Factors Affecting the Cost Management of Iraqi Construction Firms

Semaa Hazim Najim Alani
Department of Civil Engineering, University of Baghdad, Iraq
s.najim0901@coeng.uobaghdad.edu.iq (corresponding author)

Awss Hatim Mahmoud
Department of Civil Engineering, University of Baghdad, Iraq
awss.hatim@coadec.uobaghdad.edu.iq

Received: 19 July 2023 | Revised: 29 August 2023 | Accepted: 5 September 2023

 DOI: https://doi.org/10.48084/etasr.5212

ABSTRACT

Cost management refers to the procedures that must be followed to ensure that the project is accomplished on time and on budget. The goal of this study is to identify the main factors that affect cost compliance and to assess how relevant these factors are from the perspectives of clients, contractors, and consultants in construction firms in Iraq. For the purpose of this study, 100 structured questionnaires were distributed to clients, contractors, and consultants on building sites throughout the study area by using the survey approach. The Relative Importance Index (RII) technique was used for the analysis. It has been determined that the factors potentially affecting cost management in construction firms should be taken into consideration during the planning, design, tendering, and construction stages to accomplish the project within the specified time and cost. Twenty factors that affected the performance of construction firms in Iraq were identified. The results revealed the most affecting factor was poor management/poor coordination between the contracting company and the authorities involved, followed by the nationality of workers, structural materials damaged during storage, the absence of places designated for storing materials, lack of personnel specializing in devices and equipment, changing labor and material prices as a result of political changes, lack of technical staff, length of the project period, mismatch designs with execution works in site, and changes in orders. The study concludes by stating that there is not an efficient procedure in Iraq to control cost management.

Keywords-construction firms; cost management; influencing factors; cost estimation

I. INTRODUCTION

Cost estimates performed at the start of a project serve as the base for deciding whether to continue with it or not. At later phases, cost estimates are used to track the project's progress and make decisions about project completion or termination [1]. Authors in [2] stated that at the time of project approval, credible estimates of construction costs and schedules supplied by current construction companies, their advisors, and suppliers are critical for justifying a project on economic grounds and preparing the means of financing it. The financial consequence of a construction cost overrun is the potential loss of the project's economic justification. Authors in [3] stated, today's era Indian construction industry is experiencing a rapid boom with enormous demand of infrastructure facilities. This huge demand results in the completion of projects with shorter duration and most economical manner. For this, project management tools (planning, scheduling, monitoring, controlling) play a vital role in project timeline. The early cost estimation is the proposed cost of a project that is calculated in the planning stage of the project. They identified the top factors that are potentially affecting the early cost estimation of a project as: client's level of experience, level of skill and experience of consultants, financial capability of the client, level of quality drawings and workmanship, clients payment policy, use of technology, quality of assumptions made and utilization of a checklist during preparing the estimation, completeness of project documents, proper recording of project information and previously determined standard estimation technique, and build ability of the design. Authors in [4] identified the following factors as having the greatest impact on construction project cost variance: economic instability, firm's project planning and management quality, estimating team's relevant experience, accessibility of management and finance plans, estimation method, amount of labor and equipment needed, location, regular payments, precision of the bid documents provided by the client, project manager's competence and leadership, and the effect of the expected delay. Authors in [5] reported that the top factors influencing the accuracy of cost estimates in Jordan are precise and detailed drawings and specifications, pricing insight of construction projects, perception of estimation significance, equipment, project complexity, evident scope definition, validity and consistency of cost information, site conditions (access,

storage, services), availability of raw materials, client's financial capacity, and availability of resources. Authors in [6] stated that the absence of construction performance measures is a major factor in the failure of such projects. Because estimation is dependent on individual indices, there is frequently a disagreement among the stakeholders over the assessment of a building construction project's failure and success. Authors in [7] identified and assessed the major elements influencing the success of construction projects in Gaza. Owners, consultants, and contractors agreed that the most important factors were: average delay due to closures and material shortages, availability of resources as planned throughout the project duration, leadership skills for the project manager, escalation of material prices; availability of personnel with high experience and qualifications, and quality of equipment and raw materials in the project.

