

A REVIEW ON APPLICATION OF MULTIPLE CRITERIA DECISION TECHNIQUE FOR OPTIMAL SUPPLIER SELECTION

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Abstract: The construction industry often acts as a catalyst to stimulate the growth of a nation's economy. The industry is often referred to as an engine of growth. However, numerous government reports have criticized the industry's poor performance, especially in terms of quality, quantity and delivery. The preliminary data for this research was collected through a literature review and the use of a questionnaire survey targeted at some owners, purchase managers and consultants in some projects in Gujarat. Few experts were interviewed and their opinions were taken to identify factors which affect supplier selection in construction projects. As the outcome, total 38 factors that affect supplier selection may be encountered in a construction project were identified. The factors for supplier selection are then classified into nine broad categories (Quality and quantity, Cost, Delivery, Trust, Technical Capability, Financial Capability, Commercial Capability, Managerial Capability, Strategic importance of the supplier) depending on their nature and mode of occurrence. An approach is suggested to carry out ranking of these supplier selection factors by Relative importance index [RII] and importance index [IMPI] technique. It is hoped that the findings of the paper will help the stakeholders to act on critical supplier selection factor and further try to select the best supplier of their projects.

Keywords: Supplier selection, Construction Industry, Relative important index, Importance index.

INTRODUCTION

As we all of you know that construction industry is an unorganized sector where a lot of individual parties in Construction Supply Chain come together to complete one project. In the recent era of the market the competition between construction companies is increasing day by day. In this highly competitive market construction companies which design and manage their supply selection best will be more profitable and hence stronger. Supplier is one of the most important components of a supply selection. In such a scenario it is difficult to form and understand the nature and necessity of formation of supply chain fit for use for the given project. 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 company. The purchasing function of a construction company is central to materials management and especially includes the commitment of project funds for construction materials.

OBJECTIVE OF STUDY

- To study the supplier selection process and establish the factors affecting the selection of optimal suppliers for selection of construction material.
- To identify the different criteria which are affecting at the time of selection of supplier from various literature and non-structured interview with the respondents.

LITERATURE REVIEW

A number of studies have been carried out to determine the various supplier selection factors in construction projects.

Lyès Benyoucef , Hongwei Ding , Xiaolan Xie ^[6] suggest that The world is becoming more and more a global marketplace and the global environment is forcing companies to take almost everything into consideration at the same time. Increase flexibility is needed to remain competitive and respond to rapidly changing markets. In this context, supplier selection represents one of the most important function to be performed by the purchasing department. The supplier selection is a multi-criterion problem which includes both qualitative and quantitative factors (criteria).

Richard Calvi, Thomas C. Fendt, Clemens J. ^[10] conclude that article describes the application of the analytic hierarchy process (AHP) to the supplier selection decision for the strategic development of lean suppliers at a large German industrial company. In a literature survey and from explorative interviews, relevant criteria including supplier improvement potential through buyer involvement, strategic factors of the supplier development program as well as project success factors in supplier development were elaborated. Subsequently a decision model based on the analytic hierarchy process was developed and applied to the supplier selection.

Ruth Mwikali, Stanley Kavale ^[11] conclude that factors affecting the selection of optimal suppliers. The main objective was to identify the factors affecting supplier selection; the supplier selection process has also been identified. Factors affecting selection of suppliers were identified as; cost, technical capability, quality assessment, organizational profile, service levels, supplier profile and risk factors, in that relative order. This paper concludes that a cost criterion is a key factor affecting supplier selection for it dictates among many elements, the profit margins. Technical capability, quality of materials and the profile of the supplier are also closely considered. Desai Megha ^[3] suggest that Delays are unique one in every of the largest issues construction companies are facing in recent era. Delays will result in several negative effects like lawsuits between house owners and contractors, exaggerated prices, loss of productivity, revenue and contract termination. Albeit varied studies are thought of into the causes touching delays, these studies rarely discuss common and general causes of delays in construction comes. Thus comprehensive study on these delays is important. Present study works on identification of causes of delay in residential construction projects in Indian context. Literature review and structured interviews were carried out on construction projects in central Gujarat region of India

FACTOR AFFECTING FOR SUPPLIER SELECTION

As the outcome, total 38 factors that affect supplier selection may be encountered in a construction project were identified. The factors for supplier selection are then classified into nine broad categories (Quality and quantity, Cost, Delivery, Trust, Technical Capability, Financial Capability, Commercial Capability, Managerial Capability, Strategic importance of the supplier) depending on their nature and mode of occurrence. The groups of factors affecting supplier selection are shown in following charts. List of 38 supplier selection factors in construction work are given as below.

1. Quality and quantity

- Quality of materials: For work according to various specification along with the Is codes.
- Standard and certification: Various certification like ISO 9000, six sigma.
- Quantity of material: Quantity According to predefined aspects.

2. Cost

- Direct cost: Cost containing net price and delivery cost.
- Indirect cost: Cost containing ordering cost and capital investment.

3. Delivery

- Delivery leads time: Time required by vendor for the delivery after placing the order.
- Percentage of late delivery: No. of times late delivery.
- Location: Location of the supplier from the site.
- Procedural compliance: Document and formal process of receiving.

4. Trust

- Inter firm trust: Trust between the firms for placing of order.
- Interpersonal trust: Trust between the top managers from both the sides for placing of order.

5. Technical capability

- Range of the product: Various types of products availability.
- Storing facility: Storage of different materials at appropriate place for reducing loss.
- Safety measures: Various measures for man, material and machinery.
- Packing of items (if): Packing of material if material required.

6. Financial Capability

- Profit/Sale trends: Profit of various products.
- Turn-over: Total sales to the industry per annum.
- Capital and banking history: Initial money required and banking details like bank a/c. number.
- Amount of past business: Total amount of business since the industry formed.

7. Commercial capability

- Sales policy: Policy adopted for selling the product.
- Responsiveness: Overall response to the customers against any required information.
- Discipline: Work pattern of the firm for producing the product.
- Environment: Internal and External Environment of the industry.
- Reputation and Position: Reputation in the industry.

- Claim policy : Claim during return of material.
- Labour relation record: In terms of sincerity, coordination.
- Relation with contractor, developer: Coordination and goodwill.

8. Managerial capability

- Organizational structure: Type of structure of the organization.
- Types of decision maker: Optimistic or pessimistic decision maker?
- Direction of work: How to direct the work force for the better results?
- Maintenance: Maintenance of the quality either respect to time and cost.
- Desire of business: Capability and provision for future aspects.
- Commitment of supplier: The owner's / top management eagerness of supporting a supplier development project and the operating manager's eagerness for delivering.
- Customer's feedback: Feedback taken from the customers.

9. Strategic importance

- Dependency on supplier: Current and future volume as well as technical or regional dependency.
- Competitive capabilities: Competitive capabilities in terms of Cost, Quality, Delivery and Technology.
- Supplier risk assessment: The evaluation of internal and external risks of the supplier based on risks previously encountered in supplier development projects.
- Supply base effects: The potential of a supplier development project to support overall purchasing targets such as increasing competitiveness in the global market.

SUMMARY

Present study outlines the major factors affecting to supplier selection in construction projects in Indian context. Based on literature study and from interview of experts, 38 factors were identified under 9 major groups. Further methodology is suggested to work out critical factors from available two techniques: Relative importance index and Important index. Survey Questionnaire is prepared based on this technique. It is proposed to carry out ranking of supplier selection factor from RII and IMPI techniques and comparison study in the next phase of research.

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