Dynamics Of Garment Supply Chain Indian Garment Industry

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Abstract: The study's goal is to investigate the garment industry's supply chain structure in India. The Indian garment industry is one of the most diverse in the world, with a wide range of products, complexities. The study's goal is to look at the supply chain's current structure at every level, from raw materials to finished goods, from the raw material through the finished garment till it reaches the consumer, in addition, the research investigates the area of an appropriate supply chain structure that addresses, the primary supply chain problems. This is a unique opportunity, an exploratory research project that looks at the structures and concerns at every level of the organization of the supplier chain. The study is based on secondary data as well as a review of relevant literature. According to the survey, the Indian garment sector has supply chain challenges such as inventory management, visibility, lead time, cooperation, technology, and logistics, which are shared by all firms in the supply chain. The sizes and product offerings of the enterprises fluctuate based on their target consumer groups. The research also suggests the ideal supply chain strategy for each company type and product delivered.

Key Words: —*Garment sector - India, Supply chain management analysis, Quick response, Inventory management, Collaboration in the supply chain, product-specific supply chain.*

I. INTRODUCTION

The textile and garment sector are one of India's most important industries, accounting for a significant portion of the country's GDP. The Textile and garment industry analysis of India for a period is significant not only in the Indian market, but it also has a recognized presence and high status in the worldwide market. one of the world's top textile and clothing industries The Indian textile's structure and the garment industry is rife with variation, with players at every level of their supply chain characterized by a wide range of structural, operational, and performance characteristics The industry is comprised of many organized entities that are highly structured, capital intensive, and account for the majority of the market's brand value, as well as small scale, non-integrated spinning, weaving, finishing, and apparel-making enterprises and handicrafts dominated by handlooms and power looms.

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Currently, the Indian textile industry accounts for around 14 percent of industrial production, 4 percent of GDP, and 17 percent of export revenues. It employs more than 35 million people in the country and is the country's second-largest employer after agriculture.

In the fiscal year 2010-11, total textile output was 59556 million square meters, with the mill sector producing 2205 million square meters. Even though the Indian garment industry is one of the top industries in the sector in the world market, its structure in Indian circumstances is diverse, with various infrastructural challenges and different structures of actors participating at every level. These concerns have an impact on the supply chains of firms that are already dealing with numerous supply chain and logistics challenges. The fundamental supply chain difficulties confronting India's clothing sector are examined later in the report.

II. SUPPLY CHAIN IN INDIA

The paper first explores the structure of India's garment industry, then describes its issues based on a review of the available literature and offers a viable supply chain architecture with appropriate supply chain strategies based on corporate structures, their product portfolio. The study here investigates numerous aspects of the supply chain based on an

examination of the existing literature.

Fiber and yarn manufacturing, fabrication, clothing, distribution, and retailing are the major processes in the garment supply chain. The garment industry's supply chain structure in India encompasses a diverse range of enterprises, each with its own size and operating variances at each level of the chain. The differences are based not only on operational and structural variability at distinct phases, i.e., discrepancies between members of two stages, but also on differences between counterparts competing at the same stages. Despite this, the stage-by-stage variance between the actors and their actions is obvious, and supply chain practitioners must pay close attention.

III. OBJECTIVE

- To investigate the garment industry's supply chain structure in India
- To look at the supply chain's current structure at every level, from raw materials to finished goods, from the raw material through the finished garment till it reaches the consumer.
- Investigates the area of an appropriate supply chain structure that addresses, the primary supply chain problems/challenges.
- To identify the relationship between supply chain collaboration and competitive advantage among the textile supply chain partners in the Indian textile industry.

3.1 Research Methodology

The study is descriptive in nature, and both primary and secondary data are employed. To collect primary data, a thorough survey questionnaire was employed. Tamandu Textiles supplier chain partners provided us with data, numbers, and qualitative feedback on supply chain procedures. The major textile centers in Tamil Nadu include Erode, Salem, Tirupur, Karur, Madurai, and Coimbatore. It is known as the "TEX VALLEY" in India, and it served as the study's sample. TEX Valley provides 50% of the country's textile raw materials, manufacturing, trading, and exports.

