

STUDY ON SIGNIFICANT SUCCESS FACTORS FOR LABOUR SUBCONTRACTORS IN INDIAN CONSTRUCTION INDUSTRY

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ABSTRACT

In current scenario, construction industry is growing tremendously with huge and complex projects. The large quantity and complexity of work puts the various construction project in a challenging environment. In order to successfully complete the project within the scheduled time and available resources there is a requirement for more amount of skilled labours which the construction industry is in demand of. So the contractors undertaking high budget construction projects with more quantity of work opt to allot their huge proportion of works to labour subcontractors. In this paper the significant success factors for subcontractors who are specialist in providing manpower for various construction works are identified and assessed. Initially a questionnaire survey was conducted and significant success factors were identified through statistical analysis of the data. Further a qualitative analysis technique was approached by semi structured interview with the concerned experts for assessment of the identified significant success factors.

Keywords: Construction industry, Main contractors, Subcontractors, Significant success factors

I. INTRODUCTION

Construction industry in India is one of the major industrial sector which contributes for the economic growth of the country. Infrastructure development is an important aspect for any developing country. Lots of new technologies and complex designs are being incorporated. With all these advancements and technologies coming up in line with the construction industry the requirement of man power is becoming very high.

So, the Constructions firms in India taking up big infrastructure projects with large quantity and complexity of works prefer to allot their major part of work to subcontractors. Subcontracting firms tends to expertise themselves in a particular specialization of work. So, depending upon their nature and tendency of work subcontractors can be classified as equipment intensive and labour intensive subcontractors.

The main contractors consider subcontracting as a practice for saving time and cost, to share their work load need for specialized equipment and skilled labours, to meet the demand of human resource and for better efficiency in work. Since huge amount of work is carried out by subcontractors in many infra-structure projects, lack of their performance can be one of the major cause for project failure.

In previous research works equipment intensive and labour intensive subcontracts are been studied and their performance indicators, factors influencing selection of subcontractors, critical success factors and all aspects regarding the subcontracting practices have been carried out in different countries. In this paper the subcontractors who are specialist in providing manpower for various

construction works in India are identified, their significant success factors are ranked with a help of questionnaire survey and qualitative analysis of these factors are done with the help of semi structured interview in India.

II. RESEARCH METHODOLOGY

A. Literature review

The practice of subcontracting in construction project have been done around the world in many countries. So, researchers have studied the major success factors for construction project and subcontracting of various types and trades. Many studies have been done related to subcontracting practices. Research works on various factors influencing the selection of subcontractors, relationship of subcontractors with the main clients, critical success factors of subcontractors of various trades, subcontractors productivity, impact of sub-contracting practices, job performance of subcontractor workers, and subcontractors for quality improvement in construction industry. With the help of all these relevant literatures certain factors have been gathered and was used for the preparation of questionnaire for this research work [Boynton and Zmud, 1984, Chan et al., 2004, Thenmozhi, S.D. Shri, 2012, Ramadevi and Shri, 2015, Jakub and Paslawski, 2015].

B. Research objective

The main aim of this study is to identify the significant success factors for labour sub-contractors. This study also includes assessment of those identified significant success factors in different perspectives of experts in the construction industry. The scope of this study is for the better understanding of subcontracting practices and to provide a clear direction for improvement in their performance.

C. Data collection

For this research work data was collected through questionnaire survey and semi structured interview from experts in the construction industry. Success factors for sub-contractors collected from previous studies have been used in the preparation of questionnaire under the guidance of certain experts from the field. The respondents were asked to rate the factors which are more likely important for subcontractors who are specialist in providing man power for various construction works. A five point likert scale was used in the questionnaire for rating the major important factors. The scale states 5 “very important”, 4 “important”, 3 “considerable”, 2 “not important”, 1 “strongly not important”.

D. Data analysis: The data analysis process consists of two phases which involves quantitative analysis and qualitative analysis. In quantitative phase, statistical analysis of data consisting of i) identifying the major success factors by RRI (relative important index) method for ranking the factors ii) finding correlation and regression coefficient in examining if there is any divergence in opinion among the respondents of different categories. In qualitative phase, the method of data analysis is by a semi structured interview among certain experts from the construction industry. A face to face interview is conducted for assessment of the identified major success factors and suggestions for improvement in respective success criteria were obtained in perception and experience of the experts which was used in this study.

E. Survey response

As subcontractors are a part of construction industry, their relationship with main contractors, clients and consultants are said to be very important. So, in this study the perspectives of main contractors, sub-contractors and clients/consultants who are involved in big construction projects are considered and hence these three categories of people are taken as samples for questionnaire survey. The final prepared questionnaires validated by experts and professors were sent to nearly 220 samples. Because of surveying 90 valid responses were received with the response rate of 41%. Table 1 represents the percentage of valid responses received by respondents of different categories and Table 2 represents the working experience of respondents in construction projects.

Table 1: Category of respondents

Categories	Number of responses	Percentage of responses
Main contractors	35	39%
Sub-contractors	30	33.3 %
Clients/ consultants	25	28%
Total	90	100%

Table 2 Working experience in construction project

Working experience	Number of responses	Percentage
Less than 5 years	17	18.8%
5 -10 years	26	28.8%
11- 15 years	31	34.4%
16- 20 years	9	10%
>20 years	7	7.77%
Total	90	100%

Table 3 Work Position and average years of experience of interviewers

Work position	No of interviewers	Average years of experience
Planning engineer	8	5 – 10
Site engineer	13	3 – 7
Project manager	3	10 - 20
Sub-contractors	4	5 – 7

For qualitative method of analysis semi structured interview was conducted in assessing the identified major success factors. A face to face interview was conducted with 28 experts in various fields concerned with the construction industry. Table 3 shows the type of position, number of interviewers and their average experience in construction industry

III. RESULTS OF QUANTITATIVE ANALYSIS

A. Identification of major success factors

From previous literature review twenty fivesuccess factors for construction project involving subcontractors were obtained for preparation of questionnaire. The respondents of three different categories answered the questionnaires and the results indicates the important index and ranking of the factors as shown in Table 4. From the questionnaire survey all the twenty five factors were ranked by the respondents of three categories like main contractors, sub-contractors and clients. The important index was calculated by RII method individually for all three-different set of response and their respective ranking was given. Then the mean value of important index among the three respondents for all the factors was calculated and the final ranking was given. Success factors with important index more than0.75 would be taken as vital and significant success factors for sub-contractors who are specialist in proving man power for construction industry. These significant success factors willbe further considered for qualitative analysis.

B. Correlation and regression test

Since the response for the questionnaire survey was obtained from three different categories of experts, correlation and regression test was conducted to check if there is any divergence in opinion among the respondents. Correlation test was conducted to measure strength and linear relationship between two variables. Correlation coefficient r always lie between -1.0 to 1.0. The strength of correlation coefficient is said to be strong if it lies between 0.5

to 1.0. The scatter diagram graph was used to pair the numerical data of two variables one on x-axis and other on y-axis for understanding the relationship between them. If the two variables are said to be correlated, then the points on the graph will be along a line or curve. The scatter diagram for correlation between the response of main contrac-

tor and sub-contractor is shown in Fig 1a and correlation between the response of sub-contractor and client in shown in Fig 1b and correlation between the response of main contractor and client is shown in Fig 1c. The regression equation and regression coefficient is shown on respective figures.

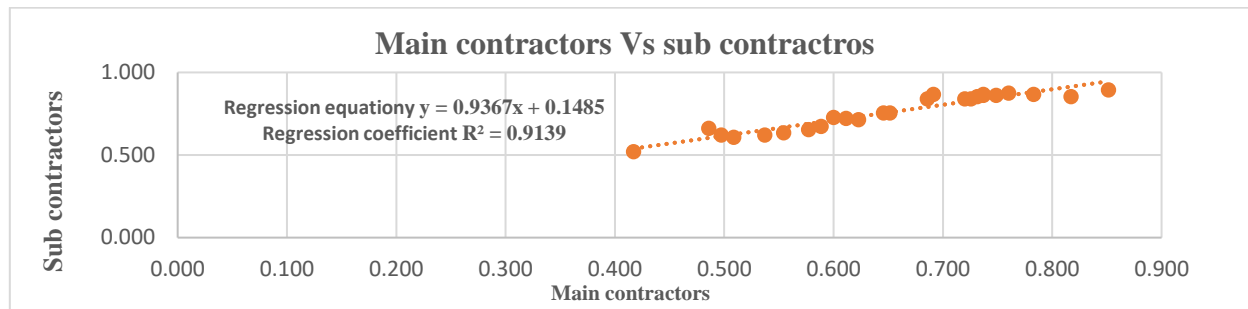


Fig 1(a) Correlation between the response of main contractor and sub-contractor

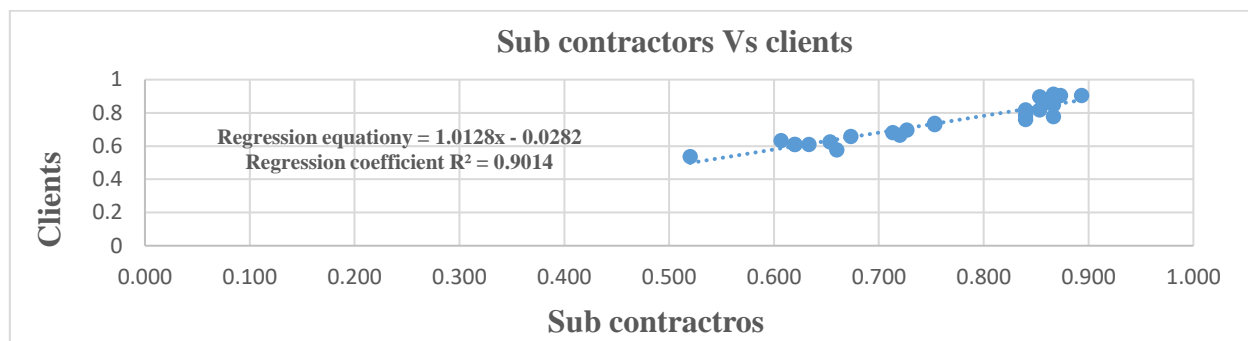


Fig (b) correlation between the response of sub-contractor and client

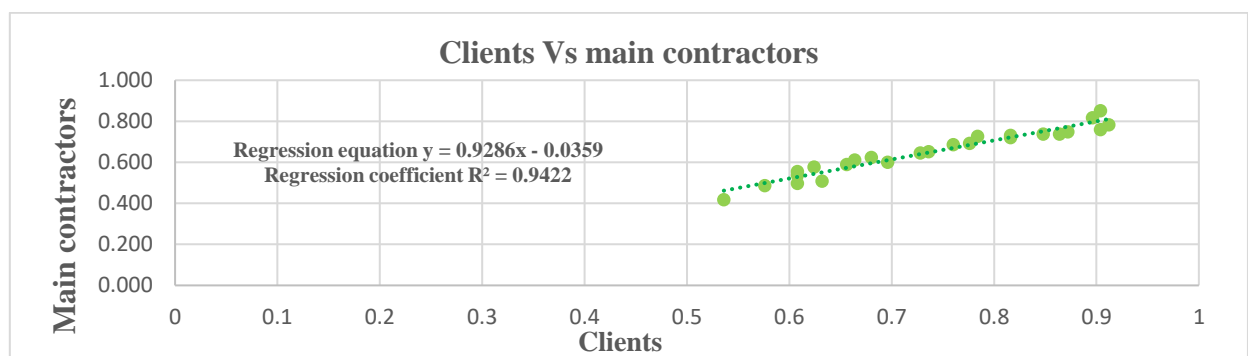


Fig (c) correlation between the response of main contractor and client

Table 4 Significant success factors for labor subcontractors

SUCCESS FACTORS	SUB-CONTRACTORS		MAIN CONTRACTORS		CLIENTS		TOTAL	
	IMPORTANT INDEX	RANK	IMPORTANT INDEX	RANK	IMPORTANT INDEX	RANK	IMPORTANT INDEX	RANK
Relationship with main contractor/ client/ consultant	0.893	1	0.851	2	0.904	1	0.884	1
Completion of work in scheduled time/ time management	0.887	2	0.869	1	0.896	2	0.853	2
Productivity of labours	0.873	3	0.771	6	0.856	5	0.840	3
Management skills /proper supervision/ guidance for labours	0.867	4	0.811	3	0.88	3	0.834	4
Avoiding shortage of workers	0.853	5	0.794	4	0.872	4	0.826	5

Profit of the project	0.840	6	0.789	5	0.848	6	0.805	6
Number of projects completed successfully	0.833	7	0.749	8	0.832	8	0.804	7
Quality in work	0.813	9	0.76	7	0.84	7	0.791	8
Safety norms and precautions	0.82	8	0.737	9	0.816	9	0.771	9
Welfare of labours	0.8	10	0.714	11	0.8	10	0.768	10
Types of project completed /budget of project completed	0.793	11	0.726	10	0.784	11	0.743	11
Effective Utilization of skilled /semi-skilled/ unskilled labours	0.78	12	0.697	12	0.752	13	0.736	12
Financial stability of subcontractors	0.767	13	0.674	13	0.768	12	0.717	13
Planning the work according to the project schedule	0.753	14	0.663	15	0.736	14	0.699	14
Clearance of bill/ Payment method for subcontractors	0.733	15	0.669	14	0.696	16	0.687	15
Reputation of the subcontracting firm	0.7	17	0.634	18	0.728	15	0.684	16
Proper communication of supervisors/ site engineers regarding the drawings and plans/ language barriers	0.713	16	0.651	16	0.688	17	0.668	17
Growth in revenue	0.693	18	0.646	17	0.664	18	0.648	18
Adequate and proper inspections by seniors	0.673	19	0.623	19	0.648	19	0.634	19
Management of resources	0.667	20	0.611	20	0.624	20	0.615	20
Insurance terms	0.647	21	0.606	21	0.592	22	0.614	21
Incorporating new methods and techniques	0.64	22	0.594	22	0.608	21	0.597	22
Reputation	0.633	23	0.583	24	0.576	23	0.59	23
Project procurement method	0.613	24	0.589	23	0.568	24	0.565	24
Policies and undertakings	0.593	25	0.566	25	0.536	25	0.884	25

IV. RESULTS OF QUALITATIVE ANALYSIS:

Qualitative analysis technique is a method of developing data or concepts in natural environment by giving importance to opinions, knowledge and experience of the participants. An insight of a particular situation or scenario can be understood with the help of qualitative analysis. A semi structured interview was conducted with 28 experts in various fields concerned with the construction industry. The identified significant factors were discussed with the experts to understand the real scenario. Their opinions and views along with their experience in the construction industry made the experts share valuable information regarding each identified significant success factor.

A. Relationship with main contractor

This factor was ranked top most among the significant success factor with important index of 0.884. Relationship of sub-contractors with main contractors is said to be very important for successful

completion of the project. Certain literature reviews and Experts from construction industry with whom semi structured interview was conducted say that for a successful relationship both subcontractors and main contractors must have a good understanding in terms of work and conditions. Major dispute between both the parties occur mainly due to financial issues and performance of work. So it's the responsibility of subcontractors for maintaining good performance in the form by providing good skilled labors and it's the duty of the main contractors to take care of the financial issues by clearance of bill regularly.

B. Time management/timely completion of project

This factor was ranked second most significant success factor with important index 0.853. Time management is considered to be very critical factor for any successful project. Expert from the industry say that this factor time management or timely completion of project is interlinked with many

other success factors. So they term it as a key factor any successful project. So it's the responsibility of labour subcontractors to provide adequate man power and contribute in successful completion of project within the scheduled project time.