The accuracy of determining the estimated cost of a construction project has a significant impact on the building contractor's predicted profit. To raise the degree of confidence, a contingency premium should be added to the basic estimate. Project cost estimating is critical to the project's performance and should be considered from the beginning; otherwise, improper estimations could result in project failure [8]. Authors in [9] showed that the top-ranked causes responsible for cost increases in Pakistan's construction industry were financial issues, sluggish payments, and inflation. In [10], the relative importance approach was used to analyze all of the gathered data. Five factors were found to surpass the main causes of cost and time overruns.

II. RESEARCH OBJECTIVES

The current research emphasizes the fundamental factors affecting cost management of construction firms in Iraq. The results will help decision-makers to make appropriate decisions in order to complete a project at specified time and cost.

III. METHODOLOGY

To find the importance of each element in order to evaluate uniformity, quality and accuracy of cost estimation, a well-designed questionnaire was used to evaluate the factors effecting the management cost in construction firms during the life cycle of a project through the statistical method of Relative Importance Index (RII):

$$RII = w / A * N \quad (1)$$

where w is the weight of each factor given by the respondent in the range of 1to 5, A is the highest weight in the scale, and N is the total number of respondents

The questionnaire was constructed on the basis of interviews with experts classified to three groups, named as client, consultant, contractor (as shown in the Appendix). A total of 100 samples of the questionnaire were distributed into 35 extensive construction projects. The characteristics of the respondents according to their educational background, academic degree levels, and years of experience are shown in Figures 1-9.

Twenty factors were identified, from the literature and the interviews with experts in construction firms in Iraq, to have dominant influence on the cost management of construction projects and were used for the analysis. Each event was rated on a five-point Likert scale as very influencing, influencing, a little influencing, very little influencing, and not influencing. The collected data were processed for RII calculation, and the results are shown in Table I.

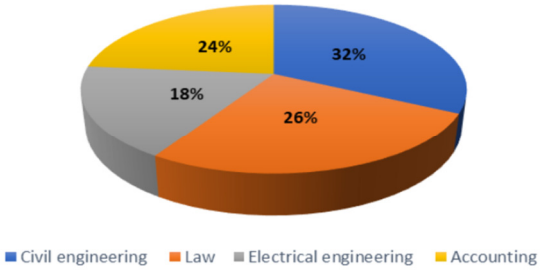

Fig. 1. Educational background of clients.

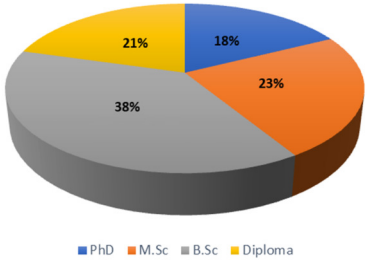

Fig. 2. Education level of clients.

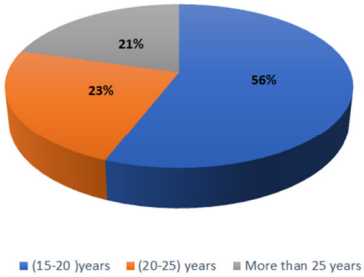

Fig. 3. Years of experience of clients.

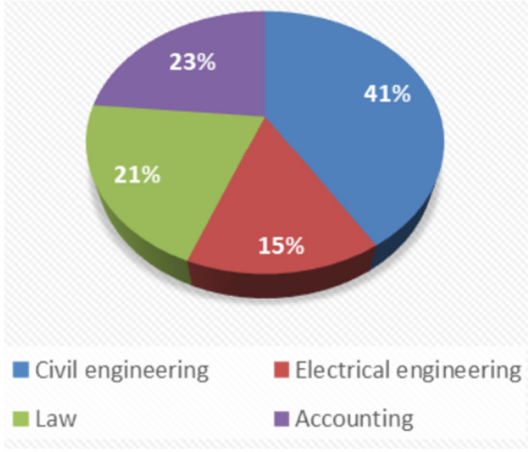

Fig. 4. Educational background of contractors.