IV. LITERATURE REVIEW

In 2007, the worldwide apparel market was estimated at $345 billion, and it grew at an annual pace of 8% during the preceding decade. Furthermore, according to the NSS Report on Household Consumption of Various Goods and Services in India, 2007, the proportion of households purchasing readymade garments increased by approximately 75% in both rural and urban areas between 1993-94 and 2004-05, while the proportion purchasing hosiery articles increased threefold. In the framework of this larger canvas of the Indian textiles sector, we provide two garment clusters. Small and medium-sized clothing manufacturers and exporters. Satyaki Roy, Garment Industry in *India (2009, Satyaki Roy).*

Grey/unprocessed items such as grey yarn and grey cloth are where India's competitiveness lies. Due to a restricted legislative regime in the past, the dyeing and processing component of the Indian textiles industry is not as technologically sophisticated. Domestically colored and treated yarn and fabric are of lower quality because of this. As a result, grey yarn, and fabric account for a far bigger percentage of Indian textile exports than colored and finished yarn and fabric. Business integration, particularly forward integration, has been significant among the major textile industries in Indian businesses**.** *(Alqa Aziz, Indian Garments Industry Performance, 2020).*

Given the industry's pre-existing challenges on both the demand and supply sides, knowledge with them will be advantageous for the future COVID19 research. Lack of technological advancement, inefficient infrastructure, fragmented industry structure, sluggish demand in major export markets such as the United States and the European Union because of the lingering effects of the Global Financial Crisis, and rising competition from countries such as Vietnam, Bangladesh, China, and Turkey in areas such as apparel, cotton fabric, and carpet Kanupriya *(Covid-19 and the Indian Textile Sector: Issues and Challenges, 2021).*

Process quality, customer response time, return adjustment, product personality, transaction satisfaction, spoilage adjustment, VMI, lead time, fill rate, inventory cost, distribution cost, operations flexibility, delivery flexibility, Roi, and shipping errors are the key performance indicators in the modelling supply chain performance of organized garment retailing. This model has anticipated the structural relationship between KPIs. It will aid OGR professionals in grasping and using the data. Concentrating on many individuals with a small number of KPIs, on the other hand, will be puzzling, leading in inefficiency. Dr. Rajwinder Singh and Dr. H.S. Sandhu (2013), Modeling Supply Chain Performance in Organized Garment Retailing.

In our country, the textile sector holds a special position. One of the world's leading textile industries gets more than a quarter of its foreign cash from textile exports. To compete in the global market, Indian textile producers are rapidly improving their technologies. India maintains a solid and stable position among the world's top five textile exporters. Technical textiles, or non-clothing uses of textiles, are experiencing a major reorientation in the textile industry. *(Rekha Berwal, Global Aspect of Indian Textile Industry,2020).*

Any organization's nerve centre is inventory management. No firm/industry can be successful in business without developing an effective inventory management system, will not be successful. The inventory is managed using a model that has been established. The variable cost is handled to lower it as much as possible. The purpose of a value at risk analysis is to discover the amount of safety stock that should be always kept. There is a close link between inventories and sales. *(DR. Sri Lakshmana Kumar, Proposed Inventory Model to Improve the Supply Chain Efficiency and Surplus in Textile Industry).*

The textile and garment industry are one of India's most important industries, accounting for a sizable portion of the country's GDP. The Indian textile and garment industry is important not only in the Indian market, but also in the global market, where it is recognized as one of the world's main textile and garment industries. The textile and clothing business in India is extremely variable, with enterprises at all stages of the supply chain exhibiting a wide variety of structural, operational, and performance differences. *Sunil Giri and Siddharth Rai, Dr. Sunil Giri and Siddharth Rai, Dynamics of Garment Supply Chain, 2013.*

the supply chain management (SCM) strategies used by garment firms in India, as well as the advantages and challenges associated with its implementation, to assess the success of SCM in the apparel sector. For this study, a questionnaire was employed as a research tool to define and evaluate the SCM systems of the selected clothing firm executives. A well-structured questionnaire was sent to a group of executives from companies involved in supply chain management. The questionnaire assesses seven different factors. Respondents were given numerous dimensions of SCM systems to consider, and the success of clothing firms' SCM procedures was assessed. *(Sanil S. Hishan, Effectiveness of Supply Chain Management regarding Apparel Industry, 2015).*

