

A Conceptual Framework for Supply Chain Competitiveness

Ajay Verma and Nitin Seth

Abstract—The purpose of this paper is to highlight the importance of the concept of competitiveness in the supply chain and to present a conceptual framework for Supply Chain Competitiveness (SCC). The framework is based on supply chain activities, which are inputs, necessary for SCC and the benefits which are the outputs of SCC. A literature review is conducted on key supply chain competitiveness issues, its determinants, its various dimensions followed by exploration for SCC. Based on the insights gained, a conceptual framework for SCC is presented based on activities for SCC, SCC environment and outcomes of SCC. The information flow in the conceptual framework is bi-directional at all levels and the activities are interrelated in a global competitive environment. The activities include the activities of suppliers, manufacturers and distributors, giving more emphasis on manufacturers' activities. Further, implications of various factors such as economic, politico-legal, technical, socio-cultural, competition, demographic etc. are also highlighted. The SCC framework is an attempt to cover the relatively less explored area of supply chain competitiveness. It is expected that this work will further motivate researchers, academicians and practitioners to work in this area and offers conceptual help in providing a directions for supply chain competitiveness which leads to improvement in the supply chain and supply chain performance.

Keywords—Competitive advantage, supply chain, SCC, supply chain management.

I. INTRODUCTION

THE fierce competition in today's market is led by advances in industrial technology, increased globalization, and tremendous improvement in information availability [1]. Competitive priorities have forced organizations to change dramatically due to rising customer expectations, continually increasing competition on a world-wide scale, time and quality based competition and mass customization [2]. During the 1980's and 1990's the industrial development has changed the market conditions for industrial activities. Networks, strategic alliances and other form of quasi-integration are the words that are depicting most adequately the changed forms of industrial activities. In this era, the organizations are forced to rethink their operations, alliances, partnerships and strategies to cope with these and similar changes. Supply

chain management (SCM) has been emerged as the major component of competitive strategy, to enhance organizational productivity, profitability and competitive success. Fig. 1 shows elements of supply chain trying to achieve supply chain competitiveness.

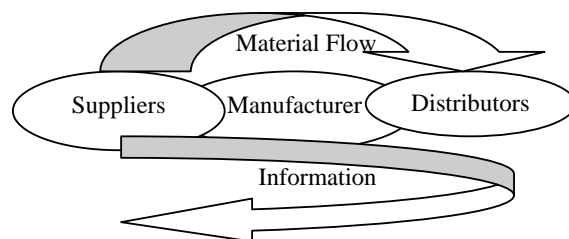


Fig. 1 Supply chain elements

Now there is a need for managing and improvements of Supply Chain Competitiveness (SCC), as the real competition, presently, are among the supply chains and not among the companies [3]. Supply chain competitiveness (SCC) is gaining importance for the reason that organizations will survive, in this global competitive environment, if they are competitive enough from both supply chain as well as customers satisfaction point of view.

The paper makes an attempt to understand the importance of SCC, SCC issues and then to present a conceptual framework for SCC. The objectives of this paper are three fold: (1) to understand the concepts of supply chain and supply chain competitiveness; (2) to highlight the importance of the supply chain competitiveness; and (3) to present a conceptual framework for SCC. The paper is organized as: after the literature review, a conceptual framework for SCC is presented. Finally, concluding remarks with some directions for future research are provided.

II. LITERATURE REVIEW

Numerous researchers have explored supply chain and supply chain management on various issues viz. definitions, dimensions, performance measurement, frameworks, applications, strategy and allied concepts, supported by a number of empirical studies from a variety of enterprise related application areas (supply, manufacturing, retailing, distribution and transportation, inventory management, information flows, demand management, value chains, customers' satisfaction, and many more). For the present work, the literature can be divided in three sections viz.

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Supply chain, supply chain management and supply chain competitiveness.

A. Supply chain

The subject of supply chain has been explored by numerous researchers and practitioners from various perspectives and applications. Table I represents select concepts and definitions of supply chain.

TABLE I
SELECT CONCEPTS AND DEFINITIONS OF SUPPLY CHAIN

Author	Definition
[4]	The network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services delivered to the ultimate consumer.
[5]	A set of firms that pass materials forward.
[6]	The alignment of firms that brings products or services to market including the final customers as part of the supply chain.
[2]	A set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer.

