

Evaluation of Critical Success Factors in Construction Projects in India

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Abstract: *The main objective of project management is to ensure the success of the construction project and identification of the important factors which play a vital role in the success of the project. Successful construction project means achievement of the desired objective and planned goals. However, there is no scale to identify the success factors, as it varies widely depending on the project objective and scope of the construction project. In this study, an attempt is made to identify the critical success factors, which attributes towards the success of the construction project. Twenty Four critical success factors were identified under 5 groups. A questionnaire-based survey was conducted to apply the consistent judgment of 80 experts working in different sectors like real estate, government sector, RCC consultant, project management consultant, etc having a wide of experience. Success factors were identified by Relative Important Index method as the most critical factors, which govern the success of the project according to the analysis of survey response. The Deviation between theoretical and actual data is analysis using goodness test of fit method. A questionnaire contains 11 failure factors in construction projects, and the rating has been given by the expertise. After analysis 15 top success factors were classified as most critical success factors. This study helps to identify the success factor in a construction project.*

Keywords: Critical Success Factors, Failure Factors, Project Success

1. Introduction

The construction business has been described as vital in nature, as a result the increasing uncertainties in technology, budgets, and development processes. Now a day, building projects are becoming much more difficult and require thorough combined process management tools and techniques. Success in construction projects is dependent on the successful organization of multiple, specialized teams, each of which brings its own ability, experience, knowledge, and skill towards implementation the joint project, but which also bring their own objectives, goals and management styles, which may not be exclusively admiring.^[1]

It is broadly acknowledged that project managers need to be focused hard work to achieve an extended conception of the possible effects of the critical success factors which in turn could help their work on current and future projects management. Project Management is one of the separate management concept used to force not only business objectives but also the economic development outline of developing countries.

A construction project is accomplished as a result of a mixture of many activities and interactions, planned or unplanned, over the life of an ability, with changing participants and processes in a constantly changing environment. Some factors are more vital to project success than others factors. These factors are called critical success factors (CSFs). The word "critical success factors," in the framework of projects and the management of projects, was first used by researcher Rockart (1982) and is defined as those factors predict success on projects (Sanvido et al. 1992). [2]

Success on a project means that some expectations for a given contributor like owner, planner, engineer, contractor or

operator. By researcher (Sanvido, V. et al. 1990) however, these expectations may be different for each contributor and the study of project success and critical success factors (CSFs) is often considered as one of the imperative ways to improve the productivity of project in the construction industry.

Many residential and commercial projects in India are well-known for delays or failure. Very few projects run according to plan. According to ProEquity Real Estate Consultancy, about 7,391 residential projects out of 9,591 residential projects get delayed and fail in Mumbai and Pune. Hence it is very most important to know the critical success factors in the construction project to avoid the delay and failure of projects.

The main aim of this study is to find out the CSFs and also the deviation between actual and theoretical data collected from the questionnaire survey. This study also contains failure factor which helps to know the reason why the project gets fail.

2. Literature Review

Omran et al (2012) study was about evaluating the critical success factors in the construction industry in Libya. A questionnaire survey was modified from Saqib et al., (2008) for collecting data. It was distributed on 1st Aug. 2010 and the survey was conducted on 25th Dec. 2010. The data was collected by close ended self-administered questionnaires. Out of 80 respondents, only 44 were returned. Data was analyzed using SPSS version 17.0. A Relative important index is used to find out the ranks of success factors. In this paper top, ten CSFs like Project management related factors, procurement, client, contractor, design team, project manager, work environment, material, labour and

productivity and external factors are said to be most important which impact positively on construction projects. Asfhin et al., (2012) aim of this study was to identify and rank the CSFs in construction projects of Pars Garma Company. A Questionnaire survey was conducted in two phase. First, includes 32 questions which include CSFs. The second was in form of AHP questionnaire and was designed for the criteria and indexes related to the CSFs. Following are the critical success factors from this study: 1) Project management 2) Logistics 3) Employer 4) Consultant design team 5) contractor 6) Project manager 7) Business environment. This study concludes that the effect of factor can be maximized the productivity of the project.

Paulo Osorio et al., (2014) explain the relationship among CSFs in project management and the result of the project. This study was conducted in the energy sector. A Study was conducted in two parts. First document analysis is done and second questionnaire survey. Total 133 questionnaires were obtained. Here critical success factors are divided into two component effectiveness and efficiency. This study concludes that the "Support from upper management" and "Scope clearly defined and detailed" are the most critical success factors in the success of project management.

