



Evaluation of Delays Generated in Construction Projects

Article History	<p>Abstract: The research aims to know the delays in the construction projects, where this phenomenon was touched to the parties to the project from the owner, contractor and consultant, from the delay in benefiting from the project to an increase in the cost of works. Due to the disputes that occur this delay, and sometimes the poor quality of the work due to the acceleration of work in order to reduce the delay after the end of the project time as a result of the prosecution of the owner and the consultant. This study explored the important factors affecting construction project delay in the context of the construction sector in Iraq. It will be important to enhance training in detailed project planning and scheduling, and during the construction phase to carefully control budget and material orders to ensure business continuity. Within the planning, it will also be interesting to develop and implement integration models between the professionals involved, objectively defining roles and implementing them in the most approximate manner; In addition, it will be useful to implement project modeling techniques that allow the design and construction work of the relevant professionals to be combined and to get an idea of the final result, identifying potential risks. Currency fluctuations, since they cannot be controlled, should be considered as a relevant point within the contingency margin, which again corresponds to good initial planning. Finally, it would be useful to focus efforts on fighting corruption and fraudulent practices in construction projects, which hinder the progress of developing countries</p> <p>Keywords: Construction ,Delays ,Material, Construction, Projects.</p>
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INTRODUCTION

Construction projects invariably encounter difficulties with time and cost differences, with respect to the baseline set in the planning stage, two primary issues of constant concern to professionals, and project developers in general. Although it is difficult to control the good performance of civil works due to the large number of variables involved (Endut, I.R. *et al.*, 2005), prior knowledge of the factors that greatly influence changes in time and costs helps greatly so that builders, or entities responsible for project development, can Make good decisions. Similarly, in order to identify relevant actions that allow to reduce the multiple negative impacts resulting from this situation, it is necessary to study the factors that lead to cost overrun and delay and to strengthen research in this area (Enshassi, A. *et al.*, 2009; & Falcone, P.M. 2018).

At the international level, the literature indicates that deviations in time and costs are a common factor in both developed and developing countries (Fallahnejad, M.H. 2020). For example, India (Fashina, A.A. 2020), Egypt (Fashina, A.A. *et al.*, 2020; & Fashina, A.A. *et al.*, 2020), Turkey (Frimpong, Y. e al 2003) and Saudi Arabia (Fugar, F.D., & Agyakwah-Baah, A.B. 1970) reported excessive time deviations, while in Malaysia cost overruns were reported in more than 50% of projects. and multiple deviations in time (Fugar, F.D., & Agyakwah-Baah, A.B. 2010). In Indonesia, an investigation was conducted into the factors that accounted for delays in large construction projects and within the findings it was obtained that increases in time were mainly caused by changes in designs, low labor productivity, improper planning and scarcity of resources (Fugar, F.D., & Agyakwah-Baah, A.B. 1970). For their part, developed countries such as the UK, which has the availability of multiple technologies to monitor advanced projects and programmes, have reported that many projects still do not meet expectations in terms of time and cost (Gann, D.M., & Salter, A.J. 2000). Higher frequency of deviations in costs and times have been reported in developing countries (Gebrehiwet, T., & Luo, H. 2017; & Gliem, J. A., & Gliem, R.R. 2003). When specifically analyzing the issue of time deviations, a very important factor that has been recognized as a cause is the error in the designs (Global_Construction. 2015; Hart. K. 1973; & Haseeb, M. 2011). Table 1 provides a detailed summary of the main factors that most affect delays according to the research consulted as a reference for the latest findings for different countries.

Regarding changes in costs assessed at the planning stage in relation to what has already been invested up to the project delivery stage, there are many factors that have a significant impact. Some of them correspond to factors related to the internal organization and management of enterprises, and others correspond to factors related to the social and cultural environment, that is, the economic, technological and political environment in which organizations operate. One investigation showed, as part of the conclusions, that developing countries suffer from much higher cost overruns compared to developed countries (Gunduz, M. *et al.*, 2015; Ika, L.A. 2009; Ika, L.A. 2012; & Ika, L.A. 2017).

