An overall literature review on Current performance of Iraqi Construction Industry

Zaid Saad Hadi
Limkokwing University of Creative Technology, Cyberjaya, Malaysia

Abstract
For a successful project completion in construction industry, the project must achieve its goals and objectives with schedule time and allocated budget. Project schedule delays and cost overruns are considered the significant problem in construction sectors, as they impact negatively on project safety, productivity and quality as they may cause conflicts between construction project stakeholders. Controlling construction completion time, changes and variations, and cost overrun minimization and control of time and cost in construction industry has been consistent problems in Iraqi construction industry development to provide a reliable project performance, where project is executed with right budget, and planned schedule, and delivering best quality. Therefore, it is considered essential to investigate the causes of the project delays and cost overrun in the region of Iraq, through previous study on the currentIraqi construction industry performance. This research paper aim to study the major causes of project time and schedule delays, and costs variation and overrun, by considering few studies in the region of Iraq, and its surrounding developing countries, like Palestine, Saudi Arabia, Malaysia, and Jordan etc. Time and cost control management is important fundament in the construction industry performance. It is considered that the for cost and time, effective control techniques and management are desirable for managing project risks of schedule delays, and cost variations in construction industry in Iraq. The evolving construction industry and the attachment of complex project and work related activities in construction industry, as the process of project performance nowadays involve many stakeholders, from various project disciplines.

1. Introduction

It has been essential for project to be competent for more capability, time accuracy and projects that add cost beneficial value, for goals of developing the country's construction industry sectors. In construction industry, is considered hard to avoid, and unforeseeable to notice or control the variations, and changes, associated with issues that tends to occur during the life stages of a construction projects, which may lead to time and cost variation leading to poor project delivery, and performance [1].

The interconnection between and cross construction project works and activities makes the construction process challenging to project stakeholder, which may lead to delays, if activities or work in construction site get clashed, hence, causing more delays in construction industry. Another effect of delays in construction is the abandonment or cancellation of projects, leading the stakeholders to abandon the main project entirely[2].

Although, the integration and complexity of construction industry has been increasing, and demanding more role of discipline by different project stakeholders and their inputs. Many construction projects characterized the poor performance that resulted from project schedule delays and cost overruns, was due different project size, construction location, and project scope and sequencing. The capital capacity and demand of project complexity increase with construction project of high nature and standards [3].

There is a tremendous amount of construction information in a project, and they are shared among many discipline in construction industry. The shared information among project stakeholders is of high importance to the construction industry, such as decision making, products or materials acquisitions, and overall collaboration between different project parties. It has been clearly identified that management of a project with their stakeholder is consider of high priority before project execution[4].

Quantifications and estimations of a project are the early stages for project cost management, which is done by manual estimation at most time in a construction project. The manual estimation and observation may lead into high probability for errors, especially in complex and high profiles projects, caused mainly by construction personnel, for which the computer application minimize these errors and improve genuine decision in construction industry[5].

2. Literature Review on Factors causing project delays and costs overrun

The most common elements that lead to time delays and cost overruns are shortages of material, changes in construction site, lack of financial support, and contractual management[6; 7]. In addition to that Kaming et al. [8], stated that most reasons that leads to project schedule delays, and variegations, are lack of adequacy in project planning, lack of resources for project utilization, low productive and performance of labor, variations and changes in design models of projects. The study also stated that the budget and cost overrun and variations are due to low accuracy in material and cost estimation calculations, material cost keeps on changing, and increase in project complexity and familiarity. Moreover, the schedule duration and cost and budget allocation issues tend to occur due to incompetent and low management skills by project stakeholders, such as contractors, client, owners, consultants, etc., when faced with payment barriers and difficulties, as has been described by Frimpong et al. [9]. Chang [10], declared in his report that the reasons cause project completion to variate, are the same reasons that cause the project cost to change based on the time of completion, it has been noticed and identified that delays in construction project has a tremendous impact in the cost, leading in increase significantly, due to interconnection in work activities in construction industry, as payment will be made in longer duration that anticipated.

