Driving Forces of Collaboration in Supply Chain: A Review
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Abstract

Purpose – To examine different aspects of collaboration in supply chain over the last 19 years with the objective of developing theory for supply chain collaboration.

Design/methodology/approach – The paper is based on the review of 80 studies from 1990 to 2009.

Findings – Major findings shows that supply chain collaboration can be applied into different areas like process, planning, forecasting, transportation / distribution and the prime motivating factors behind the manufacturing companies entering into collaboration are trust, leadership, commitment, interdependence, organisational compatibility and infrastructure/technology.

Research limitations/implications – As the study is based on the review of literature covering many sectors, the findings of the study needs to be tested across select or specific sectors.

Practical implications – This study is a compilation of the work related to collaboration in supply chain, therefore it can be used for developing theories and identifying the driving forces for various industries leading to logistic collaboration in supply chain.

Originality/value – The review provides a clear understanding of the current state of research in supply chain collaboration.

Key words: Supply chain, collaboration, driving forces.

Paper type: Literature review.
Introduction:

The widespread use of web-based technologies and increase in competition has given rise to supply chain collaboration across many industries especially the automotive sector (Bagchi and Skjott-Larsen, 2005; Ireland, 1999). Over the years the concept of collaboration has made a significant transition from being purely theoretical to highly adopted practice in supply chain and as a result it has become popular among both the practitioners and academicians (Simatupang and Sridharan, 2005). According to Pagell (2004) collaborative practices in supply chain have become a well-established research domain. Many companies have started getting benefited by their collaborative initiatives, as suggested by the growing literature on the subject (Narasimhan and Jayaram, 1998; Sanders, 2007, 2008; Shin et al., 2000; Simatupang and Sridharan, 2005; Vereecke and Mylle, 2006).

However recent researches have acknowledged the complex role of collaboration and its mixed results; for example, Sanders (2007) has indentified that intra-firm collaboration had a direct impact on firm performance whereas inter-firm had an indirect impact. Similarly, Stank et al., (2001) in his empirical study for assessing the effects of internal and external collaboration on logistics service performance have found the evidence which suggest that internal collaboration led to the improvement of logistical service performance whereas external collaboration did not. Another study done by Vereeck and Mylle (2006) has concluded that collaboration improved the performances of the firms only marginally. The basic purpose of the researcher behind mentioning the above study is to provide the contextual clarity and the beginning of the review.

Supply Chain Collaboration (Operational Definition):

According to Min et al., (2005) the concept of collaboration has been widely examined across disciplines like Psychology (Konczak, 2001; Stern and Hicks, 2000); Marketing (Gadde et al., 2003; Jap, 1999, 2001; Perks, 2000); Management (Cross et al., 2002; Sawhney, 2002; Singh and Mitchell, 2005); Sociology (Powell et al., 2005) and Supply Chain Management (Holweg et al., 2005; Tuoninen, 2004). However, in this study the concept of collaboration has been reviewed within the supply chain context.

Collaborative practices in SCM have established itself as successful and sustainable business operations (Attaran and Attaran, 2007). Also, as per the survey conducted by SCM review and computer science corporation (SCMR and CSC, 2004) collaboration has been cited as the
most important issue. It is being increasingly promoted like “Silver Bullet” in many areas of SCM (Kampstra et al., 2006). Hence, there is no denial of the fact that collaborative practices in the logistics area have become the source of efficiency and decision-makers in the manufacturing and retailing industry have understood it.

In SCM, Collaboration is a dominant concept aimed at gaining benefits and sharing results with the trading partners (Speakman et al., 1998). According to (Bowersox and Closs, 1996; Chan et al., 2003) the emphasis on the effectiveness of Supply Chain in its entirety has eliminated the boundaries of the single firms and has promoted them for collaboration between supply chain partners, leading to the establishment of strong relationships with each other. Therefore, Myhr and Speakman (2005) have described it as “A Critical linking pins, as greater specialization brings in more of integration in the overall supply chain”. Taking the broader view Bahinipati et al., (2009) has defined it as “A business agreement between two or more companies at the same level in the Supply chain or network in order to allow greater ease of work and cooperation towards achieving a common objective”.

