

BENEFITS OF SUPPLY CHAIN MANAGEMENT IN CONSTRUCTION

Mohammad Akbar¹, Thakur Divya Pratap²

¹ M.Tech Research Scholar, Construction Engineering, Bhagwant University, Rajasthan, India ² M.Tech Research Scholar, Structural Engineering, Bhagwant University, Rajasthan, India

ABSTRACT

Supply chain in construction is term which means interrelated hierarchy of supply contracts necessary to produce a built asset. Managing the supply chain involves understanding the breakdown of product, services, organizations, resources, activities that are engaged in construction of the project and it increases control and profit of the project. The importance of supply chain management is very effective in context of improving companies' performance. Although construction industry is difficult field as every project is dramatically unique prototype with different types, sizes and complexions developed by team of consultants but with construction supply management it becomes easy to tackle the challenges coming the way. This paper discusses the hurdles in project without supply chain management, components and benefits of supply chain management in construction sector.

Keyword: - Supply chain management, construction sector, challenges in projects etc.

1. INTRODUCTION

The construction industry is a significant indicator of the development of any country as it creates investment opportunities across various sectors. Construction industry share more than 5 percent to India's GDP. The industry consists of big, medium and small sized companies and contractors who work on the field. Managing construction projects is not a small feat. All resources and events should come together in the right place at right time. Tracking material plus equipment availability and labour resources is complicated. Project resource planning and supplier synchronization can be slow and can result in material waste, under-utilized equipments and underperforming labour resources thus can result in increased project cost. As traditional practice of construction, design consultants are the first tier suppliers working for the client than comes contractors and they have subcontractors under them. The responsibility generally cascades down from top management to the ones working on ground. In this process one of problem is that the first and second tier of the supply chain can go fairly on agreements but as the chain develops, so the contractual liabilities decreases and can create break in flow of chain. Some projects involves large numbers of contractors and sub-contractors which results in complexion in collaboration of the people. As a project executive or owner of the project you might be desiring for a better way and to save the cost of the project. In order to improve the performance and productivity in construction sector, recent studies have shown that adoption of supply chain management is very effective.

2. SCM: THE ROLE IN CONSTRUCTION

SCM is the concept that began in the manufacturing industry. It is seen dominating over earlier built Total Quality Management (TQM) and Just-In-Time (JIT). According to Christopher (1992) the supply chain is "the network of organizations that are involved, through all linkages in different processes and activities that produces value in the form of products and services in the hands of the final customer." Similarly "a system whose constituent part include material supply, production facilities, distribution service, and customer linked via the feed frontward flow of materials and the feedback flow of information" (Towill 1996). But since the construction sector is very complex as it includes dramatically different projects of different sizes, shapes, types and complexities and there is also high level of subcontracting within the industry so the implementation of SCM in construction industry is bit more complex.

Vrijhoef and Koskela (2000) stated that SCM roles in construction industry are important. They stated that, within construction, there are four major roles of SCM. These roles can be identified based on the industry concerns, whether it is the entire supply chain, the construction site or both as displayed in figure 1.

