





Success Criteria of Major Architectural Projects in Iraq

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ABSTRACT

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“Project Success Criteria” are dependent variables and inputs to project management practice that evaluate how successfully a project will end. This research aims to explore the main success criteria for the major architectural projects in Iraq. Qualitative and quantitative approaches had been adopted through interviews and designed questionnaires directed to clients, consultants, and contractors who were involved in the design and construction of major architectural projects in Iraq. The research findings show that achieving the strategic objectives of the project and organization was the top success criterion element, besides, the “Iron Triangle” factors which are “Time, Cost, and Quality” are found still effective in Iraqi major projects’ assessment criteria. The essential success elements could have beneficial results in one place while not influencing another. At various stages of the “Project life cycle”, multiple success criteria might be evaluated.

1. INTRODUCTION

Project success is a challenging idea to describe since it goes beyond standard metrics and project efficiency. The evaluation of project success is necessary for enhancing project management abilities. Organizations, clients, and investors are working diligently to secure the success and prevent failure of their major projects which cost the economy billions of dollars each year [1]. In recent years, academic and business research has given a lot of attention to several challenges, including project success. Project management professionals have debated the idea of what characteristics make a project successful for a long time, but they haven't been able to identify a definition that is now generally recognized as accurate.

Many studies had attempted to define the complex terminology associated with project success, but there is no consensus on what the phrase means [2].

“Project Success” is the cornerstone for “Managing and Controlling” existing projects as well as for planning and directing upcoming projects [3].

According to Khan [4], the project's success depends on the early identification and specification of success features and criteria. Researchers and practitioners differentiate between the following success-relevant themes: -

A- “Project Success Criteria” and “Project Success Factors”

“Project Success Criteria” are conditional variables that assess how effectively a project will turn out, whereas “Project Success Factors” are independent project components that may rise the chance of success. Simply said, “success factors” help people achieve success while “success criteria” are used to quantify it. Project success criteria, according to Cooke-Davies [5], serve as the measure by which a project's success or failure will be judged. Besides, these criteria are considered as a set of rules or benchmarks that must be adhered to deliver

desired results within a specific period [6].

B- “Projects Success” and “Project Management Success”

Success should be determined by whether the output met the project's requirements and provided the anticipated advantage in the months and years that followed the project's completion. According to Shenhar et al. [7], “Project Success is determined over time”.

The main focus of measuring project performance has always been on tangibles; however, some directions recent thoughts suggest that clients/stakeholders, particularly the key sponsors are ultimately the best arbiters of project success [8]. The impact on client satisfaction becomes increasingly important after the project is completed.

Many researchers linked the success to its management success in achieving the project within the cost and time stated in the agreement between the owner and the executing firm. Others believed that maintaining project quality and scope are crucial success factors. However, it is not necessarily that all successful project management leads to project success. The project may be seen as a success or failure depending on the opinions of the many stakeholders, “Owner, Contractor, Project manager, Client, User, and Community”. According to Freeman and Beale [9], the impression of project success differs depending on whom you ask. “Success” might mean various things to different individuals. A human resources manager may measure success in terms of employee happiness, while an engineer may measure success in terms of technical proficiency and quality achievement. Benefits of “Project Success Evaluation” include, but are not restricted to: increased ongoing monitoring survival; the ability to monitor key project result areas; enabling project managers to make adjustments, development; and promotions commensurate with the level of success achieved.

As a result, establishing project success criteria provides the significant benefit of boosting both the ongoing project and

subsequent developments. A technique for achieving continuous advancements through experience-based learning is the use of success criteria. Success Criteria differ according to project type, clients' objectives, and contextual factors. Major architectural projects may have their priorities for success criteria for their significant impact and role in the society and built environment. To increase the major projects' success chances, professional project management can be applied from the early start of the projects.

2. PROBLEM STATEMENT

Assigning projects' success criteria is of considerable importance in AEC sectors, especially for major projects that frequently cost millions of dollars, take many years to plan, design and construct, involve several 'Public and Private' performers, and have an impact on large numbers of people.

