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# Competitive Advantage Through Supply Chain Collaboration – An Empirical Study of the Indian Textile Industry

## Abstract

*The Indian textile industry is an important component of the Indian economy, which contributes 37% of export earnings, 20% of industrial production and 4% to the nation's GDP. The application of supply chain management in the Indian textile supply chain is in its nascent stage. Supply chain collaboration in the textile supply chain has emerged as a dominant theme in supply chain management and it paves the way for competitive advantage. This study gives a brief scenario of the textile industry across the globe. It tries to identify the factors influencing supply chain collaboration and its relationship with competitive advantage. The study includes 235 supply chain partners of the textile industry of Tamil Nadu. The Visual PLS Software package and SPSS (Statistical package for social science – 16.0) were used for analysis. Structural equation modelling was used to prove the thesis along with a reliability analysis. The result shows a positive relationship between supply chain collaboration and competitive advantage among supply chain partners.*

**Key words:** *textile supply chain management, supply chain collaboration, competitive advantage, Indian textiles.*

## ■ Introduction

Textile manufacturing and exports is an important component of the Indian economy. It accounts for over 20 percent of industrial production and is closely linked with the agricultural and rural economy. According to the Report of Ministry of Textiles 2007 - 2012 it is the single largest employer in the industrial sector. About 38 million people are employed in Textile industry sectors like ginning, agriculture, pressing, cotton trade and jute, and the total employment is estimated at 93 million. The net foreign exchange earnings in this sector is one of the highest and account for over 37 percent of total export earnings at over US \$ 10 billion. Indian Textiles alone account for about 27 percent of India's total FOREX earnings and contributes about 4% to the nation's GDP [1]. 22% of exports are textiles and 43% apparel to various countries. The textile industry is a long chain including raw materials, production, complement production, clothing production and so on. The textile supply chain is a long, complex, fragmented and unorganised sector [2]. Supply chain partners are striving to attain a competitive advantage by applying the strategies of supply chain management.

Even though the supply chain management concept is well-known in India and believed that it can improve the competitive advantage, the application of supply chain management in the Indian textiles industry is at a nascent stage. Hence it is appropriate to apply supply chain management to the Indian Textile Industry.

Supply chain collaboration in the textile supply chain is that between suppliers and buyers (supply chain partners) existing in the chain. The supply chain partners are cotton producers, ginners, yarn suppliers, manufacturers, wholesalers and retailers. Collaboration among them can bring benefits to all the partners. It is evident they can improve profitability, reduce waste, inventory, lead-time and contribute more valuable relationships between supply chain partners. Increasing competition in the textile market makes supply chain management (SCM) a viable initiative that enhances sustainable competitive advantage. Attaining a competitive textile and apparel supply chain network needs innovation, efficiency, flexibility, and high quality as their strong strategic approaches [3]. Researches state that firms collaborating with their customers and suppliers has emerged as a dominant theme in supply chain management [4]. Success in the marketplace requires industry to find suppliers who can produce quality products at a low cost in a timely manner. Researches express that to achieve competitive advantage, higher levels of collaboration is essential among supply chain partners [5]. Curwen et al. [6] states that supplier partnership is the critical factor in managing a supply chain in the manufacturing sector. It is important to know supply chain management practices in the textile and apparel industry and to explore the industry's perception of the business environment. Growing customer demand has also forced the industry to move towards vendor management inventory, collaboration, planning, forecasting and replenishment as well as

efficient customer response for effective supply chain collaboration. Supply chain management in the textile industry is a cutting edge tool for the industry to enhance its competence. It is also an important stage for the Indian textile industry to advance and upgrade its position in the global industry chain [7]. Only then would the industry be able to move towards supply chain collaboration, supply chain strategies and an efficient supply chain to compete globally [8]. Hence this study tries to measure key variable supply chain collaboration and its relationship with the competitive advantage of Indian textiles. This study also focuses on the textile cluster in Tamilnadu and its current supply chain practices, which would represent the nation's textile supply chains. The indicators of supply chain collaboration are top management commitment, trust, long-term relationship, information sharing and risk & reward sharing. The indicators of competitive advantage are cost, differentiation and focus, which are considered in this study. This study also reveals a systematic representation of global practices, especially those of the Chinese, Bangladesh and Hong-Kong textile industries, through intensive literature analysis as part of remarkable researches into textile supply chain management.