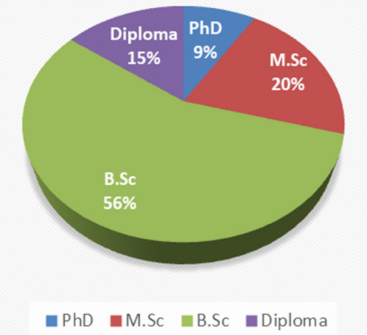

Fig. 5. Education level of contractors.

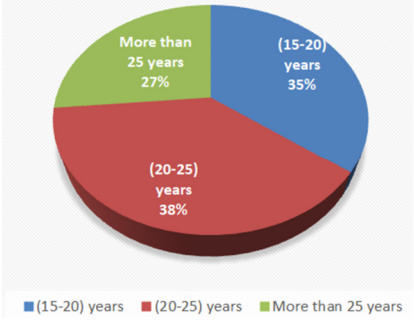

Fig. 6. Years of experience of contractors.

TABLE I. RII OF FACTORS INFLUENCING COST MANAGEMENT IN IRAQI CONSTRUCTION FIRMS

		ALL			Clients			Contractors			Consultants		
N	**Factor**	**TWV**	**RII**	**RK**	**TWV**	**RII**	**RK**	**TWV**	**RII**	**RK**	**TWV**	**RII**	**RK**
1	Poor management / poor coordination between the contracting company and the authorities.	520	2.26	1th	174	2.07	1th	169	2.43	1th	177	2.3	1th
2	Foreign or local workers.	512	2.12	2th	150	1.99	4th	183	2.36	2th	179	2.0	8th
3	Structural materials are damaged during storage.	505	2.09	3th	153	1.95	10th	165	2.25	3th	169	2.08	5th
4	Absence of places designated for storing materials.	500	2.08	4th	149	1.80	5th	161	2.12	4th	190	2.06	6th
5	Lack of specialized personnel.	493	2.02	5th	153	1.7	8th	165	2.27	5th	169	2.1	7th
6	Changing labor and material prices.	490	1.99	6th	165	2.04	2th	143	2.09	6th	182	1.85	3th
7	Lack of technical staff.	486	1.96	7th	138	2.01	9th	170	1.88	13th	178	1.98	12th
8	Length of the project period.	478	1.93	8th	135	2.23	3th	158	1.96	8th	185	1.6	11th
9	Mismatch designs with execution works in site.	475	1.86	9th	152	1.78	6th	138	1.74	12th	185	2.06	2th
10	Issuing a number of changing orders.	473	1.84	10th	130	1.83	7th	153	1.76	9th	190	1.93	4th
11	Laboratory tests failed.	468	1.82	11th	140	1.66	11th	163	1.83	10th	165	1.96	10th
12	Unlisted project works.	460	1.8	12th	132	1.61	12th	138	1.8	11th	190	1.99	9th
13	Large number of works of the same company.	455	1.59	13th	142	1.5	17th	156	1.75	13th	157	1.53	13th
14	Holidays for religious occasions.	451	1.57	14th	132	1.5	14th	145	1.71	14th	174	1.5	14th
15	Delayed payments.	445	1.56	15th	135	1.45	15th	141	1.73	7th	169	1.5	15th
16	Security conditions.	441	1.46	16th	134	1.42	16th	138	1.62	16th	169	1.34	16th
17	Delay in approving the state budget.	436	1.45	17th	132	1.55	13th	145	1.5	17th	159	1.3	17th
18	Climatic conditions.	430	1.38	18th	128	1.35	18th	140	1.55	18th	162	1.23	18th
19	Inefficient distribution of human resources.	423	1.35	19th	122	1.32	19th	136	1.53	19th	165	1.2	19th
20	Material theft on site.	420	1.31	20th	123	1.3	20th	143	1.5	20th	154	1.14	20th

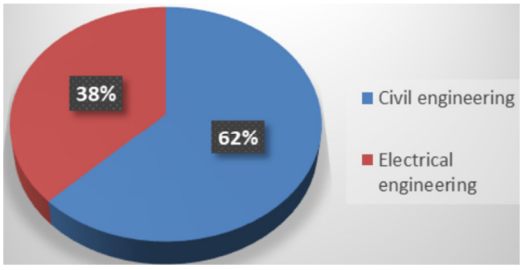

Fig. 7. Educational background of consultants.

