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Case Study on Critical Factors Affecting the Success of Construction Project in Gwalior

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Abstract *— A project that delivered on the time as per the planning and also within the same or lump sum budget that has been proposed by the organization, may called a successful project, and so must supposed to be. The success of any project might depend on the handling and controlling of the project. The complexity in the construction projects is very high in Gwalior region, and so to find out the reason behind, a research have been planned in which all the critical factors are detected. A questionnaire based survey has been conducted in the Gwalior city. The questionnaire has 33 major factors which are the causes of the construction projects are very complex in themselves, and so they are non-routine. Limited time has been allotted to the certain respective work and that should be completed accordingly. So the smoothness of the work doesn't get failure of construction project. A total of 68 questionnaire forms were distributed in three groups of Contractor, Consultant, and Engineers. The survey outcome indicates that according to all three groups most critical factors are construction methods, planning efforts, finance & payment of complete work.*

Keywords*- project, factors, success, construction industry, respondent*

I. INTRODUCTION

performance of construction projects may lead to the success of the project. Construction projects are very wide process, so it is very usual to go from some complexity while running the projects. And it is very important to work on those factors which are the cause of criticalness. While doing survey we found some of the different opinion from the same designation, and that's where we found one reason to debate on the different opinions and the results were, complexity of any construction project may different accordingly to work/project type but there are some factors or we can say critical factors exist which may the reason of complexity in every project, those must considered as the most effective critical factors for the construction projects. The construction projects are very complex in themselves, and so they are non-routine. Limited time has been allotted to the certain respective work and that should be completed accordingly. So the smoothness of the work doesn't get affect and the project may lead to the success or we can say project may complete according to the estimated time period.

They have determined that the risk management and requirements management are influencing the construction industries. One hypothetical framework have been formed to get the results (Zakari Tsiga, Michen Emes , Alan Smith, 2016). Project management success depends upon different issues and different aspects. Operating and maintenance part at the outlet of the project may useful to get those factors which should be demanding more attention in the success of the construction project. Entire period life cycle of project may depend upon the construction procedure. Critical factors may include being the resource to improve the construction project (Samarth Homthong, Wutthipong Homthong, 2016).

Construction industry is very wide and so the reason of its complexity is very much obvious and that has become a big issue nowadays, construction industry is facing a lot of problems during the construction and which may cause the delay of the construction projects. There are many reasons of the delay as the industry has lots of phases due to its wideness. So they have been a debate on those factors with the expertise. And categories factors in 5 groups, to find out the cf's in every category (Nipin Joseph Babu, 2015).

The construction project finished through a mixture of various proceedings communications, decided or not decided, over the life of a facility, it's changing the contributors and procedures in repetitively varying environment (Sumesh Sudheer Babu, Dr. B. Sudhakar, 2016). Project management team would have aware from that side of the project which might be critical for the successful completion. For the successful projects it is very much necessary to find out the requirements of the projects from starting to end, and work as the project planned so it may help in cost, time, quality, budget, these are the important factors for success of the construction project (M. Nemathullah, B. Harish Naik, 2016)

II. RESEARCH METHODOLOGY

of Gwalior. The questionnaire forms were distributed in three groups of consultants, contractors, engineers in Gwalior construction industry. 15 participate from each group has been participated. Data has been calculated by IMPI method and results were analyzed by hypothesis testing.

IMPI– Data collected to decide the most critical factor which is affecting the success of construction project of the Gwalior construction industry. The data has been collected through the survey has been ranked by IMPI method. The questionnaire form was divided in two questions one was frequency of the factor and the other was the severity of the factor.

IMPI = F.I × S.I/ 1OO %
F.I. = Frequency Index
S.I. = Severity index

Correlation– Spearman's rank correlation, it is a nonparametric trial which is used to measure any agreement in ranking of the performance between the three different groups. In this paper we used this correlation to see the relationship between the three of the groups of Engineers, Contractors and consultants. The range of correlation coefficient test is -1.0 to + 1.0.

Hypothesis testing –Hypothesis testing has been done to check the relationship between the two groups of the participants; H_0 has een used in the test, and by the calculations tcriticalis less than tcalculated. . Correlation is significant at 0.05 levels. The
results of Hypothesis test are null in this study for every group.
Results are varying between +1 to -1, so the correlation results are positive.H_0 – it denotes that there is no difference between the three groups of the perceived critical factors. H_1 – it shows that there is difference between the three groups of the perceived critical factors.