## ■ Global supply chain scenario

### Chinese textile industry

The Chinese textile industry has developed rapidly and gradually formed a perfect industry system, ranging from upstream textile fiber material processing to the manufacture of garment, home and industrial textiles. In 2007 the textile industry achieved an industrial added value of 812.6 billion Yuan, accounting for 6.9% of the total industrial added value and 3.3% of China's GDP. China shared about 30% of the total textile and garment trade volume in the international market. In the international market share the country has been ranked as the world's top for more than ten years continuously. The industry has absorbed more than 20 million employees, 80% of which have been from the rural population. The use of raw materials, e.g. cotton, hemp, silk and other natural fibre, also benefits more than 100 million local peasants. China has become the world's largest producer and exporter of textiles and apparel. The capacity and level of production and processing of China's

textile industry is seriously incompatible with its position in the international industrial chain, resulting from the period of rapid upgrade and adjustment since its accession to the WTO, which has been obviously painful.

The China National Textile and Apparel Council (CNTAC) supervises the Responsible Supply Chain Association (RSCA), which is a trade committee consisting of enterprises, purchasers, and other institutions in the supply chain. The RSCA aims at combining multi-stakeholder efforts to advocate and promote social responsibility in order to help enterprises enhance their capacity for managing social responsibility. China's textile supply chain focuses on improving information efficiency in the industry chain of "information catching - product designing - product manufacturing", which is the key to enterprise success. In addition it subdivides the high specialisation market by implementing supply chain management, after which the enterprise moves to sales promotion with pertinence and finally forms a steady customer base. They concentrate on supply chain practices along with environmental issues.

In regards to an efficient textile supply chain and handling problems such as high transaction costs, a long transaction process and irrational resource collocation in the textile industry, a "one-stop" E-commerce model of the textile industry was put forward. Through integration and consolidation of supply chain resources it provided services to manufacturers, raw material suppliers, distributors and consumers in a uniform and exoteric manner. On this basis, it designed the architecture and functional composition of a supply chain resource integration platform in detail for the textile industry. Then it used J2EE technology and adapted Struts and Hibernate, respectively, as a web application framework and database package that effectively enhance system maintainability, scalability and configurability.

### Hong Kong textile industry

Hong Kong has become an important sourcing and control centre for the global garment industry, with production plants in China, Indonesia, Thailand and India (Hong Kong Government Industry Department, 1995). Although billions of dollars of apparel business are conducted

in Hong Kong, relatively little knowledge of the management of supply chains is reported in research published. Technologies of electronic data interchange (EDI), flexible manufacturing, automated warehousing and rapid logistics appear to achieve little improvement in supply chain management [9]. New management concepts such as quick response, efficient consumer response, mass customisation and lean manufacturing again and again fail to deliver cost saving and performance improvements in the supply chain.

Hong Kong's export industries save up to HK\$9.2 billion (Australian \$2.1 billion) on logistics and administration costs. The consultants concluded that the route for Hong Kong to excellence is to become the supply chain management thought-leader in global trade. The consultants further suggested that speed sourcing and replenishment are two key factors for Hong Kong to succeed in global supply chain management (HKANA, 1997). The two Hong Kong reports clearly show how important supply chain management is to Hong Kong's domestic and export industry. Hong Kong industry in general is not well prepared for supply chain management, but the textile and apparel industry in Hong Kong is quite different. A report on techno-economics and market research study of Hong Kong's textile, clothing and footwear industries (Trade and Industry Department, Hong Kong Government, 2000) show that some supply chain management is already being undertaken by large enterprises in Hong Kong in response to demand from their buyers for supply chain co-ordination. The tactics include the integration of the supply chain through vendor partnership, streamlining of the supply chain through elimination of intermediaries, and focusing on core competency to gain competitive advantage. Two local supply chain management studies have been conducted in Hong Kong. The bottleneck to the implementation of supply chains in Hong Kong was identified in terms of technology, information sharing, training and skill in understanding the supply chain management concept. Only 4 per cent of those surveyed indicated that they were "quite knowledgeable" about supply chain management. About 27 per cent of those surveyed had "heard the term, but that's all", and over 52 per cent mentioned that they had "never heard of it".