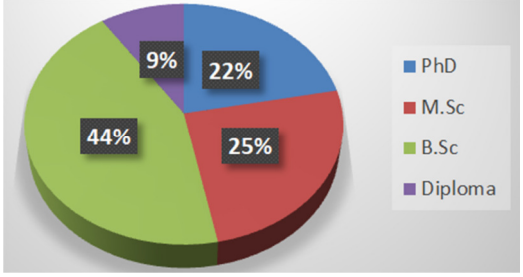

Fig. 8. Education level of consultants.

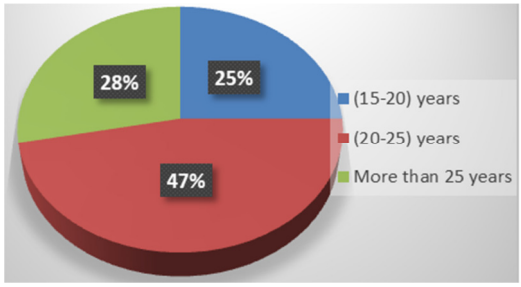

Fig. 9. Years of experience of consultants.

IV. RESULTS AND DISCUSSIONS

The elements influencing cost management of construction firms as perceived by clients, contractors, and consultants, are presented in Table I. The top ten factors that can influence the effective cost management practice of construction firms are: Poor management / poor coordination between the contracting company and the authorities involved in carrying out the work takes the first place, with RII=2.26. This result was in line with [11] and was the second factor of critical failure attributes of projects in India [12]. This factor was followed by the

nationality of workers (RII=2.12), damaged structural materials during storage (RII=2.09), absence of places designated for storing (RII=2.08), lack of specialized personnel in devices and equipment (RII=2.02), changing labor and material prices as a result of political changes (RII=1.99), lack of technical staff (RII=1.96), length of the project period (RII=1.93), mismatch designs with execution works in site (RII=1.86), and issuing a number of changing orders (RII=1.84). This factor was the sixth factor in Nigeria with (RII=1.99) [11]. The eighteenth factor, i.e. climatic conditions (RII=1.38), was the first rank for contractors with (RII=1.55). This result is in line with the findings in [7] in Gaza city whereas it was the fourteenth factor in India [2]. Theft material on site was the last factor (RII=1.31). This result did not correspond with [11], as it was the fifth factor in Nigeria.

V. CONCULSION

This research has identified major causes that effect cost performance and the overtaking the specified cost of the projects in Iraq and categorized them as client-related, contractor-related, consultant-related, material-related, labor related, contract relationship-related, external factors. Concluding, and in order to keep the cost as close in the contract as possible and not make an amendment, one must use a suitable and effective management, identify the nationality of the workers in site, keep the materials in identified places to avoid theft or damage, rely on competence and experience in choosing workers to operate machinery and equipment, the consultant and the contractor must be in contact with each other to make any change in design work to avoid the extra in change orders. This research has focused on the construction industry in Iraq. It has been determined that these factors should be taken into consideration during planning, design, tendering, and construction stage to accomplish project within the specified time and cost.

ACKNOWLEDGMENT

This paper was produced in cooperation with the Iraqi Federal Board of Supreme Audit.

APPENDIX

The Questionnaire

The purpose of this study is to assess the factors of cost management in construction firms in Iraq. Please answer all the questions, the information rendered in this questionnaire will be treated with the utmost confidentiality and will be used solely for academic purposes. Thank you in advance for your time and effort

Please tick the most correct answer(s) to your case or fill the empty space(s) as appropriate

Part One: Personal Information

1. What is your job position?

a. Client ☐

b. Consultant ☐

c. Contractor ☐

2. What is your educational background?

a. Civil engineering ☐

b. Electrical engineering ☐

c. Law ☐

d. Accounting ☐

3. What is your level of education?

a. B.Sc. Level ☐

b. Diploma level ☐

c. Master level ☐

d. PhD level ☐

4. How many years of experience do you have?

Part Two: Questionnaire

What are your opinions on the probability of occurrence of the factors influencing cost management in construction firms? Please tick on the relevant number on the table below, where:

1- very influencing, 2- influencing, 3- little influencing, 4- very little influencing, 5- not influencing

N	Factor	1	2	3	4	5
1.	Poor management / poor coordination between the contracting company and the authorities.					
2.	Foreign or local workers					
3.	Structural materials are damaged during storage.					
4.	Absence of places designated for storing materials.					
5.	Lack of specialized personnel.					
6.	Changing labor and material prices.					
7.	Lack of technical staff					
8.	Length of the project period.					
9.	Mismatch designs with execution works in site.					
10.	Issuing a number of changing orders.					
11.	Laboratory tests failed.					
12.	Unlisted project works.					
13.	Large number of works of the same company					
14.	Holidays for religious occasions.					
15.	Delayed payments.					
16.	Security conditions.					
17.	Delay in approving the state budget.					
18.	Climatic conditions.					
19.	Inefficient distribution of human resources/					
20.	Material theft on site.					

REFERENCES

[1] M. Barzandeh, "Accuracy of estimating techniques for predicting residential construction costs – A case study of an Auckland residential construction company," B.Sc. thesis, Unitec New Zealand, New Zealand, 2011.

[2] R. Stasiak-Betlejewska and M. Potkány, "Construction Costs Analysis and its Importance to the Economy," *Procedia Economics and Finance*, vol. 34, pp. 35–42, Jan. 2015, https://doi.org/10.1016/S2212-5671(15)01598-1.

[3] P. R. Bhattad and R. K. Jain, "An Assessment of Factors Affecting the Accuracy of an Early Cost Estimate for Repetitive Projects," *International Journal of Science and Research*, vol. 4, no. 4, pp. 1942–1944, 2013.

[4] E. M. Asal, "Projects' Cost Estimating," M.S. thesis, Arab Academy for Science, Technology and Maritime Transport, Egypt, 2014.

[5] M. T. Hatamleh, M. Hiyassat, G. J. Sweis, and R. J. Sweis, "Factors affecting the accuracy of cost estimate: case of Jordan," *Engineering, Construction and Architectural Management*, vol. 25, no. 1, pp. 113–131, Jan. 2018, https://doi.org/10.1108/ECAM-10-2016-0232.

[6] M. Mbugua, P. O. Ajwang', and M. M. O. Winja, "Identification and Ranking of Key Performance Indicators in Building Construction Projects in Kenya," *Engineering, Technology & Applied Science Research*, vol. 11, no. 1, pp. 6668–6673, Feb. 2021, https://doi.org/10.48084/etasr.3912.

[7] S. S. A. Shaban, "Factors Affecting The Performance Of Construction Projects in the Gaza Strip," M.S. thesis, The Islamic University–Gaza, Gaza, Palestine, 2008.

[8] E. Larson and C. Gray, *Project Management: The Managerial Process*, 6th ed. New York, NY, USA: McGraw Hill, 2010.

[9] S. Ahmed, A. H. Memon, N. A. Memon, A. N. Laghari, M. A. Akhund, and H. U. Imad, "Common Factors of Cost Escalation in Construction Industry of Pakistan," *Engineering, Technology & Applied Science Research*, vol. 8, no. 6, pp. 3508–3511, Dec. 2018, https://doi.org/10.48084/etasr.2278.

[10] F. A. Shaikh, "Financial Mismanagement: A Leading Cause of Time and Cost Overrun in Mega Construction Projects in Pakistan," *Engineering, Technology & Applied Science Research*, vol. 10, no. 1, pp. 5247–5250, Feb. 2020, https://doi.org/10.48084/etasr.3271.

[11] O. Fagbenle *et al.*, "Cost Management Practice of Construction Firms and Its Influencing Factors: Lessons from Southwestern Nigeria," in *Construction Research Congress 2018*, Mar. 2018, pp. 692–700, https://doi.org/10.1061/9780784481271.067.

[12] K. C. Iyer and K. N. Jha, "Factors affecting cost performance: evidence from Indian construction projects," *International Journal of Project Management*, vol. 23, no. 4, pp. 283–295, May 2005, https://doi.org/10.1016/j.ijproman.2004.10.003.