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ASSESSMENT OF PARAMETERS INFLUENCING THE PERFORMANCE OF CONSTRUCTION IN AHMEDABAD CITY OF GUJARAT USING RII METHOD

Gunjankumar S. Shah[1], Dr. Jayeshkumar R. Pitroda[2], Prof. J. J. Bhavsar[3]
Student of final year M.E, B.V.M Engineering College, Vallabh Vidyanagar, Gujarat, India [1]
Assi. Prof. & Research Scholar, Civil Engg. Dept., B.V.M. Engg., V.V.Nagar, Gujarat, India [2]
Asso. Prof. & Research Scholar, Civil Engg. . Dept., B.V.M. Engg., V.V.Nagar, Gujarat, India [3]

Abstract: ***The construction industry has complexity in its nature because it contains a large number of parties as clients, contractors, consultants, regulators and others. Construction projects in the Gujarat suffer from many problems and complex issues in performance, such as cost, time and safety. The aim of this paper is to identify and evaluate the main factors affecting the performance of building construction projects in the major cities of Gujarat. This paper presents the analysis of the factors affecting building construction performance of 50 respondents from various construction firms of Ahmedabad city of Gujarat region using a Relative Importance Index (RII).***

Keywords: Construction Performance, KPIs, Productivity, Questionnaire Survey, Relative Importance Index (RII).

I. INTRODUCTION

Construction industry plays a major role in developing and achieving the goals of society. Construction is one of the largest industries and contributes to about 10% of the gross national product (GNP) in industrialized countries (Navon, 2005). According to Navon (2005) Construction industry has complexity in its nature because it contains a large number of parties as clients, contractors, consultants, stakeholders, shareholders and regulators. The performance of the construction industry is affected by national economies. Performance is related to many topics and factors such as time, cost, quality, client satisfaction; productivity and safety. The construction industry in Gujarat suffers from many problems and complex issues in performance. While individual organizations have been measuring their performance for many years, there has been little consistency in the data, and the way it has been published. The performance can be measured by key indicators for evaluation. The purpose of Key performance indicators (KPIs) is that clients want their projects delivered: on time, on budget, free from defects, efficiently, right first time, safely, by profitable companies. So, Regular clients expect continuous improvement from their construction team to achieve year-on-year: reductions in project costs and time. In addition, the Key Performance Indicators (KPIs) can be used for benchmarking purposes, and will be a key component of any organization move towards achieving best practice. Clients, for instance, assess the suitability of potential suppliers or contractors for a project, by asking them to provide

information about how they respond to a range of indicators. Some information will also be available through the industry benchmarking initiatives, so clients observe how potential suppliers compare with the rest of the industry in a number of different areas. Construction supply chain companies will be able to benchmark their performance to enable them to identify strengths and weaknesses, and assess their ability to improve over time. The KPIs framework consists of seven main groups: time, cost, quality, client satisfaction, client changes, business Performance, health and safety. In this research paper, factors affecting the performance of construction projects in Ahmedabad city were analyzed. Performance indicators are used to measure performance in construction projects.

II. OBJECTIVES OF STUDY

This paper has an objective to act as a foundation for future studies and its results will become worthwhile information in efforts to improve the Performance of construction practices in Ahmedabad city.

1. To identify the factors affecting the performance of building construction projects (Key performance indicators).
2. To evaluate the most significant key performance indicators of construction projects and ranking that key performance indicators by RII method.
3. To study Engineers, Contractor, Project Managers and clients review based optimization towards the Construction performance in building projects in Ahmedabad.

III. RESEARCH METHODOLOGY

The data collected to determine the most influential factors on Performance of construction of the building project was done through a survey by explorative questionnaire to the respondents involved in the daily activities of construction firms Ahmedabad city of Gujarat. The questionnaire was designed so that respondents can give the rank to their answers based on the Likert scale. The analysis of these data was done by a method named relative importance index (RII) method using Microsoft Excel.

IV. DATA COLLECTION

A total number of 50 respondents were surveyed from the Ahmedabad city out of which 20 respondents were Engineers, 15 were Contractors, 9 were Project managers and 6 were Clients. A ranking of the factors was achieved from the Relative Importance Index (RII) method.