India (behind China) has the world's second-largest yarn-spinning capacity, accounting for around 20% of global spindle capacity. India's spinning industry has advanced to the point that it accounts for 35 to 40 percent of the country's total output. The spindles aren't more than ten years old. India has the most looms in use for weaving fabrics, with 64 in total The handloom and Power loom industries were founded with government assistance. primarily to create jobs in rural areas. The weakest link in India's manufacturing chain is the fabric processing (dyeing and finishing) sector. The textile supply chain is made up of a significant number of small units spread across the country. *(Sundar A. Shetty, India Textile and Apparel Industry, 2001).*

The Indian readymade garments and apparel (RMG) sector is the largest segment of the Indian textile and apparel (T&A) industry, accounting for over half of the total industry. The domestic RMG industry makes up almost three-quarters of the overall Indian RMG industry. The unit’s range in size from small to large, because RMG manufacturing units can be feasible at all sizes due to the inexpensive cost of plant and machinery. As a result, unorganized players continue to dominate the RMG industry. The branded clothes market, on the other hand, has achieved consistent progress in recent years. *(CARE ratings, Indian Readymade Garment Industry, 2019).*

The final phase-out of the Multi-fibre Arrangement (MFA)2 and the quota system that has governed global textile and apparel trade for the past 42 years has dramatically impacted the textile and apparel industry's institutional rules of trade. With the abolition of all remaining apparel quotas on January 1, 2005, the textile and garment industries are now completely integrated into the World Trade Organization's General Agreement on Tariffs and Trade (GATT) regulatory framework (WTO). Buyers are thus free to purchase any quantity of textile or apparel from any country, while producers are free to export as much product as they can, subject only to a system of national tariffs. *(Meenu Tiwari, Adjustments in INDIA Textile Industry, 2005).*

COVID-19-related supply chain disruptions that start in one place are likely to have 'ripple impacts' throughout the whole supply chain. Chain of supplies (ILO, 2020a, 2020b). The combined effects of, as a result, the crisis in the garment supply chain is both broad and complex. Garment production is important for a variety of reasons. Consumer marketplaces in the United States, but a big number of workers industrial manufacturers are intertwined in international supply network that manufactures clothing for international fashion labels

Located in Europe, Japan, North America, and other parts of the world. *(ILR school, The Supply Chain Ripple Effect, 2020).*

INDIA has been implementing a far-reaching structural adjustment program (SAP) since August 1991 to decrease policy-induced rigidities in the economy's functioning and attain international market competitiveness. The SAP entails lowering government interference in product and factor markets, as well as rectifying India's import substitution bias in its industrial development strategy and policy. Industrial deregulation, tariff reductions and quantitative limits on imports, access to disembodied foreign technology, and liberalization of currency rate and foreign direct investment laws are among the policy measures. *(K.V. Ramaswamy, India Apparel Exports, 2000).*

The textile industry's supply chain strategic dynamic decision dilemma is addressed in this study. On each of the three process phases, the supply chain is made up of many production locations. On the first stage's production site, many vendors furnish raw materials. There are 16 distinct categories in which products can be classified. Transportation expenditures account for most supply chain costs. The goal of this research is to figure out where textiles should be manufactured to meet assembly demand at various sites. *(A. Berthier, A Dynamic Product Allocation Decision in Supply Chain, 2021).*