The lack of a shared definition and set of standards for building project success has always been a factor in the failure to assess success. To avoid any conflicts between project teams, project success metrics must be established from the beginning of the project lifecycle.

There is a lack of research regarding success criteria in Iraqi projects, especially for the major architectural projects which experiencing a challenging performance because of their complexity, uncertainty, and special functional and environmental requirements. Accordingly, this study comes to determine the main criteria for the success of major projects in Iraq to establish a base through which the planning, design, and construction decisions can be formulated by the stakeholders and parties participating in these projects.

3. LITERATURE REVIEW

"Project Management Success" can be assessed using the widely used and accepted metrics of performance against "Scope, Quality, Cost, and Time", or the project objectives; however, "project success can also be assessed using the project's main goals, or the business objective. According to Kloppenborg et al. [10], the conventional components of time, money, and performance are present in all measurements of success. Project objectives are what the project organization and owners expect to get from utilizing the project results after the project has been delivered to them since success may be measured against a range of different sets of goals, scope, quality, cost, and time [11].

Project success may not necessarily emerge from project management success; however, feasibility studies, professional planning, and application of the professional project management methodology can drive the project to a safe line, meet project "cost and time", and increase the chances of project success. The local community expects the project to achieve social and environmental goals before, during, and after project completion. According to Turner and Zolin [8], the completion of the project's scope within the specified budget and time limits, as well as the delivery of the project's output under the specifications, should serve as indicators of the project's success. According to Serrador and Turner [12], project success may have several dimensions: -

- Achieving under project Schedule and budget;
- Development of team skills; achieving functional and environmental requirements; meeting the quality standard.

- Meeting client requirements and satisfaction;
- Business success by making new markets, and new products, developing new technology, and achieving considerable market share. According to the conventional view, completing a project on schedule, within budget, and under specifications ensures its success.



Figure 1. Empire State - New York

The Empire State Building shown in (Figure 1.) is evidence of this. It was constructed in the thirties of the last century and can be considered one of the typical successful major projects which met the "Time, Cost, and Quality" of the project. Despite the non-precedent technical challenges of the project, it had been managed in the design and construction properly and precisely to the extent that the output became an iconic building and landmark for New York City many decades later.

The scope has the most significant of the three traditional project efficiency factors "Time, Cost, and Scope" as it also has an impact on the customer and their satisfaction [7].

It had been argued that "Some projects were completed on time and within budget, yet they did not bring much value to their organizations or customers [13]. In the dynamic world of business-related projects, abiding by the triple constraint is no longer sufficient, and a new model is needed."

Sidney Opera House, shown in (Figure 2), is clear evidence of a project exceeding its time and costs however it was successful. With a five-year timeline, the project's anticipated budget was around 7 million Australian dollars.



Figure 2. Sidney Opera House

Its total cost was above \$100 million, and it took 16 years before the doors could be opened. One may infer that the "Sydney Opera House project was a reference example of

project failure” if they only looked at how well it performed in terms of schedule and budget. The Opera House continues to be one of the most intriguing projects in the world and is viewed by everyone as a success story. Project effectiveness, team satisfaction, customer impact, company success, and future planning are suggested as a model of success and examined throughout a range of timelines. (Ibid). A framework for categorizing the success factors into "four categories related to the project, related to the project manager and team, connected to the organization, and related to the external environment" is proposed [14].

A factors study carried out identified "five project success criteria dimensions" as follows: “Project efficiency, Organizational benefits, Project Impact, Future potential, and Stakeholder satisfaction” [4]. Different variables come under these five criteria dimensions such as: completed on time; completed within budget; the lowest amount of scope adjustments; and activities completed according to plan; met the predetermined quality criteria; followed environmental rules; satisfied the sponsor; met the client's criteria., and satisfied corporate objectives.

Management-related important challenges were recognized [15]. According to their findings, "coordination within the management team and cooperative efforts by the customer, contractor, and consultant are two crucial factors in a project's success". When defining “Key Success Factors (CSFs)” for project management, divided them into five categories [16]:

“External environment, Organization, Project management, Project, and Sustainability”.

