

New Perspectives on Evolutionary Supply Chain Management in Construction

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Abstract. Dramatic increase of competition through globalization is inevitable in today's business. The pressure of competition has led leading firms to draw attention to supply chain efficiency that optimizes their business with competitive advantages. Supply chain management (SCM) approach thus has gained its popularity in the globe for decades. Nevertheless, efficient SCM is extremely rare in construction, yet, it is observed as a most hostile business among the sectors. Many studies have appeared to develop and test other philosophies in the construction SCM, including integration, partnership, collaboration and coordination. These evolutionary SCMs are unable to provide a clear picture of their philosophies, yet, may lead to confusion in understanding. Therefore, a study should be carried out to investigate the evolutionary SCM so that each concept and its uncertainty can be assessed comprehensively.

Keywords: Evolutionary, Supply Chain Management, Construction

1. Introduction

Globalization is inevitable in today's world, changing from the local to global business that increases world economic integration [6]. A fierce competition thus boosts up among the firms and lead firms started pursuing the notion of competitiveness. Only possible way to survive in this fierce competitive business is to enhance their competitive advantage. In the eyes of the client, competitive differentiation of particular firms that able enduring superiority over other competitors [5], are able to remain a long-term position in the industries. An increased criticality of competitive advantage makes firms imperceptible changes in their business. More recent studies illustrate the movements towards an effective and efficient supply chain management (SCM) that perceived as one among the best strategies [14]. Many researchers have a claim that SCM as the major source and core strategic to create, develop and maintain the sustainable competitive advantage without giving up customer satisfaction.

In line with this streamlining effort, SCM has gained its popularity in the globe for decades. SCM is a concept that originated and developed in the manufacturing industry. The first signs of SCM were perceptible in the Toyota Production System for Just in Time (JIT) delivery system [21]. A success case in manufacturing of its higher profitability and competitive advantage [19] has a bridge the SCM ideas to be interpreted to other industries. For instances, automobile (Talleres Auto), retailer (Tesco and Wal-mart), logistic (Xerox) and computer (Dell and HP) have practiced the SCM to improve its business efficiency. Nevertheless, SCM concept is slowly being embraced by the construction industry which still lagging far behind from the other industries [17]. It seems no easy answers to develop the SCM in construction due to its generic problems of "reluctant to change" and lack the recognition of criticality of ambitious performance [3].

Many researchers thus attempted to test other philosophies such as integration, partnering, coordination and collaboration in SCM inherit aimed in improving the optimum beneficial of this concept. Nevertheless, these evolutionary SCMs are unable to provide a clear picture of their philosophies, yet, may lead to the confusion in understanding. An objective formulated in this paper is to investigate the evolutionary SCM so that each concept and its uncertainty can be assessed comprehensively.

2. Supply Chain Management (SCM) in Construction

In thoroughly understand the evolutionary SCM, it is necessary to comprehensive understand the origin concepts of SCM in early stage so that its evolutionary philosophies can be scrutinized in more pragmatic and sensible way. Supply chain can be considered as the network of organizations that involved in overall

business processes [5]. Construction supply chain mainly consists of three fundamental functional such as suppliers, contractors and customers that regulate the sequence processes from supply the raw materials, transform them into final products, and then deliver the products to customers. There are two significant flows in supply chain, physical material flow from the supply side to demand side and information flow circulated between both supply side and demand side. Two relationships among organizations also be established, it consists of upstream relationships between suppliers and contractors, and downstream relationship between contractors and clients. Hence, configuration of flows and management of relationships may complicate the construction supply chain. These are shown in Fig. 1.

