

AN ANALYSIS OF THE FACTORS INVOLVED IN THE APPLICATION OF SUPPLY CHAIN MANAGEMENT IN THE CONSTRUCTION INDUSTRY: A REVIEW

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Abstract: Supply chain management (SCM) has experienced considerable success in the industrial sector. Supply Chain Management aims to increase confidence among supply chain partners, thereby increasing the speed of inventory, and is an innovation that seems to be particularly suitable for construction projects. As the construction industry is a key social and economic activity in each region, the implementation of SCM strategies is deemed to be helpful in achieving greater competitiveness for construction firms. Construction is an undertaking worldwide, with many distinctive aspects and radically different types of projects, sizes and complexities. While current literature indicates that generic supply chains should be easy and linear, in the construction sector, the reality is very different. When providing a solution to the end customer, every construction company needs to incorporate a variety of construction supply chains and markets. Therefore, the purpose of this paper is to review current research and synthesize key methods and results in order to provide recommendations for future research related to construction supply chains. Specifically, the aim of this review is to screen existing studies (published in 2000-2020) with regard to their a) level of analysis b) research emphasis c) type of study / paper d) sample used e) relationships examined and f) the various types of construction subjects covered and linked to supply chains.

Index Terms: Construction industry, Supply Chain Management, Construction company performance

I. INTRODUCTION

In the late 1980s, the idea of Supply Chain Management emerged and became common in the 1990s. The businesses used the terms project management and logistics prior to the arrival of this definition.

- “The alignment of businesses that market products or services is a supply chain”.

A supply chain consists of a variety of organisations and processes conducted as the goods moving from main providers to end users. — Oliver and Webber (1982) addressed the future benefits of merging the company's internal procurement, manufacturing, sales and distribution functions. It is now a term that appears in many business plans and studies, as well as journals and texts by practitioners and scholar.

The philosophy of supply chain management is distinct from the traditional logistics definition. Tasks like procurement, storage, security and inventory management are also the subject of conventional logistics. Both conventional logistics are understood by Supply Chain Management which also involve activities such as promotion, funding, development of new products.

Structure of Supply Chain management

Simplest way in which a supply chain operates is by moving a single commodity through a network of organizations that add value to the goods created in one way or another, using the perspective of one organization, operations in front of it, flowing materials inward, are called upstream; those behind the organization, flowing materials outwardly, are called downstream.

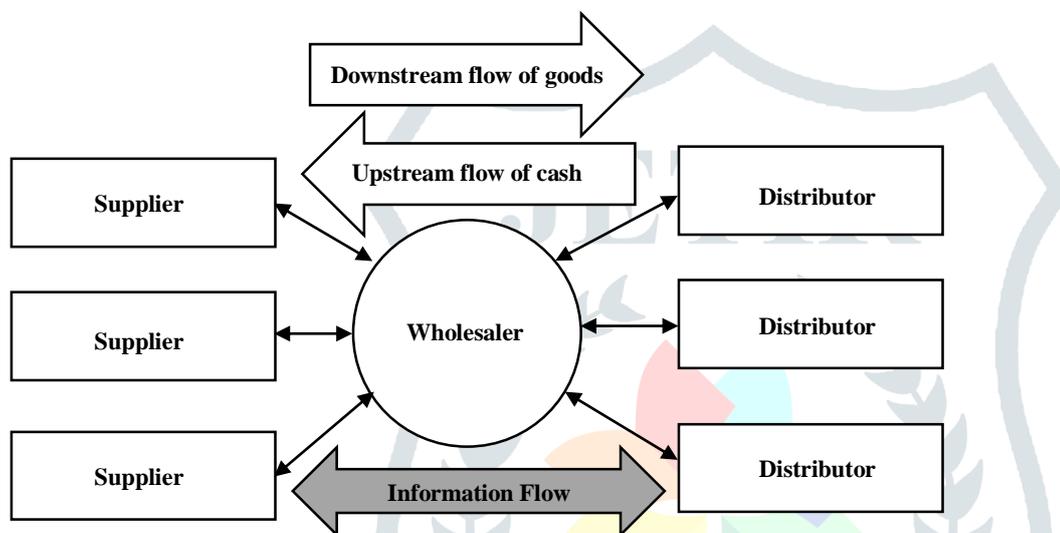


Figure Error! No text of specified style in document..1 Structure of Supply chain management

