

A STUDY ON SUPPLY CHAIN MANAGEMENT IN CONSTRUCTION PROJECTS

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Abstract:- The construction industry is generally characterized with low productivity, high fragmentation, cost and time overruns, and conflicts compared with other manufacturing industries. Supply chain management as an innovative management mode which provides a new solution for resolving these problems from systems perspective. The main objective of this study is to find critical factors affecting supply chain management in construction industries. Focusing on the questionnaire survey, factors are to be collected and using fuzzy logic based assessment ranking is to be done. The present trend in the market is not only the competition among the enterprises, also but the supply chain. Supplier selection is the most critical decision for the whole procuring department. Selection of supplier is a complicated decision involving many criteria to be taken into consideration. Ranking is to be done using SPSS software & analysis is to be carried out using fuzzy logic toolbox of MATLAB software rank. Questionnaire survey of supply chain management is to be carried out in several construction industries randomly selected among Kerala's construction industries. Supply chain management coordinates and integrate these flows within and among companies. The ultimate goal of any effective supply chain management system is to reduce the inventory.

Key Words: Supply chain management, SPSS, MATLAB.

1. INTRODUCTION

Recently supply chain has become a major subject of management research and manufacturing theory. Supply chain has been defined as the network of organizations which are involved through upstream and downstream linkages, in the different processes and activities that produce value in the form of services and products in the hands of the ultimate customer. The readiness of supply chain in integrated material procurement is one of the important indicators to define the performance of contractors. Contractor will be called competent if they can order the material and build without any delays. Supply chain management (SCM) has been widely regarded as an effective and efficient management measure and strategy to improve the performance of the construction industry, which has suffered from high fragmentation, large waste, poor productivity, cost and time overruns, and conflicts and disputes for many years. Currently supply chain management is in its developing stage. In this current scenario to avoid the conflicts and competition among the

suppliers a proper supply chain management system is needed. It mainly consists of number of participants and are complex in their nature. The construction sector players including engineers, contractors, suppliers and clients. They have major roles in establishing and developing SCM and collaboration. There are many challenges that are faced by construction industry in India, and the important challenge among them is improper material supply chain in construction. Each and every product that reaches an end user is the cumulative effort of multiple organizations. These organizations refer collectively as a supply chain. Supply chain Network of organizations and business process for procuring materials, transforming raw materials into finished products and distributing the finished products to the customers. Supply chain management is an integration of suppliers, distributors and customer logistics into one cohesive process.

2. LITERATURE REVIEW

Ana Beatriz Lopes de Sousa Jabbour et.al., (2011), they conducted studies on the topic "Factors affecting the adoption of supply chain management practices: Evidence from the Brazilian electro-electronic sector" and tests them using survey data of Brazilian electro-electronic firms. The results reveal the big picture of the SCM practices in the sector and suggest that contextual factors such as size, position and bargaining power affect the adoption of SCM practices, which are also more customers oriented. Contrary to the findings of literature, the relationship between competitive priorities and SCM practices was not supported statistically. After analysis of the 69 randomly selected research publications, it is quite evident that no study has been found in the Indian context with respect to supply chain collaboration. The major focus of the papers is on manufacturing and a retailer organization has been observed. Based on analysis of the reviewed papers, 28 factors are identified.

Anders Segerstedt et.al., (2010), "Supply chains in the construction industry" The purpose of this paper is to introduce a special issue about the construction industry and the management of its supply chains. It aims to discuss and point to some differences and possible similarities with traditional manufacturing and its supply chains. The product specification process before the customer order arrives shows different degrees of specifications: engineer to order,

modify to order, configure to order, select a variant. A construction company only executes a small part of the project by its own personnel and capacity. This is a way of risk spreading and risk mitigation and to compensate for an unstable market. If a construction company wants to establish a new concept, from “engineer to order”, it must be engaged earlier in the business process and with other than usual customers, which might complicate the process.

