CHAPTER

1 INTRODUCTION AND DESIGN OF THE STUDY

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1.1 INTRODUCTION

Textile is a part and parcel of human being as it plays an essential role right from birth to death. Quotes on textiles in scriptures speak of its significance, skill and style. To mention a few "They also took the robe, which was made of one piece of woven cloth without any seams in it" explains the skill and style with which it was made.¹ In the Rig Veda, the God Pushan, an early Vedic Solar God has been addressed as a ‘WEAVER OF GARMENTS’ (Vaso-vaya).² “O children of Adam! We have sent unto you raiments to conceal your shame and to serve as protection and decoration”³ explains the dress code of human beings as to modesty, honour, grace, virtue, elegance and beauty as the wings of a bird.

1.1.1 Terminology

The word textile, a comprehensive term, is from Latin texere which means ‘to weave’ to braid or ‘to construct’. The textile is a flexible material comprised of a network of natural or artificial fibres, often referred to as thread or yarn produced by spinning raw wool fibres, linen, cotton or other materials. Fabric refers to any material made through weaving, knitting, crocheting or banding. Cloths refer to a finished piece of fabric that can be used for a purpose.

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1. John 19:23 - The Holy Bible
3. Holy Quran 7:26
1.1.2 Sources & Types of Textiles

Textiles can be made from many materials viz., animal, plant, mineral and synthetic in various strengths and degrees of durability from the finest gossamer to the sturdiest canvas.

Animal textiles are commonly made from hair or fur. Wool refers to the hair coated with oil known as lanolin, which is waterproof and dirt proof of the domestic goat or sheep. Other animal textiles which are made from hair or fur or alpaca wool, vianna wool, llama wool, camel hair and angora rabbit are generally used in the production of coats, jackets, ponchos, blankets and other warm coverings. Silk, a smooth shiny and sleek textured fabric is made from the natural animal protein fibres of the cocoon of the silk worm.

Plant textiles are made from grass, rush, hemp and sisal used for rope; coconut fibre (coir) used for floor mats, door mats, mattresses, floor tiles and sacking; straw and bamboo used in hats and stuffing; fibres from pulpwood trees, cotton, rice, hemp and nettle used in making paper; cotton, flax, jute, hemp, modal, pina (Pineapple fibre), milk weed and seaweed in clothing and textiles, acetate used in silk, velvets and taffetas. Depending on their fibre content the leaf, flower, stem, fruit or the whole of part of plant is used.

Mineral textiles are made from asbestos and basalt fibre used for vinyl tiles, sheeting and adhesives; transit panels, sidings, acoustical ceilings, stage curtains and fire blankets; glass fibre used in spacesuits, ropes and cables; reinforcement fibre for composite materials, insect netting, flame-retardant and protective fabric, sound proof, fire proof and insulating fibres; metal fibre, metal foil and metal wire used in cloth-of-gold, jewelry and hard ware cloth used in construction.
**Synthetic textiles** are used primarily in the production of clothing, viz., polyester fibre used in clothing; aramid fibre used for flame retardant clothing, cut-protection and armour; acrylic fibre to imitate wool; nylon fibre to imitate silk and outdoor clothing; spandex (lycra), a polyethane fibre that stretches easily used in tight fittings, active wear, medical wear; olefin fibre (hydrophilic) which dries quickly used in active wear, linings and warm clothings; apolyactide fibre hydrophilic wicks away perspiration used in active wear. The additional advantages of man-made fibres, that possessed by cotton and wool are softness in handling, draping, strength, crease resistance, low shrinking, lightness in weight, quick and smooth drying, lusture, durability, easy care, easy removal of dirt and stains. The physical qualities of man-made fibres are super-imposed by the competitive price advantages and influenced by technological developments and modern techniques of production. Synthetic textiles have the features of special trade names, positive effects of large scale production and easy and accurate controllability of physical properties of fibres such as length, fineness and elasticity of strength, unlike, the production of cotton which is predominantly affected by natural factors.

### 1.2 IMPORTANCE OF TEXTILES

Textiles have been a fundamental part of human life science since the beginning of civilization and the methods and materials used to make them have expanded enormously, paving way for innovations, inventions and industrialization.

The wearing of clothing is exclusively a human characteristic and is a feature of most human societies. It is used as protection from
cold, heat and rain especially as humans migrated to new climates; clothing and textiles have been important in human history and reflect the materials available to a civilization as well as technologies that it has mastered. The social significance of the finished product reflected their culture; sentiments and moods. Its texture, pattern and style, as the order of social rank and as a matter of social discrimination, symbolize the cultural and ritual manifestation that is featured in scriptures, sculptures, literatures, ventures and history and became a very important item during festivals and family functions.