Development of the country is only because of the construction industry which increases the confusion in technology, budgets, and development process. Construction project is becoming complicated, due to such reason the staff members are facing remarkable changes. M. Saqib et al., (2008) says that study of project success and (CSFs) can improve the effectiveness of the project. Based on questionnaire survey the result indicates which variable effects the success of the project. In this paper study of key performances indicators (KPIs) is done to identify the relationship between (CSFs) & (KPIs). Here 77 factors were categorized into seven groups as project management related factors, procurement, client, design team, contractor, project manager and business and work environment related factors which where criticality score and criticality index were to identify the critical success factors.

Public construction projects form with so many team members like designers, contractors, subcontractors, construction managers, consultants. In public project management, a model of success of a project which involves managing the schedule, cost, and quality is known as 'the iron triangle', and also involves in criteria, such as avoiding disputes, and complying with safety norms. S. Z. S. Tabish et al., (2011) conduct questionnaire survey to know the experience of public sector members on success factor. Total 105 responses were received against 813 projects. An Analysis was done using (ANOVA). The following assumption where used to identify the relation between critical success for the successful project.

3. Research Methodology

The research on this study consists of following steps. First, a literature survey was conducted to find most CSFs in construction projects from different journals and publication.

From literature survey 50 success factors were identified and 24 where shortlisted as critical success factors.

In a second, step questionnaire was prepared and was distributed among 80 respondents. A questionnaire was distributed between technical persons related construction project i.e. contractor, Project manager, RCC consultant, Supplier, owner, etc. Respondents were asked to rate the factor from 1-5 according to Likert scale.

In third step, ranks were given to the success factors and failure factors with the help of Relative Important Index based on a questionnaire survey.

$$RII = \sum W / (A * N)$$

Where, W= Weightage given by respondents,
A= Highest weight,
N= Number of respondents

In fourth step, test of goodness of fit is used to find out the acceptance of factors according to the theoretical study and also deviation between theoretical and actual data collected from a questionnaire survey.

$$Xc^2 = (O_i - E_i)^2 / E_i$$

Where, O_i = Observed frequency
 E_i = Expected frequency
 Xc^2 = Chi- square distribution with K-1 d.f

Following are the Success factors which divided into 5 groups:

Construction Management: - Organization and planning, quality control, cost control, records, risk management.

Financial Condition:-Control of cash flow, Financial strength, Timely payment of bill, Profit margin.

Quality of work: - Client satisfaction, use of good quality material, teamwork, completion of job on time, qualified consultant, good subcontractor.

Sales and marketing: - company image, good advertisement, competitive pricing, sales office.

Top Management Support: - Leadership, experience, communication skill, honesty, political connection.

Following are the Failure factors:

Slow decision making, poor management, improper site management, inadequate technical manpower, inadequate finance, low productivity, inaccurate estimate preparation, shortage of material, variation of work, design change, price fluctuation.

4. Data Analysis and Discussion

4.1 Relative Important Index

Identification of Critical success factor was done by using RII method. Further Test of goodness of fit is used to find the deviation between theoretical and actual data collected from a questionnaire survey.

Critical Success Factors	RII	Ranking
Construction Management		
Organization & Planning	0.867	3
Quality Control	0.847	7
Cost Control	0.762	13
Record	0.675	19
Risk Management	0.665	20
Financial Condition		
Control of cash flow	0.815	10
Financial Strength	0.785	12
Timely payment of bills	0.745	14
Profit margins	0.677	18
Quality of Work		
Client Satisfaction	0.885	2
Use of good quality material	0.857	4
Teamwork	0.840	8
Qualified Consultant	0.805	9
Completion of job on time	0.825	11
Good subcontractors	0.727	15
Sales & Marketing		
Company Image	0.847	6
Good Advertisement	0.687	9
Competitive Pricing	0.655	22
Sales Office	0.647	23
Top Management Support		
Leadership	0.905	1
Experience	0.852	5
Communication Skill	0.685	17
Honesty	0.660	21
Political Connection	0.507	24

Table No 1: Critical Success Factors

Failure factors in the construction industry are also identified in this study by using RII method.

Failure Factors	RII	Ranking
Slow Decision Making	0.887	1
Poor Management	0.852	2
Improper site Management	0.840	3
Inadequate Tech. Manpower	0.767	4
Inadequate Finance	0.742	5
Low productivity	0.717	6
Inadequate Estimate Preparation	0.695	7
Shortage of Material	0.637	8
Variation of Work	0.617	9
Design Change	0.557	10
Price Fluctuation	0.552	11

Table No. 2: Failure Factors

4.2 Test of goodness of fit

Further using test of goodness of fit deviation between theoretical and actual data is calculated.

