

# A Review of Decision Support System For 'A- Class' Material Supplier Selection And Evaluation in Supply Chain With Respect to Automation in Construction Industry

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*Abstract: In construction industry material plays an important role because, construction materials constitute about 50% to 60% of the cost of the project. These materials are broadly classified in different categories on the basis of its use and relative cost. A class materials are used generally 5 – 10 % of the total items and accounts for 70 -75 % of the total money spent on it. It is important to give the more attention for the management and supply of these materials by implementing supply chain management in construction industry. Supply chain management is very strong concept in manufacturing industry has been widely investigated as effective and efficient management tool. It is necessary to implement management tool in construction industry because Indian construction industry is refer as part of unorganized sector. In construction supply chain good supplier play vital role who supply the construction assets within time, budget and quality. Therefore, the selection of the suppliers is important to ensure the successful completion of the project. At present construction industries selecting their supplier randomly by observing few criteria for the selection. while selecting the supplier selection and evaluation criteria should be well defined this process of selection is refer as multi criteria decision making problem and have to solve by decision making tool.*

**Keyword -Supplier evaluation, Supplier selection, Supply chain management, Multi-criteria decision making, Analytical hierarchy process**

## **I.Introduction:**

A project is a finite endeavor (having specific start and completion dates) that requires the organization and coordination of a group of different parties with specified responsibilities such as Client, Contractors, Suppliers, and Engineers etc, to create a unique product or service. It also includes the coordination of all the resources for the project such as labour, equipment, materials, utilities, technology, and time to complete the project on schedule within budget and according to the standards whole together become the concept of project management.

The construction project shall be performed perfectly and properly in order to achieve the desired result, quality product, confined completion period and minimum cost. But problems always exist along construction process. The construction materials and its management plays a key role in construction industry as the most portions of works are being run by them.

It is difficult and costly to give equal attention to all the materials hence such materials are grouped into high-value, medium value and low value materials. A class materials are generally requires 5 – 10 % of the total materials and it accounts for 70 -75 % of the total money. It is necessary to give the importance to such materials while preparing the estimate and delivery schedules. When considering the delivery of any construction asset decision

Making is most important to select the right supplier in supply chain. The supply chain has been defined as “the organizational network that involved, downstream and upstream linkages, in the different activities and processes that produce value in the form of products and services in the hands of the ultimate customer”. The overall purposes of supplier selection process is to decrease project risk, increase the availability of material and build the close and long term relationships between members of the project.

Because of such reason supplier selection process is a kind of Multi Criteria Decision Making (MCDM) problem, which has been a growing in construction industry since past few decades. The decisions in supply chain management are always subjected to various conflicting criteria or factors. As the need of supplier selection criteria changed the selection method also have to be improvised from time to time. These factors are the general crucial criteria looking by most of the construction company while procuring materials. These factors were selected by the purchase manager of various reputed company. These criteria have major influence on supplier selection problem. So supplier selection criteria which divided in 8 major groups as: Cost, Delivery, Trust, Technical capability, financial capability, Commercial capability and Managerial capability. These criteria are further subdivided into sub criteria.

The primary criteria are cost/price, quality and delivery, which are most obvious and most critical areas that affect the buyer. For many items, these three performance areas would be enough, however for critical bulk material needing an in-depth analysis of the supplier's capabilities, a more detailed supplier evaluation study is required. In manufacturing industry Supplier Evaluation and selection is become very strong concept, but has to come a long way in the construction Projects. In projects, especially in India, it is considered as a part of the unorganized sector. So construction industry having needs to put efforts in effectiveness in selection of vendors and their evaluation. Therefore, an effective and efficient material supplier selection model become the base of automation in construction industry which can help the developers to select the “best” suppliers at

the right cost, in the right quantity, with the right quality at the right time has a significant effect in the business success.

## II.Literature review:

### Daxini Bhavik K. [1]

Author concluded that 'Supplier' is one of the most important components of a supply chain. A construction company which develops good relationships with its suppliers gain cost advantages through on-time and desired quality deliveries. Therefore supplier evaluation has a strategic importance for the construction companies. This paper presents a supplier evaluation approach through the Analytic Hierarchy Process. Such approach may support supplier selection in the most scientific manner which considers the relative importance of various criteria for decision making.

### Syama Krishnakumar [2]

Author says construction industry faces a lot of inherent uncertainties and issues. Application of supply chain management philosophy to the construction industry has been widely investigated in recent years as effective and efficient management measure and strategy to improve the performance of construction. Author finds, supply chain management (SCM) can be considered as the coordination of distributed decision making of organization on material flow and information flow. Supplier selection is one of the important factors in Supply Chain Management. This study becomes important to identify the methods and factors for supplier selection by other industries.