## Bangladesh textile industry

The textile industry has played an important role in Bangladesh's economy for a long time. Currently the textile industry in Bangladesh accounts for 45 percent of all industrial employment and contributes 5 percent to the total national income. The industry employs nearly 4 million people, mostly women. Almost 78 percent of the country's export earnings come from textiles and apparel. Bangladesh exports its apparel products, worth nearly \$5 billion per year, to the United States, the European Union (EU), Canada and other countries of the world. It is the sixth largest apparel supplier to the United States and EU countries. Regarding Bangladeshi ready-made garments [10] focused on managing the lead time. Shamsuzzaman et al. [11] undertook a performance evaluation of the supply chain in the knitwear industry. The supply chain operation reference model was used to measure the supply chain performance of the readymade garment industry [12]. Their research on supply chain practices highlights the efficiency of adopting the best practices for the supply chain.

## ■ Review of literature

### Textile supply chain management

Supply chain management is the supporting tool for efficient business processes. All industries have started adapting supply chain management to compete globally. Textiles are no way an exception to this strategy. Ha-Brookshire et al. [13] states that one must acknowledge businesses' social and environmental practices along with all business decisions and strategies based on profit maximisation. Therefore the goals of supply chain members' activities must gauge both financial and nonfinancial consequences. Global textile contributors like the U.S, China, Hong Kong, Bangladesh, Pakistan, Turkey and India have started adapting supply chain strategies to sustain successfully. Researches on the supply chain started in the early 90's across various industries. The following literatures try to visualise the importance of textile supply chain management simultaneously with supply chain collaborations, which leads to competitiveness.

Fragmentation has made the U.S. textile and apparel industry more vulnerable in facing global competition [14]. Teng and Jaramillo [15] provide recommendations based on the evaluation of strengths and

weaknesses that may be used as references for small companies to increase their potential to be active partners in the US supply chain. Jinfu and Aixiang [16] give an insight into the application of e-commerce and the supply chain in the textile and apparel industry and how it improves Chinese textiles. In the Chinese textile industry researches have focused on the concept of the rapid-response eco-supply chain [17]. Lam and Postle [18] studied the awareness of supply chain management practices in Hong Kong textiles and provided a selected bibliography to develop supply chain strategies. Today, from clothing and textile producers' perspective, their supply chain is extremely fragmented and globalised [19].

Koprulu and Albayrakoglu Murat [20] suggest that firms have to be managed to derive maximum potential in the supply chain, and the selection of the supplier is the most critical task in supply management. In [21] the paper discusses supply chain flexibility in an uncertain environment reveals that unpredictable dynamics of the supply chain can arise from a variety of internal and external sources, including suppliers, operating systems, customers and competitors.

Indian textiles researches on supply chain practices have approached the issue from different perspectives. SCM practices have not yet been very widely adopted in developing countries like India. Ramesh et al. [22] assessed the present status of SCM practices in Indian manufacturing organizations. Venu and Haesun [23] discussed the influence of technology adoption on Indian apparel manufacturing firms, its effect on organisational factors and competitive advantage. Anbanandam [24] investigated the problems of global competition and provided critical insights into a firm's strategy and challenges. Effective SCM of the textile industry includes lower inventories, lower costs, higher productivity, greater flexibility, shorter lead times, higher profits and loyalty. Vereecke and Muylle [25] studied textile industry productivity and financial efficiency, focusing on the industry's current position and its performance. It concluded that company/management should try to increase production, minimise cost and operating expenses, and exercise proper control of liquidity i.e. the reduction of power, fuel, borrowing funds, overheads, interest burdens, etc.... This study builds a knowledge base for technology adoption in apparel manufac-

turing and shows influential factors in developing countries. All current researches are focused on enhancing supply chain practices; the leading textile players have started applying the concept as well strategic supply chain practices to achieve competitive advantage. To summarise, the important aspects of efficient supply chain practices are supply chain collaboration, supplier selection, supply chain flexibility, supply chain responsiveness and adoption of maturity models.

