

A Review Paper on Subcontractor Evaluation in Indian Construction Industry

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Abstract: Huge numbers of traders from different specialization makes construction industry is a complex and comical industry. To overcome the requirement on particular expertise, advanced equipment, and huge investment cost, letting out portion of the task to subcontractors has been a standard in construction industry. Selection of the best sub-contractor is a vital process in construction projects. Unsuitable selection of subcontractors might lead to several problems during work progress and after the completion of the job. Those include bad quality of work, delay in project duration and dissatisfaction of stakeholders. This paper identifies the most important attributes that impress the selection of subcontractors. Great presence of subcontracting poses challenges to contractors, client and their project management teams to manage such a large, multiple and fragmented group of subcontractors. Success of a construction project is essentially depending on the ability of prime contractor to select the reasonable sub-contractor during bidding process and the sufficient management of subcontractor during construction work progress. This paper served as a summary of literature reviews done on subcontractor selection attributes, problems generated by subcontractor, and current proposed methods to enhance the subcontracting practice in construction industry.

Keywords: Comical Industry, Subcontractor, Stakeholders, Prime Contractor.

1. Introduction

Construction is an important part of infrastructure such as houses, offices, townships, schools, hospitals, urban infrastructure, highways, ports, railways, airports, power plants, irrigation, industrial infrastructure and so on. It is recognized as the essential input for socio economic development. It originates adequate employment. It appoints not only managers, engineers and skilled workers but also unskilled male and female workers from rural and urban areas. Since, construction industry is dependent on a number of industries, its growth imparts growth in other in-

dustries as well. It indicates the health of the economy of the country and it is mandatory that the industry is properly promote for the growth of the overall economy. In India, the construction industry is the second largest industry after agriculture.

A construction project is awarded to a prime contractor, which resorts their work out to specialize outside firm to carry out specific project activities, if the provision is given in the contract document. Prime contractors are responsible for managing the project such as contract administration with clients, project financing, material and equipment procuring, and monitoring the project progress. The performance of prime contractor is mainly dependent on the subcontractors' performance. The ability of the prime contractors to deliver the project on time, within budget, with the stated quality standards and in a safe environment depend largely on performance of subcontractors.

The success level of projects may depend on the philosophy of selecting the right person for the right job. Selecting the most reasonable subcontractor for a construction project is a vital decision for owners and project managers alike. Subcontractor has become an important subject to all the practitioners in construction industry due to the common practice of subletting construction works into smaller packages in construction industry. However, subcontractor related problems are still as one of the main risk of construction project globally. Effective subcontractor selection and monitoring can minimize the problems and maximize the success of construction projects and companies. Problems of subcontractors, if ignored, can cause negative impact on construction project. Therefore, attention should be given to the issues of subcontractor, which is the major participant in almost all the construction projects.

In the research, Analytical hierarchy process (AHP) and Technique of Order Preference by Similarity to Ideal Solution (TOPSIS) method is used to rank and evaluate the subcontractors based on six attributes technical ability, management capability, financial soundness, reputation, health & safety and offered bid amount.

2. Literature Review

There are many factors that must be taken into consideration while selecting sub-contractors. Subcontractor pre-qualification and bid evaluation procedures are currently used in many countries and involve the development and consideration of a wide range of necessary and adequate decision attributes to evaluate the overall suitability of subcontractors. The review of the literatures shows the existence of various attributes and methods of assessment. Literatures and past research shows that one of the reasons for the poor performance of the construction project is due to the incapable selection of subcontractors. In order to ensure a successful completion of the project, a comprehensive assessment of subcontractors' data in a prequalification stage is required.

Appointing a suitable subcontractor to carry out the construction work becomes one of the most vital tasks to ensure the success of a project. The contractors usually sublet the works to the subcontractors to transform the risks (Felix Quentin Biketi et.al. 2017)¹. The primary goals of the subcontractor selection process in construction projects is to reduce project risk, optimize quality and build and maintain good relations between project parties (John Mitchell Bailey, 2016)². Selecting the appropriate subcontractor is one of the most important factors that affect the success of the construction company (Gul Polat et.al. 2016)³. The simple subcontract is the root of the quality hidden trouble and disputes of contract (Ouyang Yong, 2015)⁴. The selection process of subcontractors is a critical issue which is highly affected on the time, quality and performance of the project (H.W.L. Chamara et.al. 2015)⁵. To ensure project success select only those contractors who are fully qualified by excellency of their safety programs and performance (Dwarika Puri et.al. 2014)⁶. Improper selection of subcontractor might lead to very problem during and after the work progress (Mohamed M. Marzouk et.al. 2013)⁷. To overcome the demand on special expertise, advanced equipment, and huge investment cost, letting out work to subcontractors has been a norm in construction industry (Lew Yoke-Lian et.al. 2012)⁸.