“Critical Success Factor has seven dimensions: Design-related factors; Project management-related factors; Contractor-related factors; Business and Work Environment-related factors; Client-related factors; Procurement-related factors; and Project Managers-related factors” [17]. According to Ika [18], the traditional framework for project success assessment typically contains the following success criteria: time, cost, quality, and customer satisfaction. Success criteria according to Mukhtar and Amirudin [19], are client satisfaction, project completion on schedule, project completion to a specific quality standard, absence of disputes, safety, and accomplishment within budget. Success criteria are “Time, Cost, Quality, Safety, Client Satisfaction, Employees Satisfaction, Cash-flow Management, Profitability, Environment Performance, and Learning and Development [20].”

From the aforementioned literature, different success criteria had been specified by many researchers as shown in Table 1. Traditional factors: “Time, Cost, and Quality are effective [8, 10, 21-24]. However, new success factors such as stakeholder satisfaction, safety, and future visions had been added over the years as a result of the growing need to broaden the definition of success, especially for major projects which are characterized by complexity, risk, ambiguity, multi-disciplinary systems societal and cultural influence [26, 27].

Table 1. Projects’ Success Criteria by different researchers

	[7]	[13]	[11]	[18]	[10]	[21]	[26]	[22]	[8]	[23]	[4]	[25]	[12]	[19]	[20]	[24]	[27]
Time (Project duration)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Cost (Project Total Budget)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality (Project Standards)				✓	✓	✓		✓		✓	✓		✓	✓	✓	✓	✓
Efficiency and Effectiveness		✓					✓			✓						✓	
Technical specifications						✓	✓	✓								✓	✓
Functional Requirements													✓			✓	
Scope of Works	✓		✓			✓					✓	✓				✓	
Client/Owner satisfaction	✓	✓		✓		✓		✓		✓	✓		✓	✓	✓	✓	✓
Stakeholders’ satisfaction						✓	✓			✓	✓				✓	✓	
Contractor satisfaction																✓	
Suppliers’ satisfaction																✓	
Project team satisfaction		✓														✓	
Business & Commercial Factors						✓		✓		✓			✓		✓	✓	✓
Safety Requirements							✓			✓				✓	✓	✓	
Environmental Effect										✓	✓				✓	✓	
Strategic Goals/objectives											✓					✓	
Future vision		✓														✓	
Absence of Dispute						✓		✓						✓			
Sustainability										✓							

4. RESEARCH METHODOLOGY

Due to the numerous social, cultural, environmental, and human factors influencing projects, owners, and companies

adopt different techniques and tools to manage their projects in a way that increases the success probabilities and gets the anticipated benefits.

For this research purpose, a method that "combines

quantitative and qualitative approaches" is a more effective approach to addressing the research problem. The analysis of both ways helps the researcher to get more realistic results.

The research used designed questionnaires that were directed to the practitioners in major architectural projects design and construction. Besides, "Semi-Structured Interviews" were performed with experts and specialists in this regard to gather primary data. The data to be collected and analyzed from the questionnaires will be considered an objective approach, whereas the interviews will be considered a subjective approach representing the thoughts and ideas of the experts participating.

The semi-structured interviews provide greater freedom to alter, reword, and rearrange the questions to fulfill the interview's objectives. They help obtain in-depth information on the project's success aspects and criteria.

Based on the literature survey (which represents the secondary data), a designed questionnaire draft of the main extracted success criteria was arranged and discussed through interviews with experts and professionals in project management practice in Iraqi major projects to get their feedback in this regard (Figure 3). The discussion and analysis for the criteria draft took into consideration the project type of this research and its particular characteristics and requirements. The other considered factor was the local and contextual parameters such as social, cultural, environmental, contractual, and legal factors which have a certain impact on project success criteria. Some general criteria had been merged into agreed ones, for example, the satisfaction criteria of different project parties had been gathered under: (Owner and stakeholders' satisfaction) and (societal satisfaction).