C. Productivity of labours:

Labour productivity was ranked the third important significant success factor with important index 0.834. Labour subcontractors have a major role in monitoring the productivity of labours. Concluding from the interview of the experts, labour productivity is said to be the key concern governing time, cost and quality of the project. From the perspectives of the main contractors the problems affecting productivity is lack of skilled labours, rework, and improper labour supervision, which the subcontractors have to take concern. From the view of subcontractor's lack of materials, improper site conditions and working environment, and change in drawings and specifications during execution of work. These factors are to be considered for productivity of labours from the side main contractors and labour subcontractors for a successful project.

D. Management skills / proper supervision/ guidance for labours:

This factor was ranked fourth important significant success factor with the important index 0.834. As labours are lacking knowledge regarding the technical issues proper supervision and guidance from the supervisors or site engineers need to be given to them for carrying out the work effectively and showing good productivity and performance in work. So, the sub-contractors need to provide proper guidance for their labours for effective contribution towards work and for the success of the project.

E. Avoiding shortage of labours

Avoiding Shortage of workers is considered to be the fifth significant success factor with important index 0.826. As labour subcontractors are responsible in providing adequate labours for the construction work, this factor play an important role in their success. So, if there is shortage of labours it will result in delay of the project which further affects the cost of the project. So sub-contractors must do the needful by providing adequate labours for the construction work.

F. Profit of the project:

This factor is ranked sixth significant success factor with the important index 0.805. When discussed with the experts, responses were that labour subcontractors are playing the key role in the profit of the project. Whenever a subcontracting firm completes a project successfully they add value to the project. So if they contribute for the success of the project, they automatically bring the opportu-

nity for the next project. So labour subcontractors must consider profit of the project as one of their significant success factors.

G. No of projects completed successfully:

This factor is ranked seventh significant success factor with the important index 0.804. The labour subcontractors completing a project successfully will gain them reputation and value for their business. When main contractors call for tenders for big budget projects they look for the experience and no of projects completed by the subcontracting firm. So, completing more number of successful project will help them to successful.

H. Quality in work:

This factor is ranked as the eight-significant success factor with the important index 0.791. Quality in work in the major challenge in any successful project. So labour sub-contractors have taken care regarding the quality of work. Major concerns affecting the quality of work is poor workmanship, inefficient skills, poor quality and lack of materials and inappropriate working environment. So, the labour contractors need to take attention to issues related to labours and main contractors need to do the requirements for the labours to work effectively.

I. Safety norms and precautions:

Safety factor is ranked as the ninth significant success factor with the important index 0.771. In concern with labour subcontractors this factor is said to be of critical importance as safety norms and precautions need to be followed by every construction labours. Any safety accident will lead to spoil the reputation of the company. All safety measures must be provided in construction sites for the workers to prevent any kind of accident. So labour subcontractors need to consider safety norms and precautions as a significant factor for their success.

J. Welfare of the labours:

Welfare of labours is ranked as the tenth significant success factors with the important index 0.768. Labour welfare is to take care of the well-being of construction workers by satisfying their basic needs and by increasing their standard of living. Many laws concerned to the welfare of labour are been practiced in Indian construction industry. Every labour must be given fixed wages for the work they have done and proper labour camp must be arranged near very construction site. Main concern for labours is their working environment and labour camp. So labour subcontractors need to take attention for the welfare of the labours in order to retrain their labour force and for successful completion of the project.

V. CONCLUSION

The major problem faced by Indian construction industry is the scarcity of skilled labours for construction works. Many projects are getting delayed due to shortage of labours. Labour subcontractors are specialist in providing man power for various construction works like masonry, fixing of form work and scaffoldings, plastering works, painting works, flooring works, MEP works etc. These subcontractors provide man power for high budget projects or any other type of construction projects. So their contribution is very important for any construction project. In this paper the significant success factors for labour subcontractors are identified and finally the identified significant success factors were qualitatively analyzed through a semi structured interview with experts in the construction industry for further understanding the real scenario behind each significant success factors. Main contractors when selecting labour subcontractors need to consider these factors prior to their selection. Sub-contractors need to understand these factors and work for betterment which will surely improve their performance and add value to the success of labour contractors and for the success of the construction project. This study will help for further research on labour subcontracting and also other trades of subcontracting. In future, this research will be an exploratory one with a greater sample size.

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