



EVALUATION OF CRITICAL SUCCESS FACTORS IN CONSTRUCTION PROJECT

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Abstract

Achieving success is a critical issue in the construction industry due to large number of construction contractors. The aim of this study is to investigate the critical factors that lead to the success of construction companies. A questionnaire was prepared with sixty two factors and survey was made with thirty five Construction companies. The Project Management team, Contractor and Project Manager were asked to rate the factors on 5 point scale. The mean score and relative importance factors were used to identify the top critical success factors and statistical distribution of factors are analyzed by Statistical Package of Social Sciences tool. The top ten critical success factors were identified as Effectiveness of cost control system of contractor, Human skill availability, Technology facility, Decision making of contractor, Leadership skills of project manager, Developing an appropriate organization structure, Adequacy of funding, Facility of plant and machineries, Organizing skills of project manager and Political environment.

Key Words: Critical Success Factors, SPSS, Construction Industry, Project Management.

1. Introduction

Construction industry is an area which relates project management, contractor, project manager as well as work environment. Construction industries are not stable because the technologies changes from period to period and the construction becomes more complex. According to a survey report, it is found that nearly 80% projects fail to meet their objective. Success factors act an input factor to the Construction Industries and either directly or indirectly it leads

to success of the project. These success factors are also not certain and vary over time. So, it becomes mandatory to study about various critical success factors which increases the success rates in construction. Critical success factor is a management term for an element that is necessary for an organisation or project to achieve its mission. It is a critical factor or activity required for ensuring the success of a company or an organization.

Abdelnaser Omran et al ^[1] evaluated critical success factors for construction companies in Libya. The study revealed that there is a gap between the importance of Adequate Communication, Control Mechanisms, Feedback Capabilities, Troubleshooting, Coordination Effectiveness, Decision Making Effectiveness, Monitoring, Project Organization Structure, Plan and Schedule Followed, and Related Previous Management Experience are the critical success factors (CSFs). Abu Bakar et al ^[2] made an attempt to find a theoretical framework for determining project management success factors in sustainable housing development. Various past literatures were reviewed to find the critical success factors. As a result of the research, a list of critical success factors for project management practices for sustainable housing development was established. Afshin Pakseresht and Asgari ^[3] conducted the study to find the critical success factors in construction projects of Pars Garma Company. He conducted this study in two stages. In the first stage, a questionnaire was prepared and it was distributed to 58 staff managers, project managers and technical experts. By using SPSS software, Z test was conducted with the data of the questionnaire. In the second stage, a questionnaire was prepared by omitting low effect factors and distributed among 15 persons of the organizational

experts. The data obtained from this second stage, were analyzed by Expert Choice software. As a result, the critical success factors are respectively: Technical and economic assessment of the project required resources, experience and executive records of project manager, project strategic planning and executive experiences of contractor team about the project subject. Albert P. C. Chan et al ^[4] made a framework on critical success factors and identified five major critical factors namely project-related factors, project procedures, project management actions, human related factors and external environment. Arslan and Kivrak ^[5] conducted a survey in forty Turkish Companies and found that Business Management, Financial Conditions and Owner-manager characteristics were the most important factors to project success. Chan Wai et al ^[6] made a study with seventy construction companies and concluded that Project Mission, Top Management Support, Client Consultation, Technical Task, Personnel Competency, Client Acceptance, Trouble Shooting, Project Plan Monitoring and Effective Communication are the major critical factors that leads to successful completion of project. Muhammad Saqib ^[7] analyzed the survey results of a public sector construction project in Owerri to find the critical success factors. Questionnaire survey was conducted among fifty six professionals in construction industry. As a result, top six critical success factors were identified which include; efficient and effective procurement process, effective communication management, adequate planning, leadership skills of the project manager, weather conditions and effective coordination of project activities. A questionnaire survey was conducted by U. Kulatunga ^[8] to find out CSFs in construction research and development process.

