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Success Factors Affecting Public Projects of Construction Industry in Pakistan

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ABSTRACT

The global enhancement in the construction of megaprojects during the last few decades has triggered competition in project management. Achieving successful completion of projects is the fundamental need that requires understanding the critical factors that govern the productive accomplishment of tasks within due time and budget, simultaneously maintaining the quality and safety standards. Besides, the cost, time and quality, health& safety and environmental issues, and efficient project use are equally important factors that need special consideration to complete a project successfully. Several projects have demonstrated different barriers, especially in construction projects in the public sector in developing countries, such as Pakistan. Hence, this study investigated the criteria considered by the practitioners for measuring success in the construction project of Pakistan. A questionnaire survey involved 43 construction practitioners identifying the indicators relevant to measuring the success of Pakistani construction projects. The findings obtained through Statistical analysis (SPSS) and MS Excel revealed that the most common success factors of construction projects are the role of government, client capability, and project management. From a significance point of view, the role of government is reported as the most significant success factor. The government requires to exercise strict policy for getting work done successfully.

Key words: success factor, construction, Pakistan, public projects

1. INTRODUCTION

The construction sector governs any country's economy and is considered an indicator of a nation's financial well-being. Therefore, construction projects are tangible pathways to boost the construction sector. Construction projects include unrepeatable activities with several exclusive characteristics, such as time limitations, complex procedures, tremendously challenging situations, financial capabilities, and vibrant organization arrangements [1]-[2]. The overall successful completion of a project involves various stakeholders' efforts and expertise, including clients, consultants, contractors, and material and labor suppliers [3].

Due to increasing competition in the construction industry, the clients need a rapid and quality-based project completion to utilize their space and budget more quickly and effectively. Thus, the excellence of a construction project is proportional to the client's satisfaction, whereas successful completion is dependent on teamwork [4]. The construction industry provides the second largest employment opportunities in third-world countries [5], and minor changes in the completion trend of projects may affect the national economy. Like several other developing countries, the construction industry of Pakistan incorporates a vital contribution to the development of the country’s economy. More than 35% employed people in Pakistan are connected with the construction industry [6]. Hence, in the arena of the construction industry, it is emphasized that the critical factors for the successful completion of a project must be identified and utilized optimally. Though the list of essential factors of success is quite long, and ambiguity exists to categorize them as more important or not compared with each other, several factors can be classified as essential or critical success factors [7]-[8].

Unfortunately, the internal contradiction, vagueness, and inconsistency raise complicated problems for management to complete the project with the required quality and within the allocated budget. Recently, the economy of Pakistan has been improved by the contribution of housing and infrastructure development. However, a great flaw in fulfilling the

agreed-upon time of projects has been observed. Several projects were completed; however, the stakeholders suffered an unexpected loss of money due to significant delay in completion and cost overrun [9]-[10]. In general, the major reason for this failure is the lack of understanding of the mandatory factors for a successful public sector project. There is a need to identify the role of success factors for the successful completion and the influence of success factors on the overall quality of the project [10]. In the above mentioned context, this study is aimed to explore and model the factors influencing project success in the construction industry of Pakistan.

This study will help determine how public sector infrastructure projects in Pakistan are judged to be successful and how the success factors contribute to success. In addition, this study will help practitioners and stakeholders involved in public sector construction projects to identify and overcome various types of problems that cause delays in the completion of tasks or lead to the failure of projects.

2. LITERATURE REVIEW

The term 'critical success factors' was first introduced by [7] while investigating the role of project management in the information system and declared that cost, time, and quality govern a construction project's progress. Later, [8] claimed that the definition of critical success factors varies from project to project and is based on the criteria set to understand the term 'successful project'. [11] defined the essential factors of success for a construction project primarily capture the project's progress from the root level. Their effects can be observed when the project reaches at least the mid-completion stage. [12] extended this definition by further adding the statement that critical factors are the factors that should be planned at the client level and executed with proper attention by the consultant and contractors efficiently at all stages of the project to achieve the expected outcome.

