iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** IV **Month of publication:** April 2019

DOI: https://doi.org/10.22214/ijraset.2019.4625

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue IV, Apr 2019- Available at www.ijraset.com

Critical Success Factors Influencing the Performance of Construction Industry

Linga reddy[1], P. Naveen kumar[2]
[1, 2]*Civil Department, Shri Shirdi Sai Institute of Science and Engineering*

Abstract: ***Project managers would have a clear understanding of which aspects of projects might be critical for their successful completions. For a project to be successful, it is essential to understand the project requirements right from the start and go for project planning which provides the right direction to project managers and their teams and execute the project accordingly. A successful project is one that is delivered on time and managed within the budget, Time, cost and quality have been recognized as "triple constraint" or important elements of project success. The study of project success and critical success factors is often considered as one of the vital ways to improve the effectiveness of project delivery. Successful construction projects greatly depend on how the project has been managed and controlled. The critical success factors are more useful in decision-making support.***

The major objective of this study was to identify, categorize, and prioritize a general set of critical success factors for construction sectors of various backgrounds.

This study relied mainly on analytical, descriptive and field study methodologies. A questionnaire was designed in the light of the literature review and tested by pilot study, and then it is applied on a sample of 100 contracting companies. Collected data is manipulated by SPSS software using many statistical tools as, frequencies, percentile values, Means, Pearson co-relation coefficient, regression analysis and One-Way ANOVA test.

Keywords: Critical Success Factor, Construction Industry, Time, Cost and Quality

I. INTRODUCTION

A. General

Project is a complex, non-routine, one-time effort limited by time, budget and resource and performance specifications designed to meet customer needs. A construction project is completed through a combination of many events and interactions, planned or unplanned, over the life of a facility, with changing participants and processes in a constantly changing environment. Project managers would have a clear understanding of which aspects of projects might be critical for their successful completions. For a project to be successful, it is essential to understand the project requirements right from the start and go for project planning which provides the right direction to project managers and their teams and execute the project accordingly. A successful project is one that is delivered on time and managed within the budget, Time, cost and quality have been recognized as "triple constraint" or important elements of project success. The study of project success and critical success factors (CSFs) is often considered as one of the vital ways to improve the effectiveness of project delivery. Successful construction projects greatly depend on how the project has been managed and controlled. The critical success factors are (CSFs) are more useful in decision-making support. The study of project success and critical success factors (CSFs) is a means of understanding and thereby improving the effectiveness of construction projects.

B. Project Management And Success Criteria

Projects can be considered as a set of activities that must be completed in accordance to specific objectives which involve the utilization of a company's resources. The project management is coordinating a process of interrelated functions such as planning, organizing and controlling construction activities for getting successful outcomes. Success criteria are "measures by which success of a project or business will be judged".

The iron triangle of project management emphasizes the relationships among cost, schedule and quality. The golden triangle of project management emphasizes the relationships among cost, schedule, quality and people by placing people at the centre of the iron triangle (Figure 1). People are the one element that ties the other elements together. Mostly emphasis will be given to iron triangle. The emphasis on people in the golden triangle helps maintain a balance among cost, schedule and quality.

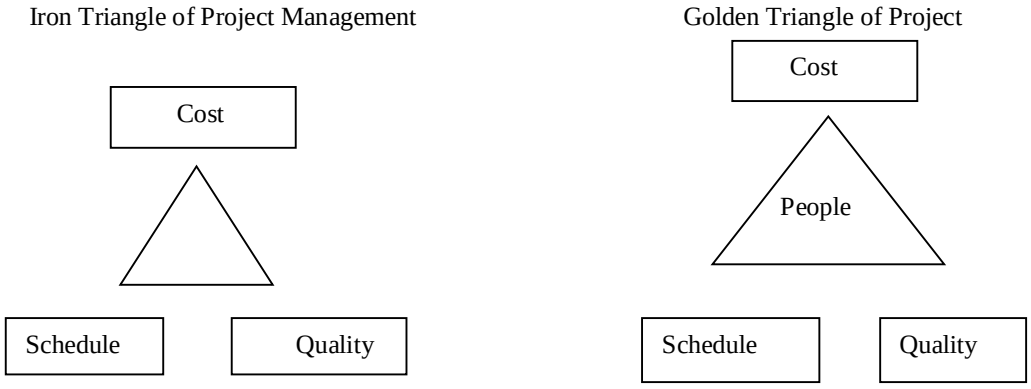


Figure 1 Golden vs. iron triangle of project management

C. Critical Success Factor Criteria

Success criteria according to owners, designers and contractors are as follows:

1) *Owner's Criteria:* Owner's criteria for measuring success are: on schedule; on budget; function for intended use; end result as envisioned ; quality; aesthetically pleasing and return on investment.
2) *Designer's Criteria:* Designer's criteria for measuring success: satisfied client; quality architectural product; met design fee and profit goal; professional staff fulfilment; met project budget and schedule; minimal construction problems (easy to operate, constructible design); socially accepted (community response); client pays (reliability); and well defined scope of work.
3) *Contractor's Criteria:* Contractor's criteria for measuring success: meet schedule (preconstruction, construction, design); profit; under budget; quality specification met or exceeded; no claims (owners, subcontractors); safety; client satisfaction.
4) *Common Criteria:* Priority item and one that appears in all three lists (designer, owner, and contractor) in some form is the financial reality of doing business. The owner wants the project completed on time and on budget, and the designer and contractor both expect to meet certain profit or fee goals. All three viewpoints also recognize the absence of any legal claims or proceedings on a project as a desirable outcome. In other words, this is a major criterion for measuring success. Another common thread among the three groups involves meeting an appropriate schedule as a way of measuring or determining if a project was successful.
5) *Unique Criteria:* It is also evident that there are some unique factors associated with each of the three groups. The designer for instance is looking for a project that will increase the level of professional development and professional satisfaction among his employees. Safety is a high-priority issue for the contractor that would not normally be an issue with the other two groups, because their employees are at much less risk during the design or operation of a building than the contractor's workers is during the construction of a building.

D. Background Of The Study

In developing countries, performance measurement of construction projects has become even more important due to its immense potential in addressing the problem of poverty, unemployment, inequitable distribution of resources in different regions etc**.** Academic researchers with a view to overcoming the limitations of the traditional performance evaluation criteria of time, cost and quality have suggested the inclusion of additional measures of performance**.** These include safety of the project site**,** environmental impact**,** community/client/customer satisfaction etc. None of the above has provided a balanced set of Key Performance Indicators (KPIs) which would capture all essential and unique features of a public sector construction project. Further, these studies have not talked about the appropriate facilitating factors that can help project managers achieve success on KPIs identified above. The identification of these factors, also known as critical success factors (CSFs), is very important for ensuring success of any project because it enables project managers to commit resources on specific factors. The CSFs have been classified in various ways by the researchers (as has been revealed in Literature Review Chapter) based on the common characteristic features of construction projects. However, there is hardly any study which has attempted to identify CSFs of construction projects based on the KPIs of the same specifically with reference to public sector construction projects. With this backdrop, the present study is an attempt to identify the KPIs amongst construction projects and on the basis of these KPIs, identify appropriate CSFs relevant for success of public

sector construction projects and find out the influence of these CSFs on project success. The relationship between project success and overall project performance in terms of the KPIs is also investigated in the current study.

E. Research Problem

The "iron triangle" criterion currently used to evaluate the performance of public sector construction projects focus more on the perspectives of the project implementing agencies and ignores the needs of the beneficiaries. These agencies are satisfied with a project once it meets budgeted cost, adhere to stipulated time and conform to the technical specifications. However, merely fulfilling these criteria may not ensure the realization of ultimate benefits of the project to the communities for whom the same is constructed. The implementing agencies are hardly concerned with whether the project is delivering intended services to the community, whether the project has created any safety issue among the people or it has created any dispute with surrounding community. Further, iron triangle criterion does not take into consideration the adverse environmental impact that might be created due to the project. Thus iron triangle criterion may satisfy the needs of implementing agency in terms of time, cost and quality but fail to address the needs of the community thereby defeating the very purpose for which construction projects were implemented.

F. Significance Of The Study

The kinds of projects analysed in this study were mainly the construction projects pertaining to Education, Health, Agricultural Markets and Industrial Estates. The outcome of the current study will be of benefit to several stakeholders that implement construction projects as well as future researchers. The project monitoring and evaluation agencies will use the developed framework to evaluate performance of public sector construction projects. Other than merely declaring a project as successful or not, they will be able to describe performance in terms of how "good" it is on different performance indicators.

1) The set of KPIs and CSFs identified will enable the project implementing agencies to assess, monitor and report the progress of the project as construction takes place.
2) The performance evaluation framework in the current study also provides direction to the government and donor agencies that they should not merely focus on economic measures of performance but also consider project outcome in terms of providing appropriate services to the society while taking care of adverse environmental impact.
3) The basis of findings of the current study, the beneficiaries of the project will have an idea of whether the intended benefits are actually being delivered by the project as conceptualised. Therefore, the study provides a basis through which the services delivered can be compared with the intended benefits. The future researchers will also gain insights as to how apparently intangible measures of performance are operationalised in order to capture all relevant project objectives.

G. Research Objectives

In view of the background of the research problem, the broad objective of this study is to develop a multi-dimensional performance evaluation framework encompassing, economic, social and environmental dimensions of public sector construction projects. Specific objectives of research are to:

1) To Identify the KPI appropriate for measuring performance of construction projects.
2) To Identify the CSF influencing the success of a construction industry.
3) To study the Association between stakeholders' (client, consultant and contractor) on construction projects and occurrence of cost overrun, time overrun and quality defects.
4) To examine the extent of differences in the occurrence of cost overrun, time overruns and quality defects across different types of construction projects.
5) To study the relationship between position of stakeholders (client, contractor, consultant) and type of project (industrial, domestic, hospital , agricultural) towards success factors of construction projects.
6) To study the relationship between factors determining the success and the outcome of prediction factors based thesis (cost, time, quality & disputes) towards factors determining the success of construction projects.
7) To study the impact between type of project and position of stakeholders towards factors determining the success of construction projects.