1.1 The Roles of Supply Chain Management in Construction

The goal is to decrease costs and reduce the running time of the facility. In this case, in order to prevent interruption of the operation, the primary concern is to ensure safe material and labour flow to the site.

Secondly, the supply chain itself should be the subject of attention, with the aim of reducing costs. It can also be an objective for product and component manufacturers.

Third, the transformation of the activity from the site to the earlier phases of the supply chain may be the priority. This is what it is like to simply avoid the conditions on site that are necessarily inferior.

Fourthly, integrated management of the supply chain and site production may be the topic of concern. Thus, growth is subsumed into SCM at the venue. The focus can be initiated by customers, suppliers or contractors.

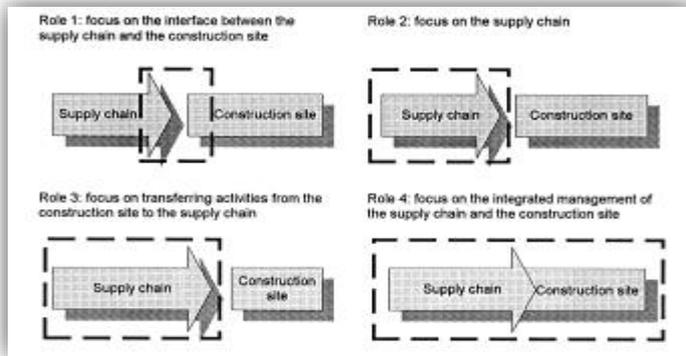


Figure Error! No text of specified style in document..2The Four Roles of Supply Chain Management in Construction

Objectives of Study

- To guarantee the safe flow of material to the site.
- Obtaining strategic and comparative advantages by creating demand, minimizing costs and incorporating all stakeholders involved in project management and development processes.
- To satisfy customer service requirements
- Face global competition
- Improve standardization

II. LITERATURE REVIEW

The previous research analysis focused on the application of supply chain management in the construction sector is presented below.

Ruben Vrijhoef.et al.(2000):Supply chain management has four special functions in construction, he argued, due to construction peculiarities. Convenient steps for each job are assessed when advancing the building supply chain. Concerning the current status, three main conclusions are drawn. Firstly, even under normal situations, there is a considerable amount of waste and issues in the building supply chain. Secondly, most of these are activated at another stage in the supply chain of construction than when they are detected. Third, the outdated, myopic management of the building supply chain mainly causes waste and problems. These results are consistent with results that are generally made on supply chains built to be made-to-order. Ultimately, the subjective and objective shortcomings of the four positions, based on empirical findings and the traditional theory of supply chain management, are assessed.

Andrew R.J. Dainty.et al. (2001) :This study focused on how manufacturers and contracting organizations could effectively implement supply chain management strategies. This paper presents research findings focusing on the role of small and medium enterprises (SMEs) in re-engineered construction supply chains. Major challenges have been generated to the incorporation of suppliers within the construction industry, stemming from skepticism on the part of SMEs about the reasons behind supply chain management practices.

Peter E.D. L .et al. (2004): A holistic approach to the SCM construction project is described in this paper. In order to integrate design and manufacturing processes into construction projects, a seamless supply chain management (SCM) project model is specifically suggested. A survey of industry professionals validated and presented their feedback on the proposed model. Future research direction is given and such work is aimed at: exploring the legalities of implementation of the model; creating an appropriate benchmarking framework; exploring the use of production of quality functions; and probity concerns when choosing members of the project team.