### Supply chain collaboration

Many researches on supply chain management have focused on strategic supplier partnership, customer relationship, inventory management, sales forecasting and logistics management. The need of today is close coordination with suppliers and customers, as customer demand requires faster, timely and accurate deliveries [26]. A single organisation often may not be able to respond quickly to changing market requirements. Temporary alliances or partnerships with trading partners help to improve the flexibility and responsiveness of organisations [27]. Supply chain collaboration is viewed as working together as a team where supply chain members are able to share information, make joint decisions, and share benefits [28]. Researchers developed a supply chain collaboration index to measure it in terms of strategic alliances, supplier relationship, customer relationship as well as internal and external integration in manufacturing and service sectors of the Philippines. The five dimensions of supply chain collaboration pave the way to efficient supply chain management [29]. The involvement of suppliers in a firm's activities will influence its performance; customer and supplier relations are positively related [30]. Kumar [31] proposed a model for measuring collaboration considering variables like top management commitment, information sharing, trust, a long term relationship and risk & reward sharing among supply chain partners in the textile apparel industry of India. It is well understood from the literature that the indicators of supply chain collaboration: top management commitment, information sharing, trust, long term relationship, and risk & reward sharing fit well in the context of textile supply chain partners. All these are interlinked and related to each other. Every supply chain partner needs them to improve their competitive advantage.



## Competitive advantage

“The capability of an organization to create a defensible position over its competitors” is termed as competitive advantage. McGinnis and Vallorpa [32] state that the greater the collaboration at all levels between the supplier and customer, the greater the likelihood that a competitive advantage can be gained by organisations. The advantages of supplier participation in new product development include reduced project costs [33], and improved perceived product quality [34]. Extensive coordination with suppliers and involving them in the new product development process has been found to enhance the ability of organisations to develop successful new products, and thus gain a competitive advantage in the market place. Ragatz et al. [35] found that supplier integration can reduce material costs and quality, product development time and cost, and manufacturing cost while improving functionality. A long-term relationship with the supplier will have a lasting effect on the competitiveness of the entire supply chain [36]. Daugherty et al. [37] describes competitiveness as a comparison between a firm’s performance and standard performance, specifically standard performance in the industry, in terms of quality, flexibility, delivery, innovation, cost and learning. Hence from the reviews competitive advantage is represented by five indicators: price, quality, delivery, dependability, lead time and product innovation. In this study focus advantage, cost advantage and competitive advantage were taken into consideration. The hypothesis (H1) was formulated as: “Supply chain collaboration influences competitive advantage”.

## Research objectives

To identify the factors influencing supply chain collaboration among textile supply chain partners in the Indian textile industry.

To assess the relationship between supply chain collaboration and competitive advantage among textile supply chain partners in the Indian textile industry.

## Research methodology

The research design is descriptive, involving both primary and secondary data. The primary data was collected through a comprehensive survey questionnaire

that gathered the facts, figures as well as qualitative responses about supply chain practices among textile supply chain partners in Tamilnadu Textiles. Tamilnadu’s major textile centers are Erode, Salem, Tirupur, Karur, Madurai and Coimbatore. It is referred to as the “TEX VALLEY” of India. Mari [38], being the sample of this study. TEX Valley contributes 50% to the nation’s textiles sectors of raw material, production, trading and exports. The supply chain partners, namely cloth manufacturers, wholesalers and retailers were the sampling frame. The sampling design was based on convenient sampling and the snowball sampling method, with sample size of 235.

Initially a relevancy test was conducted to make sure about the questionnaire, scoring well at about 96.4%. The variables and indicators of the questionnaire were justified to be relevant to the textile sector. The questionnaire consists of three parts: First it measured the demographics of the respondents, secondly the key elements of supply chain collaboration, top management commitment, long term relationship, information sharing, trust, risk & reward sharing and the competitive advantage of the firm. The questions were framed using the five point Likert scale.