From the table, supply chain can be defined in general as “a network of organizations or individuals directly involved in the upstream and downstream flows of products, services, finances, information and value from a source to the ultimate customers.”

B. Supply chain Management

The concept of supply chain management (SCM) has also been explored by various researchers. Table II presents a compilation of some important definitions and concepts of supply chain management.

TABLE II
SELECT DEFINITIONS AND CONCEPTS OF SUPPLY CHAIN MANAGEMENT

Author	Definition
[7]	It deals with the total flow of materials from suppliers through end users.
[8]	To synchronize the requirements of the customer with the flow of materials from suppliers in order to effect a balance between what are often seen as conflicting goals of high customer service, low inventory management, and low unit cost.
[5]	Two or more firms in supply chain entering into a long term agreement, the development of trust and commitment to the relationship, the integration of logistics activities involving the sharing of demand and sales data, the potential for a shift in the locus of control of the logistics process.
[9]	The process of strategically managing the movement and storage of materials, parts, and finishes goods inventory from suppliers through the firm and to the customer.

[10]	The most advanced state in the evolutionary development of purchasing, procurement and other supply chain activities. At the operational level, this brings together functions that are as old as commerce itself-seeking goods, buying them, storing them and distributing them. At the strategic level, it is a relatively new and rapidly expanding discipline that is transforming the way that manufacturing and non-manufacturing operations meet the needs of their customers.
[11]	The management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole.
[12]	It is the systemic, strategic co-ordination of the traditional business functions and the tactics across these business functions within particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole.
[13]	A set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantity, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements.

From the table, Supply chain management can be defined as “a set of integrated activities to manage upstream and downstream relationships with suppliers, manufacturers, distributors, retailers and customers in order to deliver superior customer value at less cost, efficient and effective distribution, purchasing and procurement and other supply chain activities with a continuous flow of information and to deliver customer service and gaining competitiveness.”

C. Supply chain competitiveness

Researchers are trying to describe supply chain competitiveness (SCC) for the long time and a wide range of strategies have been considered for the same. According to [14], mass customization provides a tremendous increase in variety and customization without sacrificing efficiency, effectiveness or low cost. His emphasis was on mass customization for gaining competitiveness of supply chains. On the other hand, [15] suggested information and communication as the most profound and influencing changes to be adapted that affect the companies as well as the supply chain competitiveness. He suggested the use of internet and other communication systems for SCC. Operations strategy is considered as the basic competitive tool which concentrates upon two common themes: process and content [16]. The important role of operations management and operations strategy for SCC is well documented by [16], [17], [18] and [13]. Operational activities are described as the basic units of competitive advantage by [19]. He argued that the operational effectiveness of a business directly contributes to competitiveness and market leadership. According to [20],

organizations must be quick, agile, and flexible to compete efficiently, which can not be obtained without coordination of the companies in supply chains [21].

In recent years, supply chain competitiveness is gaining a huge importance due to the challenges faced by the organizations in the global environment. [20] Argued that companies may compete if they develop and manage cooperation and collaboration partnerships. According to [22] flexibility has the greatest role in competitiveness of supply chain. Agility is suggested as the competitive priority beyond flexibility and cost efficiency [21]. [23] Suggested information, intelligence and expertise as the critical organizational sources for competitive advantage.

The "latest" approach for achieving competitiveness is through closer supplier-customer relationship by the "Advanced Supplier Partnership" concept introduced by [24]. This concept is based on effective materials management coupled with price adjustment provision systems, agreed in advance between suppliers and customer. The rapid growth in computing technology and the advent of the internet have made possible a greater grade of connectivity between supply chain partners. According to [25] there has been a growing recognition of building relationship with the customers for improvements in profitability, serviceability and reduced costs in the supply chain. [2] Argued that competitive advantage can be obtained not just through the products sold, but also through the way in which we manage the flows in a supply chain. He identified twelve drivers of for competitive advantage in supply chain, which are, according to him, necessary for supply chain to be competitive. On one hand, [26] argued that a company's competitive strategy defines, relative to its competitors, the set of customer needs that it seeks to satisfy through its products and services, on the other hand, [27] emphasized on product management. Table III presents a list of supply chain competitiveness strategies reported in literature.

