

Examining the Challenging Hindrances facing in the Construction Projects: South India's Perspective

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Abstract. Developing countries like India require a huge infrastructure to facilitate needs of the people. Construction industry provides several opportunities to the individuals. Construction manager work is to supervise and organize the construction activities in construction projects. Now a day construction manager facing challenges. This paper aimed to study the challenges facing by the construction manager in the perception of construction professionals. 39 variables were taken from the literature review which found to be severe impact on construction managers' performance. Construction manager, project manager and site engineers are the respondents for this survey. Using SPSS, regression analysis was done and recognized significant challenges. These challenges were classified into 5 domains. In management challenges, resource availability and allocation, risks and uncertainties existing in the project onsite, top management support and cost constraints are the most significant variables. In skills requirement of a construction manager challenges, technical skills required to learn and adapt new technology in the project, decision making and planning according to the situation in site are the most significant variables. In performance challenges, implementation of tasks according to the plan is the important variable whereas in onsite challenges, manage project risks, develop project policies and procedures are the most important.

1. Introduction

Construction industry involves several departments within the organization along with peripheral departments align with that organization to perform works. To execute construction management related works in construction, a key entity is required called as Construction manager. He is the person responsible for initiation, execution, monitor the work periodically to check quality and deliver the project by meeting client constraints. In the process of executing these works construction manager faces more challenges. [1&2] Studied about the construction manager challenges in Indian construction industry whereas [3] identified construction management challenges in rural projects which were related to project manager and construction manager work. To achieve project quality, cost, time and scope requirements, construction manager has to manage the operations proactively [2]. [4] Stated that the project manager difficulty with challenging authority due to matrix structure, cross-functional and motivation which were comes under human resource challenges. In order to overcome the stated HR challenges the suggestions were reported.

The construction project managers suffered from different types of stresses. This stress had shown a negative influence on performance (task, interpersonal and organizational) of the construction project managers[5]. These parameters implied that it was important to implement preventive stress



coping strategies. Till now, there are no perfect duties and responsibilities of construction manager related to job. [6] Concluded that there was some unanimity and disagreements among the parties to a construction project relative to CM duties. Disagreements were mainly between designers and contractors. But still, management related to site work come under construction manager duties. [7] explained that construction manager as a leader should aware of needs and characteristics of project. Leadership skills and technical competency must be required for the construction manager to handle the difficult situations. [8] Explained about the technical competencies of construction manager in macro and mesa level. As a construction manager, he should think about the safety in construction work place. [9] Stated about construction manager responsibilities related to safety. [10] Explained about the safety perception by 6 groups of job holders in construction industry. [11] Described in the public and private sector where project manager performance was affected.

[12] Explained about the evaluation of construction contractor performance beyond national boundaries. Japanese contractors have capability to make fewer defects compared to UK and USA. They can achieve specific goal in shorter time by increasing the human resource in the site. [13] Explained about the factors affecting delays in construction projects. Lack of commitment, poor site management, poor site coordination, inefficient planning, less clarity in project scope, improper communication, substandard contract are the factors that produces delays in construction projects. [14] Discussed about the communication patterns at construction manager level in Israel and explained about the effective and ineffective projects. Communication between design team and construction manager were found to be essential for attaining project objectives. [15] Disclosed the causes of contractor cost overrun in Ethiopian construction projects. As per the contractor, inefficiency in proper planning, variation in the material cost, poor productivity, inflationary pressure and project financing are the reasons for cost overrun. [16] Unveiled the causes of project delay in the construction industry in Afghanistan. Security, corruption, lack of technical capabilities of contractor's technical staff, delayed payments by clients; poor site management and poor supervision by contractor are the critical factors which cause delays in construction projects. [17] Explained about the causes of delays in construction industry. To reduce these delays adequate planning and coordination, monitoring of the projects by the experienced and qualified professionals should be required. [18] Discussed about the cost overrun in Malaysian public and private construction projects. Cost overrun can lead conflicts and litigation or in extreme project may be abandoned.

2. Problem Statement

Construction industry in India primarily focused on infrastructure, housing, and irrigation projects to facilitate the requirements and needs of the people. Due to complex activities involved in present construction projects, huge human resources are required to execute the concerned activities. To reduce the workloads of project manager in construction projects, firms created a designation called construction manager. Construction manager is responsible to look over the execution works in the project. Construction firms in south India seriously neglected the challenges facing by the construction managers and providing necessary solutions to those challenges. Because of more duties and responsibilities, construction manager faces challenges. It is important to solve the problems facing by the construction manager in construction projects for better and optimal output. The main purpose of this research study is to understand and evaluate major challenges facing by the construction manager and suggest the appropriate recommendations to handle the challenges.