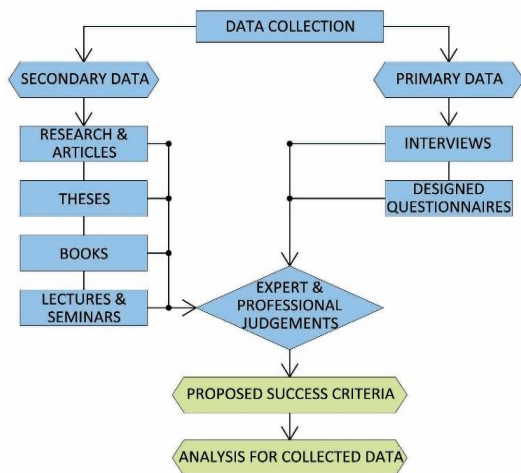


Figure 3. Data collection and analysis process

5. DATA COLLECTION, ANALYSIS AND RESULTS

The final questionnaire was fixed on proposing nine criteria that are expected to represent the features of Iraqi major projects. These criteria are shown in Table 2.

Ninety-five questionnaires had been distributed to engineers in various positions in contracting companies, consulting firms, and clients of several major projects in Iraq to collect their feedback on the "Success Criteria" of the major architectural projects they had participated in.

Engineers who responded were invited to share their ideas regarding the importance of each of the nine criteria of success included in the questionnaire distributed to the selected

engineers. A "Five-point Likert scale" was adopted to classify the level of importance or influence for each criterion, which is expressed as follows: - "Very low importance, Low importance, Medium importance, High importance, and Very high importance".

Eighty-three responses were received, six of which were incomplete. The complete questionnaires received were seventy-seven questionnaires sent from (19 architects, 40 civil and structural engineers, 11 mechanical engineers, and 7 electrical engineers) where the percentages of the respondents' specializations are shown in Figure 6.

The collected data were processed through the SPSS statistical program, and the "Relative Importance Index" is relied upon to define the significance of each criterion.

The "Relative Importance Index (RII)" is the statistical tool used to determine the relative importance of quality factors identified in a project. The levels of influence and their weights assumed in research are denoted by a value (W) where the following equation shows how to get the RII:

$$RII = \frac{\sum W}{A * N}$$

where:

"RII – is the Relative Importance Index"

"W – is the weight given to each factor by the respondents ranging from 1 to 5 in five levels"

"A – is the highest weight (i.e., 5 in this case)", and;

"N – is the total number of respondents."

Accordingly, RII shall be found as per the following:

$$RII = \frac{5(n_5)4(n_4)+3(n_3)+2(n_2)+n_1}{5(n_5+n_4+n_3+n_2+n_1)}$$

Other indexes used to assess the importance of the variables are the "Mean and Standard Deviation". They can be calculated as follows:

Mean Equation:

$$\bar{X} = \frac{\sum X}{N}$$

" \bar{X} = Mean of all values in the data set",

"X = each value in the data set",

"N = number of values in the data set".

"Standard Deviation Equation"

$$S = \sqrt{\frac{\sum (X - \bar{X})^2}{N}}$$

S = Standard Deviation

Based on the "Relative Importance Index (RII)" and the Mean ranking analysis, the results show that the main "Success Criteria" of major architectural projects in Iraq are;

(1) Achieving the strategic objectives of the project and organization (RII 86.20%); (2) Completion within the contractual cost (RII 84.10%); (3) Completion within the contractual period (RII 82.00%); (4) Achievement within the required quality (RII 80.50%); (5) Achievement in compliance with owner and stakeholder satisfaction (RII 76.30%); (6) Meeting the expected economic value (RII 74.20%); (7) Getting societal satisfaction (RII 71.60%); (8) Creating symbolic and moral value (RII 69.30%); (9) Contributing to the creation of a more safe and sustainable environment (RII 66.70%).