2. Methodology

Through this study, the various issues involved in the successful completion of project can be identified. Several recommendations and mitigation measures to strategically cope up with the factors can also be found out. The study involves in collection of the factors causing the success in construction projects from literature survey. The identified projects are listed and the construction industry experts are asked to rate the factors with 5 point scale in the questionnaire. The critical factors identified by the data

collection was used to find the mean of the factors and rank accordingly. The methodology followed in this study is indicated in figure 1.

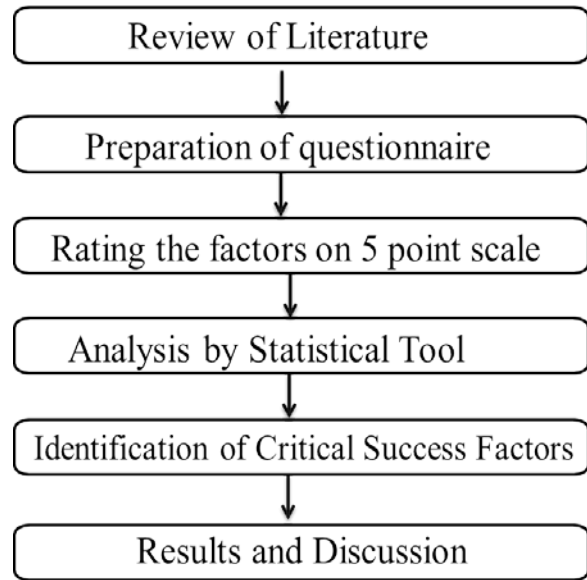


Figure 1 Methodology

3. Data Collection

There were 35 respondents for the questionnaire survey. The CSFs are with respect to the following :

- Project Management related factors
- Contractor related factors
- Project Manager related factors
- Business and work environment related factors

The factors were rated on a scale of 1 to 5 with 1 having least importance and 5 the highest as indicated in Table 1

Table 1: Criticality Level

Mean factor score range	Criticality Level
1.0	Least significant towards project success
2.0	Mildly significant towards project success
3.0	Moderate significant towards project success
4.0	More significant towards project success
5.0	Most significant towards project success

3.1 Critical success factors – Project Management related

The CSFs considered with respect to Project Management are Communication System, Control mechanism, Feedback capabilities, Troubleshooting, Planning effort, Coordination effectiveness, Decision making effectiveness, Project monitoring, Developing an appropriate organization structure, Implementing an effective safety program, Implementing an effective quality assurance program, Control of sub-contractors’ work, Prior project management experience, Risk identification and allocation, Formal dispute resolution process, Motivation/ Incentives, Constructability program, Training the HR in the skill demanded by project, Overall managerial actions, Plan and Schedule Followed and Previous Management Experience.

3.2 Critical success factors – Contractor Related

Executive experience of Contractor experience, Site management, Supervision, Extent (Involvement) of Subcontracting, Contractor’s cash flow, Effectiveness of cost control system, Speed of information flow, Involvement of sub-contractor, Cash flow, Prior Contractor experiences, Decision Making, Effectiveness of communication, Physical Work Environment, Facility of Plant and Machineries

3.3 Critical success factors – Project Manager Related

Project Manager’s competence, Project Manager’s experience, Project Manager’s authority to take day-to-day decisions, Project Manager’s authority to take financial decision, selecting key team members, Technical capability of project manager, Leadership skills of project manager, Organizing skills of project manager, Coordinating ability of project manager with contractors/ subcontractors, Coordinating ability of project manager with owner/ owner representatives, Motivating skills of project manager, Project manager’s commitment to meet quality, cost & time, Project manager’s early & continued involvement in project, Project manager’s adaptability to changes in project plan, Project manager’s ability to delegate authority, Construction control meetings, Project Plan Monitoring, Executive experiences of Contractor Team and Project Manager’s Involvement in Project.