A survey was carried out byChartered Institute of Building (CIOB) in which was found that the UK complex construction projects are projected to be concluded within more than half a year late to their original scheduling[11]. An investigation study by Hoffman.et.al. [12], studied theconstruction project funded by Air Force in USA.It was also found in another study that almost 72 %of construction project were behind time in project completion, than the project has been anticipated.

Various studies have been carried trying to investigate and understand the sole and core reasons responsible for project delays in construction industry in Iraq. A study by Jahanger [13], in the city of Baghdad, studied the delays factors, which were divided into fifty-five (55) reasons and factors that causes delay in construction industry in Iraq, and hence lower the performance of projects. The study concluded, and stated the reasons based on the top priority by respondents for causing delays, as errors or mistakes that causes un-clarity with project design and documentations, contractor poor scheduling and planning of construction project, inadequate coordination and supervision of construction project, bad selection of manpower and technical teams, low productivity of labor and manpower. In addition, another

studied carried by Bekr[14], on the delays that occurs in construction industry and their factors. He identified and questioned respondent on sixty-five (65) barriers and factors that could lead longer duration and cost overrun in Iraqi construction industry. Based on their results, they highlighted the most factors that causes these issue in Iraqi construction industry are inaccurate planning and design at early stage, project owners are unclear of the project scope and work performance in construction industry, longer duration for project handing-over between different construction stakeholder, settlement of payments between different construction project parties, owner lack of confidence for decision making, and certainties. Based on previous studies, it was indicated the cost estimation at the project completion is considered relatively higher that the project budget anticipated at design stage[15].

Although, few researchers believe for an optimum project completion, and best performance in construction industry, it is essential to estimate the cost overrun at project completion, by looking, and comparing the cost of the original contract and final amount of cost at the completion and delivery of construction project [16]. Cost estimation categorized as the cost planning and measuring, which are prior the execution and construction of a project, nevertheless, project conditions, types and different regions may alter the project time and cost schedulingandplanning. Project costs are often described as the costs needed to complete a task or activity in a construction process, hence, its interconnected, moreover it is described as the excessive costs to the original cost planned for a project at completion of projects. Therefore, it is an essential and important to study the cost overrun as most projects faces this problem in the construction industry performances [17], as shown in table 1.

Table 1: Causes of project cost and time changes based on Owners/Clients[17].

Causes of delays and cost overrun	Time Delays		Cost Overrun	
	Month	Rank	Kuwaiti Dinar	Rank
Order and project changes	5.30	1.00	9000.00	4.00
Financial Difficulties	4.90	2.00	10000.00	3.00
Lack of owners experience	4.40	3.00	1000.00	7.00
Lack of materials	4.30	4.00	10200.00	2.00
Variation in environment and weather	3.90	5.00	8800.00	5.00
Labour issues	2.90	6.00	2800.00	6.00
Stakeholders issues	2.00	7.00	20000.00	1.00
Mix issues	5.00	0.00	8900.00	-

A study that was conducted by Al-Agel and Al-Hassan [18], where they studied cost overrun in the construction industry of Iraq. They studied twenty six (26) issues and factors that could lead to major projects cost variations and overrun. The study concluded that the majority of the respondents chose the following factors as their main reason they think it caused project overrun. The factors were incompetence of engineering and architecture construction companies to meet projects requirements and standards, inadequate decision of tendering and choices of contractors, as the lowest offers are more likely to win the tender, lack of project planning and cost estimation accuracy, limitation on project scheduling, and determining the duration to completion of the project, as shown in table 2.

Table 2: Reasons for Cost Variations and Overruns in Iraqi Construction Industry[18].