To study the impact of the factors determining the success and the outcome of prediction factors based thesis (cost, time, quality & disputes) towards factors determining the success of construction projects

II. LITERATURE REVIEW

Zarina Alias (2014) says that Critical success factors (CSFs) are inputs to project management practice which can lead directly or indirectly to project success. It encompasses many elements, which have to be synchronized to ensure the project delivery on time. The purpose of this study is to identify the extent of the relationship between CSFs and project performance. The research findings will be expected to assist the organization in evaluating the performance of project management. Finally, the conceptual framework was developed by identifying five variables for project success namely Project Management Action, Project Procedures, Human Factors, External Issues and Project Related Factors.

Hari Garbharran et.al, 2008**,** gives an insight on the construction industry is one of the largest job creators in developing countries and is highly competitive. The high number of project failures suggests the existence of underlying critical success factors which have not been identified. This article assesses the perceptions of contractors and project managers on the critical success factors that lead to project success in the construction industry. This article is based on the four COMs model (comfort, competence, communication and commitment). A survey was conducted among 95 project managers and 61 active grade four contractors in Durban, South Africa. The findings reveal that both project managers and contractors strongly support the identified critical success factors as significant in achieving project success. There was no significant difference in their perception of critical success factors, based on the biographic characteristics. The recommendations presented may be used as a guideline for successful execution of construction projects.

Mahmood Shahid (2012) says that the construction industry is an important sector of any economy and has multiple backward and forward linkages with other sectors. This industry contributes significantly to socio-economic development, along with creating employment opportunities. Construction companies are the building blocks of construction industry and their success or failure significantly affects the construction industry. There are many factors that influence the success or failure of construction companies and projects. Since the stake holders involved in a project have different needs and expectations, therefore they interpret project success according to their own perception. The objective of this study was to find replies for the questions, how we define success and what criteria should organizations use to identify success?

This study has focused to identify the Critical Success Factors (CSFs) of the construction companies working in and around Islamabad. The survey data has been collected through a questionnaire from 36 construction companies. The results have been analyzed by using descriptive analysis, frequency analysis and the relative importance index (RII) technique. The research has identified 35 CSFs and they have been ranked as per evaluation on RII and weighted average of Likert scale. The most significant CSFs have been identified and analysed for the consideration of management of construction companies to address these issues for increasing chances of their success at the construction projects. Construction companies therefore need to re-visit their existing policies and positions with respect to CSFs identified in this study. It would not only enhance their profitability, productivity, compatibility and quality but would also enhance the sustainability of national economic growth and strength of construction industry. Olatunji S. O (2014), made a study on construction projects which suggests that the construction industry is made up of professionals whose various disciplines are to ensure that construction work can be completed. This study evaluates the effects of the performance of construction professionals on construction project success in Nigeria. The study adopted a survey research design with the use of a well structured questionnaire which was administered on construction professionals, 68 copies were retrieved and used for the analysis out of the administered 139. Frequency and percentiles was used to analyse the distribution of demographic descriptors of construction professionals while mean score and mean difference was used to analyse the roles of construction professionals and factors influencing the performance of construction professional. The findings revealed that the major role of an architect is to translate the user's needs into builders requirement, engineer is most concerned with the calculation of load and grade requirements, liquid flow rates and materials stress points to ensure that the structure can withstand stress, the quantity surveyor is mostly concerned with management and control of costs within the construction projects while a builders major role is building production management.

K. N. JHA and K. C. IYER, 2006, had made a detailed study on the reasons for the underperformance of the quality of Indian construction projects was studied to suggest possible remedial measures. A preliminary survey identified 55 attributes responsible to impact quality performance of the projects. Statistical analysis of questionnaire responses on the attributes resulted into two distinct sets of success and failure attributes. Further analyses of individual sets of success attributes and failure attributes separately grouped them into fewer critical success and failure factors. The critical success factors obtained were: project manager's competence; top management's support; monitoring and feedback by project participants; interaction among project participants; and owners' competence. The factors that adversely affected the quality performances of projects were: conflict among project participants; hostile socio-economic environment; harsh climatic condition; PM's ignorance & lack of knowledge; faulty project

conceptualization; and aggressive competition during tendering. Analyses also led to the conclusion that the extent of contribution of various success factors varies with the current performance ratings of the project.

Adnan Enshassi et.al,(2009) studies briefly about the construction projects located in the Gaza Strip, Palestine suffer from many problems and complex issues. Consequently, the objective of this paper is to identify the factors affecting the performance of local construction projects; and to elicit perceptions of their relative importance. A comprehensive literature review was deployed to generate a set of factors believed to affect project performance. A total of 120 questionnaires were distributed to 3 key groups of project participants; namely owners, consultants and contractors. The survey findings indicate that all 3 groups agree that the most important factors affecting project performance are: delays because of borders/roads closure leading to materials shortage; unavailability of resources; low level of project leadership skills; escalation of material prices; unavailability of highly experienced and qualified personnel; and poor quality of available equipment and raw materials. Based on these findings, the paper recommends that: 1) project owners must work collaboratively with contractors and facilitate regular payments in order to overcome delays, disputes and claims; 2) project participants should actively have their input in the process of decision-making; and 3) continuous coordination and relationship between project participants are required through the project life cycle in order to solve problems and develop project performance.