3. Objective of the study

The primary objective of this study is to scrutinize the challenging facing by the construction manager in the construction projects of South India. The objectives include

- To understand the demographic profile of the construction professionals working in South Indian Construction Projects.
- To investigate and find out the necessary construction practices and problem areas in construction projects of South India.

- To evaluate the challenges facing by the construction manager and deliver suggestive approaches to overcome the construction manager challenges

4. Methodology

This methodology finds the methods and approach of the research. Steps in this research are:

4.1. Study population

Respondents in this research study are construction professionals generally in South India.

4.2. Sampling Technique

Random sampling technique was used to select the respondents. Project managers and construction managers are the main respondents for this survey for good fit of reliability of the data.

4.3. Data collection method

Structured questionnaire was used to collect the primary data. Construction professionals in South India were the respondents for collection of primary data.

4.4. Questionnaire Design

This research study is a survey approach. The approach comprises of both literature search and structured questionnaires which was considered to be most suitable instrument to reach the population. The study was conducted with construction firms that are situated in Hyderabad, Chennai, Vijayawada, Tirupati, Thanjavur, Trichy and Bangalore which can be called as cluster of south India. This research study adopted a qualitative as well as quantitative search to find out the impact of various challenges facing by the construction manager in construction projects. The challenging variables extracted from the above literature. The extracted variables are cross examined with the construction professionals and specialized educational laureates. After thorough scrutiny, 39 challenging variables were listed in the questionnaire for final survey. The questionnaire comprises of two parts. Part-A explains about the demographic profile of the respondents whereas part-B explains about the challenging variables facing by the construction manager. The respondents for the study were construction manager, project manager and site engineers. A total of 107 questionnaires duly completed, returned and found suitable for analysis. The challenging variables questionnaire consists questions related to 5 domains namely Management challenges, Skill and Knowledge requirements, Performance challenges, Onsite challenges and External challenges. Respondents were asked to rate on 5 point Likert scale where 1 = strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree and 5 = strongly agree.

4.5. Data analysis tool

SPSS [21] software was used to analyze the data. Quantitative data analysis will be espoused to identify patterns and relationships for the data by statistical methods. The data was subjected to Reliability Analysis to check the internal consistency of the variables. The data was analysed using Descriptive Statistics, Regression, one way-ANOVA (ANalysis Of Variance), and Correlations with the help of SPSS(Statistical Package for Social Sciences) version 14.0. Data was analyzed using tables and percentages for Means and Relative Important Index (RII) in Excel sheets. Relative Importance Index (RII) was calculated for each challenging variable. The variables were ranked based on the Relative Importance Index (RII) value which ranges from 0 to 1.

Relative Importance Index (RII) = $\frac{\text{Sum of weights } (w_1+w_2+w_3+w_4+w_5)}{(P*N)}(1)$

Where w is the weighting given to each variable by the respondents, ranging from 1 to 5

P is the highest weight (i.e. 5) in the study; and

N is the total number of samples.

5. Results and Discussions

Analysis of the data should mainly focus on the reliability. If data is reliable, then further analysis should be prefer. Because reliability refers to the internal consistency of a research study or measuring test. Below Table 1 Indicates the Reliability Statistics. It shows the Cronbach’s Alpha as 0.891 which is greater than the threshold value 0.7. Cronbach’s Alpha is used as an estimate of reliability. For good fit of reliability Cronbach’s Alpha should be greater than 0.7. So, these 40 items can be considered as good and fit for the further data analysis.