1.1. CALCULATIONS AND RANKING

Table no.1
shows the results of IMPI data calculations for the all three groups of Engineer, Consultant, and Contractor. Among the 33 factors from the three groups top 10 factors from each group is ranked. And accordingly the ranking ofBut some of factors are common in these groups. Some of them are mentioned as follow- As finance and complete payment work is ranked no 1 in consultant and engineer's group where as it is ranked on no.2 in contractor's group. Construction methods is ranked on no.2 in consultant's and engineer's group and ranked on no 4 in contractor's groups. Unforeseen site condition's is ranked on no 3 in the consultant's and contractor's group and it is ranked on no 9 in the engineer's group.

SUCCESS FACTORS	ENGINEER		CONSULTANT		CONTRACTOR	
	IMPI	RANK	IMPI	RANK	IMPI	RANK
Finance & Payment of complete work	12.97	1	17.99	1	14.88	2
Construction method	10.31	2	15.27	2	12.58	4
Planning efforts	9.73	4	7.93	7	10.31	6
Shortage of labor & technical personnel	9.57	5	7.91	8	7.89	10
Realistic cost & time estimate	8.59	6	11.30	4	15.42	1
Site management	8.45	7	8.99	5	8.52	8
Client's satisfaction	10.11	3	7.10	10	11.78	5
Quality assurance	8.27	8	7.26	9	8.30	9
Unforeseen site conditions	8.27	9	11.92	3	12.72	3
Quality and shortage of material	8.09	10	8.81	6	8.30	7

Table no -2
The Table no.2 express the degree of agreement between the two of the groups Engineer and consultant. According to the results of data calculation the

Engineer – consultant correlation –

Correlation coefficient (r)	Name of association	T- test value	Reject H1	R2	p-value
0.6565	Positive correlation	2.4618	yes	43%	0.0392

coefficient correlation (r) is 0.6565 and the value of r varies between -1 to +1 so the assessment of correlation shows that there is positive degree of agreement between Engineer's and Consultant's group. When the significance of the relationship tested, the results showed that $t_{calculated}$ 2.4618 is greater than $t_{critical}$ 2.3646 at 5% significance level $\alpha = 0.05$ and degree of freedom is (n-2). Since $t_{critical}$ is less then $t_{calculated}$ so H_0 was not accepected for the relationship.Thus there is no strong strength relationship between these two groups.

Table no -3
The Table no.3 express the degree of agreement between the two of the group consultant and contractor. According to the results of data calculation the

Consultant – Contractor correlation

Correlation coefficient (r)	**Name of association**	**T-test value**	**Reject H_1**	**R^2**	**p-value**
0.7223	**Positive correlation**	**2.9542**	**Yes**	**52%**	**0.018**

coefficient correlation (r) is 0.7223 and the value of r varies between -1 to +1 so the assessment of correlation shows that there is positive degree of agreement between Consultant's and Contractor's group. When the significance of the relationship tested, the results showed that $t_{calculated}$ 2.9542 is greater than $t_{critical}$ 2.3646 at 5% significance level $\alpha = 0.05$ and degree of freedom is (n-2). Since $t_{critical}$ is less then $t_{calculated}$ so H_0 was not accepected for the relationship. Thus there is no strong strength relationship between these two groups.

Table no- 4
The Table no.4 express the degree of agreement between the two of the group consultant and contractor. According to the results of data calculation the

Contractor – Engineer correlation

Correlation coefficient (r)	**Name of association**	**T-test value**	**Reject H_1**	**R^2**	**p-value**
0.822	Positive correlation	4.137	yes	68%	0.0033

coefficient correlation (r) is 0.822 and the value of r varies between -1 to +1 so the assessment of correlation shows that there is positive degree of agreement between Consultant's and Contractor's group. When the significance of the relationship tested, the results showed that $t_{calculated}$ 4.137 is greater than $t_{critical}$ 2.3646 at 5% significance level $\alpha = 0.05$ and degree of freedom is (n-2). Since $t_{critical}$ is less than $t_{calculated}$ so H_0 was not accepected for the relationship. Thus there is no strong strength relationship between these two groups.

VI. CONCLUSION

The motive of this study was to develop a performance evaluation framework of Gwalior construction industry. Based on a survey and reviews of the expertise some factors are identify as the most critical factors which are affecting the success of construction projects. Following the survey we find out top 3 ranked factors amongst the three of the group, which are followed as- finance & payment of complete work (17.99) (14.88)ranked 1, in engineer's and consultant's group.The payment system of the Gwalior construction industry is very poor. Construction method (15.27), (10.31) is 2nd ranked factor in eng- consultant group, as the methods used in our industry are the same used in early time. There are no new techniques has been introduced to the work.Unforeseen site conditions(11.92),(12.72) ranked 3 in the consultant-contractor group, as the efforts of the planning are the most important part of any function, and the success of the project totally depends on the planning. At the time of the execution of the plan, a lot problem confronted during the construction.

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