### Manal S. AbdelHamid [3]

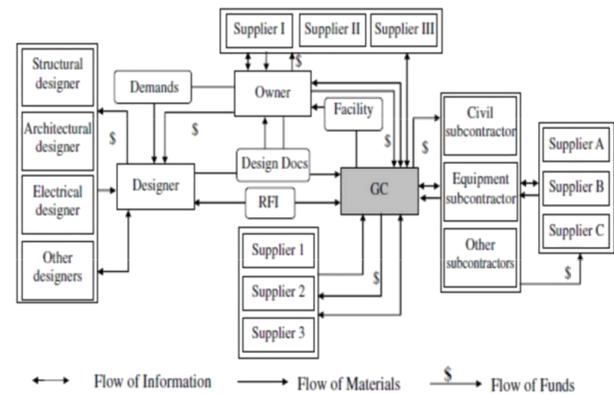
Author says in construction sector, contractors are facing unprecedented challenges to comply with the estimated time and budget of their projects. These challenges increased due to political unrest in his area of research. As a result of the study, contractors need to apply more strict approach to minimize the risk in supply chain management to avoid cost overruns in construction and delays in construction due to improper material management especially in large scale projects. The research helps to identify the current risk management approach for contractors. The paper emphasizes the criteria for supplier selection to reduce expected risks.

### Patil Akshay A. [viii]

Author says supplier evaluation and management is a very strong concept in manufacturing industry, but has to come a long way in the construction Projects. In projects, especially in India, it is considered as a part of the unorganized sector. While preparing a supplier survey for the purchaser it is to be decided which performance categories to include. The primary criteria are cost of the material, quality of the product and on time delivery, which are generally the most obvious and most critical areas that affect the buyer. The study helps to find critical items needing an in depth analysis of the supplier's capabilities, a more detailed supplier evaluation study is required. Also helps to find various approaches for supplier evaluation and selection.

## Supply chain management in construction

Supply chain management (S.C.M.) is a strong concept that has flourished in manufacturing industries. Today Supply chain management represents a self-governing managerial concept, although still largely dominated by construction industry of our India. The construction supply chain of any project involves different parties to carried out the project in all respects, like architects and engineers, main contractors, specialty subcontractors, and material suppliers that all come together in one time to build a single project for a specific owner within time and budget. Construction supply chain is characterized by adversarial short-term relationships formed by the aggressive bidding process. Construction Supply Chain Management focuses on strategies like purchasing management just-in-time concept, supplier evaluation, supplier selection, subcontractor relationship management, equipment management, information sharing, and project quality management, all these are essential for lean construction.



Supply chain management in construction industry (fig.1)

## Supplier Selection and Evaluation

Supplier is key element in supply chain management .The definition of supplier evaluation is Assessment of existing or new suppliers on the basis of their delivery, prices, production capacity, quality of management, technical capabilities, and service. The selection and evaluation of suppliers, structuring the supplier base is an important task in any organization. It assumes utmost importance in the current scenario of global purchasing. Each Organization especially manufacturing industries they are dealing with number of suppliers so it is a need of Supplier evaluation matrix or model in their own place. This research tries to bring in a typical Supplier Evaluation Framework, which blends with company's basic values, and help in establishing a Strategic sourcing policy. It also establishes long-standing relationships in between suppliers and organization.

## Analytical Hierarchy process (AHP)

Analytic Hierarchy Process (AHP) is one of Multi Criteria decision making method is largely used in the manufacturing industries. Application of this complex technique will become useful for dealing with complex Decisions in supply chain of construction industry. It helps decision makers to find out which

is the best suitable supplier for the project requirements. It aims at quantifying the relative priorities for the given set of the alternatives on the ratio scale, based on judgment of decision makers and stresses the importance of initiative judgment of decision maker as well as consistency of the comparison of alternative decision making process.

### III. Conclusion:

Supplier selection is a multi-criteria decision making problem and proposed study to address the problem of supplier selection in supply chain of construction industry. So the research focuses on to use multi criteria decision technique for supplier selection. So, a survey questionnaire will be prepared based on this technique. The present trend of supplier selection by construction companies has certain shortcomings. It requires certain support of scientific technique in decision making. The present study will develop a framework of criteria which contributes for supplier selection. Such approach will be more comprehensive and will include the relative importance of criteria in the final decision making. Analytical research framework serves as tool for automation in construction industry. Stakeholders are encouraged to use such innovative and simple tool to support their decisions which will finally help the project success achievement.

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