V. ANALYSIS

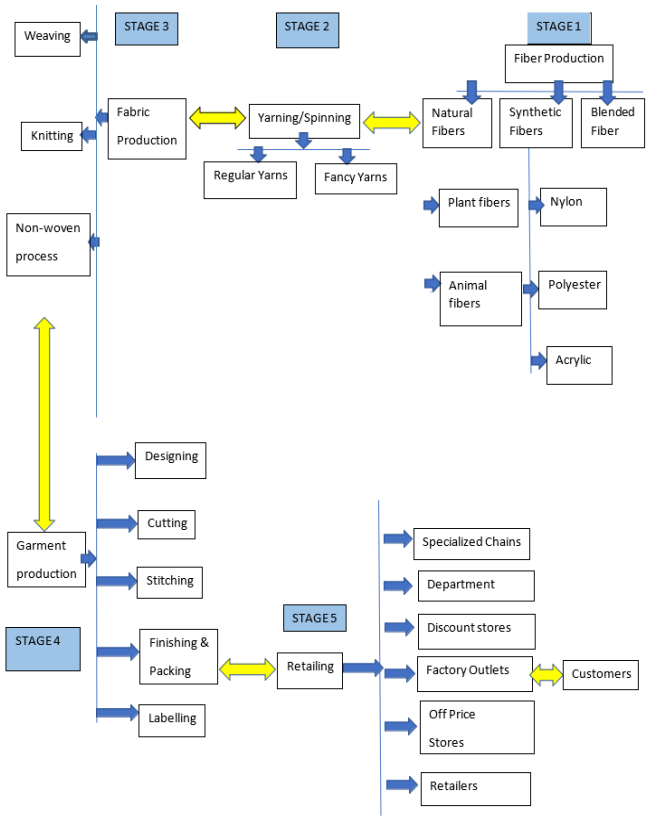
5.1 Structure of garment supply chain in India

Raw Materials Finished: Good: Customers

The study's goal is to look at the supply chain structure of the Indian apparel industry. The Indian garment industry is one of the world's top garment industries, with a wide range of products and complications. The study's goal is to examine the present supply chain structure at every level, from raw materials through garment manufacture and all the way to the client.

5.2 Fiber Production

Fiber manufacturing is the earliest and most fundamental stage in the garment supply chain. Fiber is the fundamental material used to create any type of garment product. Natural fibers and artificial or synthetic fibers are the two forms of fibers.



Manmade fibers, also known as synthetic fibers or artificial fibers, are often made from coal, petroleum, and castor oil (Tanchis, 2008), and include polyester, nylon, acrylic, Rayon, and other synthetic fibers. Acetate, for example (Tanchis, 2008; Wilson, 2001; Sen, 2008). Blended fibers are a type of fiber that is made up of both natural and synthetic fibers (Tanchis, 2008). In 2011-12, India produced 1233.61 million kg of manufactured fibers. (Source: India Statistics).

5.3 Stage 2: Yarning / Spinning

The natural and artificial fibers are then converted into yarns in the next stage of the garment supply chain. Fiber is spun in spinning mills, where it is held in the lengthwise direction and twisted together to be converted into yarns, either single or folded (Wilson, 2001). Yarns are made in both conventional and extravagant styles.

5.4 Stage 3: Fabric production

Spinning – weaving – garments manufacturing – dyeing & printing & finishing.

5.5 Stage 4: Garment Production

Following the selection of the patterns, pieces of cloth are cut shapes and sizes for the many versions of the specified designs. Through the stitching process, the components are

subsequently stitched together in the prescribed manner required by the design. Many Indian garment manufacturing businesses handle the cutting and sewing operations themselves, while others outsource the cutting and stitching processes to local contract manufacturers and supply them with the designs and instructions for each stage. Some firms, however, execute the cutting in-house and use local contract manufacturers to patch the joints in a predetermined manner.

Once the garment has been sewn and prepped, it is returned if the stitching process was outsourced, and the garment items are prepared for the finishing process, which includes cleaning, pressing, and final preparations. Postponed actions dissociated in prior stages and not completed till then, if any, are likewise completed at this step. After finishing it is Packing, labeling, and distribution to their respective retail outlets via the necessary logistical system and network.

5.6 Stage -5: Retailing

Extraction – polymerization – spinning & dyeing -weaving – finishing – clothing manufacture – retail.

Coordination between the flow of information and the flow of product and material is critical in the garment industry supply chain. The flow of material and product occurs in the forwarding path, which is based on the flow of data regarding consumer orders and wants as well as mark demands and trends flowing backward from customers to merchants and then through them to producers that send on information about raw material requirements to suppliers. The synchronization of information flow and material flow is critical because Companies that have greater synchronization between the two do better in the business, Within India.