Several researchers have to contribute to identifying and defining success factors. [13] performed research evaluating seventy-five construction projects and revealed that decreasing profit margin, developed guidelines and strict following, increased meetings among stakeholders, and efficient control of commodities result in high quality resultant. Almost similar results were obtained in their study by [14]. Their investigation highlighted that cost, quality and scheduling have more impact on successful completion on the project. A study of more than 100 projects in the last decade concluded that there are nine other factors that contribute to the success of a construction project [15]. These factors include time, cost, quality, contingency planning, avoiding non-excusable delays, proper training to stakeholders about utilizing their resources efficiently, proper communication among stakeholders, hiring of experienced and well-known consultants and contractors, sufficient knowledge of risk management, maintenance of risk management register, sufficient and maintained documentation, and quick progress in one-third duration of the process. [16] admitted that cost, time, and quality are the most critical success factors; however, the realization of social responsibility significantly reduces the chances of delay in project and project failure. Notably, the management's role in coordinating with other stakeholders by understanding their nature and organizational setup leads towards completing a construction project.

[17] considers the post-constructional phenomenon as a part of successful project completion and declares that the client-contractor coordination and cost are the major factors that control the overall performance of a construction project. [18] collected data through survey questionnaires from experienced personal related to the construction industry and analyzed the survey form. Critical analysis revealed that clean bidding, socio-political atmosphere, equal opportunity policy, organizational setup ratio, and government writ highly influence a construction project's progress. However, their study was limited to the local public sector construction industry of China.

[19] investigated the effective level of success factors based on various attributes. Data was collected through seventy-eight survey questionnaires, and analysis of output was performed. The findings revealed that technical and environmental project complexities have negative impacts on safety performance and the negative impact of project complexity on safety performance becomes less significant when a higher level of resilient safety culture exists. Still, this impact might not be substantial for a high resilient safety culture level. Their study was limited to the Vietnam construction industry only. A comprehensive review of literature helped in listing 44 common factors used to measure the success of construction projects categorized into six categories.

- *Government-related factors*

This construct includes items that are under the discretionary power of government. For any public project to be successful, it is mandatory to have the legal and political support of the government. Besides that, the relationship with local authorities for approvals and their involvement plays a vital role in completing the project. Moreover, minimizing the political conflicts and the government's financial guarantee adds value to the project outcomes.

- *Market related/social factors*

Good social support acts as the key pillar for the successful completion of the public project. It is funded by public money, so it is mandatory to satisfy the general needs to gain confidence in the projects. Besides that, stable macroeconomics of the country and precise evaluation of the market and the competitors makes it easy for the cash flows/finances of the project to avoid any delays.

- *Client related factors*

Clear vision and precise formulation of the client strategies make the project scope more vivid and increase the client's efficiency. Further to that, the client's involvement in the project and timely decision-making avoid change orders and reduce delays to increase the project's schedule performance and cost efficiency.

- *Project management related factors*

Management commitment has always been the key factor for successful completion of the project. Project management factors act as the binding forces to keep the project on track. This includes the managers leadership skills, his communication and coordination system. Efficient supply chain management of material and human resource management reduces the project delays and adds value to the project's schedule efficiency. In addition to that, reliable and vivid contractual arrangements lessen the chances of conflict and arbitration for efficacious completion of the project.

- *Contractor related factors*

One of the significant factors for the unsuccessful completion of the public project is the contractor's wrong selection. Contractor's experience and market reputation is the critical factor for the selection of the contractor. As it is usual practice in Pakistan, there is a delay in payment to the contractor due to the complex documentation process. Hence, the contractor's financial strength matters a lot to keep the work in progress to avoid delays. Besides that, due to the complex nature of the projects, the contractor must have access to latest equipment and machinery and to some extent, small processes can be automated.

- *Project-related factors*

This construct includes all the items related to the project starting from proper selection of the project type to project delivery system. To successfully complete the public project, it is necessary to have financial transparency, a fair bidding process, and economical design. Besides that, the project monitoring and control system and proper site management add value to the project outcomes. Efficient planning and adequate risk analysis avoid delays to add value to the schedule efficiency of the project.

3. DATA COLLECTION AND ANALYSIS

This study involved a questionnaire survey in collecting the data. The collected data could be analyzed through different computer applications. This study utilized the IBM SPSS (Statistical Package for Social Sciences) and MS Excel to analyze the results. The Average Index (AI) method was used for descriptive analysis to rank the parameters. This method illustrates the findings in the rating of Likert (ordinal) scale categories. For this study, five-pint Likert scale was used as in table 1.

Table 1: Attributes of Cleveland dataset

Scale	Description	Abbreviation
1	Not Relevant	NR
2	Slightly Relevant	SR
3	Moderately Relevant	MR
4	Very Relevant	VR
5	Extremely Relevant	ER

Collected data was analyzed for calculating Average Index (AI) value with following equation:

$$\text{Average Index} = \left[\frac{\sum_{i=1}^{5} a_i x_i}{5\sum_{i=1}^{5} X_i} \right] \text{ for five scale rating}$$

Where,

i = the rank

a_i = constant of weightage assigned to i

X_i = variable showing the frequency of the reply for the value of i *(1,2,3…)*

X_1 = occurrence of the 'Not Relevant' reply; equivalent to $a_1 = 1$;

X_2 = occurrence of the 'Slightly Relevant' reply; equivalent to $a_2 = 2$;

X_3 = occurrence of the 'Moderately Relevant' reply; equivalent to $a_3 = 3$;

X_4 = occurrence of the 'Very Relevant' reply and equivalent to $a_4 = 4$; and

X_5 = occurrence of the 'Extremely Relevant' reply; equivalent to $a_5 = 5$.

3.1 Demography of Respondents

A total of 80 questionnaire forms were distributed amongst the experienced practitioners involved in handling construction projects. Unfortunately, only 51 forms were received back, among which 43 were valid samples and used for analysis. Therefore, the factual information of the respondents participating in the questionnaire survey is presented in table 2.

Table 2: Respondents' profile statistics

Parameter	Frequency	Percent
Type of Organization		
Consultant	14	32.5
Contractor	5	11.6
Client	23	53.5
Researcher/Academia	1	2.4
Total	**43**	**100.0**
Experience of Respondents		

0 - 5 years	2	4.6
6 - 10 years	6	13.9
11 - 15 Years	11	25.7
16 - 20 years	23	53.5
21 - 25 years	0	0
Above 25 years	1	2.3
Total	**43**	**100.0**

Table 2 shows that most of the respondents, i.e., 23 are clients, 14 are consultants, 5 are contractors, and 1 is Researcher/Academia. Among these, 35 respondents have been working in the construction industry for more than ten years, and only eight respondents have experience of fewer than ten years.

4. RESULTS AND DISCUSSION

4.1 Ranking of the Success Factors and Attributes

The factor and the attributes are ranked based on the average index value of the factors and relative attributes. The frequency of response and ranking of the success factors is presented in table 3.

Table 3: Ranking of Success Factors

No.	Success Factors	NR	SR	MR	VR	ER	Total	AI	Rank
		1	2	3	4	5			
1	Role of Government	0	0	0	4	6	10	4.6	1
3	Client Capability	0	0	0	5	5	10	4.5	2
4	Project Management	0	0	2	0	8	10	4.0	3
5	Contractor Capability	0	0	2	3	5	10	3.7	4
6	Project Conditions	0	0	2	6	2	10	3.4	5
7	Market Conditions	0	0	3	4	3	10	3.1	6

From table 3, it is seen that role of the Government is the most relevant factor which plays a vital role in the success of public projects. The respondents placed client capability at the second rank in playing a role for achieving success in the projects. If the client is not capable or does not have adequate technical knowledge, it can also lead to disputes or affect the quality of work. Similarly, project management is the third major factor of success. Project management is always considered an essential criterion in managing the projects from the conceptualization stage to the completion of the project. The frequency of response and the ranking of the attributes measuring the success factors is presented in table 4.

Table 4: Success Factors and Attributes

No.	Success Factors and Attributes	NR	SR	MR	VR	ER	Total	AI
		1	2	3	4	5		
	Role of Government							
1	Government approvals and involvement	0	0	0	6	4	10	4.4
2	Government guarantee and experience	0	1	2	2	5	10	3.8
3	Favorable legal and political support	1	0	2	1	6	10	3.5
4	Good relationship with local bodies	0	0	4	2	4	10	2.8
5	Political conflicts	2	1	3	3	1	10	2.4
6	Unethical practices	3	1	5	0	1	10	1.3
	Market Conditions							
7	Accurate analysis of market and competition	0	0	1	3	6	10	4.2
8	Stable macro-economic conditions	1	0	1	5	3	10	3.6
9	Market demand	2	1	0	6	1	10	3.6
10	Purchasing power of the market	0	0	2	5	3	10	3.5
11	Favorable social support	1	1	4	3	1	10	2.3
	Client Capability							
12	Timely release of funds to contractor	0	0	0	1	9	10	4.9
13	Design quality	0	0	0	3	7	10	4.7
14	Effective project briefing	0	0	0	6	4	10	4.4
15	Client involvement in the project	0	0	0	8	2	10	4.2

16	Client's decision making Skills	0	0	2	1	7	10	3.9
17	Transparency in tendering process	0	0	2	1	7	10	3.9
18	Precise formulation of vision and strategy	0	0	2	4	4	10	3.6
	Project Management							
19	Reliable contractual arrangement	0	0	0	2	8	10	4.8
20	Decision making ability	0	0	0	3	7	10	4.7
21	Management leadership skills	0	0	0	4	6	10	4.6
22	Effective communication and co-ordination system	0	0	0	4	6	10	4.6
23	Management commitment	0	0	0	5	5	10	4.5
24	Appropriate organizational structure	0	0	0	8	2	10	4.2
25	Strong & reliable stakeholder consortium	0	0	1	7	2	10	3.8
26	Effectiveness of human resource management	0	0	2	6	2	10	3.4
27	Team motivation (rewards and incentives)	0	0	3	3	4	10	3.2
28	Efficient supply chain management	0	0	4	5	1	10	2.5
29	Contractor's experience &reputation	0	0	0	2	8	10	4.8
30	Contractor's reputation	0	0	0	3	7	10	4.7
31	Contractor's financial strength	0	0	0	4	6	10	4.6
32	Contractor’s profitability margins	0	0	0	6	4	10	4.4
33	Use of new technology and automation	0	0	5	3	2	10	2.2
	Project Conditions							
34	Effective project monitoring &control system	0	0	0	3	7	10	4.7
35	Economic viability of the project	0	0	0	7	3	10	4.3
36	Effective resource management	0	0	0	7	3	10	4.3
37	Adequacy of planning and scheduling	0	0	0	7	3	10	4.3
38	Project delivery system	0	0	2	3	5	10	3.7
39	Project scope clarity	0	0	2	4	4	10	3.6
40	Proper selection of the project type	0	0	2	6	2	10	3.4
41	Project team experience	0	0	3	4	3	10	3.1
42	Unforeseen conditions	0	0	4	5	1	10	2.5
43	Weather conditions	0	0	4	6	0	10	2.4
44	Adequate risk analysis	0	0	6	3	1	10	1.7

Table 4 depicts that in the domain, ‘Role of Government’, the attribute Government approval and involvement is the most relevant factor and is ranked first by the respondents. Similarly, accurate analysis of market and competition is at the first rank in the category ‘Market Condition’. Timely release of funds to contractor, Design quality, Effective project briefing, and Client involvement in the projects are most relevant in the client capability domain. In the project management domain, various attributes are ranked most appropriate by the respondents, such as ‘reliable contractual arrangement, Decision-making ability, management commitment, and contractor’s experience and reputation. Finally, in ‘project condition’ domain; Effective project monitoring and control system and economic viability of the project are ranked most relevant by the respondents.

5. CONCLUSION

Public projects in Pakistan are facing many delays and conflicts. Therefore, there is a dire need to study the factors influencing the successful completion of public projects in Pakistan. This study reported that the role of the Government, client capability, and project management are major factors that play a vital role in achieving the success of any project. This study suggests that the Government can take preventive measures and device policies for public projects. Similarly, contractors and consultants can gain knowledge and prepare beforehand before bidding for any public projects.

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