TABLE III
SUPPLY CHAIN COMPETITIVENESS STRATEGIES

Author	SCC Strategy
[2]	Customer orientation, Demand Management
[14]	Mass customization
[15]	Information and Communication
[16]	Process capabilities
[19]	Operational effectiveness
[13]	Operations Strategy
[20]	Coordination, Cooperation, Collaboration , Flexibility
[21]	Agility, Flexibility
[22]	Flexibility
[23]	Information, Intelligence, Expertise
[24]	Strategic partnerships/alliances, integration
[25]	Customer relationship, agility
[26]	Customer satisfaction
[27]	Product Management, SC flow management, SC Synergy, Demand Management

III. FRAMEWORK FOR SCC

Based on the strategies reported in literature which are

important for SCC, a conceptual framework for SCC has been presented in fig. 2, which is showing activities required for SCC, environment in which the supply chain is competing and outcomes of achieving SCC.

The conceptual framework of SCC is divided in three parts:

- (A) SCC inputs,
- (B) SCC environment
- (C) SCC outcomes

A. SCC inputs

SCC inputs are the activities to be performed at different levels of the supply chain to achieve SCC. These activities in supply chain are necessarily being required to get competitive advantages. This part is consisted of the following activities:

- Flexibility
 - Coordination
 - Collaboration
 - Cooperation
 - Customer orientation
 - Supply chain synergy
 - Mass customization
 - Supply chain flow cycles
 - Integration of key processes
 - Demand management
 - Product management
 - Strategic alliances
 - Agility
- Flexibility: Flexibility is defined as the process of adapting things for the requirements of the customers. If it would not be given due consideration, no organization will cope up with changing customers requirements and no competitive advantage can be gained. [20], [21], [22]
 - Four C's of SCC: Coordination, Cooperation, Collaboration and customer orientation are the four C's must be considered. For supply chains to be competitive, coordination, cooperation and collaboration among the chain elements must be achieved [20], [21], while no supply chain can have competitive advantages if it fails to satisfy the customers [2]. Hence customers' orientation is very necessary for SCC.
 - Supply chain synergy: supply chain competitiveness can not be achieved if the supply chains are not synergizing the performances [2]. It means that the sum total of outcomes must be greater than the some total of inputs.
 - Mass customization: Mass customization provides a tremendous increase in variety and customization without sacrificing efficiency, effectiveness or low cost [14]. Hence mass customization also helps in gaining competitiveness of supply chains.