III.RESEARCH METHODOLOGY

A. Introduction

This chapter details the methodology and procedures which are used in the field study. This chapter deals with the research method, research population and sample, sample characteristics, research tools, Internal Consistent Validity, Questionnaire. Reliability, as well as list of statistical procedure used in the study.

B. Methodology

This research used descriptive analytical method. Also primary and secondary data were used.

1) Secondary Data

This type of data is gathered from

a) Books and references;
b) Periodicals, papers and master thesis;
c) Contractors unions such as builders association of India was considered ;
d) Internet and its electronic versions.

2) Primary Data

This type of data was collected in the following steps

a) Interviews with contracting firm's managers in and around Chennai to find out the crucial factors success.
b) Interviews with experts, academics and professionals to enrich the research results.
c) Questionnaire setting up through the following steps:

i) Primary design in the light of knowledge published in literature
ii) Relevance test by research's supervisor.
iii) Questionnaire adjustment as per supervisor's instruction.
iv) External experts and specialists judgment.
v) Pilot study.
vi) Modifications according to pilot study.S

Questionnaire in a final format which was used in the field study (See appendix -2). The following are the basic dimensions of questionnaire:

1. Personal Characteristics of the contract and the position.
2. Organizational Characteristics of Companies
3. Mission and Goals; (experience and the number of projects handled per year)
4. Managerial Skills for contractors
5. Financial resources
6. Cost Control
7. Procurement approach employed
8. Project start and finish time
9. Type of project etc

C. Questionnaire Delivering And Recovery

A list of contracting companies specialized in the field of construction in and around Tamilnadu, especially around Trichy, Tanjore and Chennai which were officially registered with the BUILDERS ASSOCIATION OF INDIA of the contractors union until 22/5/2015 is obtained from contractors union, this list includes companies names, and addresses.

Contractors are contacted and delivered by the questionnaires, after that they were recovered through a period of one to five weeks as follows:

1) The pilot study sample was 30 companies and it was carried out during the first and second weeks, then it is eliminated from the original sample, which become 70 companies only.

2) Questionnaire is delivered in the third and fourth weeks, and contractors were followed and motivated to fill the questionnaire by telephone calls, fax and visits.

3) An amount of 100 filled questionnaires is collected in the fifth week.