In the words of Whipple et al., (2002) it means partners working together, in a trustful, loyal and mutual environment aimed at reducing costs and improving performance. It is seen as a powerful instrument in achieving effective and efficient supply chain management (Fu and Piplani, 2004; Mentzer et al., 2000). Collaboration in supply chain has been conceptualized in various ways by researchers, as it can range from very shallow transactional focused to highly integrated close relations (Goffin et al., 2006); from collaborative communication to supplier development (Oh and Rhee, 2008) or from inward facing to outward facing (Frohlich and Westbrook, 2001). Some definitions of collaboration in supply chain are presented in the table 1 below:
<table>
<thead>
<tr>
<th>Authors</th>
<th>Definition</th>
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<tr>
<td>Bowersox et al., (2003)</td>
<td>Emerges when two or more firms voluntarily agree to integrate human, financial, and/or technical resources in an effort to create a new, more efficient, effective or relevant business mode.</td>
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<td>Crum and Palmatier (2004)</td>
<td>Characterized as “cooperative behaviour” or “joint decision making” between companies, and represents a willingness, versus a requirement, to engage in inter organizational efforts.</td>
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<tr>
<td>Finley and Srikanth (2005)</td>
<td>Diverse entities working together, sharing processes, technologies, and data to maximize value for the whole group and the customers they serve.</td>
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<tr>
<td>Min et al., (2005) adapted from Anthony (2000)</td>
<td>Two or more companies sharing the responsibility of exchanging common planning, management, execution, and performance measurement information.</td>
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<tr>
<td>Sanders and Premus (2005) adapted from (Schrage, 1990)</td>
<td>An affective, mutually shared process where two or more firms work together, have mutual understanding, have a common vision, share resources, and achieve collective goals.</td>
</tr>
<tr>
<td>Simatupang and Sridharan (2002) and Whipple and Russell (2007)</td>
<td>Two or more companies working together to create a competitive advantage and higher profits than can be achieved by acting alone.</td>
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<tr>
<td>Simatupang and Sridharan (2005)</td>
<td>The close cooperation among autonomous business partners or units engaging in joint efforts to effectively meet end customer needs with lower costs.</td>
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<tr>
<td>Skjoett-Larsen et al., (2003)</td>
<td>Two or more parties in the supply chain jointly planning a number of promotional activities and working out synchronized forecasts, on the basis of which the production and replenishment processes are determined.</td>
</tr>
<tr>
<td>Stank et al. (2003)</td>
<td>A process of decision making among interdependent parties, involving the joint ownership of decisions and collective responsibility for outcomes.</td>
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**Source:** Operational collaboration between shippers and carriers in the transportation industry (Fugate et al, 2009).
Different terms such as co-ordination, cooperation, collaboration and integration are considered to be similar in supply chain, Arshinder and Deshmukh (2008). However, Kampstra et al., (2006) considers it as a sequence of business initiatives carried out by like minded collaborating partners and has divided it into four levels.

**Level 1: “Communication”**- here the goal of the partners is to achieve improvement in productivity and sharing of information through simple IT applications.

**Level 2: “Co-ordination”**- It involves intra and inter entity co-ordination of processes and its main purpose is the synchronisation of flows and automation of certain routine decision making processes for improving speed and accuracy. Here, the main focus remains on dealing with physical and policy constraints and additional investment in IT infrastructure becomes a necessity.

**Level 3: “Intensive Collaboration”**- It involves collaborative members intensively for improving the strategic decision making and enhancement of innovation in the supply chain.

**Level 4: “Partnerships”**- It involves extended financial linkages like sharing of investments and also profits.

In order to innovate within their supply chain firms enter into relationships. Various authors have called these types of relationships by various name like inter- organizational collaboration as joint ventures (Doz and Hamel, 1998); Strategic alliances (Vyas et al., 1995); inter–firm cooperation and virtual collaboration etc. These terms have been described in brief as under:

**(i) Joint Ventures:**

They are used to develop new market opportunities where the local party contributes in the form of market knowledge, labor and networks and the firm looking for new market provides goods and services, marketing strategies and financial resources (Collins and Doorley, 1991).
(ii) Strategic Alliances:

These are type of long term inter-firm relationship in which two or more partners indulge in sharing of resources, knowledge and capabilities with the objective of enhancing the competitive position of each partner (Spekman and Sawhney, 1990).