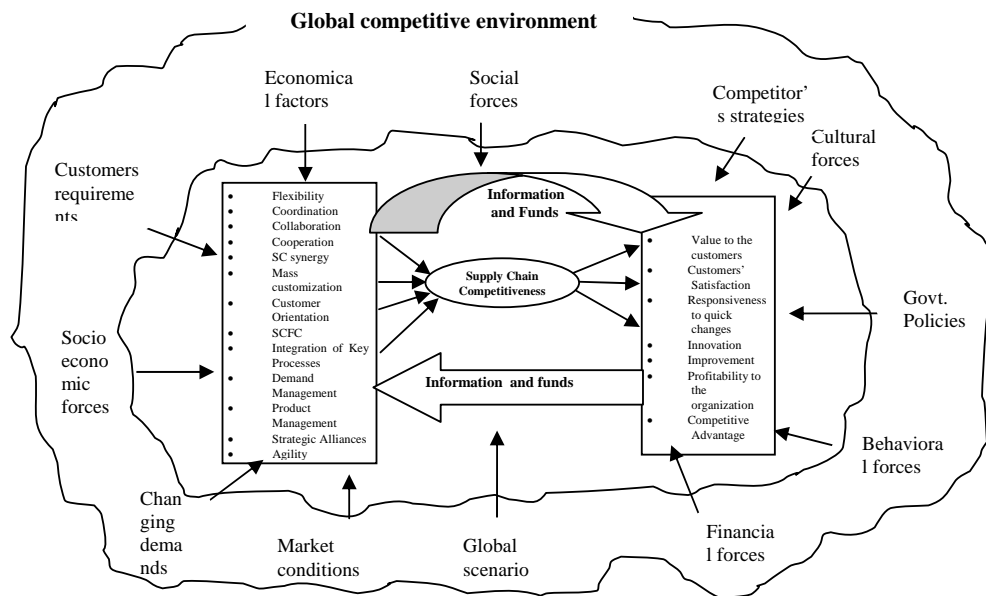


Fig. 2 A conceptual framework of supply chain competitiveness

- Supply chain flow cycles: It means that the supply chains must have easy flow of materials, information and funds for supply chains to be competitive [2], [15], [27].
- Integration of key elements: The key elements of supply chain are supplier's suppliers, suppliers, manufacturers, distributors, retailers, customers and customer's customers. There integration is a very necessary activity for SCC [24].
- Demand and product management: These are related terms which are to be managed so as to get competitive advantages. If demand is managed, we are managing the products according to the requirements of the customers. Hence these are the key activities of supply chain to get SCC [2], [27].
- Strategic alliances: This can be defined as the alliance to get strategic benefits [24], [27].
- Agility: Agility means to change according to the changing demands of the customers as quick as possible and it is now becoming the major activity for SCC [20], [21], [25].

All these activities, if performed properly, lead to supply chain competitiveness which in turn gives the outcomes discussed in part C. But, the activities are to be performed in an environment of competitiveness from business as well as global point of view, which is being discussed in the following part.

B. SCC environment

The competitive environment is consisted of business as well as global environment. Business environment

encompasses the factors like competitors strategies, changing demands of the customers, financial factors, market conditions, social forces, economical forces, government policies, socioeconomic forces etc. While the global environment consists of global scenario, behavioral forces, economic conditions, cultural forces, foreign trade policies etc. The competitiveness environment is working under the vicinity of information and funds (forward and backward both).

C. SCC outcomes

Gaining SCC is a task achieved by performing the activities in part A. The outcomes of SCC are given below:

- Value to the customers
 - Customers' Satisfaction
 - Responsiveness to quick changes
 - Innovation
 - Improvement in the products and services
 - Profitability to the organization
 - Competitive Advantage
- Value to the customers: As high quality of products is available at low costs, customers are getting more value through the SCC. Adding value to the product is an inherent feature of SCC.
 - Customers' satisfaction: Most profound outcome of SCC is customers' satisfaction. More the supply chains are competitive; more is the satisfaction to the customers. More the satisfaction to the customers more is the

competitive success of the supply chain.

- Responsiveness: Due to SCC, the supply chains are more flexible and agile; hence responsiveness of the organizations will increase. i.e. less time is required to respond to the changing situations.
- Innovation: innovation is another important outcome as it relates requirements into the reality. Hence supply chains get competitiveness as demand and product chain is managed simultaneously through innovation satisfying the customers.
- Profitability to the organization: This is the ultimate goal of any organization, which is achieved by SCC.
- Competitive advantage: Competitive advantage is achieved by SCC which in turn results in profitability, and low cost of products.

Looking to the outcomes from SCC, we can say that SCC is one of the most important aspects of business success. In this world of completion, SCC provides solutions to those questions which are to be answered by each firm.

IV. CONCLUSION

The paper presents a conceptual framework for SCC. The key activities, environment and outcomes of SCC are being depicted in the framework. It may be noted that the activities for SCC are interrelated. It is expected that this framework would be highly beneficial to the organizations in leveraging the efficiency of supply chain management and to achieve supply chain competitiveness. Some of the key benefits of the framework are visualized as:

- It helps in understanding the activities, roles and responsibilities of suppliers, manufacturers and distributors for achieving SCC.
- It provides directions for future studies for the supply chain competitiveness.
- It can be used as a guiding tool to understand SCC and further improvements.
- It can be used for managing supply chain according to the needs of organizations.

There is a need for an empirical validation of the proposed framework along with development of separate, but interrelated, modules for suppliers, manufacturers and distributors. The bi-directional information at different levels will have affected the supply chain at all levels and it should be managed to reduce the information distortions.

The paper highlighted some of the major activities, environment and outcomes of supply chain competitiveness. They need further to be determined empirically along with their relative impact on supply chain performance. The major insights gained through this paper suggest a conceptual supply chain competitiveness framework that will be useful to the academicians, administrators of the organizations as well as

practitioners.

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