D. Research Framework

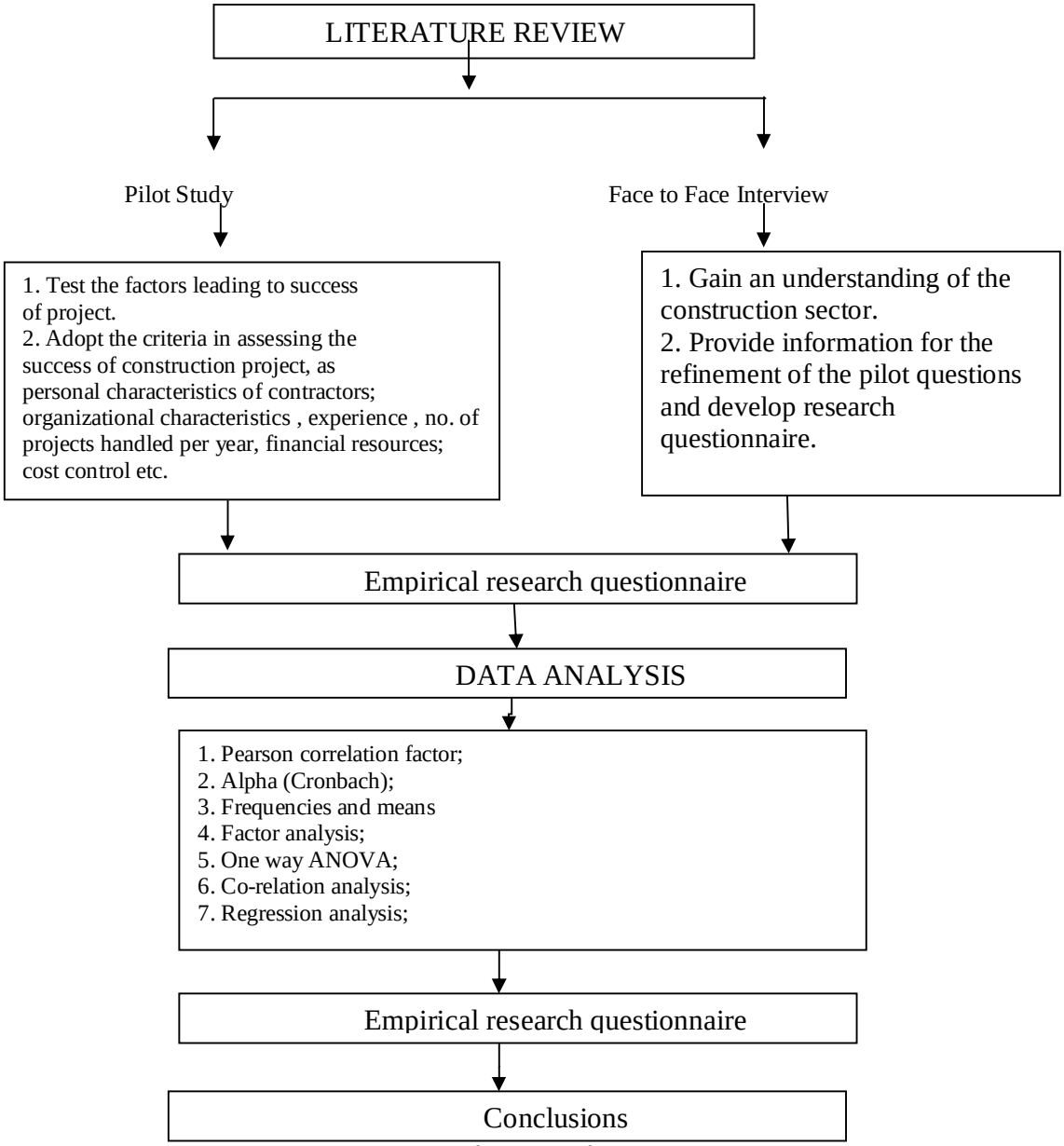


Figure 3.1: Overall research framework for this research study

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue IV, Apr 2019- Available at www.ijraset.com

IV. DATA ANALYSIS AND INFERENCE

A. Screening Of Collected Data

While inputting the data it was observed that a few sections of the questionnaire were not fully completed. Such sections were left blank for purposes of proper analysis. The SPSS Missing Data Analysis option was used to analyse the noted patterns in the data. The Replace Missing Values option was used to replace the missing values that were not significant with mean of all valid responses as is the norm with similar studies. Those respondents with a significant number of missing values were eliminated.

B. Demographic Characteristics Of Project Profile

1) Project Type

TABLE 4.1 Project type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Health Care	11	11.0	11.0	11.0
	Industrial Estates	51	51.0	51.0	62.0
	Educational	16	16.0	16.0	78.0
	Domestic market	22	22.0	22.0	100.0
	Total	100	100.0	100.0	

The above table shows the frequency distribution of the project types from which the samples were collected and it was found that the respondents from the health care was11%, Industrial estates were 51%, educational projects were 16%, domestic projects were 22% out of the total sample space of 100 respondents.

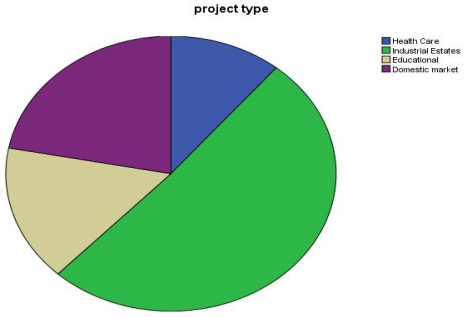


Figure 4.1 Project type

2) Project Position

TABLE 4.2 Project position

Project Position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Client	15	15.0	15.0	15.0
	Consultant	28	28.0	28.0	43.0
	Contractor	57	57.0	57.0	100.0
	Total	100	100.0	100.0	

The above table shows the frequency distribution of the project position from which the samples were collected and it was found that the respondents from the stakeholders of the construction project were found to be 15% of the clients, 28% of consultants and 57% of the contractors.

3) Years of Experience: Based on the years of experience of the respondent we can have a precise conclusion that the respondent will have a precise experience on the type of survey conducted.

TABLE 4.3 Years of experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 3 years	8	8.0	8.0	8.0
	3 – 6 years	19	19.0	19.0	27.0
	over 6 years	73	73.0	73.0	100.0
	Total	100	100.0	100.0	

The table 4.3 shows that about 8% of the project respondents had an experience below three years in a project which says that they are mostly a fresher. About 19% of the respondents were having a minimum of 3 to 6 years of experience and around 73% of the respondents were having minimal experience over 6 years of the total respondents of 100.

C. Factor Analysis (FA) Scale

The data in the study comprising 100 responses was used to carry out FA on performance measurement variables in order to identify the KPIs of construction projects. First, the descriptive statistics of the performance measurement variables are presented and subsequently the factorability of the variables is assessed before the variables are subjected to FA.

1) Descriptive statistics of performance Measures: The responses on 30 variables relating to project performance provided by the respondents were included in the present study. The findings regarding the minimum score, maximum score, mean and standard deviations of the scores on responses to performance measurement variables were found through mean analysis. The minimum and maximum values were 1 and 5 respectively for 28 out of 30 variables, indicating that, in general, respondents used the entire 5 point survey scale. The mean score ranged between 2.84 *(29.)* accidents were often reported during the project) and 4.25 *(*Design Complexity of project (Type, size, nature and number of has influenced the project cost and time)*).* Standard deviations were found to be above 1 except in some variables. This shows that the means represent a good measure of the distribution of scores in the survey data. However, the standard deviation values of the variables being close to 1 indicate that the responses to these questions varied considerably amongst the respondents.