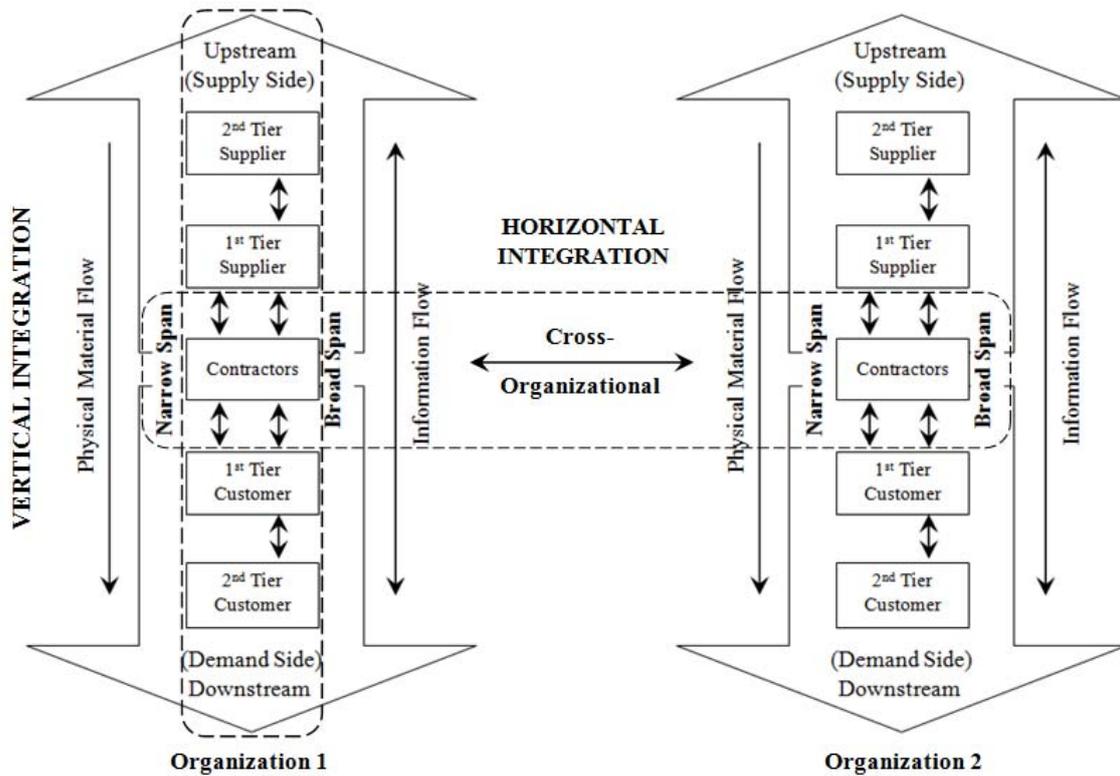


Fig. 1. Configuration of Construction Supply Chain Management

In an effort to efficient manage the construction supply chain, SCM plays important roles in forming the integrative philosophy that accomplish the total flows through the varying organisations [9]. It is to increase the transparency and alignment of a supply chain configuration, regardless of organisational boundaries. Two integrative philosophies often discussed in SCM literature, consists of vertical integration and horizontal integration. In vertical integration, an integrated set of practices has been practised aimed at managing and coordinating the total flows from raw materials to end customers [23]. A responsive flows of good, services and information eventually strengthen the upstream and downstream relationships among the functional. Some studies also focus on spanning the functional tiers in vertical integration of SCM. Broad-spanning can create greater business processes and activities throughout the entire network but not just between a few channel pairs. Superior customer value with maximization of customer demand at less cost to the supply chain can be achieved [5]. On the other hand, horizontal integration is pursues the notion of cross-organizational integration. Two or more intra-organizations have been synchronized aimed in reinforcing the competitive advantages, rather than to compete solely for business. Effective partnering also can be achieved in horizontal integration that creating a teamwork and “win-win” interest among organizations [15]. Closer and team working through partnering, thus ensuing the long term relationship and supply chain [8].

Nevertheless, several questions have been emerged in line with this issue. What are the unique contexts in the evolutionary SCM? Are these concepts confusing the substances of the original concept? In comprehensively know the answer, these evolutionary SCM must thoroughly investigate, and thus it will discuss in the next section.

3. Evolutionary Supply Chain Management (SCM)

Achievement of global improvement is evident in many sectors especially in today fierce competition. It is not uncommon of the evolution of SCM philosophy in construction that able to achieve the vast improvement of construction business performance. Each evolutionary SCM has been instigated in a different context and some fundamental principles interlinked as well as interdependent. Therefore, this section entirely discusses the evolutionary SCM so that contemporary concept of SCM can be deeply assessed.

3.1. Supply Chain Integration (SCI)

Integration can be defined as all activities within the inter-organization are integrated together [20]. SCI can be observed as integrated management of the interface between site activities and supply chain [24]. In attaining the integrated interface, the “involvement climate” must be nurtured in the SCI. Each party can be working together as a unified team, rather than as a disparate collection of separate organizations [7]. Cross functional integration, thus is essentially been developed across organisations, aimed in blurring the boundaries of inter-organization and achieving more effective and responsive construction supply chain.

Until recently, there are two key issues of SCI in construction have been studied, including the material flow integration and information flow integration [12]. In material flows integration, “Just-in-Time” solutions based on pre-assembly has been introduced to synchronize the physical activities flow. It is started transferring the activities from the construction site to an industrialization supply chains such as prefabricated from construction manufacturing. Harsh nature for on-site activities has successfully transformed into value-added production in terms of least time, lowest costs, and quality production line. IT system also has been recommended to expenditure the information flow integration in order to enhance the information exchange and communication in both sides. Not only able to strengthen the downstream and upstream integration of construction parties but also lead an appropriate decisions making.

