

# Evaluation of Supply Chain Management In Construction Industry

Shishanshu Singh<sup>1</sup>, S.V. Pataskar<sup>2</sup>

<sup>1</sup>Dept of Civil Engineering

<sup>2</sup>HOD, Dept of Civil Engineering

<sup>1, 2</sup> D.Y Patil College of Engineering, Akurdi, Pune, University of Pune, (411044) India.

**Abstract-** *The construction industry is the main social and economic activity of each country. Construction is a global business with many features and plans of different types, size and complexity. The Importance of Supply Chain Management (SCM) has been widely discussed in the literature, especially in the context of improving the company's performance. The purpose of the study is to identify and analyse key barriers of supply chain management in the construction industry. Questionnaires were designed to collect data from experts in the construction sector. Data derived from experts was measured by the statistical method. After analysis, all obstacles were classified, and key barriers were identified. The finding of the paper will help the civil engineers to act on critical barriers and further try to reduce real cost, remove waste of materials, better service, reduce inventories, reduce paperwork and reduce transportation costs.*

**Keywords-** Supply chain management, Barriers, Literature Review, Questionnaire Survey, Relative Important Index

## I. INTRODUCTION

SCM is a viewpoint that describes how organizations should manage their supply chains to achieve strategic advantages. Its goal is to attend the client requirements with the materials and information flows along the supply chain, until reaching a balance between the client satisfaction and the cost. It refers then to the correlate of the activities of all that participate in the supply chain, to knowing the production requirements with the purpose of contentment the client, to delivering of products of higher value and to reducing the costs of the organization that apply these principles.<sup>[2]</sup>

The Supply Chain (SC) includes all activities, features related to flows and the exchange of goods and services of materials. SCM helps reduce inventory, accurate information exchange and develop trust among the SC partners. However, despite these major benefits, organizations continue to encounter barriers which hinder them from effective implementation of supply chain. These barriers are known as SCM barriers.<sup>[1]</sup>

They are inside and outside of manufacturing organization. Lack of involvement and support for top management, Short-term decision-making perspectives, Lack of information technology, lack of training and training for staff and suppliers, lack of equipment and lack of managerial skills Insufficient motivation and employee involvement are some of the tasks of the manufacturing organization, but resistance for change has become an potentially effective way of competitive advantage and improving the organization's efficiency.<sup>[1]</sup>

### • Supply chain management in construction

All engineers, managers and contractors usually do not take into account the supply chain daily, they deal with the supply chain and develop a SCM solution every day. In the project, the supply chain includes owners, planners, designers, architects, engineers, site managers, general contractors, subcontractors, suppliers, distributors and manufacturers.

Throughout the business, the company provides a supply chain that can include accounting, human resources, equipment fleet operations etc. As part of a construction project, the supply chain designed with the owner, and then designers, contractors, and specialists' contractors / subcontractors / distributors, etc. They form a different number of supply chain levels. Demand can be seen as flowing down the chain in terms of information, e.g. project briefs, drawings, schedules, works orders etc., with a flow of goods and materials flowing in the opposite direction. Supply chain management is often a problem due to fragmentation in the construction industry, complication designs and demand for high performance at lower prices for customers. These problems have made stakeholders more actively take part in the project's life cycle.<sup>[3]</sup>

The construction process is divided into two main processes,<sup>[3]</sup>

- I. The procurement process
- II. Construction services process

The procurement process is involved in the supply of materials, equipment and labor on the construction site. In this process, stakeholders are content producers, tool manufacturers, wholesalers, suppliers or vendors, labor unions, contractors and subcontractors.<sup>[3]</sup>

The chain in this process can be termed as 'procurement chain'. The construction services process consists essentially of customers, architects, designers, construction managers, contractors and contractors etc. This fixed chain can be called the construction cycle. Project requirements move along the construction chain in the form of project outlines, schedules and budgets as described earlier.<sup>[3]</sup>

## II. RESEARCH SCOPE AND OBJECTIVE

The objectives of this paper are as follows:

- The review has been led to recognize the barriers in supply chain management in construction projects in India.
- The barriers have been recognized through a survey from construction firms.
- Besides, a few recommendations and proposals have been suggested to cope up with these barriers.