METHODOLOGY

Research design by developing a strategy in order to collect data and provide a full understanding of all elements of the study, by relying on a methodology aimed at developing the management of the study, which is the entire case study, which consisted of interviews with heads of construction departments in Baghdad, Iraq to study the case of delays in projects Construction. The results were analyzed on the basis of IBM® SPSS 25 software, and the results were discussed.

Statistical analysis was used to analyze the results of the project and the study in general. As for the descriptive approach, it relied on studying the quantitative description of the project and describing it accurately.

In addition, the questionnaire and the interviews relied on analyzing the sample tools, and the questionnaire was relied upon in order to collect the data completely.

All sections of construction projects located in Baghdad, consisting of the Department of Construction

and Roads, and the Department of Water and Sanitation, were considered. These departments included heads of departments and a project advisory department. Late construction projects were identified in the period 2017-2020, these projects were supervised by their engineers, and a special interview was conducted with consultants and heads of departments.

Questions asked to the community sample

1. What are the consequences of delaying the implementation of engineering projects on the parties to the contract (owner, contractor, consultant)?
2. Funding is one of the main reasons for delay
3. Number of projects implemented during the study period
4. Lack of contract tightness is one of the reasons for delaying the implementation of engineering projects

Statically Analysis

The questions that directed the experiment were the following:

- What factors and/or global aspects most affect the time difference
- What factors and/or global aspects most affect cost variance
- Within these large groups, what factors are important or most explain changes in project times
- Within the three large groups, which factors are important or most explain the changes in costs in projects? To answer these questions, the statistical methods listed below were selected, which were applied through the R software: 1(i) Kruskal-Wallis test: is the non-parametric equivalent of ANOVA, which can be used to determine the effect of factors on the variance of a response variable, Wilcoxon test It is a non-parametric test, equivalent to the T test, used to determine whether there are statistically significant differences between sample.

RESULTS

Table 1: Main factors that affect times in construction projects

Factor	
Non-compliance and problems in general with subcontractors	30%
climatic calamities	19%
Government conditions	10%
Changes in the scope of the contract by the owner	9%
worker shortage	8%
unskilled labor	6%
Poor planning and scheduling by the contractor	5%
Lack of communication between the different parties involved in the projects.	3%
currency fluctuations	4%
Design changes	3%
Labor disputes and strikes	3%

Table 2: Main factors that affect costs in construction projects

Factor	
currency fluctuations	25%
Government conditions	15%
Defaulted payment by the project owner	14%
Inadequate supervision and direction of the project	10%
Poor budget planning	9%
Low worker productivity	9%
Non-compliance of subcontractors	8%
Design changes	6%
Lack of communication between the different stakeholders involved in the projects.	2%
Changes in the scope of the contract by the owner	2%

Table3 -RII ranking for Clients/Owners-related delay factors.

S/N	Owner-related causes of delay	RII	RII ranking	Level of contribution
1	Delay in honoring payment progressively	0.846	1	Very high
2	Delay in the provision or delivery of project site	0.742	4	High
3	Slow decision-making process	0.658	9	High
4	Errors in design and specifications	0.696	7	High
5	Lateness in the revision and approval of design documents	0.729	5	High
6	Poor communication and coordination with contracting parties	0.767	3	High
7	Difficulties in accessing credit facilities (E.g. Loan)	0.683	8	High
8	Change orders during construction by owner	0.792	2	High
9	Conflicts between project joint-owners	0.708	6	High
10	Indefinite suspension of work by owner	0.696	7	High
11	Lack of complete documentation before commencement of project	0.642	10	High
12	Delay in the approval of sample materials	0.625	11	High

Table 4- RII ranking for Contractors-related delay factors.

S/N	Contractor-related causes of delay	RII	RII ranking	Level of contribution
1	Difficulties in project financing	0.783	2	High
2	Errors during construction	0.696	8	High
3	Improper planning and preparation during construction project	0.721	6	High
4	Poor site management and coordination	0.700	7	High
5	Delays in sub-contractor's work	0.779	3	High
6	Underestimation or overestimation of the project cost	0.808	1	Very High
7	Conflicts between contractor and other parties	0.746	5	High
8	Delays in the mobilization of workers	0.650	10	High
9	Regular change of sub-contractor's technical staff	0.746	5	High
10	Conflicts in sub-contractor's schedule in execution of project	0.692	9	High
11	Underestimation of the project durations	0.763	4	High

Table 5 - RII ranking for Consultants-related delay factors.