3.4 Critical success factors – Business and Work Environment related

Economic environment, Social environment, Political environment, Physical work environment, Industrial relations environment, Administrative approvals, environment Commitment of all parties to the project, Adequacy of funding, Technology availability, Human Skill availability.

4. Analysis Using SPSS Software

The above factors were analysed using Statistical Package of Social Sciences Software (SPSS). The data collected through questionnaire survey were entered in variable view of SPSS software and the responses were entered in data view of SPSS as indicated in Figures 2&3. Descriptive Statistics analysis was carried out and the top ten critical factors were ranked in descending order based on the mean factor and relative importance factor.

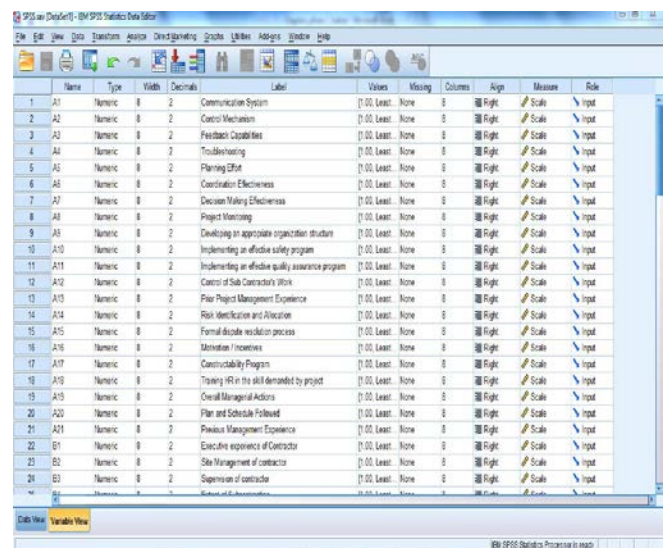


Figure 2: Data entered in variable view

The mean factor and relative importance factor are calculated as follows :

$$\text{Relative Importance Index} = [\sum W / (A \times N)]$$

where, ‘W’ is weightage given to each factor by respondents ranging from 1 to 5, ‘A’ is the highest weight (5 in this case) and ‘N’ is the total number of respondents. The RII value ranges between $0 < RII \leq 1$. The highest value of RII is the most important success factor and it is the major success factor.

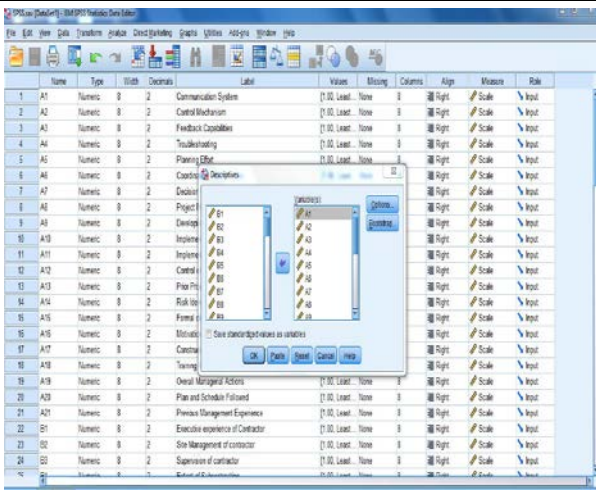


Figure 3 Descriptive Analysis of Data

5. Results And Discussion

The detailed analysis result for top ten critical factors are done using SPSS software and ranking were given by considering relative importance factor. The descriptive analysis is done for each factor separately and top ten CSFs are tabulated in Tables 2,3,4 and 5

Table 2 : Top ten CSFs Related to Project Management

Critical Success Factors	Mean Factor	RI Factor	Ranking
Developing an appropriate organization structure	4.628	0.9114	1
Project Monitoring	4.085	0.817	2
Communication System	3.314	0.662	3
Decision Making Effectiveness	3.114	0.651	4
Previous Management Experience	2.828	0.531	5