Table 2. The ranking of the success criteria of major architectural projects in Iraq

“Project Success Criteria”		Importance Level “Likert Scale”					ΣW	RII	Mean	S.D	R
		1	2	3	4	5					
X1	Completion within the contractual period	1	2	17	25	32	316	0.820	4.103	0.926	3
X2	Completion within the contractual cost	-	1	16	26	34	324	0.841	4.207	0.816	2
X3	Achievement within the required quality	1	-	21	29	26	310	0.805	4.026	0.858	4
X4	Achievement in compliance with the owner and stakeholder satisfaction	-	8	19	29	21	294	0.763	3.818	0.956	5
X5	Getting societal satisfaction	4	6	23	29	15	276	0.716	3.584	1.055	7
X6	Creating symbolic and moral value	5	10	22	24	16	267	0.693	3.467	1.153	8
X7	Meeting the expected economic value	-	8	22	31	16	286	0.742	3.714	0.915	6
X8	Contributing to the creation of a safer and more sustainable environment	7	12	20	24	14	257	0.667	3.337	1.209	9
X9	Achieving the strategic objectives of the project and organization	-	2	12	23	40	332	0.862	4.311	0.831	1

R- Rank

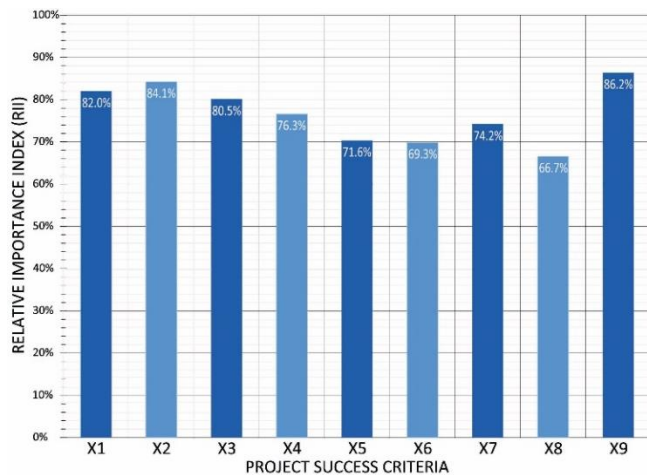


Figure 4. “Relative Importance Index” of project success Criteria of major projects in Iraq

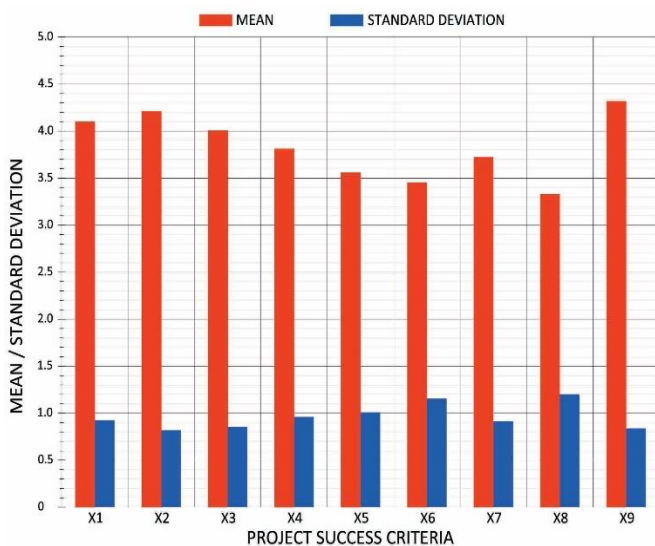


Figure 5. “Mean and Standard Deviation” of project success Criteria of major projects in Iraq

Figure 5 shows the “Mean” as an indicator of each Success Criterion value obtained from the sum of the values given by respondents (ΣW) divided by the number of respondents. It reflects the importance of each Criterion.

The Standard Deviation (SD) is used as a measure of the

amount of “Variation or Dispersion” of each Criterion value. It is found that the (X2, X9, X3) Criteria are of the lowest (SD) values respectively which means that these values tend to be closer to the “Mean” and are of more accuracy and less “Dispersion”.