3.2. Supply Chain Partnering (SCP)

Partnering is another new concept through the establishment of contractual obligation between two organisations for either a specific length of time or for an indefinite time period [15]. In this sense, it is laying effort to prolong the obligation and create an avenue for continual working environment that longer the relationships of parties. Two major roles of SCP in construction supply chain, there are prolonging the short-term relationships and forging the adversarial relationships.

It is argued that construction has extensive use of “one-off” contracts which is generally short-term [2]. Problem is complicated by the unique and sole supply chain for each contract, and thus leads its supply chain always suffers the uniqueness and nonrepetitive. In an effort efficiently resolve these shortfalls, SCI plays the first roles in prolong the time horizon of obligation that makes it continual and longer cooperative relationship of construction parties. Arm-length relationship is to transform into obligation relationships that embedded within broader relationship with mutual trust. It also enables the construction parties likely to work together on long enough and sufficient enough to build trust in longer commitment, and thus developing a collaborative cooperative work environment. Parties will share resources willingly, integrity and openness in terms of information, knowledge, technology and competencies [24]. A mutual or win-win interest has also been developed in this longer contractual relationship. Cooperative and collaborative work environment, eventually has eliminates the adversarial barriers in construction relationships.

3.3. Supply Chain Collaboration (SCC¹)

SCC¹ has been defined as “two or more parties working together to create a competitive advantage through sharing information, making joint decisions, and sharing benefits which result from greater profitability of satisfying end customer needs than acting alone” [22]. From this statement, shared vision can be observed as one of the major roles of SCC¹ in enhancing the supply chain performance. However, it is seemed challenges in achieving the shared vision in construction supply chain.

Heterogeneous construction parties from different disciplines, organisations, and cultures are required in a relatively short period to exchange a large volume of information. In such complexity, poor information quality is evident such as inaccuracy, incompleteness, misunderstanding, late and delays. Informal communication in construction further complicates the challenges. Often, irregular meetings conducted in

constructions site that may hinder the opportunities to share with another the concerns, weakness, and best practices [10]. Lack of standard procedures from irregular meetings may also causes to the failure of project delivery [16]. SCC¹ is essential in instilling the sharing willingness and commitment among the parties, in order to establish a trust and cooperative team. SCC¹ also plays a significant role in fostering the virtual team, business operation and supply chain through the Information Technology (IT). SCC¹ can be observed as the IT alternative in enhancing the information sharing for connecting members of the supply chain, and create an effective communication process [11]. IT provides real-time communication channel that get the advantages of immediate, quality and innovative decision making and knowledge sharing. Reliable information flow and communication structure can be achieved in SCC¹ in improving the virtuality of construction supply chain.

3.4. Supply Chain Coordination (SCC²)

Coordination has been introduced, mainly in managing the interdependencies among the activities and chain members in a supply chain. According to Malone and Crowton [18], if there is no interdependence, there is nothing to coordinate. With this simple intuition, it is challenges for SCC² in construction because it's highly complex of activities have owed the different and discrete types of interdependencies that must be coordinated. Two major roles of SCC² have been observed, there are coordinating the interdependencies of construction activities and parties.

Construction project involves myriads of interrelated activities, tasks, and work packages [4], from substructure work until the external work. In such complexities, SCC² is essentially to recognise and coordinate the interdependencies of whole activities in supply chain [24]. Three types of construction activities' interdependencies have been identified are pooled, sequential, and reciprocal interdependencies [1]. Different interdependencies were affecting the activities management in judging the relationship, criticality, priority and output. SCC² also concerning how to coordinate the independent parties to work together as a whole to pursue the common goal of chain profitability [22]. Independent parties have been gathered in a project because the existing interdependency roles that it represent their contractual relationships with others. Interdependencies are complicated by the project-based practice that involved heterogeneous parties throughout the construction process. Multi-disciplinary of the parties causes to the problematic organizational independencies as well as the technical interdependencies of the work [13]. SCC² is essentially to create a cross-disciplinary coordination of parties, in order to forging their interdependence relationship [18].

4. Summary

This paper looks insight on the four major evolutionary SCM concepts. Each evolutionary concept has its uniqueness, as well as overlapping strategies in enhancing the construction supply chain performance. SCI is mainly to integrate the total flows of operation in enhancing the interaction of parties; SCP is tend to prolong the contractual obligation in achieving the trust, win-win and long-term relationship; SCC¹ is primarily to instil the shared vision in improving the virtuality of supply chain; SCC² is generally to coordinate the interdependencies in accomplishing the boulder-less work environment. The main conclusion are drawn in this paper regarding the evolutionary SCM can be observed as the contemporary SCM philosophy. Comprehensive understanding of these evolutionary concepts, therefore, is prominent in eliminating its' confusion. Further study should be conducted to investigate the point of views from professional in validating this literature.

5. References

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