## III. LITERATURE REVIEW

Literature reviews of research work published over the last ten years were taken to study.

Vishal Parmar (2016) Objective of this study is to identify critical factors of supply chain management (SCM) in manufacturing organization through literature review of past ten years and identify most critical barrier which hinder the performance of supply chain. List of barrier is recognized by comprehensive literature review is presented here. This paper has recognized 23 key SCM barriers which help industrial practitioners and academic experts to implement SCM.

Adetunji (2008) supply chain management (SCM) have, in recent years, become two of the most important performance-related issues within the construction industry. To achieve corporate sustainability within any organisation, it is essential that sustainability issues are addressed throughout the organisation's whole supply chain, a process referred to as sustainable supply chain management (SSCM). The implementation of SCM and sustainability is, however, an extremely complex undertaking. Through an extensive literature review and detailed interviews, this research has identified the conditions and strategies for achieving SSCM within construction organisations. The research also

investigated the meaning, barriers and enablers, issues, tools and techniques for achieving successful SCM and SSCM. The study was based on the perspectives of senior managers of exemplar organisations with a proven track record in sustainability and SCM. It has been possible to identify best practice from which other organisations can learn, thus supporting the industry in the move towards more sustainable construction practices.

Alfredo Serpell (2000) This paper presents the main result about the relationships between the participants of the supply of construction in Chile. It also provides a general methodology for the application of SCM in construction. Finally, it discusses about its main application barriers and their causes, its benefits and the requirements for its effective application in this sector.

## IV. RESEARCH METHODOLOGY

The methodology of the study is as follows:

1. An exhaustive literature review was done, through which various barriers of supply chain management were recognized in the construction industry scenario. In all forty five (45) barriers were made for survey questionnaire.
2. Questionnaire of two sections A and B was developed. In Part A individual Information of the respondent was inquired. Part B was planned to get data about reasons for barriers in construction industry, it was made a request to rate forty five (45) barriers according to the given scale.
3. A Survey was conducted through individual meetings in which respondents were made a request to rank and score these barriers according to their experience.
4. Assessment of feedback from questionnaire survey was made. Analysis is discussed in detail in the following section, on the basis of which recommendations to construction industry were made.

## V. DATA

A total of Eighty (85) sets of questionnaires were sent to various construction companies (Clients, Consultants and Contractor). Out of 85, Fifty six (56) (65.9%) completed sets were received back which were evaluated in order to find the important barriers of supply chain in construction management.

## VI. DATA ANALYSIS

Assessment of barriers of supply chain was carried out using 4 point Likert scale from 1 to 4 representing can be not at all, no, most of the times, yes respectively. Data analysis was done calculating Relative Importance Index (RII) by following formula.

$$RII = \frac{\sum_{i=1}^4 w \times x}{A \times N}$$

Where,

- RII = Relative importance index
- W = Weighting given to each factor by respondents and its ranges from 1-4
- X = Frequency of it response given for each factor
- A = Highest weight (i.e. 4 in case)
- N = Total no. of respondents.

**VII. RESULT AND DISCUSSION**

Table I: Top BARRIERS of SCM

SrNo	Factor ID	Barriers	RII	Rank
1	42	Unclear organization objectives	0.955	01
2	19	Lack of information technology	0.951	02
3	30	Lack of necessary tools, management skills	0.938	03
4	16	Change in material prices	0.929	04
5	36	Lack of awareness about SCM	0.924	05
6	43	Improper technical study by contractor during the bidding stage	0.920	06
7	02	Delay of payment by client	0.920	07
8	20	Rework due to errors during manufacturing	0.911	08
9	21	Lack of senior management commitment	0.911	09
10	32	Unwillingness to share information among supply chain partners	0.906	10