Reasons for Cost overrun	Issues Rank
Inability of company to meet project requirements, because it's specialized and / or large project.	1
Accepting lowest offers.	2
Inadequate planning.	3
Inaccurate estimation of the cost.	4
Lack of control to the time of the project or predict the date of its end.	5
Poor performance of Project Managers.	6
Delayed cash flows by owners.	7
Inefficient executive manager of project.	8
Lack of experience in creating and preparing project documents.	9
Poor performance of the contractor.	10
Bureaucracy in bidding / tendering method	11
Inappropriate contractual procedures of subcontracting.	12
Time period of the execution.	13
Poor decision making process.	14
Multiple sources of the decision and the overlap of powers.	15
The negative impact of the population in the project area.	16

In addition, another study by Jaber [19], in Iraq, on the project risk that could arises with construction cost overrun in, he found out that by demonstrating the factors based on the study impact by the responds' survey that the factors that causes the risks of cost overrun are security measures of the region, which are caused by mainly war, corruption and bribery, which may lead to project abandonment when allocated budget expires, unexpected delays due to government approvals and the routine required to obtain an approval, the uncertainties of project lifecycles to completion, political changes and issues creates variation on time and

cost of the projects, which may lead to many variations as the price of materials, and manpower costs, and productivity.

Although, project management with unified areas in adhere knowledge and information, tools, methods and application, the schedule delays and variations, and costs overrun tends to occur as common issues in the projects of a construction industry [20]. Howsoever, it is essential to compare the construction industry performance to the triangle of engineering, which is cost time, scope and quality. Therefore, it is considered an important task to determine the causes in construction industry that leads to longer project durations and cost variations issue, to determine an amendment to improve project performances. It was concluded that time and schedule variation and delays as they are the most common issues that arises in construction industry, leading to cost and quality changes and variations.

It was well defined in previous researches that the project delays are considered the most common occurring in construction industry, they tend to increase project cost extensively, which creates a tremendous gap for research study to improve and enhance the managerial skill in decision making [21; 22; 23; 24]. A study to determine the impact of time issues in construction industry, for owners input to projects in terms of project performance, and to study cost variations for project contractors. It was determined that delays are major sources of project low productivity, in terms of performance, and it leads to project excess cost, and could end in project loss, or even to lawsuits. It was determined that delays various depending on project size, manpower, companies involved, and location of project [2; 25].

As stated by Chan et al [26], indicated that inadequate management and supervisions in construction sites, undefined sites situation and condition, owners' changes of scope and model variation during construction projects, which leads construction team to change the models, and work were the main reasons for project duration and variation and cost increment and variations. Another study in Jordan, by Al-Momani [27], studied over a 100 construction projects, government sectors. He found out that reason for project delays and cost overrun in construction industry in Jordan, are due to architect and engineers, climate and weather changes, owners and clients demands and variations, longer tasks delivery, location and economic condition of the construction project were the main reason behind low project performance.

It was stated that in a study by Frimpong et.al. [21], that the major causes for project delays and cost overruns, in Ghana, are procurement and sections of materials, inflation in

construction materials and manpower, lack of experts in contractual management, and lack of financial management to control project budget and accuracy of project costs, materials, labors salaries. Another study in Hong Kong, by Chan and Kumaraswamy [28], indicated that what causes the project excessive cost and delays in Hong Kong construction industry were uncertainties about project location and its conditions, lack of managerial skill for project site during work activates, lack of making decision in construction projects, leading project to poor performance and productivity.

Moreover, in a research made by Odeh and Battanieh [29], where they studied the project performance condition to complete project with planned cost and scheduled duration in the construction industry, from consultants and contractors in related construction field. The studied found out that the main factors influencing project delays and cost overrun are interference and changes made by owners and clients, lack of experience within project stakeholders, project financial plans, productivity of project team and workmanship, poor communication and decision making, incompetent subcontractors, and inadequate project planning and executions.

A study was conducted on 90 metropolitan construction projects in Taiwan, by Hsieh et al. [30]. They determined that the main causes of project delays and cost overrun in Taiwan are due to improper project design and planning of construction projects. Meanwhile Sambasivan et al. [31], declared out that project delays are some complex problems in construction that occur primarily due to changes and variations that occurs during design, planning and executions stage, and mostly caused by inadequate experts and workmanship in construction industry. Additionally, Kaliba et al. [32], stated that the initial causes of construction project delays and cost variations are due to improper financial plans and strategies set for construction projects, contractual changes and variations, drop in economical situation, material selection and acquisition, inadequate supervision that leads to improper work delivery and performance in project site, during construction process.