V. DATA ANALYSIS BY RELATIVE IMPORTANCE INDEX (RII) METHOD

The data collected was manually analysed by the RII method with the help of which a decimal figure for each factor is obtained which is known as its Relative Importance index. This index is used to rank the factors.

Total 65 factors were analyzed using RII Method and ranked as shown in Table 1.

TABLE NO 1: RANKING OF FACTORS FOR CONSTRUCTION PERFORMANCE

No.	The factors influencing performance of construction	RII	RANK
	(A) Cost		
1	Prices escalation of material	0.69	2

2	Cost of material and equipment	0.58	10
3	Project cash-flow	0.81	1
4	Project labor cost	0.66	4
5	Organizational liquidity	0.68	3
6	Profit rate of project	0.6	8
7	Cost of rework	0.61	6
8	Wastage rate of materials	0.57	11
9	Project design cost	0.57	12
10	Project overtime cost	0.61	7
11	Overhead percentage of project	0.52	15
12	Lack of credit facilities	0.6	8
13	Cost of variation orders	0.55	14
14	Interest rate	0.56	13
15	Market share of organization	0.65	5
(B) Time			
16	Delay due to materials shortage	0.65	5
17	Procurement of resource according to planned duration	0.64	6
18	Delay in payment to contractor	0.72	1
19	Estimate project duration	0.72	1
20	Time needed to implement changes	0.65	4
21	Site preparation time	0.54	7
22	Time required to rectify defects	0.53	9
23	Lack of credit facilities	0.54	7
24	Timely decision making	0.7	3
(C) Quality			
25	Durability	0.8	1
26	Constructability	0.72	4
27	Conformance to specification	0.7	6
28	Availability of skilled personnel	0.72	3
29	Equipment and raw material quality in project	0.76	2
30	System of quality assessment in organization	0.71	5
31	Quality of training program	0.58	9
32	Multiple projects	0.59	8
33	Construction methods	0.66	7
(D) Productivity			
34	Multiple functionality	0.67	10
35	Unreliable material supply base	0.69	9
36	Low morale and motivation of craftsman	0.74	6
37	Poor planning and supervision	0.8	1
38	Project complexity	0.71	8
39	Low mechanization	0.78	3
40	Land owner disputes	0.8	1
41	Team work and coordination	0.76	5
42	Technical background	0.73	7

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43	Attitude of site personnel towards work	0.77	4
(E) Client Satisfaction			
44	Acceptable quality	0.72	2
45	Number of reworks	0.58	6
46	Meets prestated objectives	0.57	7
47	Number of disputes between owner and project parties	0.62	5
48	According to budget	0.72	3
49	Investment opportunity	0.7	4
50	Value for money	0.74	1
(F) Government Policies			
51	Amendments	0.59	5
52	fiscal constraints and extensive controls	0.66	1
53	Political influence from higher authorities	0.62	3
54	Contractual risk	0.62	3
55	Corruption	0.65	2
(G) Health and Safety			
56	Accidents rate in project	0.55	3
57	Application of Health and safety factors in organization	0.55	3
58	Assurance rate of project	0.56	2
59	Accessibility to location	0.61	1
(H) Innovation and Learning			
60	Learning from past experience	0.68	2
61	Training programs	0.54	3
62	Creativity in controlling cost and developing own efficiency	0.72	1
(I) Surrounding circumstances			
63	Climate changes	0.65	2
64	Pollution	0.54	3
65	Unforeseen site condition	0.68	1

VI. CONCLUSION

The Construction industry is considered as an important sector in the world as it develops and achieves the goals of the society. A questionnaire based survey was used to judge the attitude of Contractors, Project Managers, Engineers and Clients towards factors affecting building construction projects of construction firms in the Ahmedabad region of Gujarat. 80 questionnaires were distributed as follows: 31 to Engineers, 27 to Contractors, 14 to Project Managers and 9 to Clients. 50 questionnaires (62.30%) were returned as 20 respondents were Engineers, 15 were Contractors, 9 were Project managers and 6 were Clients. The respondents were asked to indicate the level of importance of each of the 65 factors of Construction Performance in Ahmedabad city of Gujarat region as very high, high, mid, little, very little degree affect. Results indicated that the most important factor affecting Performance of construction where teamwork and coordination, project cash-flow, low mechanization, accessibility to location, delay in payment to the contractor, durability, constructability, investment opportunity, technical background, unreliable material supply base, Availability of skilled personnel, estimate project duration etc.