(iii) Co-operative arrangements:

Co-operative arrangements are sought by many organizations with other organizations due to fast technological changes, organizational strategies, and competitive environment (Ring and Van De Ven, 1992). According to Cousins (2002) the rationale behind cooperative efforts lies on sharing of both tangible and intangible resources, collaboration and business goals like efficiency, competitive advantage and survival, through redesigning of process and products. According to Bowersox et al., (2000) due to ever changing global market and fierce competition, the traditional arm’s length relationships are no longer considered to be effective. Therefore, it is not surprising that most of the companies quickly adopted themselves to this emerging trend of supply chain collaboration, which Lapide (1999) has classified into three major types.

In manufacturer supplier collaboration, manufacturer collaborates with suppliers and can reap the benefits in the areas of new product development, order fulfillment and capacity planning. In manufacturer customer collaboration, collaborative relationships develop between manufacturers and customer or manufacturer with distributors, wholesalers and retailers. Such collaboration can take place in the areas of demand planning and inventory replenishment.

While focusing jointly on planning of logistics activities, collaboration between companies and third party logistics (3PL) providers and fourth party logistics providers can take place. Further, elaborating on the levels and types of collaboration found in the SCM literature, Barratt (2004) has presented the directions in which collaborative relationship can be formed i.e. either vertical or horizontal collaboration. In this he has identified “The four different potential relationship partners, suppliers and customers on the vertical axis and complementors or competitors on the horizontal plain”. In addition, a new form of collaboration has also been identified called lateral collaboration, which is a form of combined relationship linking the benefits of vertical and horizontal collaboration (Mason et al., 2007).
(iv) Virtual collaboration:

It refers to a temporary tightly coupled collaborative effort between independent entities i.e. suppliers, customers, competitors linked by telecommunication technology Byrne (1993). It helps in accessing the global market, cost sharing and skills.

Matopoulos et al., (2007) in his study has presented the conceptual framework for supply chain collaboration and has observed that it is about organizations and enterprises working together and the relationships can be considered as beyond normal commercial relationships. In the words of Bowersox, 1990; Mentzer et al., 2000; Muchstadt et al., 2001; it can be understood as a notion which implies that the chain members (two or more than two) get involved and work together actively for coordinating activities spanning the boundaries of their organizations for fulfilling and satisfying customers’ needs.

Matopoulos et al., 2007; have suggested a general research framework for supply chain collaboration. In his framework, he has identified two pillars and distinguished them i.e. the one dealing with design and governing of supply chain activities and the other dealing with the establishment and maintenance of supply chain relationships.

(a) Designing and governing of supply chain activities:

The first step in this involves taking the decision regarding the selection of partner. This is so because companies interact with large number of suppliers and customers in the real world but not all of them can be involved into collaboration, as it is based on the perceived benefits and drawbacks, expectations and the “Business Fit” of companies.

The selection of activities on which collaboration would be established constitute the second step and the activities are defined as “Width” of collaboration. Elaborating on this Sahay (2003) says that companies should determine specific activities on which collaboration can be performed as all the activities do not require the same kind of involvement and close relationships.

The third step is the decision regarding the strategic, tactical and operational level and constitutes the “Depth” of collaboration (Chopra and Meindl, 2001; Fawcett and Magnan, 2002). The combination of above three elements mentioned above comprises the intensity of collaboration. As mentioned by Matopoulus et al., 2007 “The more the
depth (from operational level to tactical and strategic), the width (from simple supply chain activities to more complex such as new product development) and the number of entities, upstream/downstream) the more intense the collaboration is”.

The last step involves the decision regarding the selection of appropriate technique and technology for facilitating information sharing. This is considered as very complicated decision because all the members may not be able to meet the requirements in terms of technology and techniques.

(b) Establishment and maintenance of Supply chain relationships:

The second pillar identified by Matopoulus et al., (2007) is the establishment and maintenance of supply chain relation. Some of the critical elements in this cited by the authors like Barratt and Oliveira, 2001; Stank et al., 1999; are mutuality of benefits and sharing of risks and rewards. The other identified elements, in the literature like trust, power, and dependence also play an influential role in the company’s decision to collaborate.

