delay cause was financial problems from both sides, contractors and owners, where

this issue was repeated five times in the recent studies. [11] concluded that the payment schedule contributes about 68.09% of the total percent of delay factors, and the percentage of shortage in the financial budget was 66.37 % from the total percentage of delay. On the other hand, [10] referred that the capacity of contractor from financial side was one of the main reasons in construction delay and the most factor caused delay in a project construction. Also, [13] mentioned to the weak in ability of contractor finance represents one of the major reasons for construction delays. These results are compatible with [14] results. Similarly, [21] concluded that delay in payment process was one of the main causes of construction delay.

The second factors which cause construction delay are political problems and management issues which both of them were mentioned in four articles, which is the first category in the group of reasons. The issues with political reasons were one of the main reasons in four various projects which implemented in Iraq, particularly with war circumstances which contributed a ratio of (47.75%) from the total ratio of delay factors through constructed different projects in Baghdad such as car parks and realization projects, which emerged from a questionnaire survey contains two stages, one covered a general information and second was focused on risk sources [11]. Additionally, [12] referred to political problems was the main case of delay in implementing of transport sector, however, he used statistical indexes such as Spearmans rank correlation and Frequency index to analyze questionnaire data. Consequently, [14] also used statistical tools (relative importance index (RII)) to check political issues as one of the major causes of delay. Another study which was conducted in Najaf city used Chi-squared test, that a statistical tool to assess a questionnaire response from 115 participants [18]. All searches used questionnaire response by more than 60 participants who have different graduation from Bachelor degree to PhD degree with different specialized engineering with various sectors and technicians. All researches did not mention to a mitigation action unless [12] who referred to a recommended action by increasing the number of laboratories to avoid the delay.

The second reason in the second state which appeared in four recent articles is the troubles in management issues where [14] mentioned to this factor in addressing the most delay factors through a questionnaire when they studied the reasons of delay in completing universities buildings as a case study of the troubled constructions projects, however, effective management of projects contributes with small ratio of delay the completion of troubled public projects especially in roads, bridges and buildings [17]. Management in catastrophic situation such as, pandemic of COVID-19 is considered one of the main reasons of delay in many aspects like risk management, deficiency in management and problems in supply chain management through executing hospital construction projects [21]. Although management process is considered the main reason of delay, [22] referred that management process effected on the completion of a project as third reason of construction delay through an online survey in the Najaf city obtaining responses of 213 participants which contains contractors, engineers, clients and consultants. Therefore, both political and management problems appeared frequently as main reasons in construction delay in Iraq.

However, other reasons were mentioned in the recent articles, each one of these reasons was repeated three times in different studies. This reason came in the third category is economic problems.

Economic issues have affected on project constructions by the results of [13] who concluded that most reason delays are the lowest bidder always were selected for execution the project and the high prices of construction materials. Similarly, [14] referred to economic issues was one of six main reason categories for the delay in construction executing through professional questionnaire, however, [18] considered that economic problems with both local and global parts negatively affected on the progress of project construction.

Other factors came in the pre-last stage respective to how many repeated in the recent studies are technical problems, legal issues, failure in final processes of a project, the effect of climate change, specifications of accepted bidder, external reasons and change orders. All these factors were repeated two times, whereas the last factors which could cause delay in construction project are twenty factors were mentioned in Table 2, which appeared once in the recent articles.

Results of this study pointed to the main cause of construction delays is finance issues, which is similar to a study was achieved in Pakistan by [20] who concluded that problems in financial process was one of the main causes of construction delay. Also, results of a study in Saudi Arabia pointed to the same reason [9]. However, results of a study in India were poor communication, poor site planning and unprofessional site management were the main reasons of construction delay [4].

4. Conclusions

The exploration of the most effective causes of delay in a project construction in Iraq was being investigated by many studies, particularly in the last decade. Results of the last twelve articles reported that fourteen different causes were mentioned as an explanation of why construction projects did not finish their works at the signed time in the contract. The review revealed that the most effective cause of delay is financial issues with various aspects, either on contractor's side or owner side. Financial issues are contribute to the finance process, buying equipment, buying materials and financial issues between owner and contractor respective to the construction plan. The second reason for delay was political issues and the weakness in project management. Therefore, to avoid the possible delay in completing construction project in Iraq, project owners should put suitable plan with enough liquidity in project budget and selecting management plan to solve any possible problems, however, political issues cause delay in construction projects without any mitigation from both contractor and owner.

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دراسة تأثير العوامل الحرجة على التأخير في تنفيذ مشاريع البناء في العراق: دراسة مراجعة

الخلاصة: يعد قطاع البناء جزءاً مهماً ولا يتجزأ من تطوير اقتصاد أي بلد وتعزيز التنمية وعليه، فإن تنفيذ مشاريع البناء في الوقت المثبت في العقد أمر ضروري لنفيذ متطلبات الخطة العامة. وعلى هذا الأساس، فإن تأخير البناء سيعيق عملية تسليم المبنى كاملاً خلال الفترة المشار لها في العقد وبالتالي تأخير في بداية مشروع آخر. تم مراجعة الأدبيات وبالأخص المقالات الحديثة في العراق قبل عشر سنوات من خلال استكشاف المنهجيات والأسباب الأكثر شيوعاً لتأخير مشاريع البناء في مدن مختلفة مثل بغداد والنجف. خللت هذه الدراسة 12 مقالة وبحثت فيما يتعلق بالمنهجية وأسباب التأخير والتخفيف. وكانت النتائج هي اختبار 31 سبباً للتأخير في مشاريع البناء ولكن السبب الأكثر شيوعاً للتأخير هو المشاكل المالية لكل من المقاول والمالك والتي تكررت خمس مرات في الدراسات السابقة، ومع ذلك، تكررت العوامل السياسية والإدارية أربع مرات في المقالات. استنتجت هذه الدراسة أن العامل المالي والإداري يمثل السبب الرئيسي للتأخير. لتجنب

التأخير المحتمل في إكمال مشاريع البناء في العراق، يجب على أصحاب المشاريع وضع خطة مناسبة مع توفير السيولة الكافية لميزانية المشروع واختبار خطة الإدارة لحل أي مشاكل محتملة، ومع ذلك، فإن القضايا السياسية تسبب تأخيرًا في مشاريع البناء دون أي تدخل من المقاول ورب العمل.

الكلمات المفتاحية: مشاريع البناء، أسباب التأخير، المقاول والمالك، إدارة المشاريع.