Construction stakeholders, such as contractors, and client or project owners, tends to be the main sources of payment delays, based on a study by Abd.El-Razek.et.al. [33], where these delays caused significantly the project to take longer duration to completion and the cost intends to increase. At the same time the clients tend to have variations or changes, on project design at the time of construction. Additionally, Le-Hoai et al. [34] compared the construction industry performance in their country, Vietnam with other surrounding countries

with same economic and development strength. In their study it was concluded that the construction industry in Vietnam was lacking of experts and professional in the construction fields sector, improper project time and estimations, design mistakes, untrained workmanship, financial and government related issues. Whereas as study by Toor and Ogunlana [35], conducted on the performance of construction industry in Vietnam, it was observed and concluded that the construction industry performance level was low compared to developing countries. Vietnam construction industry lacks of proper project designing and modelling, shortage materials and manpower for project executions, or during construction, deficiency in project management which leads to inadequate project planning and cost estimation.

Project duration variations, and delays and project cost overruns tends to occur due to internal reasons within construction stakeholders like contractors, engineering and architecture firms, consultants, client and owners. Some of the reasons tends to be external impact, that could lead to longer project duration, hence increase the cost, like material delivery delays and supplies, site conditions like weather, and government rules and regulations [36]. Meanwhile Olawale and Sun [37], stated that design changes by different project parties and stakeholders caused the highest amount of time variation and excessive project costs, based on the respondents from construction industry. According to Alinaitwe et al. [38], the main five causes to project delays in construction industry, that lead to low project performance are project and design scope changes and variations, late payment settlement within construction project, the cost of capitals and equipment's is considered relatively high, improper project supervision and coordination, and government related issues,and insecure and instable political system. Meanwhile in Turkey, a study by Gündüz et al.[38], stated that of the highest 15 reasons that leads to project schedule variation and longer time to completion were lack of experts and professionals by project contractors, improper project scheduling and planning, project variations due to lack of adhere management [39].

Moreover, in a study by Samarghandi et al. [40], in Iran, where they determined that the main reason for project duration delays and cost variations and overruns. Project duration delay reasons were categorized based on a statistical methods and models into 4 major factors, which included stakeholder defects, such as owner and client factors, contractor factors, consultant factors, and other related factors, such as government legal, law and approvals factors. Meanwhile the main reason to cause project duration variations and delays and cost

overruns in Iran are lack of material and resources in construction sectors, orders variations from differ project parties, delays on project documentations submission, like drawing, and financial difficulties during project lifecycle, poor managerial skills in problem solving and decision making [24; 41].

In addition, based on previous studies, it has been shown that among the highest ranking issues to cause project delays and cost overrun are financial, and inadequate budget and costs allocations, and poor and improper project site and documentation supervision and coordination in the construction industry in Malaysia, hence, defecting the projects performances [2].

3. Literature Review Findings

Construction industry contributors face occurring troubles to deliver successful projects due to limited budgets, limited manpower, fast hours, in addition to issues related to the waste problem, which arises given the fragmented nature [41].

Project time and cost management has been the most essential criteria for a successful project completion in the construction industry, thus, has the highest potential for errors and issues during execution. Nowadays, project quality is one of the three most essential values involved, the other two are time and cost to complete a project, and it is an interconnection of all three, to achieve best projectpractices and performance. The control of cost and time management is considered one of the important construction phenomena that could assist with risk detection, schedule planning and cost estimation, to improve the project performance during project lifecycle, since construction project are becoming more complex and involves various stakeholders, standards and specifications [14].