Thus to summarize the above discussion, it can be said that collaboration in supply chain means different companies involve themselves in the flow of products and information from the raw materials to final consumer in order to fulfill the customer needs. The areas in which they collaborate, as identified by Anderson and Lee, 1999, 2001; Ellaram, 1995; Horvath, 2001; are supply chain design (procurement, transportation and distribution); manufacturing (planning, inventory management, product design and development) and for order fulfillment (including order processing, sales, customer service and demand management).

In the SCM literature, traditional supply chains are considered as a weakly connected activity both within and outside the organization due to which there exists a lack of cohesion that destroys value in the supply chain. As such according to Anderson and Lee, 1999; Bauknight, 2000, collaboration in supply chain have been recognized as a significant process which holds the value creation opportunity and drive effective supply chain management.

In the words of Lambert and Cooper (2000, p.76) a process “is a structure of activities designed for action with a focus on end customers and on the dynamic management of flows involving products, information, cash, knowledge and ideas”. According to Ellinger et al., (2000) collaboration has been widely mentioned as a process aimed at
creating competitive advantage through trust, mutual respect, joint decisions, information sharing and collective responsibility of outcomes between buyers and sellers. One of the pre-requisites for the supply chain process to be successful is that it should be flexible as far as possible to respond to the different customer requirements at minimum costs.

Eight key supply chain processes has been proposed by Croxton et al., (2001) which includes customer relationship management, supplier relationship management, demand management, order fulfillment, manufacturing flow management, new product development, commercialization and returns management. It has been observed that a company having a partnership with its suppliers and /or customers is forced to bring change in its relationships, expectations and job descriptions. Therefore, Hoyt and Huq (2000) have stated that for collaborative supply chain management to be successful, drastic actions are required for changing or redesigning the organizational structures and business processes. According to Poirier, 1999; it can be achieved in four levels i.e. “Sourcing and logistics” and “Internal excellence” as the first two levels focused internally and the two levels as “Network constructs” and “industry leadership”. However, companies face difficulties while “Aligning” their internal processes with suppliers and customers, (Kampstra et al., 2006). This is so because tactical and operational issues are not well understood. But an aspect which motivates the businesses to integrate their processes is the potential benefits associated with it. For example, Corbett et al., (1999) has empirically shown that process improvement in inventory management and order fulfillment led to better results when the chain members got involved in aligning joint optimization rules with logistics and commercial benefits.

Further, Bowersox et al., (1999) and Lambert (2006) have opined business process integration as the main source of competitive advantage within a firm and across firms. The three collaborative enablers that drive the shared supply chain processes leading to better supply chain performances are information sharing, incentive alignment and decision synchronization. For example, information sharing provides visibility and help in better decision making. With the help of information technology as a tool of collaboration, it leads to sharing of process between manufacturers. Like “CPFR” is a business process where in trading partners use technology and a standard set of business processes for collaboration on forecasts and plans for replenishing
product. Similarly, electronic data interchange (EDI) as a tool facilitate co-ordination and promote relationship building in supply chain (Hill and Scudder, 2002; Kim et al., 2006).

For collaborative supply chain management to work effectively and efficiently an appropriate amount of planning is necessary. Planning involves two critical steps or stages. At the first stage comes front–end agreement and joint business plan. The next stage includes forecast oriented steps i.e. sales forecast collaboration and order forecast collaboration. While developing front end agreement requirements of all partners and objectives are clarified. This aligns all parties around common objectives and guarantees adequate commitment to collaboration by all supply chain partners. The second step enables partners in exchanging information regarding product or item and involves joint business planning. According to Simatupang et al., (2002) for facilitating the coordination of planning and executing decisions between the participating members decision synchronization has been considered as a means. Fisher (1997) and Lee et al., (1997) have observed that decisions involving independent parties lead to sub-optimal performance where as joint decision making leads to the benefits of chain members. Decision synchronization also relates to the trade–off between centralization and decentralization. According to Sabath et al., (2001) centralization is required for firm level integration and coordination as it provides focus and long-term planning at the supply chain level whereas decentralization in selected areas like purchasing, logistics, inventory management leads to flexibility, improved operational efficiency and enhanced responsiveness.