Table 1. Reliability Analysis

Cronbach's	
Alpha	N of Items
0.891	40

Using frequency distribution, raw data is transformed to grouped data. Grouped data is used to understand the range of values for a particular variable. Demographic profile of the respondents are chosen as the variable for this survey. Through this frequency of a particular variable chosen by the respondents can be known. Below table 2 shows that the respondents having age group of 26-35 years responded with a percentage of 35.5 and followed by 36-45 years with 27.1%. The percentage of Male and Female respondents surveyed was 83.2 and 16.8. Majority of the respondents were graduates with 52.3% followed by post graduates with 23.2%. It is coped with the views on educational programs[22 to25]. Out of 100, 36.4% of the respondents handled less than 5 projects and 30.8% handled 6-11 projects. Respondents having experience of 2-6 years were 13.6 percentage and 12-16 years of experience were 19.6 percentage. Most of the respondents worked in urban location with a percentage of 72 followed by semi urban with 20.6 percent. Majority respondents’ deals projects having an average project budget of 26 – 50 crores with 55.1% followed by project budget less than 25 crores with 23.4 percent. Survey statistics show that commercial projects respondents are more with a percentage of 47.7 followed by industrial projects with 29.9 percent. Majority of the projects comes under medium category with 68.2% and followed by large projects with 17.8 percent.

Ranking the challenging factors of construction manager is used to know which factors are mainly challenging factors for construction manager. It is easy to take immediate actions or modifications for better results. Below Table 3 rankings are provided for the challenges based on relative importance index. From management challenges it is observed that resource availability and allocation, safety and cost constraints stands at 1, 2 and 3 places with relative importance index of 0.76, 0.74 and 0.72 which were previously ranked as 7, 4 and 3 respectively [2]. Decision making, technical capabilities of construction manager stand 1 and 2 places with 0.81 and 0.75 weightages. Variance is observed as 0.02 and 0.25 with [2]. Monitoring and Implementation of tasks got 1 and 2 rankings in performance challenges category. Develop project specific policies and procedures, Implementation of team meetings frequently, Commitment by the manpower to achieve the project goals, Material wastage, Clarity in drawings and specification and Equipment productivity stances in 1,2 and 3 rankings with RII of 0.75, 0.71 and 0.70. From onsite challenges, Codes and permits, Government regulations and Labor laws are ranked as 1 and 2 with 0.76 and 0.72 weightage factors from external challenges.

Table 2. Demographic profile of the respondents

S.No	Variables	Description	Majority wise first	Majority wise second	Majority wise third	Majority wise fourth
1	Age	Category	26-35	36-45	46-55	18-25
		Percentage value	35.5	27.1	21.5	12.1
2	Gender	Category	Male	Female		
		Percentage value	83.2	16.8		
3	Education Qualification	Category	Graduate	Post Graduate	Diploma	
		Percentage value	52.3	23.2	20.6	
4	Number of projects handled	Category	Less than 5	6-10	11-15	Above 15
		Percentage value	36.4	30.8	21.5	11.2
5	Experience in years	Category	2-6	12-16	Less than 1	Above 16
		Percentage value	34.6	19.6	16.8	15
6	Location	Category	Urban	Semi Urban	Rural	
		Percentage value	72	20.6	7.5	
7	Average budget of the project	Category	26 - 50	Less than 25	51-75	76-100
		Percentage value	55.1	23.4	18.7	2.8
8	Type of projects worked on	Category	Commercial	Industrial	Residential	Govt. Projects
		Percentage value	47.7	29.9	12.1	10.3
9	Size of the project	Category	Medium	Large	Small	
		Percentage value	68.2	17.8	14.0	

Table 3. Ranking using Relative Importance Index

	Mean	RII	Rank
Management Challenges			
Resource allocation	3.81	0.76	1
Time delay	3.05	0.61	7
Cost limitations and overrun	3.59	0.72	3
Quality proposed	2.90	0.58	8
Safety	3.72	0.74	2
Risk and uncertainties	3.50	0.70	4
Communication with top management	3.32	0.66	5
Top management support	3.29	0.66	5
Skill Requirement of a Construction Manager			
Technical skills	3.75	0.75	2
Planning	3.64	0.73	3
Communication with site engineers and workers	3.65	0.73	3
Coordination	3.65	0.73	3
Integration	3.51	0.70	5
Leadership	3.17	0.63	7
Problem-solving	3.26	0.65	6
Decision-making	3.55	0.71	4
Trustworthiness	4.03	0.81	1
Flexibility	3.00	0.60	8
Performance Challenges			
Planning on site	3.71	0.74	3
Implementation	3.74	0.75	2
Monitoring	3.83	0.77	1
Controlling	3.56	0.71	4
Onsite Strategy Challenges			
Develop Realistic estimates and forecasting	3.26	0.65	4
Managing project risks	3.30	0.66	6
Develop project specific policies and procedures	3.77	0.75	1
Assign roles and responsibilities to the manpower	3.46	0.69	3
Implementation of team meetings frequently	3.74	0.75	1
Commitment by the manpower to achieve the project goals	3.56	0.71	2
Dispute resolution in the project	3.39	0.68	5
Material wastage	3.55	0.71	2
Clarity in drawings and specification	3.49	0.70	3
Equipment productivity	3.49	0.70	3
Availability of technical staffs	3.47	0.69	4
Availability of skilled labor	3.44	0.69	4
External Challenges			