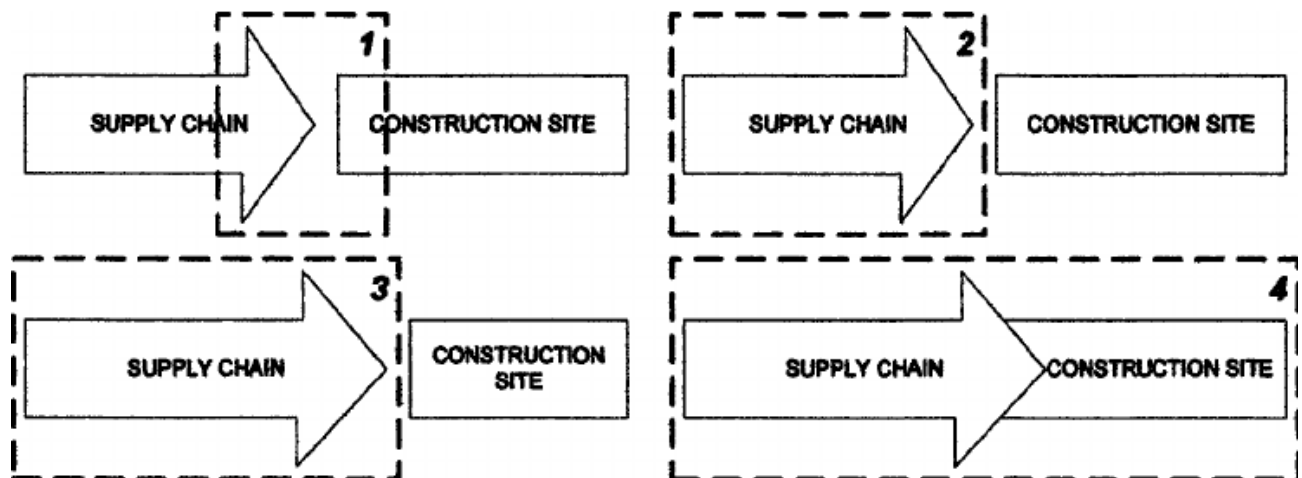


Figure 1

1. Focus on the interface between the supply chain and the construction site.
2. Focus on the supply chain,
3. Focus on transferring activities from the construction site to the supply chain.
4. Focus on the integrated management of the supply chain and the construction site.

3. CONSTRUCTION SUPPLY CHAIN CHARACTERSTICS

Construction supply chains (CSC) can be very multifaceted particularly in big projects. This complication, one of the key characteristics, can be attributed to the variety of site materials and parties (suppliers and sub-contractors) required for a construction project. The project can become more complex as more people get involved i.e. first tier, second tier suppliers and other tiers of sub-contractors etc. Moreover, there is a correlation between the increase of the scope of the project and the complexity of the supply chain as more manpower, parties and materials are necessary for the completion of the project. This needs a great deal of planning, organising and collaboration between supply chain partners which may cause the complexity. A large construction corporation may interact with hundreds or thousands of suppliers and sub-contractors per a year in order to deliver a project. Vrijhoef (1998) carried out research on residential buildings and contributed that CSCs are normally converging, make to order, fragmented and temporary, as described below:

1. **Temporary supply chain:** For any project, on completion, all participants and companies involved are normally dismissed and this can be traced to the project based nature of construction. Consequently, all participants in the project must finish their roles and duties. This short-term partnership with different members may cause problems and fluctuations in performance and productivity.
2. **Make to order supply chain:** Clients initiate the creation of construction projects. This can be the result of the end user's tradition to take the initiative and start a construction project. Therefore, end user get involved in the whole production process
3. **Converging supply chain:** Normally in construction projects, operations, documents, materials and so on are to be assembled and delivered to the site by sub-contractors and suppliers under supervision of the main contractor. Usually, the end user is one or a limited number of people. As a consequence, the CSC is uniting in nature unlike the manufacturing supply chain, which is most likely to be diverging.

And also, Muya et al. (1999) pointed out other CSC features as follows:

1. **The primary supply chain:** This delivers the materials that are incorporated in the final stage of the construction process, such as: sub-assemblies, components, raw materials and electrical and mechanical equipment.
2. **The human resource supply chain:** This is responsible for the supply of supervisory staff and labour as inputs to the construction process.

3. **The support chain:** The chain is responsible for providing expertise and equipment that smooth and facilitate the construction process such as: scaffolding and excavation support.

4. CONSTRUCTION SUPPLY CHAINS AND CONSTRUCTION INDUSTRY PROBLEMS:

The construction industry and all its supply chain suffers from various problems which affects the construction process. Projects affecting the construction industry includes: overrun budget, delay, low profit margin and many legal claims and counter claims (Yeo and Ning 2000). Some problems are:

1. **Inappropriate selection criteria:** The problem refers to the practice of awarding a contract in the construction industry to the contractor that offered the lowest price, disregarding the value of the offer. As a consequence the awarded contractor may deliver the poor quality of work which may lead to several problems such as: difference in structure verses in design which may result in additional cost of the project.
2. **Discontinuous and low demand problem:** The economic recession and low demand of infrastructure projects leads to a less public investment, which results in such problems.
3. **Inappropriate allocation of risk:** The weak consideration of risk factors in construction activity between the main contractor and client.
4. **Frequent changes in specification:** This problem is due to the client and occurs while construction process. These cause serious problems to planning, cost and other factor.
5. **Undefined value stream:** For each activity, the necessary labour, information, equipment, and materials must be defined but it is very commonly ignored in construction.
6. **Less investment in training:** There is very lack in training, research and development in the construction industry, which may affect quality.
7. **Poor management:** Poor management at site and company level is very affecting part to performance and success of the project.
8. **Adversarial culture:** This problem may lead to negative impact on client and contractor and may proceed to failure regarding adoption of new procurement process.