It has been stated by Anderson and Lee (1999) that in order to achieve a “Synchronized Supply Chain”, industry participants “Collaborate on planning and execution”. However, according to Hoover et al., (2001) the benefits of planning in collaboration are significant only when collaboration is possible on a larger scale and it cannot be considered just as a solution between close partners but needs to be implemented with a larger number of different business partners.

In the context of supply chain, information sharing can be defined as the extent to which crucial information are available to the chain members. The shared information can be tactical i.e. related to purchasing, operation scheduling and logistics or strategic i.e. related to long-term corporate objectives, marketing and information of
the customer. In other words, it refers to the act of capturing and disseminating relevant and timely information to the decision makers for planning and controlling the supply chain operations. Simatupang and Sridharan (2002) have defined it as “The access to private data in all partners systems enabling the monitoring of the progress of products as they pass through each process in the supply chain”. It covers data acquisition, processing, representation, storage and dissemination of demand conditions, end–to-end inventory status and locations, order status, cost–related data and performance status.

Some of the criterion which is used to judge the contributions of information sharing leading to collaboration in supply chain are relevancy, accuracy, timeliness and reliability. In supply chain collaboration, information sharing has been considered as a starting point as it aims at capturing and disseminating timely and relevant information to the decision makers which enables them in planning and controlling the supply chain activities. Several studies like Bowersox et al., (2000), Cannon and Perreault (1999) have associated the success of buyer-supplier relationship with high levels of information sharing. Thus sharing of information has been recognized as the main requirement for inter-organizational collaborative relationships. One of the important factors responsible for information sharing becoming the main feature of supply chain collaboration is the advances in the information technology (IT). For example, internet, decision support systems, enterprise resource planning etc are used to convey latest data regarding product movement, workflow, cost and performance to facilitate information sharing with customers and partners. Some of the specific customer oriented IT applications include informational facility like online information about custom and standard products, frequently asked questions section, contact person, return policy etc and transactional facilities like online order, order modification, notification and tracking of orders, online payment security and technical assistance. Similarly, for supply chain partners IT application includes information regarding customer demand (like customer profiles, products, prices, locations, quantity and demand patterns); resource planning (like forecasting, shipping schedules, inventory, capacity, location, lead times and products) and contract status such as price, automatic ordering, order-status-tracking, invoicing, auction and electronic payments etc.
However, the success of coordinating the collection, processing and dissemination of information among the chain members depends upon the readiness of using the shared information while executing logistics tasks leading to the operational and financial performance. According to Patnayakuni et al., (2006); Zhou and Benton (2007), information sharing leads to three major advantages to the supply chain members. One, information is distributed throughout the supply chain, secondly closeness increases between the receivers and the senders and finally the members become able to act on new information in a timely manner. In the words of Truman (2000) information sharing helps in improving relationships through the integration of partner’s information system, decision systems and business processes leading to improved performance. Some of the researchers highlighting the importance of formal and informal information sharing between the trading partners indicate that it leads to increase in visibility and reduction in uncertainty (Brennan and Turnbull, 1999; Handfield and Bechtel, 2002). The extent of information shared helps in creating collaborative opportunities and removing of inefficiencies in the supply chain and significantly impact the buyer/ supplier relationship.

Several examples from the real world testify the above mentioned benefits of information sharing in supply chain collaboration. For instance, Wal-mart uses supplier information for setting the optimal inventory levels. Dell delivers finished product only when it has real demand from an end customer (Schonfeld, 1998). Similarly, orders and sales information are received by Benetton electronically from hundreds of companies agents located across the world (Camuffo et al., 2001; Dapiran, 1992). Another fashion firm Levis Strauss, while capitalizing on information sharing charges premium price for personally fitted jeans (Schonfeld, 1998). Also, in one of the survey study, conducted by Simatupang and Sridharan (2004) in 76 retail companies in New Zealand have found out that sharing of information significantly affected on time delivery, accuracy, fill rate and inventory performance, while it had moderate impact on lead time and flexibility.

