

General Overview of Contractor Performance Evaluation in Construction Industry

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Abstract- *The research project aims to perform literature survey on contractor's performance evaluation in construction industry to improve the construction efficiency and avoid delay in project. Usually, contractor's performance is not evaluated hence we are unable to recognize the flaws and work on it accordingly to improve it. The literature survey will help in determining various factors considered in evaluation and finding the gaps in literature so as the researchers can work on the gaps to get the result. Method of research includes a literature review of previous peer-reviewed journal papers focusing on performance evaluation of contractors in construction. Google Scholar and Scopus is used to collect the literatures and perform a survey on the key findings and the gaps of the paper. The results and the conclusion of the papers includes the key findings and the answers to the basic questions in evaluating the performance of the contractors and hence making it easy to prepare a new questionnaire for the evaluation and finding the limitations so as the future researchers can start working on it rather than working on the same previous findings. Analysis of these papers will help in getting the result on performance evaluation easily and quickly.*

Keywords- Construction, contractor's performance, Evaluation, Construction management.

I. INTRODUCTION

Contractors Evaluation does not seem to be much important in the day to day construction work but has a very huge necessity behind it. Considering Construction being one of the most dangerous industry with poor safety records. Construction activities are very necessary in the growth of a country contributing to the gross domestic product (GDP), employment and market for products from various other sectors of production [7,8]. It is well said about the construction industry is resistive to accept new advanced technologies. Performance Evaluation is a very hot topic in construction industry but is discussed very rarely.

An evaluation of performance is usually performed for the business control and now also it is the same with some

modification considering the type of performance in construction industry like quality, time, cost, flexibility, safety of project sites, site disputes, environmental impact, client satisfaction and all this leads to the best outcome of the result in construction. It is always found that construction work is rarely completed without any rework also, neither is it completed in time and in budgeted cost. Industry aims in achieving 5 objectives of effectiveness, efficiency, relevance, impact, and sustainability. Evaluation of any work helps in finding a better result and avoiding any poor-quality work likewise in construction industry the performance evaluation helps in mitigating the poor quality, increased cost, and delays in project. Key Performance Indicators include time, cost, quality, safety, minimum site disputes, and environmental impact considered in the performance evaluation of contractors.

In this research paper we will be reviewing different existing literatures related to contractor's performance evaluation in construction industry. While reviewing we will see there are various outstanding proposals and authors will also further suggest with the aim of enhancement in future research on Contractor's performance evaluation in construction industry. A review of previous research will be useful for the future researchers working on this research and help them in finding the research gaps in their studies. We have found 108 papers out of which 72 are directly related with the performance evaluation of contractors in construction industry which are used in preparing this research paper.

ROLE OF CONTRACTORS PERFORMANCE EVALUATION IN CONSTRUCTION

Contractors are the major part in any of the construction industry. The performance of any construction can be demonstrated on the critical success factors which are popularly used by different researchers from different perspectives. Considering the current construction work we have grouped the success of any construction project into six main factors known as critical success factors (CSFs) and are as follows client-related, project-related, consultant-related, contractor-related, supply chain-related, external environment-

related factors. Out of this CSFs we will be more focused on contractor-related factor. The paper is primarily structured on the performance of contractors which affects the success of a construction project.

The following paper accounts to prepare the questionnaire from the objectives and analyzing those with different projects for the successful outcome of timely and economical construction projects. This will show the research methodology used and, in the study, followed by an literature review and then preparation of a questionnaire and then performing analysis and then performing a discussion and as a result providing a concluding statement for the future mitigation of delays in the project due to contractors performance [7].

II. NEED FOR STUDY

Lot of study is being conducted on performance evaluation in construction industry but still some of the major points are missing which is shown in this research paper to examine and evaluate the literature survey and provide the scope of work for the researchers to start their work on. This study can be used as a guideline to determine the challenges faced by the contractor and identify the best possible solution to mitigate it and avoid any delays in the project but also, there are some gaps which need to be filled and get various benefits in construction industry. This research can be a map work for the researchers to understand how important excellent performance by all the team for the better result in construction industry is. And hence mitigate and minimize all the possible delays by evaluating the performance and this literature survey will help in preparing the questionnaire survey for the researchers. So, the findings of this study will be beneficial in planning the methodology and solutions in performance evaluation in construction industry. As the survey will help in some ideal answers for the basic questions and help in getting the specific answers for the questions.

III. OBJECTIVES

1. To identify major critical barriers in performance of contractors in construction and provide remedial measures to maintain the efficiency of contractors in construction work through literature survey.
2. Through the literature survey find out the future works need to be done in increasing the efficiency of contractor's performance and make it easy for the future researchers to work on the limitations of this literatures.