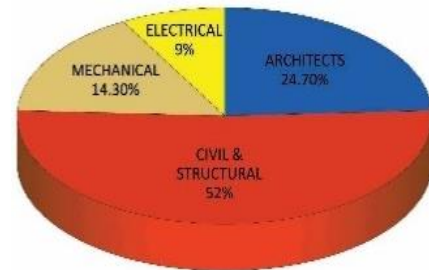


Figure 6. Percentages of professional respondents

The criteria data and measures presented in Table 2, Figure 4, and Figure 5 can be used to assess the importance of each success criterion in measuring project success and management success of Iraqi architectural major projects. Creating the symbolic and moral value criterion in this research showed a certain level of importance according to respondents’ assessment which can be created through some of the major architectural projects and can add significant added value for the clients, society, and country.

6. CONCLUSIONS AND RECOMMENDATIONS

This research established nine success criteria for Iraqi Major architectural projects, it reveals that (Achieving the strategic objectives of the project and organization, Completion within the contractual cost, and Completion within the contractual period) are the three most important criteria for measuring project success in major architectural projects.

The Cost (X2), Time (X1), and Quality(X3) criteria are found of a reasonable rank as per the results. They are coming in the (2nd, 3rd, and 4th) importance rank respectively.

Despite the fact that these criteria are conventional, however, they are still adopted in the majority of projects as evaluation index especially when the size of the project becomes larger and is expected to take a long time and huge cost.

The results show that the Satisfaction of Owners-Stakeholders (X5) criterion and Societal Satisfaction (X7) are of (5th and 7th) rank importance respectively. This reflects the role of the owners in the success of projects and to what extent they should be of enough management knowledge and clear objectives to direct their management people to put the project on the right track. Besides, society's role in project success is crucial as the interaction with society's needs and meeting its need by project facilities can assure project success.

The results show that the importance of these criteria differs from each other, however, it should be realized that their duration effectiveness is differ throughout the project lifetime as well. In the short term of project life after its completion, success can be reached by controlling "Costs, Time, and Quality". In the medium-term life of the project, the impact of the project on the owner and the user becomes clear through the extent to which the functional and environmental requirements of the project are achieved in line with client satisfaction. In the long term, the success of the project will be realized by achieving commercial benefits and expected returns.

The decisions made in the early stages of the project life cycle have a greater impact on the project's cost, time, and benefits. The project won't be successful if the owners are unaware of the factors that will affect the objectives, they set at the initial planning stage.

The impact of each success criterion referred to is different according to the project type. The residential projects aren't expected to be symbolic projects when compared to art centers, cultural centers, museums, and airports. On the other side, the cost impact and time impact have a major effect on residential and medical projects that may be different from the art centers.

The project must be well managed and coordinated with the organization's business goals. This may be accomplished by holding frequent meetings, conducting project audits, adhering to the schedule and deadlines, and producing a project that meets expectations. It is advisable to remain focused on the goals that the project is committed to achieving. Reaching project goals including delivering the product or service to users and ensuring customer satisfaction, among others, are vital criteria.

Some Iraqi Major projects experienced a certain level of success as the Bismayah Residential Complex in Baghdad which succeeded in delivering hundreds of residential units to the public in a reasonable time, cost, and quality. Others like the Central Bank of Iraq by Zaha Hadid, represent a monumental feature where success is in its Creation of symbolic and moral criteria.

- There is a need for more in-depth studies to know the different criteria for the success of major architectural projects according to their functional specializations.
- All participants in major projects should recognize these success criteria obviously at the early stage, to enable them to focus on the same route to accomplish overall success in similar projects.
- This research can guide owners and developers to establish their objectives and business targets and prioritize them accordingly.

For future research, it is recommended to study the "Success factors" for major projects in Iraq to combine it with this research as there is an overlapped area that needs to be studied between the "Success Criteria" and "Success Factors" to get the benefits for all project participants. Besides, future researches should make focus on achieving success in the long

run through the extent of willingness to achieve change, adapt to external challenges, and try to build new proficiencies and skills that are expected to be needed in the future.

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