The supply chain literature on collaboration has identified several areas/ activities were collaboration can take place like supply chain designing which includes (procurement, transportation and distribution), collaborative manufacturing which includes (inventory management, product design and development, manufacturing.

The determination of organizations competitiveness and the percentage of market share depend upon the type of the product. Further, it also helps in capturing suppliers and customer’s information leading to the measurement of their involvement in product development activities. Olsen and Ellram (1997) have acknowledged item (Product) critically as a key in buyer-supplier relationship and says that more critical items has more expectancy of developing relationships. Some of the characteristics which operationalises the items criticality are value addition in the product line, percentage of raw material in total cost and their profitability impact, supply scarcity, pace of technology/material substitution, entry barriers, logistics cost or complexity etc.

Further, Bensaou, 1999 and Holweg et al., (2005) have also identified some of the characteristics of item criticality like technical complexity, novelty of technology, frequency of design changes, the level of customization required and short shelf life and high-item value.

Collaboration on forecasts between companies helps in increasing efficiency and decrease in costs as valuable resources are spent by the companies on responding to unexpected conditions (Andarski, 1998; Stank and House, 2001). Similarly, Ireland and Bruce ( 2000) considers forecasts to be a pivotal business function, which when not strategically, systematically coordinated between firms can contribute to disruption of activities at the point between trading partners where product is planned, ordered and replenished. As such collaborative forecasting provides a substantial opportunity for improved supply chain performance and should be viewed by the firms as priority (Helms et al., 2000).

The existing literature on collaborative forecasting falls into two categories. First, the intra firm collaborative forecasting efforts among functional business units within a firm (Diehn, 2000, 2001; Lapide, 1999; Reese, 2000, 2001; Wilson, 2001). Second, the inter firm collaborative forecasting among trading partners (Ackerman, 2000; Andarski, 1999; Barratt and Oliveira, 2001; Ireland and Bruce, 2000; Vics, 1999). According to Burgin et al., (2000) inter firm collaborative forecasting extends the process beyond the four walls of an enterprise and include the trading partners either
face to face or electronically while forecasting. Some of the essentials of collaborative forecasting are trust and reliance on supply chain partners in providing accurate, detailed and timely demand information.

Coyle et al., (2003) has defined transportation as “The physical link connecting the fix points in a logistics supply chain” (Coyle et al, 2003). It has been considered by Christopher and Towill (2000), and Ellram (1991) as the key integral process for planning and control of material flow, for delivering superior value to the end customer and contributing to the overall goal of successful supply chain management. According to Daganzo (1998) and Fleischmann (1998) distribution system can be efficient in the collaborative arrangement only if the transportation network is efficient. This is because of the interaction between the distribution structures and transportation structures, where the cost of transport and performance are considered to be an important factor in deciding about the distribution structure.

Inventory has been considered as a critical supply chain resource. For most of the managers, it is an asset, time buffer and insurance against any wrong doings. According to Zipkin (2000), inventory performance has been considered as a vital measure of supply chain effectiveness as well as one of the most sought after goals of supply chain collaboration initiatives. It touches every value added activity of a firm from new product development to logistics, sourcing, operation and sales (Fawcett and Fawcett, 1995; Mentzer et al., 2008). Some of its requirement is clear and frequent communication, close coordination of efforts; open sharing of sensitive strategic plans and excellent tracking systems.

Frankel et al, (2002) observes that few companies have adopted the significant change in philosophy and practices required to manage inventory collaboratively. On the other hand Angulo et al.,2004; Boddy et al.,1998; Ellinger et al., 2006; Fawcett et al.,2007; Moberg et al., 2003; Yao and Dresner, 2008; believe that despite exemplary success achieved by some companies, many firms have failed to achieve desired performance improvement through their collaborative inventory management practices. The companies have also struggled in achieving coordinated inventory flows due to lack of investment in technological and organizational structures (Fawcett et al., 2006; Stank et al., 1999). However companies like Toyota, Dell and Wal -mart have illustrated the value of collaborative inventory management and have
achieved difficult to replicate strategic advantage and better than financial returns (Dyer, 1996; Fawcett et al., 2009 b; Frohlich and Westbrook, 2001; Liker and Choi, 2004; and Stank et al., 1990).