Stanley E. Fawcett.et al. (2008): The mail survey targeted senior ordering, manufacturing, and logistics executives. Customer loyalty and quality are seen as more lasting than cost savings. However, individuals are concerned, like society, trust, aversion to change becomes more intractable. This paper uses triangulation methods to analyze main supply chain management problems at various stages of the supply chain.

Anders Segerstedt.et al. (2010): This paper poses a special topic concerning the building industry and its supply chain management. The goal is to resolve and highlight the differences and possible parallels between conventional production and its supply chains. Different degrees of requirements are involved in the design specification process prior to the arrival of the client order: engineer to order, order adaptation, order layout, and model collection. Only a small portion of the project is carried out by the construction company at its own capacity. This is a way to spread risk and to mitigate risk and balance an volatile market. The paper offers papers that include analytical details about the numerous problems and opportunities associated with the construction industry's project-based supply chain management.

Chu-hua Kuei.et al. (2010): This paper provides a global context for supply chain quality management. In this analysis, to illustrate the conceptual structure. There are three separate types of variables: a hierarchy of architecture variables, a hierarchy of device variables, and a hierarchy of methods of problem solving. This analysis also contains interviews in Taiwan with senior global chief executives. We also see the decision-making period in this review. The (AHP) is used for the three following hierarchical levels to describe priority indices: environmental scanning, strategic choice, and tactical choice. A system approach is followed by the presented framework and ensures the design, produce and distribution of quality conscious products.

Hans-Martin Lonngren.et al. (2010): In this industry, supply chains have a clear tendency towards waste and inefficiency. The aim of the paper is to concentrate on the development of an aggregated strategic alliance. Workshop and meeting findings, semi-structured interviews and links to key records, network IT infrastructure and network archives were included in the data collection tools. The main success factors in the strategic partnerships of the building industry are: central collaboration between stakeholders using decentralized task management and the implementation of an effective IT solution.

Anant Deshpande (2012): Researchers did not discuss core issues such as the relationships between various dimensions of the SCM and the relationships between the underlying dimensions of the SCM and SCM performance comprehensively. A theoretical structure and guidelines have been developed based on a

systematic literature review. In conclusion, for executives, the explanation of possible consequences and effects of the study is taken into account. Overall, the researcher concluded that enhanced collaboration between important supply chain management constituents would enhance the capacity of the company to accomplish desired goals. Lastly, guidelines for future research are also given.

Davide Aloini.*et al.* (2012): Papers have been objectively classified and evaluated on the basis of a risk management perspective. In the literature, a total of 13 specific risk factors are listed and objectively analyzed, taking eight key viewpoints into account. These emphasize the emphasis on the planning phase of the project and affirm the Principal Contractor as the SCM Training Primary Promoter. Study explores 11 years of SCM Construction literature (2000-2011). The study of the SCM Principles should not focus on the area of risk management in the building industry. The results reflect an initial attempt to establish an organizational risk assessment process to facilitate the successful implementation of SCM in the sector. To make a contribution and to encourage further study, research gaps are established.

Nenad C̃us̃-Babic.*et al.* (2013): This paper discusses the concerns concerning the incorporation of knowledge flows in the building sector with regard to material supply chain management.

Helal AlbalousHI.*et al.* (2014): The data was collected through a survey of questionnaires. The questionnaire was mailed to 100 UAE construction companies. It received 72 correct responses. Most of these supported the need to use SCM as a way of achieving project goals and described the key factors affecting the supply chain's productivity to help upper management: technical supply chain history; and business practices in dealing with supply chain management. Analysis of significance and output described the greatest changes required in upper management support; sequences of activity; Approaches to consumer needs; technological history for the supply chain; and preparation of capital.

Ravinder Kumar.*et al.* (2015): This paper identified 13 Critical Success Factors (CSFs) in small and medium-sized enterprises for SCM implementation and studied their effect on Indian SMEs' results. Top management engagement, committed supply chain capital, and the implementation of a successful SCM strategy have emerged as the most important CSFs. In order to assess changes in efficiency, the authors considered various metrics relating to customer service and satisfaction. Effects are evaluated using traditional statistical techniques by evaluating study propositions.