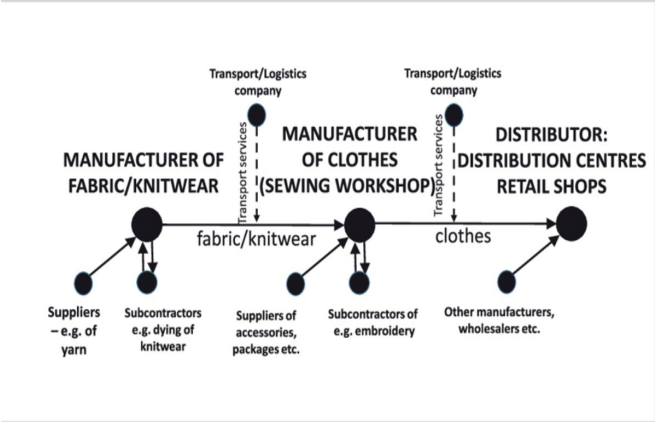


Fig.1. Garment Supply Chain Process

An effective supply chain necessitates an efficient logistics system (Sharma et al., 2013). Despite its enormous and impressive logistical network and stats, the Indian logistics structure is inefficient. The key cause for India's logistics industry's underperformance is its undeveloped and weak physical and communication infrastructure (Planning Commission, 2012). Poor road conditions and numerous checkpoints with varying paperwork requirements delay freight flow (Planning Commission, 2012; Jayaram and Avittathur, 2012), and it takes three times as long to reach its destination as it does in the United States (Jayaram and Avittathur, 2012). Inadequate seaport infrastructure and procedural approvals cause congestion, resulting in high wait times for ships at ports that can last up to 5 days (Planning Commission, 2012; Jayaram and Avittathur, 2012).

VI. HYPOTHESIS

There is Relationship between supply chain collaboration and competitive advantage

H0 (NULL HYPOTHESIS): - In the Indian textile business, there is no association between supply chain collaboration and competitive advantage among textile supply chain partners.

H1(ALTERNATE HYPOTHESIS): - In the Indian textile sector, there is a link between supply chain collaboration and competitive advantage among textile supply chain partners.

6.1 Analysis / Results

Top management commitment, trust, long-term relationships, information sharing, and risk and reward sharing are the drivers driving supply chain collaboration. Table 1 shows the frequency analysis, which reveals the percentage of influence.

Reliability tests are used to assess the correctness of the constructions. Cronbach's coefficient alpha was calculated for each construct to assess its dependability. According to [39], an alpha score greater than 0.7 is typically considered enough accuracy for a construct. The reliability of each concept was assessed using the CITC (corrected item-total correlation) values of all its indicators (Table 2).

Table.1. indicators of supply chain collaboration

factors	% Of effect
Top management commitment	87 %
Trust	76 %
Long term relationship	64 %
Information sharing	81 %
Risk and reward sharing	62 %

Table.2. Alpha values for constructs

VARIABLES	ALPHA
Supply chain collaboration	0.833
Competitive advantage	0.856

Every construct has an alpha value greater than 0.8, indicating high dependability. After purifying the data using a re-liability test, the constructs were examined for convergent validity. Convergent validity is used to describe the degree of relationship between a construct's measurements. The average variance extracted values are the indicators of validity.

6.2 Findings

Following the reliability and validity tests, the proposed hypothesis was tested by using structural equation modeling to calculate the standardized path coefficient. The bootstrap procedure was used in Visual-PLS software to obtain the construct's t-statistics. The t value is a statistical measure that confirms the significance level of the hypothesis or path model relationship. A t-statistic greater than two indicates that the hypothesis is accepted. Because the construct's t value is 2.651, hypothesis H1 is statistically accepted.

6.3 Interpretation

- As a result, we conclude that supply chain collaboration has a beneficial impact on competitive advantage.

VII. CONCLUSION

The Indian garment industry is varied, with various small and large enterprises at every level of the supply chain. They differ in their operations, target clientele, and supply chain architecture. The supply chain in India, on the other hand, is fraught with complexities, worries, and impediments, the bulk of which are related to inventory management, lead time, collaboration, technology, logistics, and transportation. Although these are the key difficulties that must be addressed for garment companies to be efficient, responsive, and competitive in the market, they will be handled if garment firms implement the proper supply chain strategy based on their size, operational demands, and client focus. The nature of the offers and the target client should decide the supply chain approach.

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