Many Writers such as Christopher, 1998; Gattorna and Walters, 1996; Gunasekaran et al., 2001; Hines, 1994; Lamming, 1993 and Lewis, 1990; have recognized collaboration as a means of establishing closer and long term working relationship with suppliers and customers at various levels in the chain. Goffin et al., (2006) highlights the need for identifying potential partners before entering into collaboration. Elaborating on this Vereecke and Muylle (2006) gives importance to the accuracy in making choices about working closely as supply chain collaboration with anybody and everybody does not always lead to improvement.

Collaboration as a new source of competitive advantage has emerged for the companies due to globalization (Dyer and Singh, 1998). According to Horvath (2001) and Spekman et al., (1998) supply chain collaboration has been regarded as the new strategy for creating competitive advantage by the companies. In recent years, manufacturing firms have led emphasis on collaboration in supply chain as a means of achieving competitive goals. Collaborative manufacturing practices have been found to maximize the effectiveness of value chain leading to profits and addressing the ever changing market demands. Fischer (1997) observes that by working closely supply chain members can create and capture mutual benefits, which according to Walker et al., (2000) can translate into very positive return on investment and more efficient inventory management.

In the production process fast development of new products have increased the difficulties of manufacturing companies, as such they are required to restructure their functions and positions in the industry. Thus, according to Bowersox (1990) and Lee et al., (1997) a closer relationship can be seen as a solution as it may help the participating companies in achieving reduction in cost, revenue enhancement and flexibility in dealing with supply and demand uncertainties. For instance, Hewlett-Packard (HP), while collaborating with one of its major resellers achieved improvement in fill rate, increase in inventory turnover and sales (Callioni and Ballington, 2001). Similarly, Wal-Mart attained mutual benefits of collaborative planning, forecasting and replenishment by collaborating with Warner-Lambert (Parks, 2001). As mentioned by Kotler (1997) the basic reason of firms entering into collaboration was that they cannot compete individually. Elaborating on this Anderson and Narus (1990) have said that most of the firms coordinated along the cross firm activities, in order to
achieve superior performance. More specifically, Lambert et al., (1998) mentioned that companies obtain for inter firm collaborative arrangement for sharing risks and rewards and for securing higher performance which they could not achieve individually.

According to Akintoye el al., (2000) the key factor informing supply chain collaboration is the trust between all parties that is suppliers, manufacturers and customers. Further, trust leads to other factors such as mutual help, openness, common development of interest and resource synchronization. Defining trust in the context of SCM, Doney and Cannon (1997) and Ganesan, (1994) refer it as “the extent to which supply chain partners perceive each other as credible and benevolent” (Doney and Cannon, 1997; Ganesan, 1994). In the words of Spekman et al., (1998 p.635) trust is not only a desired characteristic but a necessity for collaborative arrangement. Due to trust coordination improves, process become reliable and quality of information is improved as a result of which purchasing cost decreases (Zaheer et al., 1998). In addition to trust, according to Moorman et al., (1992, p.316) commitment is an “enduring desire to maintain a valued relationship” (Moorman et al, 1992, p.316). As stated by Grifix et al., (2004) shared goals, open communication and a commitment of sharing information, joint problem solving and rapid response to failures to meet expectation were the main drivers for successful collaboration in supply chain.

In the SCM literature both commitment and trust has been identified as key variables for collaboration (Morgan and Hunt, 1994). Trust has a positive influence on commitment. For instance Narayandas and Rangan (2004) have found that inter personal trust in a buyer supplier relationship facilitated the development of inter organizational commitment in a mature industrial market. Similarly, Zineldin and Jonsson (2000) has identified that commitment from every member in the supply chain was a strategic factor leading to the improvement in the effectiveness of the supplier customer relationship. On the other hand, Morgan and Hunt (1994) had found out that negative influence of commitment in a relationship reduces collaboration and success.

Thus, it can be contented that both commitment and trust leads to increasing collaboration but trust is crucial factor for the development of commitment.

Supply chain relationships involve a higher degree of interdependency between competitors (La Londe, 2002). It is defined as the resource dependencies among partners for the achievement of mutual benefits (Mohr and Spekman, 1994). According to Heikkila (2002) it
refers to the need of maintaining a relationship with the partner for achieving its goals. It exists when one party do not have entire control in the supply chain operations.