Iraq, as one of the developing country in the region, faces project delays and cost overrun in the construction industry in the country, and are considered a major issue, to project completion, which could end in a project loss, leading to project abandonment or even worse to a project lawsuit. Therefore, to study the issues, and new technologies to overcome such issue like project cost and time variation, and to handle, and tackle the issue with caution and knowledge, to improve the project performance and construction industry sector overall.[42].

Throughout this review paper on the current situation on Iraqi construction industry, it was determined that the main causes of project duration variation, and longer time to project completion are country's security measures for project stakeholder, tendering and contract issues cause by inadequate contractors' practices, and low productivity of stakeholders, and

project manpower, as shown in figure 1. Meanwhile the most important issues that lead to cost variation and overruns are lack of skilled professional and manpower, inadequate contractors' rules and policies in their contracts, and the control of construction industry by international investors and developers, as shown in figure 2. Based on the review studies, it is suggested to address the issue of project delays and costs variations and overruns, for instance, developing key security forces that assist with construction industry security, imposing rules that are strict for project stakeholders, making allowance for work incentive to increase productivity, training, and special workshops, increase recruitment of skilled local workers, induce new technologies, techniques and methods in construction industry into the contractor's practices, and support and encourage local Iraqi construction company, and increase the level of construction project competency. The construction industry in Iraq has been left in a bad shape, and its it moving forward towards improvement, based on the allocated budget the government has set for re-construction and renovation of damaged building and properties, due to war, and as well as new developments and projects. Thus, it is considered of most important to study the reasons that could lead to problems and how to help minimize, control and improve the current conditions, with the growing utilization of technologies in the construction industry. [43].

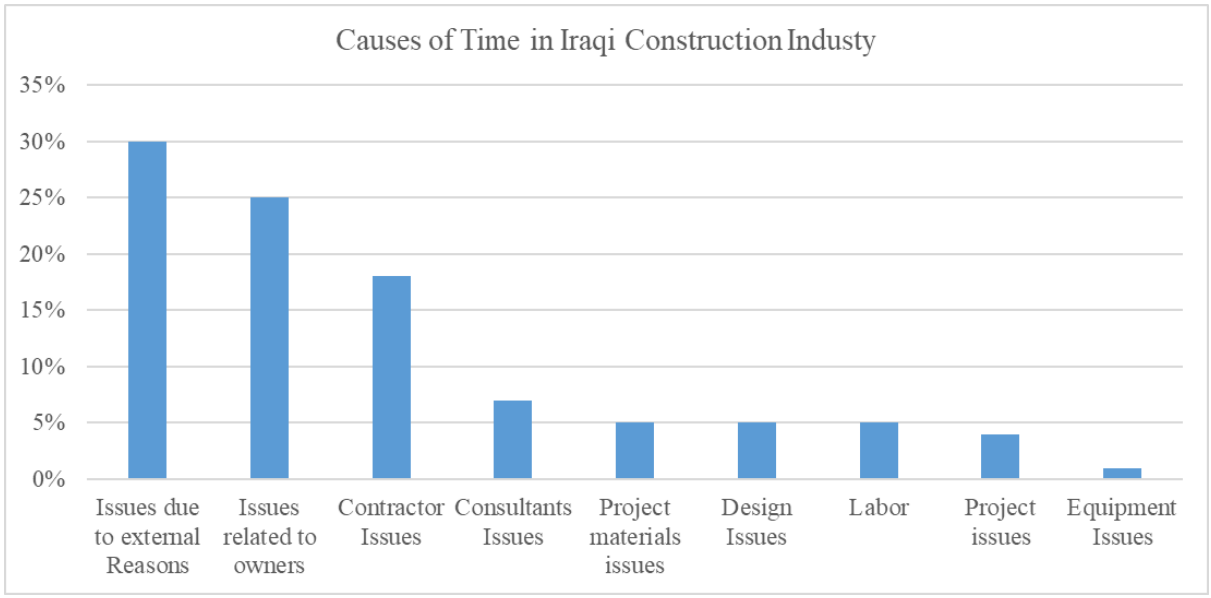

Figure 1: Causes of time delays and variations [43]

