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# A Critical Literature Review Exploring the Challenges of Research in Delays and Cost Overruns in Construction Projects

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**Abstract**

Construction project delays and cost overruns represent a constant source of concern for project developers and several researches have been developed in order to identify causes of these kind of deviations worldwide. In this paper, a literature review was developed in order to identify the most significant factors that generate overruns in construction projects and the methods applied to identify them. The results include a synthesis of internal and external factors, a critical evaluation of different investigations and recommendations for future research.

**Keywords:** Construction projects; construction delays; construction cost overruns

## Introduction

Construction projects are constantly faced with the difficulties stemming from construction delays and cost overruns, representing a source of uncertainty for construction professionals and project developers. In light of the large number of variables involved Enshassi et al. [1], it is difficult to maintain full control over the performance of civil projects. A deep knowledge and understanding of the significant factors that lead to delays and cost overruns, would facilitate the establishment of actions that minimize the negative effects that can lead to disputes and claims leading to trials or the total abandonment of the project.

The scientific literature reports delays and overruns as common occurrences worldwide. In India, over 40% of construction projects are facing time overrun Iyer & Jha [2] for groundwater construction projects of Ghana, it was reported that 75% of the projects have deviations in cost and time Frimpong et al. [3]. The average of time overrun in large construction projects in Saudi Arabia is between 10% and 30% of the original duration Assaf & Al-Hejji [4]. For international projects, a research conducted by Ahsan & Gunawan [5] found that real duration exceeds overall planned in average 33.37%. For Indonesian construction projects, Kaming, Olomolaiye, Holt & Harris [6] found that only 54.5 percent of the projects are completed on time, and Olatunji [7] found that in Nigeria 55 per cent of 137 analyzed projects had overruns. The Gaza Strip, an area with complex problems and limited resources that affect project performance, faced similar problems reported on other countries [1] and on the other hand, developed countries, such as the United Kingdom, failed to meet time and cost expectations Olawale & Sun [8]. Finally, Memon & Rahman [9] found that developing countries present considerably higher cost overruns when compared to developed countries. In Table 1and Table 2 are exposed the most significant factors in terms of project delays and cost overruns respectively.

**Table 1:** Main factors generating construction project delays.

| Factor | Articles |
|---|---|
| Non-performance / subcontractors | Doloi et al. [11], Aibinu et al.[14] |
| Weather-related issues | Iyer & Jha [2]; Assaf & Al-Hejji [4] |
| Unforeseen ground conditions | Gunduz, Nielsen, & Ozdemir [15], Aziz & Abdel-Hakam [16] |
| Shortage of W/E/M* | Kaliba, Muya, & Mumba [10], Doloi et al. [11] Bagaya & Song [17], |
| Unqualified labor force | Kaliba et al. [10]; Marzouk & El-Rasas [18] |
| Poor planning by the contractor | Doloi et al. [11]; Marzouk & El-Rasas [18]; Fallahnejad [19] |

| | |
|---|---|
| Poor site management / supervision | Doloi et al. [11]; Gunduz, Nielsen et al. [13] |
| Lack of communication | Batool & Abbas [20]; Sambasivan & Soon [21] |
| Design changes | Gunduz et al. [13]; Gunduz et al. [15]; Kazaz, et al. [22] |
| Strikes and political situation | Iyer & Jha [2]; Fallahnejad [19]; Mahamid, et al. [23] |
| Contractor´s financial problems | Fallahnejad [19]; Abd El-Razek, et al. [24] |
| Problems subcontractors | Aibinu & Odeyinka [14]; Bagaya & Song [17]; Fallahnejad [19] |
| Material procurement/ delays | Gunduz et al. [15]; Sambasivan et al. [21] |
| Low level of professional skills | Gunduz et al. [15]; Sambasivan, et al. [21]; Aziz & Abdel-Hakam [16] |
| Delays in progress payment by owners | Gunduz et al. [13]; Kamanga & Steyn [26]; Sambasivan et al. [21] |
| Changes in contract scope by the owner | Ahsan & Gunawan [5]; Gunduz et al. [13]; Chan & Kumaraswamy [27] |

* W/E/M = workers/equipment/ materials.

**Table 2:** Main factors generating costs overruns.

| Factor | Articles |
|---|---|
| Currency fluctuations | Doloi [28]; Memon & Rahman [9] |
| Delays in progress payment | Alghonamy [29]; Alinaitwe et al. [30] |
| Low worker productivity | Memon & Rahman [9];Derakhshanalavijeh & Cardoso[30] |
| Poor planning and scheduling | Memon & Rahman [9]; Doloi[28]; Alghonamy [29] |
| Poor technical performance | Doloi [28]; Derakhshanalavijeh & Cardoso [31] |
| Design changes | Alghonamy [29]; Derakhshanalavijeh & Cardoso [31] |
| Design errors | Memon & Rahman [9]; Derakhshanalavijeh & Cardoso[31] |
| Lack of communication | Memon & Rahman [9]; Derakhshanalavijeh & Cardoso[31] |
| Changes in the contract scope | Doloi [28]; Alinaitwe et al.[30] |
| Strikes & Political situation | Alinaitwe et al.[30]; Derakhshanalavijeh & Cardoso[31] |
| Poor site management / supervision | Memon & Rahman [9]; Doloi[28]; Alinaitwe et al. [30] |

In respect of the applied research methodology, it generally consists on a survey for project stakeholders in order to ascertain, in their opinion, the significant factors that lead to time and cost deviations. After that, through descriptive statistics like frequency and importance index, a list of the most significant factors is established. Other methods applied consist in case studies Kaliba et al.[10], factor analysis Doloi et al. [11], ANOVA Ahsan & Gunawan [5], KRUSKAL WALLIS Shehu Z et al. [12] and fuzzy logic to estimate the probability of delay that was also considered by Gunduz et al. [13].

## Discussion

Construction is currently considered one of the most important sectors as far as economic growth and job creation are concerned, but frequently delays and cost overruns are reported generating multiple problems and even the total abandon of the project. The negative effects of this situation make the research in this topic a need.

Many of the factors generating delays and cost deviations are related to planning and, in light of these findings, enough time and resources should be dedicated to the initial phases of project life cycle. Other external factors such as: currency fluctuations, weather or geopolitical problems remain beyond stakeholders control and there are in some cases unpredictable. For these factors, the focus should be on the analysis and definition of risks that may arise during project development.

The investigation related to cost and time deviations has to establish correlations among factors and aspects such as project scale, business size and project type (public, private, residential, infrastructure), contract type, among others. Other important aspect to consider is the relationship between the different factors identified, like which of them generate the occurrence of others and which of them are presented simultaneously [14-31].

## Conclusion

Case studies are an effective method for providing in-depth knowledge about a topic and are appropriate to identify the causes of deviations in projects from primary sources. In this way, research can be continued with focus on creating or identifying mitigation measures that can benefit those involved in construction. There is still open to research the challenge for developing a unified methodology to deal with the problem of time and cost overruns in construction projects. In this line, there is an essential need for a model that allow the comparison of results, characterizing construction projects and focused on data science, taking into account not only the physical characteristics, but also the organization and contract conditions, besides geographical locations, size, sector and adjudication process.

However, in spite of the great importance of this research topic for construction industry, the analyzed literature does not allow the research community to compare the obtained results, and apply corrective measures based on lessons learned in other studies.

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