Organizational compatibility refers to “Complementarities in goals and objectives as well as similarity in operating philosophies and corporate cultures” (Buklin and Sengupta, 1993, p.35). According to Niederkofler (1991) if the partners do not match each other’s operating requirements, culture and structure then it becomes very difficult to achieve cooperation. It has also been found that after the relationship becomes operational, large manufacturers tend to create obstacles for their smaller suppliers. Therefore, large firms in the supply chain context need to fill the gap enthusiastically in order to create operational compatibility. For example, Nokia mobile phone (NMP) collaborates closely with its upstream supply partners to develop and manufacture its new product line while it interacts with its downstream partners to obtain customer input and seize new market opportunities. It has put forward several IT initiatives and intensive information exchange between its upstream and downstream partners leading to the creation of a flexible and efficient supply chain network. As a result of these initiatives it is having the second best supply chain network, after Dell computers (O’ Marah, 2004).

Highlighting the importance of quality of leadership, Kidd et al., (2003) observes that within the supply chain firms leadership acts as an important driver, as it helps in shaping the culture of the firm and also management perception in the alliances. In the words of Kotler (1996) “Collaboration leaders is the most important strategic partner together with collaboration coordinator and no successful transformational changes can occur without proper leadership” (Kotler, 1996). Providing incentives to suppliers and customers for their commitment and performance also help in developing good relationship among OEMs, suppliers and customers. On similar lines Peterson et al., (2000) is of the view that sharing of rewards and penalties within the chain act as a mechanism for driving efficiency and unity. Jassawala and Sashittal (1998) have found out that more equitable distribution of power among the chain members leads to a more collaborative firm.

Apart from the above mentioned factors infrastructure/ technologies such as database, information system and the internet also plays an important role in making CSCM a success. For instance, linking of the supply chain partners through information sharing mechanism
leading to transparency have been considered as one of the most critical drivers for successful supply chains (Min and Zhou, 2002).

Some of the drivers identified in the SCM literature leading to supply chain collaboration are presented in Table 2 as under:

<table>
<thead>
<tr>
<th>Authors</th>
<th>Driving Forces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lewis, 1990</td>
<td>Increase in market share, asset utilization, Enhancement in customer service, improvement in quality of product, skill enhancement and economies of scale in production.</td>
</tr>
<tr>
<td>Paster, 2000</td>
<td>Decrease in the risk of failure of product development.</td>
</tr>
<tr>
<td>Holton, 2001; Parker, 2000</td>
<td>Reduced inventory (In the face of technological complexity and rapid rate of product development and obsolescence).</td>
</tr>
<tr>
<td>McCarthy and Golicic, 2002; Parker, 2000</td>
<td>Gaining rapid access to market.</td>
</tr>
<tr>
<td>Horvath, 2001; Lewis, 1990; Mclaren et al., 2000; Parker, 2000</td>
<td>Sharing and reduction in the cost of product development.</td>
</tr>
<tr>
<td>Lewis, 1990; McCarthy and Golicic, 2002; Mclaren et al., 2000; Parker, 2000</td>
<td>Reduced time in product development.</td>
</tr>
</tbody>
</table>

**Conclusion:**

This paper covers a literature review of eighty studies pertaining to supply chain collaboration undertaken in the period of 19 years that is from 1990-2009. It is noted that supply chain collaboration can be in various areas such as process, planning, information
sharing, forecasting, transportation/distribution, inventory management and strategic planning. Further, various factors which motivates a manufacturer into supply chain collaboration and have a significant bearing on its working are identified as trust/commitment, interdependence, organizational compatibility, leadership, and infrastructure/technology members. Interdependence implies resource dependence, where by each partner supplements the deficiency of the other: as a result collaboration is mutually beneficial. Organizational compatibility is achieved by matching each other’s operating requirements, culture and structure. Leadership helps in molding the culture of the organization and also enables better management perception in the alliance. Lastly, infrastructure and technology links the supply chain partners and brings about transparency in the entire supply chain.

Trust leads to commitment among collaborating members and commitment further leads to improvement in effectiveness of relationship among the collaborating
References