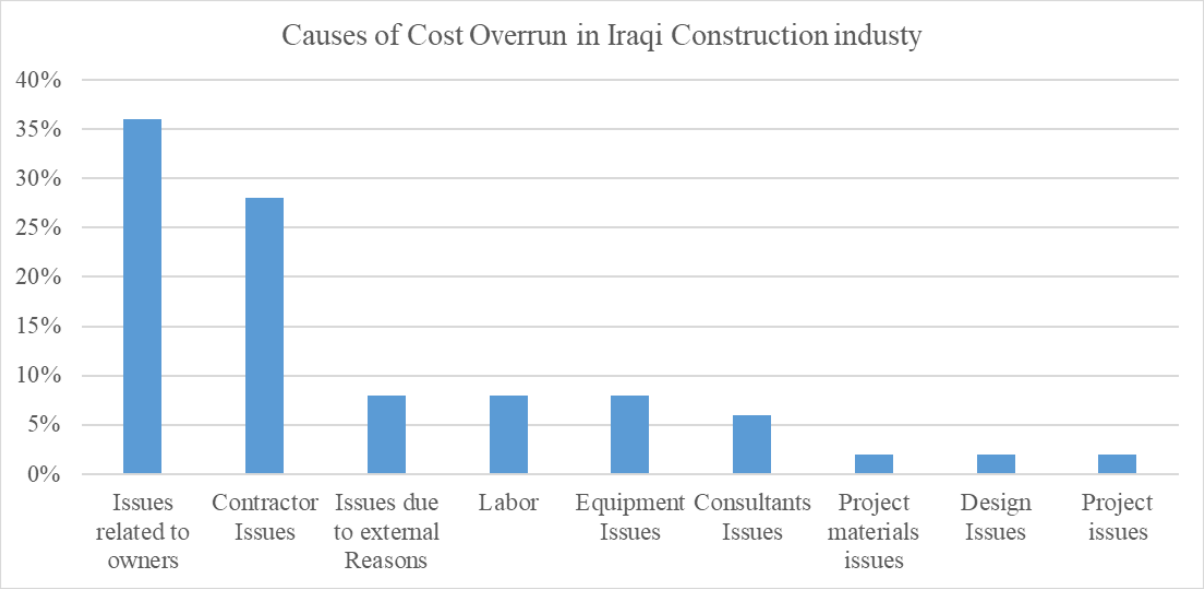

Figure 2: Causes of cost changes and variations [43]

It was found out in this review paper that the reasons and factors that causes project duration variation and delays, and project cost changes and excessiveness in the construction industry in Iraq, leads to the project to poor and inadequate construction performances in the past years. Although many researchers have tried to minimize, control and improve the current condition, but the issues keep on reoccurring. It is believed that further studies are required on this issues, and hence, usage of new technologies and application method, that has been recommended for project utilization, to improve project tasks duration and budget to completion, which helps develop a platform for all project stakeholders, work implantation and personal disciplines into the project input, to increase productivity, ease of resources selection, and enhance overall project performance. [14, 43].

4. Conclusion

The construction industry in Iraq is going through a remarkable expansion as the outcome of various government initiatives, where construction projects have become substantial, intricate, expeditious, and highly ambitious due to the presence of multinational companies in the region. Traditional practices have been the subject of constant judgement in the Iraqi construction industry, leading to delayed projects, production waste, unsatisfied customers, exorbitant projects, deficient health and safety merits, and inadequate use of resources.

Preceding research and studies have highlighted that the project delivery time is a crucial element in the construction industry in Iraq on account of its reliance upon project time and cost over completion. Ineffective planning and control, poor site management, and inefficient

resource management are the main reasons to overcome project delay, one of the leading and constant problems in the Iraqi construction industry.

Accordingly, it is emphasized in literature that the construction industry in Iraq must implement modern project management techniques and latest digital techniques that can refine and upgrade the work applications, and ultimately the capacity and productivity of Iraqi construction industry.

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