D. Mean Rank

The mean ranking analysis is used to find out the most significant of all the key performance indicators based on the response of the liker scale analysis. The rank with the highest score is considered to be more significant in order with the other performance indicators. Ranking analysis is done to find out which of the above stated performance variable is most agreeable by the respondents. Based on the ranking, the highest ranked value will be given more priority than the lowest ranked performance variable. Here, the highest priority of ranking is given to Design Complexity of project (Type, size, nature and number of has influenced the project cost and time) (20.83) thereby proving, the more complex the project more cost and time is considered and this is followed by, Site Managers possessed requisite skills necessary for the kind of projects executed(20.36). The least priority is given to accidents were often reported during the project, thereby proving there was sufficient safety measures and insurance in big scale construction projects.

E. Factor Analysis Following Varimax Rotation

Principal components analysis (PCA) was used with varimax rotation given that the primary purpose was to identify the underlying factors. Initially all 30 variables were allowed to load freely on various factors so long as they had eigenvalue greater than one. This approach, together with the screen plot generated enabled the researcher to fix the number of factors to be extracted at six. Therefore, while identifying the final factors underlying the Key Performance Indicators (KPIs), the process was subjected to four conditions: (i) the number of factors fixed at six, (ii) deletion of items with loadings of less than 0.5 or cross loadings of greater than 0.5, (iii) retention of only those factors with at least two items and (iv) the number of factors extracted should account for at least 60% of the variance (Field, 2005; Hair et al. 2006; Malhotra and Dash, 2011).

1) *Assessing The Factorability Of Project Success Variables:* Assessment of factorability of project success variables was done based on correlation matrix shown in Table 4.6. It was observed that the correlation matrix had a chi square value of 5466.934 and significant level of .000 based on Bartlett's sphericity test. This suggested that inter-correlation matrix contained sufficient common variance to allow for factor analysis. Similarly, the KMO value for the entire matrix was found to be above the suggested threshold of 0.500 (Hair et al., 2006). However, observation of the anti image correlation matrix revealed that three success variables had individual KMO values below 0.5, which indicated that the dataset, in its current form, was still not suitable for factor analysis (Hair et al., 2006). These values were sequentially eliminated one after another, starting with the one whose KMO value was lowest, until 30-item scale with an overall KMO value of 0.758 and individual KMO value of at least 0.5 was obtained for each item.

TABLE 4.4 KMO TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.758
Bartlett's Test of Sphericity	Approx. Chi-Square	971.173
	Df	253
	Sig.	.000

2) *Factor Analysis following Varimax Rotation:* Having established that factor analysis could be applied on the 27 project success variables, principal component analysis (PCA) was employed with varimax rotation in order to identify the underlying structure of relationships. Due to lack of a priority basis on the number of factors to be extracted, initially all 27 variables were allowed to load freely on various factors so long as they had Eigen value greater than one. Further a screen plot for different components was obtained (as shown in figure 4.2) in order to have an idea about the amount of variance explained by each factor.

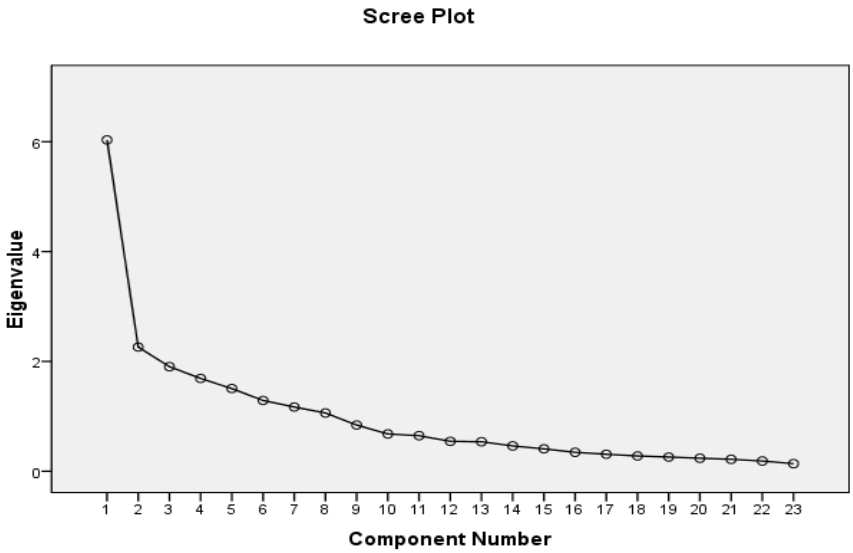


Figure 4.2 Eigen Vs component number

Observation of the shape of the screen plot generated (Figure 5.8) revealed that six factors could adequately capture variance amongst the success variables. During factor analysis, all success variables loaded appropriately based on the four conditions (already mentioned in section 5.3.3) which yielded a 6-factor 30-item instrument, accounting for 73.5% of the variance in the dataset. In this study, factors were named as Project management related, Cost related, Quality related, Time related, organisational set up.