Anna Duboi et.al., (2000), “Supply strategy and network elects purchasing behavior in the construction industry” This paper explores the occurrence of network elects in the construction industry. The study finds such elects to be unusual in the construction industry. The main reasons for the absence of adaptation are found to be the current focus on the efficiency of individual projects and the competitive tendering procedures used. It is concluded that these characteristics are having a hampering effect on both efficiency and innovation in the industry today.

M. Agung Wibowo, et.al., (2015), “The analysis of supply chain performance measurement at construction project”. The aim of the study is to analyze supply chain performance in road projects. The impact of various supply chain management practices on project performance has been measured through a combination of a survey and the development of simulation models. Performance measurement using the Supply Chain Operations References (SCOR) will analyze the supply chain management of contractor. This measurement using the SCOR model as a Key Performance Indicator (KPI) is calculated using the weighted criteria Analytical Hierarchy Process (AHP). Weighting and measurement results were analyzed using Objectives Matrix (OMAX) and traffic light. The results of the analysis and the measurement of supply chain performance are medium score or good enough for road projects. The factors that lead to the success of this supply chain are the readiness of the contractor, supplier partners, supply chain strategy, and the ability of labors.

Mohammed Saad et.al., (2002), “A review of the progress towards the adoption of supply chain management (SCM) relationships in construction” This paper examines the early progress towards the adoption of supply chain management (SCM) relationships in construction. It is based on a literature review and survey of the views of construction practitioners. This paper has shown that there is significant awareness of the importance of SCM and its main benefits in construction. It is seen as a multi-factor innovation, which can help construction overcome its fragmentation and adversarial culture, improve its relationships and better integrate its processes. Its effective implementation is also perceived as dependent upon continuous and shared learning and strong commitment.

Rajen B. Mistry et.al., (2003), “Evaluation of factor affecting for supply chain in construction project”. The main

objective of this study is to find critical factors affecting supply chain. A survey was carried out in south Gujarat region city, on architects, contractors, consultants, site engineers, retailers, distributors, developers. Total 38 factors identified from the literature review. Total 148 feedbacks were analyzed through the Relative Importance Index (RII) techniques. Five most crucial factors in descending order from RII Technique are late deliveries, Complexity management/ rationalization, Product changes batch ordering, inaccurate demand forecasting, Price fluctuations and discounts. Contractors shall act on these factors to improve material supply chain in construction projects.

Rajesh K. Singh (2011), “Developing the framework for coordination in supply chain of SMEs” SCM is one of the most important areas for competitiveness and growth of industries. Small and medium enterprises (SMEs) in India and other developing countries face problems in coordinating their supply chain due to lack of resources and improper directions. The purpose of this paper is to develop a framework for improving the coordination in supply chain and development of an index for coordination. It is observed that all of these factors have strong mutual linkage and top management commitment is a major driver for improving the coordination among these factors.

Ruben Vrijhoef et.al., (1998), “The four roles of supply chain management in construction” The present status of construction supply chains is investigated by means of case studies and a comparison with previous research. Previous initiatives to advance the construction supply chain have been somewhat partial Three main conclusions are drawn regarding the present status. Firstly, even in normal situations the construction supply chain has a large quantity of waste and problems. Secondly, most of these are caused in another stage of the construction supply chain than when detected. Thirdly, waste and problems are largely caused by obsolete, myopic control of the construction supply chain. These results concur with the “findings made on make-to-order supply chains in general. The generic methodology offered by SCM contributes to better understanding and resolution of basic problems in construction supply chains, and gives directions for construction supply chain development. The practical solutions offered by SCM, however, have to be developed in construction practice itself, taking into account the specific Characteristics and local conditions of construction supply chains.

S. Mukesh Balwani et.al., (2015), “Supply chain management in construction” (SCM) is a concept that has flourished in Manufacturing, originating from Just-In-Time (JIT) Production and Logistics. SCM endeavors to observe the entire scope of the supply chain. SCM offers a methodology to relieve the myopic control in the supply chain that has reinforcing waste and problems. The generic methodology offered by SCM contributes to better understanding and resolution of basic problems in construction supply chains,

and gives directions for construction supply chain development. In this paper application of Lean principles are carried out to optimize the concreting operation. The application and Fundamentals of VSM are applied into the case study for improvisation of concreting operation.