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REFERENCES

[01] Abdelnaser O., Abdalrahman S., Abdula H. K. P., "Project Performance in Sudan Construction Industry: A Case Study", "Academic Research Journals", Volume 1, Number 1, ISSN 2375-6035, January-June 2012, 55-78

[02] Albert P. C. Chan, Scott D., Chan P. L., "Factors Affecting the Success of a Construction Project", "Journal of Construction Engineering and Management", Volume 130, Number 1, ISSN 0773-9364, February 1, 2004, 153-155

[03] Alwi, S.; Hampson K., Mohamed S., "Factors Influencing Contractor Performance in Indonesia: A Study of Non Value-Adding Activities", "Journal of Construction Engineering and Management", Volume 13, Number 2, ISSN 2033-1024, 27-28 March, 2002, 1-13

[04] Basheka B. C., Milton T., "Measuring the performance of contractors in government construction projects in developing countries: Uganda's context", "African Journal of Business Management", Volume 6(32), Number 2, ISSN 1993-8233, 15 August 2012,

[05] Belassi Walid and Tukel Oya Icmeli, "A new framework for determining critical success/failure factors in projects", "International Journal of Project Management", Volume 14, Number 3, ISSN 0263-7863, February 1996, 141-151

[06] Best Rick and Langston,Craig "Evaluation of Construction Contractor Performance: A Critical Analysis of Some Recent Research", "Construction Management and Economics", Volume 85, Number 2, Issn 3486-7845, April 2006, 439-445

[07] Chaudhari C., Vaghela P., Memakiya S., Prajapati A., Pitroda J., "A Critical Literature Review on Factors Affecting Performance of Contractors in Building Construction", "International Journal of Advanced Research in Engineering, Science & Management", Volume 123, Number 1 , ISSN 0345-7856, April 2013, 1-5

[08] Dadzie J., Abdul-Aziz A.R. and Kwame A., "Performance of Consultants on Government Projects in Ghana: Client and Contractor Pespective", "International Journal of Project Management", Volume 23, Number 3, Issn 6034-6784, January 2009, 256-267

[09] Daniel W. and Martin S., "Factors Affecting the Performance of Small Indigenous Contractors in Papua New Guinea", "The Australian Journal of Construction Economics & Building", Volume 10, Number 1, ISSN 3489-9876, November 2002, 80-90

[10] Enshassi A., Abdul-R., Abdul-A., Saleh A., "Performance of Construction Projects: Perception of Owners in Palestine", "Emirates Journal for Engineering Research", Volume 16, Number 1, ISSN 3498-4509, June 2011, 23-32

[11] Enshassi A., Mohamed S., Saleh A., "Factors Affecting the Performance of Construction Projects on The Gaza Strip", "Journal of Civil Engineering and Management", Volume 15, Number 1, Issn 1822-3605, 2009, 269-280

[12] Garbharran Hari, Govender Jeevarathnam, Thulani Msani, "Critical success factors influencing project success in the construction industry", "Academic Research Journals", Volume 23, Number 2, ISSN 5481-0498, July 2013, 90-108

[13] Iyer K. C. and Jha K. N., "Critical Factors Affecting Schedule Performance: Evidence from Indian Construction Projects", "Journal of Construction Engineering and Management", Volume 132, Number 8, ISSN 0733-9364, August 1, 2006, 871-881

[14] Mamman .E. Juliet and Omozokpia .E. Ruth,"An Evaluation of Factors Affecting The Performance of Construction Projects in Niger State", "Journal of Environmental Sciences and Resources Management", Volume 6, Number 1, ISSN 2277-0097, 2014