V. CONCLUSIONS

The purpose of the current study was to develop a performance evaluation framework for assessing performance amongst construction projects in developing countries. In order to realise this objective an extensive review of the relevant literature in order to identify the existing body of knowledge in the domain of performance measurement of construction projects. Based on the review, performance indicator variables and the variables that influence project success were identified and discussed with the experts in the area of construction management. The variables were refined and a survey instrument was designed. This was subsequently administered to clients, consultants and contractors who had been involved in the construction projects in Chennai. The demographic statistics regarding project characteristics and respondents' profile were analysed using Chi-square test of independence and one way Analysis of Variance (ANOVA) and their frequency distribution was also studied. The relevance of the performance indicator variables and success related variables amongst construction projects in Chennai was established through Factor analysis, correlation and regression analysis.

A. Findings

The purpose of the current study was to develop a performance evaluation framework for assessing performance amongst construction projects in developing countries. In order to realise this objective, an extensive review of the relevant literature in order to identify the existing body of knowledge in the domain of performance measurement of construction projects. Based on the review, performance indicator variables and the variables that influence project success were identified and discussed with the experts in the area of construction management. The variables were refined and a survey instrument was designed. This was subsequently administered to clients, consultants and contractors who had been involved in the construction projects in the Chennai. The demographic statistics regarding project characteristics and respondents' profile were analysed using Chi-square test of independence and one way Analysis of Variance (ANOVA). The relevance of the performance indicator variables and success related variables amongst construction projects in Chennai was established through Factor analysis, regression and the correlation.

1) The occurrence of time overrun, cost overrun and quality defects does not vary on the basis of the type of CDF construction projects. All types of projects are prone to these problems pointing towards the need for other factors to be considered.
2) Respondents' experience has no relationship with the occurrence of time overrun, cost overrun and quality of defects on CDF construction projects. Most of these projects are characterised by standard procedures which guide the construction process.
3) The occurrence of time overrun and quality defects on CDF construction projects does not vary with the project promethod. However, the occurrence of cost overrun varies across different procurement approaches. This is because different procurement approaches have implications on how project costs are computed and appropriated amongst different parties who are responsible for undertaking construction.
4) Project performance of construction projects are evaluated on the basis of six KPIs namely project time, cost, quality, safety, site disputes and environmental impact. These KPIs address the economic, social and environmental dimensions of public sector construction projects.
5) Whilst not all the KPIs are significant in terms of their relationship with project performance, there is significant evidence and support for measurement of project performance on the basis of time, cost, quality and site disputes.
6) There are six CSFs that influence success of public sector construction projects: project-related factor, client-related factor, consultant-related factor, contractor-related factor, supply chain related factor and external environment-related factor.
7) All these six CSFs assessed are significant, providing empirical support for considering them as factors that influence success of public sector construction projects.
8) The external environment related factor does not mediate the influence of the remaining CSFs on project success.
9) Client related and project related factors; client related and consultant related factors; and contractor related and supply chain related factors are inter-correlated.
10) Success of public sector construction projects has a significant positive association with overall project performance on the various KPIs. This supports inclusion of the two concepts in the performance evaluation framework for assessing performance of public sector construction projects.

B. Recommendations

1) Understand the needs of the community through proper involvement of the representatives of the community and other stakeholders and accordingly select suitable projects which would cater to their needs.

2) Understand the urgency of evaluating public sector construction projects on multi-dimensional performance measures incorporating economic, social and environmental aspects. Develop appropriate operational metrics to reflect the three broad dimensions of performance of public sector construction projects.

3) Allocate considerable amount of resources into the issues relating to project time, cost, quality and site disputes of public construction projects. This is because *cost*, *time*, *quality* and *site disputes* were relatively more important.

4) Put more emphasis on project characteristics as they ranked higher in importance among the CSFs influencing project success. However, the contractors play an important role in the day-to-day management of the construction activity. Thus even though the other factors were not ranked as high as the project related factor, the managers should allocate sufficient resources to the remaining factors as well which would enable them to achieve satisfactory success on these CSFs for public sector construction projects.