Political influence	2.51	0.50	4
Public involvement	3.42	0.68	3
Labor laws	3.61	0.72	2
Government regulations	3.62	0.72	2
Codes and permits	3.79	0.76	1

To know the relationship between dependent and independent variables in the data, regression analysis was used. This analysis tells about the most significant independent variables with respect to dependent variable. Here dependent variable is overall performance of handling the challenges. Below Table 4 shows the factors and their significant value. This significant values tells about how much relationship exist between factor and dependent variable. T calculated using coefficient (B) divided by standard error (Std. Error). Unstandardized coefficient B explains the amount which dependent variable changes by changing of one unit in independent variable. Standardized coefficient Beta compares the strength of each individual independent variable to the dependent variable.

Table 4. Regression Analysis

S.No.	Model	Coefficients			T	Sig.
		Unstandardized Coefficients		Standard Coefficients		
		B	Std. Error	Beta		
	(Constant)	1.273	.595		2.138	0.036
1.	Resources availability and allocation	-0.276	0.095	-0.306	-2.909	0.005
2.	Time Delay due to miscellaneous activities	0.050	0.088	0.052	0.565	0.574
3.	Cost constraints	0.301	0.092	0.353	3.272	0.002
4.	Meeting the proposed Quality specifications	-0.115	0.101	-0.116	-1.146	0.256
5.	Ensure the Engineers and Workers safety at Project site	0.013	0.083	0.015	0.161	0.873
6.	Risks and uncertainties existing in the project onsite	-0.196	0.082	-0.203	-2.396	0.019
7.	Communication with the Top Management	-0.026	0.077	-0.032	-0.329	0.743
8.	Top Management Support	0.236	0.072	0.295	3.299	0.002
9.	Technical skills required to learn and adapt New Technology in the project	0.439	0.089	0.501	4.941	0.000
10.	Plan the tasks and activities before executing in the site	-0.128	0.097	-0.126	-1.323	0.190
11.	Communication with site engineers and workers	-0.078	0.115	-0.083	-0.680	0.499
12.	Coordination of Manpower	-0.147	0.094	-0.150	-1.552	0.125
13.	Integration of several departments	0.059	0.087	0.058	0.679	0.500
14.	Leadership	-0.099	0.080	-0.117	-1.227	0.224
15.	Problem Solving Capabilities	0.067	0.067	0.091	1.008	0.317
16.	Decision making	0.245	0.080	0.276	3.063	0.003
17.	Trustworthiness	0.168	0.106	0.166	1.593	0.116
18.	Flexibility	0.008	0.059	0.011	0.134	0.894

19. Planning according to the situation in site	0.175	0.081	0.184	2.163	0.034
20. Implementation of tasks according to the plan	-0.254	0.087	-0.268	-2.917	0.005
21. Monitoring of activities	0.101	0.101	0.091	1.004	0.319
22. Controlling of Deviations	0.078	0.083	0.088	0.942	0.350
23. Develop realistic estimates and forecasting	-0.047	0.078	-0.059	-0.608	0.545
24. Managing project risks	-0.223	0.073	-0.272	-3.069	0.003
25. Develop project policies and procedures	-0.567	0.114	-0.544	-4.986	0.000
26. Assigning roles and responsibilities to the human resource	0.035	0.095	0.038	0.372	0.711
27. Implementation of Team meetings frequently	-0.038	0.085	-0.042	-0.451	0.653
28. Commitment by the manpower to achieve the project goals	-0.031	0.092	-0.034	-0.331	0.742
29. Dispute resolutions in the project	0.058	0.102	0.066	0.572	0.569
30. Wastage of Material	0.201	0.084	0.235	2.395	0.019
31. Clarity in Drawings and Specifications	-0.186	0.090	-0.225	-2.068	0.043
32. Equipment Productivity	-0.087	0.072	-0.099	-1.208	0.231
33. Availability of Technical Staff	-0.258	0.084	-0.276	-3.079	0.003
34. Availability of Skilled Labor	0.220	0.077	0.262	2.859	0.006
35. Political Influence	0.029	0.078	0.030	0.368	0.714
36. Public Involvement	-0.012	0.089	-0.014	-0.131	0.896
37. Labor Laws	0.275	0.107	0.304	2.575	0.012
38. Government Regulations	0.200	0.088	0.220	2.267	0.027
39. Codes and Permits	0.427	0.112	0.444	3.799	0.000