5. SUPPLY CHAIN MANAGEMENT BENEFITS IN CONSTRUCTION:

Supply chain management helps to ensure the continuity of the supply chain during construction. Traditionally, the relationship between client and contractor is by means of contract only with predetermined prices and specifications. Clients are not heavily involved in construction process and only contractor is responsible for construction activities and sometimes the contractor lags in interest regards quality of the construction. The adoption of the integrated supply chain enables SCM to be wholly incorporated. Benefits of integrated supply chain are as follows:

1. Cost reduction
2. Waste reduction
3. Completion of project in time
4. Value for client
5. Good business relationship with client
6. Proper utilization of different resources effectively
7. Risk reduction

6. SUPPLY CHAIN MANAGEMENT INTEGRATION:

Planning and communication are key aspects of SCM. Improving communication is necessary in order to progress and develop the construction industry. For improvement several practices should be as: Firstly, a shift from traditional selection of contractors based on lowest bid to selection based on best value. Secondly a shift from contractor/client relationship to involve all supply chain members such as sub-contractors. Thirdly, shift from under communicating team to good continuation communication during supply chain.

6.1 SCM INTEGRATION DRIVERS:

Tan (2010) gave five key components when moving towards a more fully integration supply chain:

1. Transformation in corporate culture
2. Communication and trust between all relevant parties
3. Sharing of knowledge/information
4. Incorporation of supplier evaluation in the development process
5. Sharing common objectives regarding both increased efficiency and waste elimination

6.2 SUPPLY CHAIN INTEGRATION BENEFITS:

Supply chain integration helps to increase the overall efficiency of the project. It helps to define the stream lines and objective of including all parties to achieve the goal. It aids to increase the productivity and reduction of the waste and hence saves the overall cost of the project. It helps to maintain the flow chain during the construction and also helps to allocate the resources at right place in right time due to this the resources are utilized with maximum efficiency and minimum waste and resultantly reduces cost and extra time.

6.3 SUPPLY CHAIN INTEGRATION CULTURE REQUIREMENTS:

In 2004 Barratt stated a collaborative culture for the supply chain integration which is as:

1. Internal and external trust
2. Mutual benefits
3. Exchange of information within the supply chain
4. Corporate emphasis/attention on SCM
5. Goal congruence
6. Good understanding and communication between all parties
7. Quality of information and transparency of information

Vrijhoef (2011) believed that all parties including client, contractor, sub-contractor and suppliers should be involved from beginning and overall cost will be reduced. They also conclude that sub-contractor and supplier early involvement is as necessary as early contractor involvement. This early involvement of all parties would allow the exchange of expertise in their effective field and thus overall cost would reduce.

7. CONCLUSION:

Supply chain management is very helpful and effective in running construction activities efficiently. Supply chain management provides the construction industry with opportunities to have more control on projects, increase profits and reduce time, cost and waste. Supply chain management encounters many problems in construction project such as: poor logistic planning, lack of partnerships, lack of strategic alliance with supplier, helps to improve communication and involves everyone in the communication, provides transparent communication. The construction industry should take corrective measures in order to make supply chain efficient such as: moving from traditional way of contracting i.e. choosing from lowest bid to choosing for best quality of work, early involvement of all parties such as client, contractors, sub-contractors, suppliers in order to improve communication and reduction in overall cost of the project.

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BIOGRAPHIES



My name is Mohammad Akbar, Senior Engineer at Manomav Engineers Pvt. Ltd. and Research scholar Civil Engineering Department in Bhagwant University, Ajmer, Rajasthan. I have passed B.Tech from UPTU & M.Tech from Bhagwant University in Civil Engineering. I have published several papers. My Research areas are Geopolymer concrete, Construction Management. Etc.



My name is Divya Pratap Singh Research Scholar Civil Engineering Department in Bhagwant University, Ajmer, Rajasthan. I have passed B.Tech in Civil Engineering. My Research area are Waste Management, Environmental Engineering, Structural Engineering, Fluid Mechanics, Advanced Methods of Structural Analysis etc.