Se-Hak Chun et.al., (2015), "Green supply chain management in the construction industry: case of Korean construction companies" Enterprises have started considering Green SCM for the purpose of securing a competitive advantage over other enterprises because of the increase of international conventions related to the recent climate change, the strengthening of global regulations for environment protection, the demand for environmental suitability by stockholders and investors of enterprises, and the consumer's preference for environmental friendly products. Green SCM is emerging as the strategy to preemptively cope with environmental regulations. This study investigates green business activities of small-medium enterprises and examines differences across SCM processes.

Shahram Gilaninia et.al., (2013), "Studying the factors affecting supply chain management and provide proper strategies for improving it" (Case Study Poultry Farming Industry) Understanding the principles of supply chain management and proper utilization of it during poultry industry chain, is the subject of current study. To assess research hypotheses questionnaires were distributed to active companies in the poultry industry in Rasht city and 70 senior managers, middle managers and industry experts participated in the study. The results indicated that among characteristics of supply chain strategy, relationships with supplier strategy, has the maximum relationships with organizational performance of companies operating in poultry industry. The results showed that there is a significant relationship between characteristics and performance of enterprise supply chain strategies and manager believes that supply chain strategy provide progress in the organization. Among the features of supply chain strategy, supplier relationships strategy has maximum relationship with organizational performance companies operating in the poultry industry.

Tae Hong Shin et.al., (2011), "A service-oriented integrated information framework for RFID/WSN-based intelligent construction supply chain management" The main objective of this research is to develop a seamlessly integrated information management framework that can provide logistics information to project stakeholders for their decision making. The pilot test of the framework developed in this research showed that it can improve time efficiency by about 32% compared to the traditional supply chain management. The result of this research is expected to be utilized effectively as a basic framework to manage information in RFID/WSN based construction supply chain management (CSCM) environments. The objective of this research is to develop an information management

framework that can seamlessly integrate heterogeneous and dynamic supply chain environments of a construction project in order to support effective management of supply chain information among project participants while utilizing SOA, RFID, and WSN technologies. This research adopts intelligent equipment that incorporates RFID/WSN technology to collect and communicate information on the supply chain.

Xiaolong Xue et.al., (2005), "An agent-based framework for supply chain coordination in construction" The research analyses the problems in construction supply chain. In order to resolve these problems and improving the performance of construction, an agent-based framework for construction supply chain coordination is designed based on the agent technology and multi attribute negotiation and multi attribute utility theory (MAUT). The framework, which integrates the construction organizations in construction supply chain and multi attribute negotiation model into a multi agent system (MAS), provides a solution for supply chain coordination in construction through multi attribute negotiation mechanism on the Internet. Finally, the prototype of the framework is developed and tentatively run based on an imaginary construction project. The trial run reveals the feasibility to implement the agent-based framework for coordination in construction.

Xiaolong Xue et.al., (2007), "Coordination mechanisms for construction supply chain management in the Internet environment" In this paper; the concepts of CSC and CSC management are defined. Furthermore, the inter-organization problems that effect CSC coordination are identified. Considering the Internet fosters the integration of construction processes and provides an efficient platform for CSC coordination, this paper presents two types of Internet-enabled coordination mechanisms: market mechanism, such as auction and contracting, and coordination flow, including information hub and electronic marketplace, for improving construction performance and to accelerate the innovations in the construction industry.

3. CONCLUSIONS

Studies and discussions were done on supply chain management at various fields based on the journals collected. Supply chain management is a challenging task in the construction industry and are complex in their structure. It is composed of large number of participants who work together in the project in a temporary manner. Different factors affecting supply chain in construction fields are to be identified and the conceptual remedial measures for each study are going to be suggested according to its convenience. The details regarding the topic are to be collected by questionnaire survey with the help of internal and external personalities involved in the system. Different methods are suggested by the authors for the ranking of the factors in the management system like RII technique, Fussy logic method

for maximization and minimization techniques, etc. Most effective questionnaire was the Likert scale method in which each and every one can respond according to his/her will.

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