S/N	Consultant-related causes of delay	RII	RII ranking	Level of contribution
1	Delay in the approval of major changes in the work scope	0.800	1	Very high
2	Poor communication and coordination	0.767	2	High
3	Lack of significant experience of consultant	0.750	3	High
4	Mistakes and discrepancies in contract documents	0.700	6	High
5	Delays in creating design documents	0.733	4	High
6	Inadequate site survey and data collection before design	0.713	5	High
7	Delay in instructions from consultants	0.671	8	High
8	Back report of the consultant	0.692	7	High

Based on the results obtained in surveys, data analysis and a review of previous literature, the conclusions reached are presented below.

The five most representative aspects of project implementation time difference in are schedule planning, machines needed on time, changes in designs, currency and sector fluctuations within economic activity. According to these results, the trend of general planning factor participation is seen, confirming this global factor as one of the most influential factors in weather variability. It can also be pointed out that the economic sector in which projects are implemented is not indifferent to the increase in time, and that the uncertainty in the risks to which it is exposed in construction projects is very high, because despite its control. some variables,

It will be important to allocate the necessary time and attention to the initial stage of project conception, planning and design, adopting as a first step the exclusive focus on analyzing and identifying potential risks and unforeseen events that may have to occur during the project, with the aim of training professionals and companies capable of estimating and preventing the consequences of almost every risk. In fact, it is also necessary to plan for the development of research that delves into the search for intrinsic factors affecting time in public and private enterprises, because although it was obtained through this study that the sector of economic activity significantly influences deviation, it was not possible to determine The direction or direction of this variable.

In terms of cost variance in projects, the five most influential factors are lack of timely needed materials, lack of communication between interested parties, currency fluctuations, fraudulent practices and type of project. In contrast to the results over time, for the cost variable, an explanation was obtained from all global factors and not just the planning factor, indicating that in construction projects, cost behavior consistently includes important aspects for all project phases. The lack of integration between the parties involved plays an important role in the explanation, incompatibilities sometimes arise in the project documentation, as well as deficiencies or inconsistencies in designs and many times economically suitable options for the project are not looked for. On the other hand, the lack of timely material is a consequence that can ultimately indicate a lack of planning and, above all, control by professionals. The effects of not having the material when needed are manifested in the fact that in the face of urgency and the need not to affect important activities, sometimes the solution is to pay a higher cost to get what did not arrive on time. Currency fluctuations essentially mean that the prices of many inputs can fluctuate in ways that affect the given budget. When

there is a devaluation of the local currency, materials or equipment in general tend to increase the cost, a phenomenon that has been seen in recent years, especially because currently in the field of construction in different products and services from abroad are used. Regarding fraudulent practices, it was not possible to find a trend within the parameters of this investigation, but it is clear that the problem exists and to some extent affects the cost of construction projects. Regarding the type of project, it was also not possible to establish a direction, which is why the new research called for a study of the influencing factors in depth, limiting itself to each type of project. Regarding fraudulent practices, it was not possible to find a trend within the parameters of this investigation, but it is clear that the problem exists and to some extent affects the cost of construction projects. Regarding the type of project, it was also not possible to establish a direction, which is why the new research called for a study of the influencing factors in depth, limiting itself to each type of project.

CONCLUSION

In conclusion, this study explored the important factors affecting construction project delay in the context of the construction sector in Iraq

It will be important to enhance training in detailed project planning and scheduling, and during the construction phase to carefully control budget and material orders to ensure business continuity. Within the planning, it will also be interesting to develop and implement integration models between the professionals involved, objectively defining roles and implementing them in the most approximate manner; In addition, it will be useful to implement project modeling techniques that allow the design and construction work of the relevant professionals to be combined and to get an idea of the final result, identifying potential risks. Currency fluctuations, since they cannot be controlled, should be considered as a relevant point within the contingency margin, which again corresponds to good initial planning. Finally, it would be useful to focus efforts on fighting corruption and fraudulent practices in construction projects, which hinder the progress of developing

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