A Visual PLS Software package and SPSS (statistical package for social science – 16.0) were used for analysis. Structural equation modeling (SEM) expresses the relationship among several variables that can be either directly observed (manifest) or unobserved hypothetical (latent) variables. SEM is a powerful statistical tool that combines a measurement model (affirmative factor analysis) and structural model (regression of path analysis) in one statistical synchronic test.

## Analysis and results

The factors influencing supply chain collaboration are top management commitment, trust, long term relationship, information sharing and risk & reward sharing. The frequency analysis, revealing the percentage of influence, is exhibited in *Table 1*.

Top management commitment and information sharing score above 80%, which shows that buyer–supplier commitment, followed by information sharing, is satisfactory. Trust is the factor that results

**Table 1.** Indicators of supply chain collaboration.

Indicator	Percentage of influence
Top management commitment	87%
Trust	76%
Long term relationship	64%
Information sharing	81%
Risk & reward sharing	62%

**Table 2.** Alpha values for constructs.

Variables	Alpha
Supply chain collaboration	0.833
Competitive advantage	0.856

of satisfied Information sharing which scores 76%. The sharing of information and trust help to mitigate risk in the supply chain. Long term relationship and risk and reward sharing is 64% and 62%, respectively. The fragmented nature of the supply chain, a lack of contractual business, the choice of supplier and changes in business decisions were reflected. Measuring the indicators of collaborative practices assists chain members in identifying the shortcomings of their current levels and identifying possible initiatives to remedy them. Indian textile supply chain partners adhere to the factors of supply chain collaboration, but the indicators of information and risk & reward sharing need attention. The length of a relationship increases the level of cooperation in terms of coordination, participation and joint problem solving, which are good indicators of successful partnerships; thus SCM requires partners to build and maintain a long-term relationship.

The accuracy of the constructs is tested by Reliability tests. Cronbach’s coefficient alpha was computed for each construct to test its reliability. According to [39], an alpha score of larger than 0.7 is generally acceptable as sufficient accuracy for a construct. The reliability of each construct was measured by CITC values (corrected item total correlation) of all its indicators (*Table 2*).

Every construct’s alpha value exceeds 0.8, which proves good reliability. After getting purified data by conducting a reliability test, the constructs were tested for their convergent validity. Convergent validity is used to indicate the degree of association among the measures of a construct. Average variance extracted (AVE) values are the indicators for

the validity. An AVE value of above 0.5 indicates good convergent validity. The AVE values for all the constructs exceeded 0.5, which proves good convergent validity.

After conducting the reliability and validity tests, the hypothesis proposed was tested by conducting structural equation modeling to measure the standardised path coefficient. The bootstrap procedure was employed in Visual-PLS software to get t-statistics of the construct. The t value is an indicator confirming the significance level of the hypothesis or path model relationship. A t-statistic of more than two leads to the acceptance of the hypothesis. The t value of the construct is 2.651, hence hypothesis H1 is statistically accepted.

Therefore we interpret that supply chain collaboration has a positive influence on competitive advantage, which is similar to the studies in [40]. A well-focused collaborative effort can improve profitability, reduce waste, and contribute to more valuable relationships between wholesalers, retailers and their manufacturing partners. Since the industry is mostly unorganised, the supply chain partner's level of collaboration reflects the efficiency of the industry. It is true that in the case of the Indian textile industry supply chain partners must improve their long term relationship and risk & reward sharing.

## Conclusion

This study proves that the Indian textile industry is moving towards developing efficient supply chain strategies. The factors of collaboration were identified by using five dimensions, namely top management commitment, information sharing, trust among supply chain partners, long-term relationship and risk and reward sharing [29]. A total of 235 companies participated in the research. The survey results proved that the methodology of quantifying collaboration proposed was highly reliable and adequately valid. The research showed the positive relationship between supply chain collaboration and competitive advantage. In a long-term perspective the intensity of buyer-supplier coordination in the Indian textile industry, such as provision of technological and managerial assistance and exchange of information during product development and production stages, needs more attention. Supply chain partners have to balance

supply chain considerations, including production and distribution costs, inventory carrying costs, product quality, supply chain speed and competitive trends. The study proves that competitive advantage through supply chain collaboration leads to the synchronisation of the buyer-supplier relationship.

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  - tenacity
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  - thickness-mechanical scanning method
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