$$\hat{Y} = 1.273 + (-0.306)x_1 + (0.052)x_2 + (0.353)x_3 + (-0.116)x_4 + (0.15)x_5 + (-0.203)x_6 + (-0.032)x_7 + (0.295)x_8 + (0.501)x_9 + (-0.126)x_{10} + (-0.083)x_{11} + (-0.150)x_{12} + (0.058)x_{13} + (-0.117)x_{14} + (0.091)x_{15} + (0.276)x_{16} + (0.166)x_{17} + (0.011)x_{18} + (0.184)x_{19} + (-0.268)x_{20} + (0.091)x_{21} + (0.088)x_{22} + (-0.054)x_{23} + (-0.272)x_{24} + (-0.544)x_{25} + (0.038)x_{26} + (-0.042)x_{27} + (-0.034)x_{28} + (0.066)x_{29} + (0.235)x_{30} + (-0.225)x_{31} + (-0.099)x_{32} + (-0.276)x_{33} + (0.262)x_{34} + (0.030)x_{35} + (-0.014)x_{36} + (0.304)x_{37} + (0.220)x_{38} + (0.444)x_{39} \tag{2}$$

where, \hat{Y} is the estimated overall performance of handling the challenges. The above equation shows that the impact of challenging variables against the overall performance handling by the construction manager. The above equation states that, on an average, if the variable namely resources availability and allocation changes by 1 unit, there will be -0.306 unit increase in the overall construction managers' performance of handling the challenges. The result of the t test reveals that the calculated significance of the partial regression coefficients -0.306, 0.353, -0.203, 0.295, 0.501, 0.276, 0.184, -0.268, -0.272, -0.544, 0.235, -0.225, -0.276, 0.262, 0.304, 0.220 and 0.444 are valid at 1 and 5 percent level respectively. Resources availability and allocation, cost constraints, risks and uncertainties, top management support, technical skills, decision making, onsite planning, implementation of tasks according to the plan, managing project risks, develop project policies and procedures, material wastage, clarity in drawings and specifications, availability of technical staff, availability of skilled labour, labour laws, government regulations, codes and permits (0.005, 0.002, 0.019, 0.002, 0.000,

0.003, 0.034, 0.005, 0.003, 0.000, 0.019, 0.043, 0.003, 0.006, 0.012, 0.027, and 0.000) having the significance value less than 0.005 it has been concluded that these variables represent statistically dominant variables that evaluates the overall performance of handling the challenging by the construction manager.

6. Conclusion

From the findings and discussions it is concluded that the construction manager facing several challenges in construction projects of south India. The challenges are categorized in 5 domains. Resources availability and allocation, cost constraints, risks and uncertainties, top management support have more impact on construction managers' management approach. Technical skills and decision making skills are observed dominant skill requirements that required for a construction manager to handle the construction projects smooth and efficient. Onsite planning, implementation of tasks according to the plan is confessed as challenges for the construction manager in performing the activities. Manage project risks, develop project policies and procedures, material wastage, clarity in drawings and specifications, availability of technical staff and availability of skilled labour have higher impact on construction manager's performance in field. Labour laws, codes and permits and government regulations seem to be prominent from external challenges which pose difficulty for the construction manager to handle.

7. Recommendations

Resource allocation challenges and cost overrun challenges can be reduced by adapting resource management approaches and effective estimations. In order to overcome the risks and uncertainties in the construction projects, construction manager need to forecast the issues by inspecting progress of the project at regular intervals. Top management should have to increase its communication levels with construction manager to execute the works in a stipulated way. Construction manager need to learn the new technologies evolved in the construction practices to facilitate in making good decisions at right time. In order to reduce the technical staff scarcity in projects, job rotation among the engineers should be employed. On job training and development to the newly recruited engineers will give good results. Labour laws, Codes and permits and Government regulations should be reviewed periodically by the top management as well as construction manager and project manager. It reduces the ambiguity among the labours and engineers in the construction projects.

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