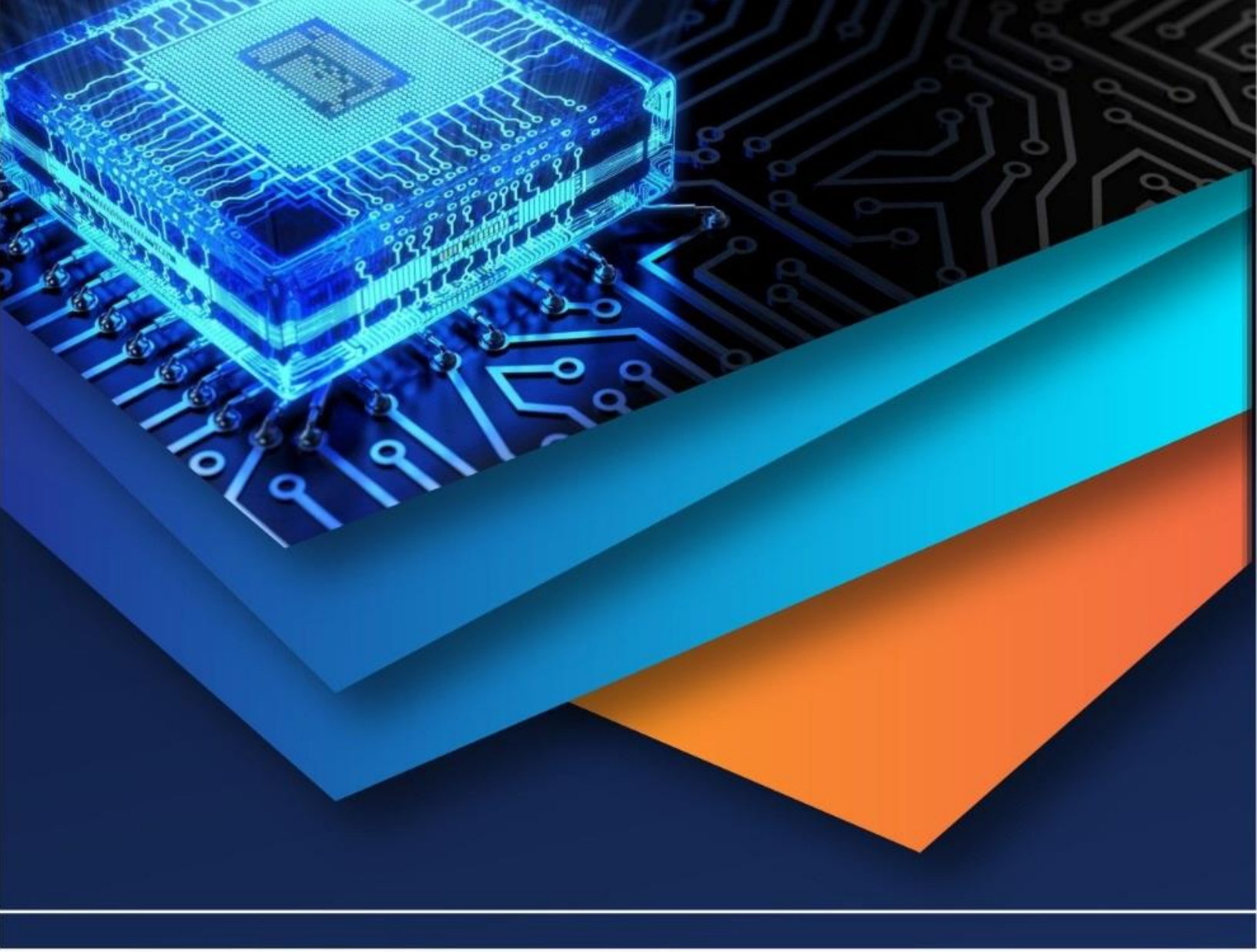
C. Future Research

1) Future studies can attempt to identify the direct relationship between the CSFs and KPIs through empirical studies. Also, future studies may examine moderating factors that may have an effect on the relationship between CSFs and project success.

2) A study incorporating the effect of corruption in performance evaluation of public sector construction projects is of great importance. This is because the intended objectives of public sector construction projects can be properly realised in a corruption free environment. It is a well known fact that these kinds of projects are severely affected by the scams prevalent in many countries.

REFERENCES

[1] Adnan, E., Sherif, M., Saleh, A.2009.Factors affecting the performance of construction Projects in the gaza strip, JOURNAL OF CIVIL ENGINEERING AND MANAGEMENT,15(3), 269–280
[2] Albert, P. C.C, David, S. and Ada, P. L. C .2004. Factors Affecting the Success of a Construction Project,ASCE, 130(153), 0733-9364.
[3] Arti, J.J. , Pankaj, P. B.2013.To Study Critical Factors Necessary for a Successful Construction Project ,International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2 (5), 2278-3075.
[4] Hari, G., Jeevarathnam,G., Thulani, M.2008. Critical success factors influencing project success in the construction industry, ASCE, 116(11), 1329-1344.
[5] Inuwa, I.,2013.Evaluation of critical success factors for construction projects(2013) International Journal of Strategic Property Management ,17 (1).
[6] Jha, N. K. and Iyer, K.C,2006. Critical Factors Affecting Quality Performance in Construction Projects, Total Quality Management,17(9), 1155–1170.
[7] Mahmood, S.,.2012.Exploring the Critical Success Factors for Construction Companies of Developing Countries. ISSN ,2251-1571.
[8] Muhammad, S., Rizwan, U.F., Sarosh, H. L.2008.Assessment of Critical Success Factors for Construction Projects in PakistanFirst International Conference on Construction In Developing Countries (ICCIDC–I),6(7),2011-2112.
[9] Neringa, G., Laima, R., Audrius, B.2013.An Evaluation of Critical Success Factors for Construction Projects using Expert Judgment. International Virtual Scientific Conference,2(18),2335-2659.
[10] Nicholas Chileshe and Theo C. Haupt, (2005)Modelling critical success factors of construction project management (CPM), Journal of Engineering, Design and Technology, 3 (2), 140-154.
[11] Olatunji S. O, Oke A. E, Owoeye L. C ,2014, Factors Affecting Performance of Construction Professionals in Nigeria, International Journal of Engineering and Advanced Technology (IJEAT) ISSN:, 3 (6), 2249 – 8958.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY