Journal of Advances and Scholarly Researches in Allied Education
Vol. XV, Issue No. 2, (Special Issue) April-2018, ISSN 2230-7540

Supply Chain Management in the Construction Industry; Construction Supplier Selection and Evaluation

Suraj P. Langute[1], Somesh S. Jerath[2], Akshay J. Gote[3], Aniket R. Jadhav[4], Prof. Abhijit N. Bhirud[5]*

[1,2,3,4] Department of Civil Engineering, Imperial College of Engineering and Research, Pune, Maharashtra, India

[6] Departments of Civil Engineering, Imperial College of Engineering and Research, Pune, Maharashtra, India

Abstract – The supply chain has been the main theme of the focal organization in the design and implementation of the supply network. The explosion of technology and the rapid growth of its application in business competition have become intensive even in mature industries. The advance is possible through the process of innovation of new offers and of achieving a cost benefit with a greater response of quality of offer for the clients. The administration of the supply chain has to do with the network of relationships and the roles around the focal company, the ideal client to meet the demand or the next demand. Progressively, the management of various alliances between companies in the supply chain system is referred to as supply chain management (SCM).

----------X----------

INTRODUCTION

A consultant at Boaz Allen Hamilton, named Keith Oliver, introduced term "supply chain management" In 1982, at an interview given for Financial Times. The management that looks of the flow of goods and assistance, includes movement and storage of raw materials, of work-in-process record, and of finished goods from point of foundation to point of point. Supply-chain management is defined as "design, plan, execute, control, and monitoring of supply chain activities with objective of creating net value, building a competitive infrastructure, purchasing worldwide logistics, synchronized supply with demand and measuring performance worldwide." Supply Chain Management is next big thing in Indian industrial situation According to Management specialists there is a lot of opportunity for supply chain management (SCM) in India due to increasing variability of supply networks, globalization of businesses, growth of product change and reducing life cycle of product Customize content and services for customers add to cause The employability likely of graduates are very high here SCM practice draws from the areas of industrial engineering, systems engineering, operation management, logistics, procurement, information technology, and marketing and aspire for an united approach Marketing agencies play an important role in supply chain management Current research in supply chain management is agitated with topics related to sustainability and risk management, among others, whereas "people dimension" of SCM, social issues, internal blending, visibility, and human capital management are topics that have, so far, been marginalized on basis of research agenda.

2. REVIEW OF LITERATURE

Ghaith Al-Werikat (2017): From this paper we get an idea of Client's approval is necessary in order to continue to the next stage of a project but clients are not always capable due to lack of proper knowledge and insufficient funding to approve. Organizing and maintaining efficient information flow between clients and contractors guarantee that contractor understands the client's demand, specifications and concerns relating to the project. Eventually, it is client's responsibility to avoid causing any work disturbance.

Kiran Bala (2014): From this paper we get an idea of Supply chain success requires process, people and technology. It gives definition to company purpose. It enables all participants to know what is required. This in turn provides swiftness to handle exceptions and to adjust to changes. Having those three elements is important to having metrics, ones that are useful across organization. Supply chain management as a driving force in customer

fulfillment and in having competitive advantage, with service and productivity.

Sudhir Yadav (2015): From this paper we get an idea of Strategic needs analysis and value management study should be made an fundamental part of construction project. Such studies help make the work easier and faster at the later stages. A balanced information system helps achieve transparent and mutually valuable processes for all parties in project supply chain.

3. METHODOLOGY

In every business there is a stream of processes of moving goods of customer order throw the raw material stage, supply, production and distribution of the products to the customer. Managing the chain of events in this processes is what is known as supply chain management. Effective management must take into account coordinating the all the different pieces of this chain as quickly as possible without losing any quality or customer satisfaction while keeping cost down. .The first step is obtaining a customer order followed by production storage and distribution of products and suppliers to the customer site.

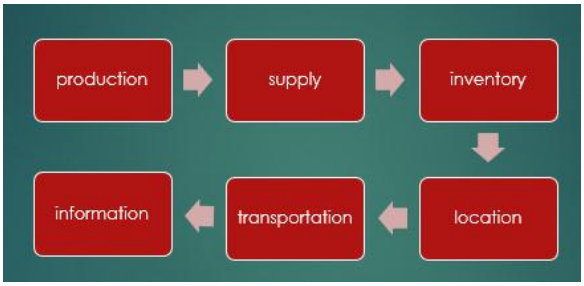

Fig 1: Methodology Flow chart

Production: - Planned decisions regarding production focus on what customers want and market demand. This first stage in the development of the supply chain activity takes into account what and how many products to produce and what parts and components should be produced in which plant and which suppliers. These planned decisions regarding production should also focus on the capacity, quality and volume of the products, taking into account that the demand and content of the customer must be met. On the other hand, the operative decision focuses on programming the maintenance of the workload of the equipment and satisfying the immediate demand of the market. Quality control and work balance are issues that must be taken into account when making these decisions**.**

Supply: - Then, an organization must determine what its facilities can produce efficiently, maintaining high quality. But most companies cannot provide excellent performance with the manufacture of all components. Outsourcing is an excellent alternative to consider those components that the facilities of an organization cannot produce effectively. Companies must be careful when selecting suppliers of raw materials. When choosing the supplier, the focus should be on the development of speed, quality and flexibility, while reducing the levels of costs. In summary, planned decisions must be made to determine the central capacity of the facilities and the outsourcing partners must grow these decisions.

Inventory: - Other planning decisions focus on storage and the quantity of internal product. There is a delicate balance between excess storage, which can cost between 20% and 40% of its value and not enough storage to meet market demand; this is a key factor in the effective management of the supply chain. The decision of operational storage revolved around optimal levels of stock in each location to guarantee customer satisfaction since the market demand is not stable. Control policies must be observed to determine the correct levels of supply in the order of the organization and to maintain high levels of customer compliance.

Location: - Location decisions on market demands and determination of customer compliance. The strategic decision should focus on the location of the production, distribution and stock plants in the facility. Placing in privileged locations the market served. Once the customer market is determined, a long-term commitment must be made to locate the production and storage facilities as close to the customer as practical. In industry, if the components are lightweight and market oriented, the installation must be closed for the end user. In the heaviest industry, careful consideration must be given to determine where plants should be located to be closed to the source of the raw material. Concerns about location should also take into account tax and tariff issues, especially in interstate and global distribution.

Transportation: - The strategic transportation decision is closely related to the decision of inventory, as well as the satisfaction of the demands of customers. The use of air transport, obviously, makes the product go faster and for the customer in a timely manner, but the cost is high and is opposed to shipping by ship or rail. However, using sea or rail often means having a higher level of internal inventory to meet the fast customer demand. It is strange to keep in mind that, given that 30% of the cost of the product in transportation covered by the correct transport mode is critical, the strategic discloses. Above all, the level of customer service must be matte and this offends time to determine the mode of transport used. At times, this may be an operational decision, but strategically an organization must have a mode of transportation established to ensure a smooth distribution of goods.

Information: - Effective management of the supply chain requires obtaining information from the destination point used and linking the information resources along the chain for the exchange rate. An overwhelming flow of paper and a fired computer system are unacceptable in today's competitive world. Promoting innovation requires a good organization of information. The connection of complete networks of computers and the Internet and the rationalization of the flow of information consolidate the knowledge and the ease of the speed of the product. Account management software, product configuration, enterprise resource planning system and global communication are key components of an effective supply chain management strategy.

4. DATA COLLECTION

We visited a list of suppliers in Pune and its surroundings, and collected data related to materials like cement, crushed sand, steel, brick, tile, aggregate, fly ash etc. the problems they had related to their supply chain. They gave us their views on the problems they faced from the client side. Some problems are mentioned below.

- Do not share project information.
- Fear of losing control.
- Lack of self-awareness.
- Lack of awareness among partners.
- Inability to recognize project objectives.
- Lack of understanding about the supply chain.

We create a supplier qualification assessment that contains a questionnaire for suppliers, contains scores and evaluation providers, the following factors, in addition to the price of quotation, should be considered:

- Replenishment time.
- Performance on time.
- Supply flexibility.
- Frequency of delivery / minimum lot size.
- Quality of supply.
- Incoming transport cost.
- Price terms.
- Ability to coordinate information.
- Design collaboration capacity.
- Exchange rates, taxes and duties.
- Provider viability.

	Purchase Price of Component	Inventory		Transportation Cost	Product Introduction Time
		Cycle	Safety		
Replenishment Lead Time			x		
On time Performance			x		
Supply Flexibility			x		
Delivery Frequency		x	x	x	
Supply Quality	x		x		
Inbound Transport Cost				x	
Pricing Terms	x	x			
Information Coordination			x	x	
Design Collaboration	x	x	x	x	x
Exchange Rates and Taxes	x				
Supplier Viability			x		x

Fig 2 : scoring and assessment of suppliers

In this case; strongly disagree = 1, disagree = 2, undecided = 3, agree = 4, strongly agree = 5

5. DATA ANALYSIS

The Index of relative importance (RII) is a process in which importance is assigned to each type of response according to the user's judgment. Then RII for each option is calculated using the equation;

$$\mathbf{RII = (W_1*n_1 + W_2*n_2 + ...) / A*N}$$

Where W = Weight of the option as decided by user, n = Number of responses under each option, A = Highest weight given and N = Total number of respondents.

6. CONCLUSION

While selecting supplier construction industry looks for consistent performance in terms of quality and on time delivery. Client expect their suppliers to be responsive. Supplier should have a good testing capability to finish project as per established QA & QC. Frequent design changes the supplier and subcontractors are informed well in advance. Suggesting an idea about implementing penalty is the best way for preventing wastage at site.

7. REFERENCES

"Adoption of Supply Chain Management (SCM) For Construction Project: The Review of SCM benefit" –American Journal of civil engineering by Lancine Doumbouya,

Guoping Goa, Changsheg Guan (2016). Vol.4, No 3, pp. 74-79.

"Contractor Transformation Strategy for Adopting Supply Chain Management" – ASCE by Yong Han Ahn, Young hook Kwak and Sung Joon Suk 2015

"Solution For scalability in supply chain management "- by Sixuan Wang, Gabriel Wainer, Rhys Goldstein and Azam Jearthon 2014.

"State Of Practice Of Supply Chain Management in the construction industry –ASCE, Awad S. Hanna, Michael Yeutter and Diane G. Aoun, -2014.

"Supply Chain Management (SCM) – Using design technology in Construction industry "IOSR Journal by Eng. Pro. Dr. S.S. Pimpalkar,,Pune , Maharashtra, India ISSN : 2278-1684 Volume 1, Issue 2, July – Aug 2014, pp. 10-21.

"Supply Chain Management: Optimizing SCM Adoption And mindset change "– By Kelvin Mulenga & Ziqing Han, Goteborg, Sweden 2016

Analytical Study On The Relationship Orientated-Supply Chain Management – ASCE – Zhenghong Peng, Ru Wang and Hua Liu 2012.

Benton W C, Jr. & Linda F. McHenry (2010). "*Construction Purchasing and Supply Chain Management*." New Delhi: Tata McGraw Hill.

O'Brein William J., Formoso Carlos T., Vrijhoef Ruben and London Kerry A., [2009]. "*Construction Supply Chain Management Handbook*." New York: Taylor and Francis Group

Vrijhoef Ruben & Koskela Langute. (1999). Role of "Supply Chain Management In Construction." Research Paper. University of California Study on "A Survey Study of Supplier Selection Issues in Construction Supply Chain" *By* Rohan Choudhury and Pratik Dave PGP ACM 23rd Batch (2009- 2011) NICMR, Pune

Corresponding Author

Prof. Abhijit N. Bhirud*

Departments of Civil Engineering, Imperial College of Engineering and Research, Pune, Maharashtra, India

E-Mail – abhijitbhirud11@gmail.com