Success Factors	Xc ²	Xt ²	Remark(Xc ² <Xt ²)
Construction Management	18.4	59.5	Accepted
Financial Condition	14.6	59.5	Accepted
Quality of work	08.8	59.5	Accepted
Sales and Marketing	20.6	59.5	Accepted
Top Management Support	19.0	59.5	Accepted

Table No. 3: Goodness test for success factor

Failure Factors	Xc ²	Xt ²	Remark(Xc ² <Xt ²)
Slow Decision Making	18.2	59.5	Accepted
Poor Management	18.6	59.5	Accepted
Improper site Management	22.2	59.5	Accepted
Inadequate Tech. Manpower	31.8	59.5	Accepted
Inadequate Finance	42.6	59.5	Accepted
Low productivity	39.8	59.5	Accepted
Inadequate Estimate Preparation	49.2	59.5	Accepted
Shortage of Material	70.4	59.5	Rejected
Variation of Work	61.8	59.5	Rejected
Design Change	95.0	59.5	Rejected
Price Fluctuation	94.8	59.5	Rejected

Table No. 4: Goodness test for failure factors

Fifteen top success factors are said to critical success factors according to the RII result. Leadership(0.905), Client Satisfaction(0.885), Organization and Planning(0.867), Use of good quality material(0.857), Experience(0.852), Company Image(0.847), Quality Control(0.847), Teamwork(0.840), Qualified Consultant(0.805), Control of cash flow(0.815), Completion of job on time(0.825), Financial Strength(0.785), Cost Control(0.762), Timely payment of bills(0.745), Good subcontractors(0.727).

After analyzing the data it is seen that Construction Management(18.4), Financial Condition (14.6), Quality of work (8.8), Sales and Marketing (20.6), Top Management Support (19.0) all this factors are smaller that theoretical data (59.9) (Engineering Statistical Handbook by Dr. Hoang Pham) which is accepted as the critical success factors in construction industry.

Slow decision making (18.2), Poor Management (18.6), Improper site management (22.2), Inadequate technical manpower (31.8), Inadequate finance (42.6), Low productivity (39.8) and inadequate estimate preparation (49.2) this factor are said to the failure factors which affects the failure of the project.

Shortage of material (70.4), Variation of work (61.8), Design change (95.0), Price fluctuation (94.8) these factors are rejected as they don't affect the failure of the project.

5. Conclusion

This study helps to identify the success factors which act as most critical success factors in construction projects which impact positively on the organization to improve the productivity. Also, the failure factors are also identified in this study which gives an idea about due to which factors project may get fail. So it is very important to study about CSFs in the construction project to achieve the goal.

6. Limitations

The factors considered in this study might not enough to decide the impact of the factor on construction projects. Success and failure factors depend on type and situation of the project it does not remains the same.

Reference

- [1] Chen, W. T., Chen, T.-T., Lu, Ch. Sh., Liu, Sh.-Sh. 2012. Analyzing relationships among success variables of construction partnering using structural equation modeling: a case study of Taiwan's construction industry, *Journal of Civil Engineering and Management*, 18 (6): 783–794.
- [2] A. Mahmood, F. Asghar, and B. Naoreen, “” Success Factors on Research Projects at University ” An Exploratory Study,” *Procedia - Soc. Behav. Sci.*, vol. 116, pp. 2779–2783, 2014.
- [3] Z. Alias, E. M. A. Zawawi, K. Yusof, and A. Abra, “Determining Critical Success Factors of Project Management Practice: A conceptual framework,” *Procedia - Soc. Behav. Sci.*, vol. 153, pp. 61–69, 2014.
- [4] M. A. A. Abdelnaser Omran and A. O. Gebril, “An Evaluation Of The Critical Success Factors For Construction Projects In Libya,” *J. Econ. Behav.*, vol. 2, pp. 17–25, 2012.
- [5] B. Paulo, C. Felix, O. L. G. Quelhas, L. P. Zotes, E. Shimoda, and S. França, “Critical Success Factors in Project Management: An Exploratory Study of an Energy Company in Brazil,” vol. 14, no. 10, 2014.
- [6] A. Pakseresht, “Determining the Critical Success Factors in Construction Projects: AHP Approach,” *Interdiscip. J. Contemp. Res. Bus.*, vol. 4, pp. 383–393, 2012.
- [7] M. Saqib, R. U. Farooqui, and S. H. Lodi, “Assessment of Critical Success Factors for Construction Projects in Pakistan,” *First Int. Conf. Constr. Dev. Ctries. “Advancing Integr. Constr. Educ. Res. Pract.”*, pp. 392–404, 2008.