Implementing an effective safety program	2.657	0.520	6
Prior Project Management experience	2.600	0.515	7
Risk Identification and Allocation	2.428	0.280	8
Plan and Schedule Followed	2.314	0.462	9
Control Mechanism	2.200	0.440	10

Table 3: Top ten CSFs Related to Contractor

Critical Success Factors	Mean Factor	RI Factor	Ranking
Effectiveness of cost control system	4.857	0.971	1
Decision Making	4.657	0.931	2
Facility of Plant and Machineries	4.257	0.851	3
Speed of information flow	3.657	0.731	4
Effectiveness of communication	3.314	0.662	5
Prior Contractor	3.228	0.645	6

experience			
Physical work environment	3.142	0.628	7
Supervision	3.085	0.565	8
Cash Flow	2.828	0.417	9
Site Management	2.800	0.377	10

Table 4: Top ten CSFs related to Project Manager

Critical Success Factors	Mean Factor	RI Factor	Ranking
Leadership skills	4.628	0.925	1
Organizing skills	4.171	0.834	2
Project Manager's experience	3.771	0.748	3
Technical capability of Project Manger	3.742	0.645	4
Project Manager's commitment to meet quality, cost and time	3.228	0.582	5
Project Manager's Involvement in Project	3.142	0.428	6
Project Manger's	3.142	0.425	7

authority to take day to day decisions			
Motivating skills of Project Manager	2.885	0.331	8
Project Manager's Competence	2.714	0.302	9
Project Manager's adaptability to changes in project plan	2.685	0.295	10

Table 5 : Top ten CSF Related to Business and Work Environment

Critical Success Factors	Mean Factor	RI Factor	Ranking
Human skill availability	4.771	0.954	1
Technology Facility	4.771	0.954	2
Adequacy of Funding	4.257	0.851	3
Political Environment	4.142	0.828	4
Commitment of all parties to the project	3.94	0.788	5
Physical Work	3.771	0.754	6

Environment			
Administrative approvals	3.400	0.721	7
Economic Environment	2.828	0.457	8
Social Environment	2.285	0.428	9

From the analysis, the top ten critical success factors among four categories were found and it is represented in Figure 5.

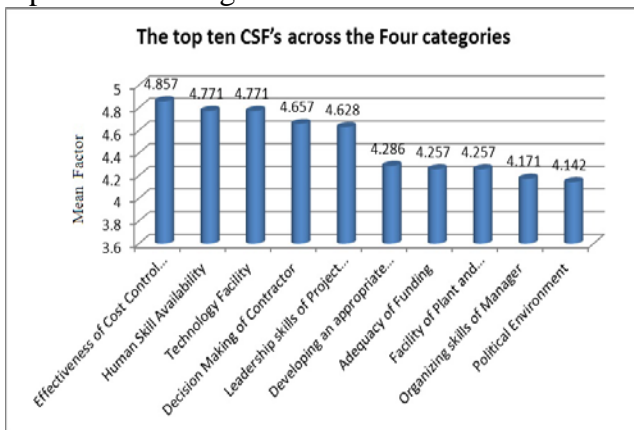


Figure 5 Ten Critical Success Factors

Effectiveness of cost control system related to contractor is required for the successful completion of the project that has to be given priority among all the factors as it kick starts the project. Human skill availability and technology facility plays a major role in success of a project. Contractor should have a good decision making skill whereas it helps to find a correct solution during crisis. While assigning the Project Manager, his leadership skills must be considered, which helps to tackle the critical situations. Necessary funding arrangement should be made so it may not be a hindrance to finish the project in appropriate time. Developing an appropriate organization structure helps to complete the project effectively without any breakthrough.

6. Conclusion

There are many CSFs which leads to success in construction projects. In the present study, based on the analysis the top ten CSFs identified are Effectiveness of cost control system of contractor, Human skill availability, Technology facility, Decision making of contractor, Leadership skills of project manager, Developing an appropriate

organization structure, Adequacy of funding, Facility of plant and machineries, Organizing skills of project manager and Political environment.

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