IV. DATA COLLECTION

In this survey we have collected papers on the topic

Contractor's Performance Evaluation in Construction Industry from various database searches like Google Scholar, Scopus from year 2000 to present the query was added to the search for the Documents on Article Title, Abstract, Keywords, and Source type journal, Language English. Focusing on the papers which included construction, and contractor's performance were considered we got a set of 72 papers relevant to the topic. I have read all the abstracts and the papers which did not contain any relevance to construction and contractor's performance were neglected.

Christopher Ngacho and Debadyuti Das and Andy Neely, Mike Gregory and Ken Platts [2015] have discussed various literature based on KPI's (Key Performance Indicators) and CSF's (Critical Success Factors). They have demonstrated the relation using a conceptual diagram among the CSF's and overall project performance depicting how the performance leads to community satisfaction. The literatures were grouped under 2 major categories:

1. Dealing with performance measurement criteria
2. Focus on CSF's in construction industry

During the research they found quality, time, and cost as the main measures of project performance and other factors included safety, free from disputes, and having minimal environmental impact. Thus, in this research the authors postulated 9 propositions as the effects on the performance of project as:

1. Six KPI's are the salient components of construction project performance.
2. If the project characteristics are challenging
3. Effect of client performance on overall project performance
4. Involvement of consultant experience in project construction improves project performance
5. Extent of contractor's adherence to specification will have a positive influence on project performance.
6. More efficient the supply chain better the overall project performance
7. Indirect effect of external environment impact on the project performance
8. Contribution of six interrelated CSFs on project performance
9. Level of community satisfaction depends on the extent of the performance of the construction projects

in terms of time, quality, cost, safety, minimum site disputes, and minimum environmental impact.

Also in the paper “Performance evaluation framework of development projects: An empirical study of Constituency Development Fund (CDF)” constructed between 2003 to 2011 in Kenya with the viewpoints of 175 respondents on 35 performance related variables with a response format of different variables assigned with values ranging from 1- strongly disagree to 5- strongly agree [7,8].

As Stated by **Hesham Ahmed Bassioni [2004]**, has pointed on the Egan and Latham reports on performance improvement in construction industry being the performance measurement as key elements. The scope of this research was to find the gaps in knowledge and future modification to other types of construction companies. It has also been discussed regarding the tools used in UK construction industry in performance measurement such as Key Performance Indicators (KPI), European Foundation for Quality Management (EFQM) Excellence Model, Balanced Scoreboard, and Baldrige Excellence Model (USA). Therefore, a dilemma among the construction companies in using different tools for performance measurement to give a comprehensive result has led to this research paper [23].

In this research he has used initially adopted concepts and merged all of them to give a ‘hybrid’ comprehensive framework. Combining EFQM, Balanced Scoreboard, and Baldrige Excellence Model theoretical framework was developed and termed as ‘Integrated framework Concept’ thus this methodology relates to excellence and strategic performance measurement to strategic management process. The questionnaire survey with 50 responses and 41.7% response rate was conducted included a descriptive part with the linkage with strategic management and another analytic part and this approach was termed as “Integrated Methodology”. The research paper also had the limitations such as:

1. Limited generalization capability
2. Subjectivity
3. Difficulty of replication
4. Lack of transparency
5. Sampling Limitation
6. Non-response limitation
7. Data Collection errors
8. Data Processing errors.

Thanet Aksorn, B.H.W. Hadikusumo [2008] stated 16 Critical Success Factors (CSFs) of safety programs from

safety literature and previous research and these were thereafter validated by construction safety professionals.

A Questionnaire survey with 80 respondents ranging from medium to large scale project took place participating 40 Project Managers and 40 Safety Personnel. Resulting into most influential factor being Management support. And then the 16 CSF’s were grouped under 4 dimensions as:

1. Work involvement
2. Safety Prevention and control system,
3. Safety Arrangement and
4. Management Commitment

And after that for validating these findings furthermore 3 case studies were conducted to test the effect of the previous success factors on construction safety performance [26].

Dinesh Kumar R [2016] depicts various factors in the delay of construction project and it is categorized in 8 different factors and finally the effects of delays are discussed. Some of the factors discussed are regarding the contractor’s performance like shortage of labors, unskilled workers, labor strikes, labor safety and health issues and this leads to effects of delay. Here the questionnaire survey was prepared from the literature review and also, he found 103 causes of delay and have categorized it in 8 different groups, and 8 effects of delays were found. In the survey Relative Importance Index method was used to determine the importance of various causes of delay using 4 point Likert scale ranging from 1- not important to 4 – extremely important.

$$RII = \text{sum of } W/A * N$$

W- Weighting ranging from 1-4
A – Highest Weight
N – Total no. of respondents

It was concluded that the most important factor causing delay is inadequate contractor’s work, experience, poor risk management, and ignorance ranked 1 with the RII of 0.86875 and the major reason behind this being lack of commitment and coordination within the project participants [9].