Rafaella Broft.*et al.* (2016): In accordance with relevant SCM definitions, the SCM maturity levels are generated and are based on seven SCM organizational principles and converted into a conceptual model by Holti et al. (2000). The research contributes in two ways to the issue of SCM in construction. Both policymakers and industry professionals involved in enhancing construction efficiency must prove beneficial to the results. Secondly, the SC maturity model has been developed, that forms the conceptual basis for the establishment of an effective system of improvement for the successful implementation of the SCM.

Lana Lovrenčić Butković1.*et al.* (2016): The latest literature suggests that generic supply chains should be easy and linear, and the reality is very different in the construction industry-any construction company must incorporate a multitude of construction supply chains and markets as it provides an end-customer / customer solution. Therefore, the aim of this article is to review existing research and synthesize key approaches and

findings in order to provide recommendations for future supply chain research in construction. In particular, this study aims to screen current studies (publicized using the Pro Quest database in the 2010-2015 era)

Mohamed B. Daya *et al.* (2017): The Internet of Things (IoT)'s position and effect on Supply Chain Management (SCM) is explored in this paper via a detailed literature review. The definition of IoT, The key enablers of IoT technology and various applications and SCM processes are significant aspects of IoT in SCM. Researchers include a number of existing categorizations of literature, such as methodology-based, industry-based. This study has found that, with limited theoretical models and observational trials, most studies have concentrated on conceptualizing the IoT effect. Several studies, however, have centered on the operation of the supply chain and the food and industrial supply chains. It also describes potential areas of SCM research capable of promoting IoT implementation.

Payam Shojaei *et al.* (2018): The key contribution of the researchers in this report, along with the proposed novel approach, is to set the stage for a debate between project management academics and practitioners and those in the manufacturing sector, which they firmly believe is a chance for shared growth.

Sulafa Badi *et al.* (2019): A thorough analysis included 44 of the initial search results of 207 articles. In terms of publishing source, publishing date, geographical setting, and stakeholder position, the papers are described. The results are summarized to demonstrate a categorization of the methodology and a detailed concept of green supply chain management in construction.

Pei-Yuan Hsu *et al.* (2019): A mathematical model has been developed in this report. Production, transport, assembly and selection of the necessary warehouse locations are taken into account in the model.

Jiuping Xu *et al.* (2020): This paper generated a groundbreaking method of environmental assessment (EEM) embedded in a model of multi-objective optimization. In order to demonstrate its viability and usefulness in the management of the suggested solution was then extended to a particular case study in China with GHG greenhouse and AG acidification problems and the reduction of environmental economic disputes. Analyses of scenarios on the basis of cost control and attention ratios were also carried out, during which some clear assumptions and policy recommendations were made.

Venugopal Reddy Battula *et al.* (2020): The questionnaire survey was designed in this paper to synthesize and inherit previous studies and to consult experts. Interviews were performed face-to - face in this paper to gather data. An analysis of more than 10 organizations involved in the construction industry was conducted as part of this initiative. The investigator evaluated the data using the RII method and gave the factor rankings based on the mean RII-value.

III. CONCLUSION

Via a variety of methodologies and approaches, such as a systematic approach to the SCM construction project, the documents relate to the application Management of the supply chain in the building industry. A seamless project supply chain management (SCM) model is explicitly proposed to integrate design and manufacturing processes into construction projects. Through a systematic literature review, some of the papers addressed the role and the Internet of Things' effect (IoT) on Supply Chain Management (SCM). The survey of questionnaires was arranged in some paper to synthesize and inherit previous studies and to consult the experts. Participants in the study are those who have worked with prime contractors and involved in

construction projects. The latest literature indicates that generic supply chains should be straightforward and linear, but in the construction sector, the truth is very different. The aim of the various studies is to examine the progress of the implementation of Supply Chain Management (SCM) in the construction sector, analyzing the risk factors that affect the implementation of the SCM principles.

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