Table II: RANKING OF BARRIERS OF SUPPLY CHAIN MANAGEMENT

Factor ID	Supply Chain Barriers	RII	Rank
<b>CLIENT RELATED BARRIERS</b>			
1.	Lack of finance to complete the work by client	0.500	33
2.	Delay of payment by client	0.920	07
3.	Delay to furnish and deliver the site to the contractor by the owner	0.875	12
4.	Suspension of work by the owner	0.491	34
5.	Delay in issuance of change orders by the owners	0.321	44
6.	Lack of customer relationship	0.518	32
<b>MANUFACTURER RELATED BARRIERS</b>			
7.	Shortage of construction materials in market	0.906	11
8.	Late in selection of finishing materials due to availability of many type in market	0.830	13
9.	Change in material specifications	0.723	19
10.	Change in material prices	0.929	04
11.	Delay in material procurement	0.813	14
12.	Lack of senior management commitment	0.911	09
<b>CONTRACTOR RELATED BARRIERS</b>			
13.	Poor qualification of contractor technical staff	0.652	27
14.	Inefficient work breakdown structure	0.469	36
15.	Frequent change of sub-contractors because of their inefficient work	0.638	28
16.	Poor coordination by contractor with other parties	0.540	31
17.	Conflicts in subcontractor schedules in execution of projects	0.661	26
18.	Delay in field survey by contractor	0.625	29
19.	Improper technical study by contractor during the bidding stage	0.920	06
20.	Rework due to errors during manufacturing	0.911	08
<b>CONTRACT RELATED BARRIERS</b>			
21.	Major disputes and negotiations	0.571	30
22.	Inappropriate overall organizations	0.674	25
23.	Unclear organization objectives	0.955	01
24.	The scope of work is not well defined	0.321	45
25.	Legal disputes between various parties	0.460	37

HUMAN RESOURCE RELATED BARRIERS			
26.	Low skill of manpower	0.451	38
27.	Shortage of manpower	0.701	24
28.	Low productivity level of labour	0.362	40
29.	Lack of necessary tools, management skills	0.938	03
30.	Lack of education and training to employees	0.741	18
31.	Lack of motivation and employee involvement	0.438	39
32.	Lack of human resource capabilities	0.710	23
33.	Lack of experience	0.772	17
34.	Lack of expert employees	0.790	16
35.	Lack of awareness about SCM	0.924	05
INFORMATION AND COMMUNICATION RELATED BARRIERS			
36.	Lack of information technology	0.951	02
37.	Deficient communication and information transfer	0.321	43
ORGANIZATIONAL RELATED BARRIERS			
38.	Resistance to change	0.719	20
39.	A lack of inter organizational cooperation and coordination	0.326	42
40.	Lack of proper organizational structure to create and share knowledge	0.808	15
41.	Lack of frame work	0.714	22
42.	Lack of measurement system	0.482	35
CULTURAL BARRIERS			
43.	Unwillingness to share information among supply chain partners	0.906	10
44.	Unwillingness to implement supply chain practice	0.714	21
45.	Mistrust among employees and supply chain partners	0.353	41

### VIII. CONCLUSIONS

This study on the barriers of supply chain management in construction industry has identified and analyzed major critical barriers of supply chain. It was observed that Unclear organization objectives, Lack of information technology, Lack of necessary tools, management skills, Change in material prices, Lack of awareness about SCM, Improper technical study by contractor during the bidding stage, Delay of payment by client, Rework due to errors during manufacturing, Lack of senior management commitment are major barriers. The finding of the paper will help the civil engineers to act on critical barriers and further try to reduce real cost, remove waste of materials, better

service, reduce inventories, reduce paperwork and reduce transportation costs.

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### REFERENCES

- [1] Vishal Parmar and H.G.Shah, (2016) "A literature review on supply chain management barriers in manufacturing organization", IJEDR, Volume 4, Issue
- [2] Alfredo serpell and Boris heredia, "Supply chain management in construction: diagnosis and application issues" *Direction*, ser. Vicuña Mackenna 4860, Edificio San Agustín, 3er. Piso, Santiago.
- [3] V.C. Jagadeesh Kumar, S.Nandhini and R.Jeya Priya "Investigation Of Supply Chain Management In Construction Companies," IRJET., Volume: 04 Issue: 06, June -2017.
- [4] Akintola Akintoye, George McIntosh, Eamon Fitzgerald, (2000). "A survey of supply chain collaboration and management in the UK construction industry" *European Journal of Purchasing & Supply Management*, 159, 168.
- [5] Adetunji, I., Price, A.D.F. And Fleming, P.( 2008) "Achieving sustainability in the construction supply chain" *Proceedings of the ICE - Engineering Sustainability*, 161 (3), pp. 161 - 172