Xianguo Wu, Qian Liu, Limao Zhang, Miroslaw J. Skibniewski, Yanhong Wang [2015] stated that they have used a Systematic Structural Equation Modelling (SEM) methodology for Prospective Safety Performance Evaluation (PSPE). SEM model was prepared with 26 items for PSPE from sample of 450 valid questionnaire survey for 30 Chinese

construction enterprises. To measure the level of safety performance three types of construction enterprises, namely state owned, private, and Sino-Foreign joint venture were selected as a sample. Results show that the overall safety performance is rated at least a level of III fair or above. This shows that the industry needs to improve the level of safety performance and also, they are categorized according to different construction enterprise and compared to evaluation results providing insights to cause-effect relationships among safety performance factors and goals, in turn facilitating improvement of high safety performance in construction industry.

The influential factors for safety performance indicate.

1. Safety Climate
2. Safety Culture
3. Safety Attitude
4. Safety Behavior

Questionnaire was prepared and distributed to 600 participants returning 454 responses (75.7%) with largely obtained through hand-out surveys (68%). Structural Equation model was prepared to determine the safety performance consisting of 3 steps:

1. Evaluation Matrix
2. Weight Determination
3. Calculations and result

Also, the limitation for this survey was time and cost constraints as this questionnaire was laborious and expensive hence could not be conducted globally and hence focus on online data collection using Group Decision System was used [29].

Arpit Singh, Subhas C. Misra [2020] states that with the help of literature survey key safety indicators were identified and prioritized depending on the importance of safety. In this paper the method used is Multi Criteria Ranking Method (MCRM) and for ranking of the indicators Dominance-based Rough Set (DRSA) is used. It was found that constant interaction with the workers and involvement of management had a significant impact on safety performance to provide necessary safety training to the employees and appointing dedicated staff to ensure are following the safety protocols. Also, this study will help the small scale construction industry in establishing a efficient and easy-to-use safety assessment framework and providing the benchmark for the safety performance of the employees [5].

Various indicators for measuring safety performance are:

1. Safety Plan
2. Organizational Safety
3. Specialized Safety Rules
4. Monitoring Safety
5. Safety Equipment
6. Prompt Response to emergency
7. Subcontractor's selection and evaluation
8. Safety Panels
9. Promotional activities related to safety
10. Execution of the project

V. RESULT AND DISCUSSION

Contractors and Managers can determine where the dangers may happen. This gained knowledge spreads from one construction project to another. Contractor's agreement with the goal that the individual who starts the work are the one to complete it. Experts are used for undertakings where execution or results incredibly impact security. Therefore, experience of one's own or others' mishaps expand the measures of safety.

Contractors working on site are mostly illiterate and work only in practical sense without any documented form. They mostly work on the daily wages so have less knowledge regarding the contract documents. Hence, make it difficult to adhere to the compliance with the contract document. If the contractors are given a proper knowledge regarding the contract prior to the work would improve the performance of the work and avoid delays in the project. Many contractors do not read the contract documents what they are supposed to do in a particular project and do the work as per regular way therefore creating confusion while working on site and affecting the performance.

While evaluating for the performance of contractor with respect to contract it was also noticed that in some contracts the work scope is not mentioned clearly by the builder or the client which also creates disputes among the contractor and builder and at the later stage it is either the contractor or the builder who suffers in terms of money and the purchaser suffers in terms of delay in the project due to lack in performance and the blame usually comes on the contractor.

It is always necessary to have a well-planned and descriptive work scope in the contract to avoid any delays due to contract. To have a well-planned contract both the parties should be equally responsible and make the terms on practical basis.

Here the six Key Performance Indicators (KPI) are the salient components of performance evaluation in any construction project. Along, with the KPI'S there are also Critical Success Factors accompanying for the evaluation of contractor's performance [7].

Key Performance Indicators:

1. Time
2. Cost
3. Environmental Impact
4. Safety
5. Quality
6. Minimum Site Disputes

Critical Success Factors are:

1. Project Related
2. Client Related
3. Consultant Related
4. Contractor Related
5. Supply Chain Related
6. External – Environment Related

VI. CONCLUSION

From the above research it shows that many of the researchers have worked on contractor's performance evaluation, but the major research is done in road and infrastructure project whereas the need for evaluation in building project is also of equal importance. Most of the research is done on Key Performance Indicators and Critical Success Factors. Although, research on limitations of data collection, data processing and lack of transparency is yet to be solved by the future researchers.

It is well concluded from the literature review that focusing on the KPI's will solve the major problem of contractor's performance in construction industry.

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