The lowest bid price is usually the key determinant factor in most selection processes (Mária Kozlovská et.al. 2012)⁹. Residential subdivisions are done almost entirely by subcontractors and the general contractor should do to effectively manage subcontractors (H. Randolph Thomas et.al. 2011)¹⁰. Subcontracting is an extensive tool and it is used widely in the execution of project in the international construction market (Serdar Ulubeyli et.al. 2010)¹¹. Subcontractors lessen resource requirements faced by general contractors and provide specialized expertise to construction projects (Mohammad S. El-Mashaleh, 2009)¹². The subcontractor evaluation and management framework should be linked with subcontracting strategy, monitoring and management process, performance evaluation and a positive feedback (Creed S. J. Eom et.al. 2008)¹³. The overall benefit of selecting the most suitable contractor can be an improvement of the stakeholders' overall performance (Zenonas Turskis, 2008)¹⁴. Before choosing the qualified subcontractor, the careful risk evaluation should be made on the probability of success and the potential effect of each subcontractor on the whole project (Jixiang Li, 2008)¹⁵.

Subcontracting helps to shift risk from the prime contractor to the subcontractor and promotes specialization (Sergio Maturana et.al. 2007)¹⁶. The little documentations are the source of problems which may affect the progress and the quality of the work (Adnan Enshassi et.al. 2006)¹⁷. Contractors should not be selected according to the lowest price only, but it must be selected according to both quantitative and qualitative criteria attributed to the highest weight (Nerija Banaitienė et.al. 2006)¹⁸. Subcontracting is a mechanism used by contractors to redistribute their risks to an organization at the next level along the supply chain (A.S.Y. Chung et.al. 2006)¹⁹. It should be collect the local information about politics, economy while evaluating the subcontractor. The quality of work can suffer when in-

capable and inexperienced subcontractors are employed (S. Thomas Ng, 2003)²⁰. The main problem of procurement is related to schedule delays and lack of specified quality for the project (Luis F. Alarcón et.al. 1999)²¹.

3. Methodology

Subcontracting is especially popular in areas where complex projects are the norms, such as construction and information technology. Subcontractors are hired by the project's general contractor, who continues to have overall responsibility for project completion and execution within its stipulated parameters and deadlines. The research is recommended several actions to improve the relations between the contractors and their subcontractors and suggestions to reduce the issues between both the parties. Although, it is certainly beneficial for a company to subcontracting work among experts, many problems tend to arise when combining the efforts of varying subcontractors. As project sizes increase, the number of hired subcontractors usually increases as well, leading to problems in subcontractor management.

The review of literature shows that there are several studies focused on developing a model for subcontractor selection. The main objective of the research is to propose an integrated approach for selection of subcontractor. For this purpose, the following task will have performed:

- Determining the attributes that impact on subcontractor selection.
- Integrating AHP and TOPSIS method for the selection of subcontractor.
- Applying the integrated approach subcontractor selection problem.

The research examines problems that exist in subcontractor management, as well the best practices that should be followed to reduce the obstacles which are occurring in the management of subcontractors. The initial step in research is to conduct a literature review. Through numerous books, journals, and internet sources it was concluded that each source is identified for key thoughts and ideas. Once all relevant information has been gathered through a literature review. The organization or individual who manage subcontractors have been chosen from field survey including highway and residential construction. After that the attributes and their relative weightages have been identified, that should be taken into considerations for evaluation of subcontractors. Relative weightages of the attributes and that's rankings have been calculated by Analytic Hierarchy Process (AHP) technique. In the last step evaluation framework will be developed by the using Multi Attribute Decision Making (MADM) technique which will be implemented at the specified project for selection of subcontractors.

4. Conclusion:

Subcontractors have become integral subject in construction industry because of subletting the project work to small packages and requirement of expertise. Selecting the most suitable subcontractor is one of the most important factor that affect the success of a construction project and company. In this research an approach that integrate the AHP and TOPSIS method will proposed to provide construction companies with a tool that can be used in selection of most suitable subcontractor. Effective subcontractor selection can maximize the success and minimize the problems which prevent the success of the project. Monitoring of the subcontractors' work should be required for success of the project. This paper proposed attributes to evaluate subcontractors according to bid documents. Some contractors may choose to use just one of the attribute used to qualify a subcontractor to the stage of tendering procedure and it is usually the subcontractor's experience. Majority of the research contractors evaluate subcontractors after having completed their cooperation, they keep their data and also declare giving preferences for those subcontractors with which their cooperation was successful. One important step that can be taken to ensure project success is to prequalify and select only those subcontractors who are fully qualified by their safety programs and performance. A good safety record reduces the cost of construction work and helps to support the desired attitude toward quality, cost and time. Comprehensive subcontractor evaluations conducted before to the selection can reduce the risks faced by a construction project.

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