From early times, textiles have been used to cover the human body and protect it from the elements, to send social cues to other people, to store, secure and protect possessions; and to soften, insulate and decorate living spaces and surfaces. Textiles have a variety of uses, the most common of which are for clothing and containers, such as bags, baskets and so on. In the household, they are used in carpeting upholstered furnishings, window shades, towels, covering for tables, beds and other flat surfaces and in art. In the workplace, they are used in industrial and successful processes such as filtering. Apart from these miscellaneous usages include flags, backpacks, tents, nets, cleaning devices such as handkerchiefs and rags, transportation devices such as balloons, kits, sails and parachutes, in addition to strengthening in composite materials such as fiberglass, industrial geo-textiles, in making collages, sew quilt and toys, automatic applications, medical textiles (ex. implants), geotextiles, agro textiles (textiles for crop protection), protective clothing (eg. against heat and radiation for fire fighter clothing, against molten metals for welders, stab protection and bullet proof vests).4

4. wikipedia.org/wiki/textileart
The history of textiles is also the history of international trade that it started with exchange of leather, cotton, silk and dyes. The fascination for imported luxury fabrics even led to sumptuary laws during the middle age and renaissance. Although trade across the continents had already existed, trade on Silk Road was a significant factor in the development of the great civilizations, by connecting east and west, linking traders, merchants, pilgrims, monks, soldiers, nomads and urban dwellers and helped to lay the foundations for the modern world.

Textile is the basic necessity of life, next to food. Globally, textile and clothing play an important part in the world economy and in international trade. Historically, the development of textiles and apparel manufacturing has been an important ‘first step’ of many countries’ industrialization and progression. Textile industry played a pivotal role for the economic growth of both developed and developing countries and contributes to sustainable and socially responsible development. Cotton, the main base of textiles is one of the most important and widely produced agricultural and industrial crops in the world, that it is grown in more than 100 countries on about 2 per cent of the world’s arable land, making it one of the most significant in terms of land use after food grains; broadly traded agricultural commodity, with over 150 countries involved in its trade.

This vital cash crop is the raw material of development, industrialisation and wealth, providing income for food, education, health, housing and transportation. The first industrial revolution was a revolution of textile technology and the first labour unrest and protest also occurred in textile mills that paved way for labour laws.  

5.  www.cotton-trade.aspx
6. wikipedia.or/wiki/history of textiles
1.3 IMPORTANCE OF THE STUDY

An important role is being played by the wet processing and finishing technology in rendering the fabric wearable and presentable. Although the Indian textile was founded during 1875, even during the early 20th century, India was known entirely as a country manufacturing grey textile from the Indian short staple cotton fibre. Manchester was in those days the guiding star for our textile processes. One time famous Dhaka Mulmul became a thing of the past. The vast potential of Indian market was explored by the overseas processors on the strength of the treatment which the fabrics received and the magic touch which changed the entire look of the textile material. In the initial stages, the local manufacturers were mostly concentrating their attention on grey fabrics, which were exported to foreign countries, mainly to Great Britain and were subjected to the wet processing & finishing process abroad; then they were sent back to our country in a wearable state. Only after the Second World War, the necessity of obtaining expert knowledge for wet processing was felt.

The Indian processing sector consists of about 13,000 processing units spread over the country. Approximately more than 10,500 units are hand processors, 83 are composite units, 155 semi composite units, independent and power processing units and so on constitute 2324 of which 60 per cent belong to SSI sector, units with modern technology are 227, medium technology are 1775. In a country like India with a population of 121 crores as per census 2011, the total turnover of the industry was about Rs 450 billion during 1998-99. Thus we are poised but yet to take a quantum leap.

7. censusindia.gov.in, website: office of the Registrar of census
The major problems are lack of updated technology, skills, consistent quality and interest for large investments. Major pitfalls prevailed in India coupled with the high cost of imported machines & automation system higher conversion (labour) cost. The problems related to modernization are lack of process and fundamental pretreatment, lack of quality control in dyeing, printing colourants used and colour fastness, lack of professionalism, non adherence to ecological parameters and so on.

Processing units are fragmented in nature and located at different places and discharge of effluents has become their problem. The units are tiny in nature and all of a sudden they are put under pressure to have Effluent Treatment / Reverse Osmosis (ETP / RO) Plant which may cost a minimum of Rs.2 crores.

Processing units are lagging behind in technical aspects and do business rather conventionally than as professionals. In the processing sector, there are more than 10,000 hand processing units using obsolete technology. The existing technology, in the wet processing sectors is largely inadequate to meet the challenges of improvement in productivity, quality, product diversification and value addition. As success of the industry depends on technical expertise alone, it is time the processing units arm themselves with the required technical back-ups and R & D facilities. While the two ends of the textile chain – spinning and the garment sector-have made headway through cost cutting, capacity expansion and technology up-gradation, the weaving and processing sectors have not kept pace. Not surprisingly, these sectors are considered as the weak links in the integrated structure of the textile industry.

8. www.texmin.nic.in
Wet processing of textile materials requires large quantities of energy and water with various reactions at elevated temperatures to transfer mass from the processing liquid medium to the surfaces of the textile materials or vice versa are dependent on time and temperature. Increasing cost of power adds burden.

In weaving, knitting and processing, over 90 per cent of the production is currently in the decentralized sector, which mostly supplies small lot of relatively low quality fabrics and therefore, cannot use much of the high quality yarn that is produced in the country.

At present, there is a strong desire for natural looking, comfortable garments with a neat look. Most of the development works are aimed at enhancing the comfort properties along with various functional finishes. The value-added textiles have great potential to offer a new opportunity to enhance our presence in the global market.

Valued added textiles have established a strong potential to open up a new avenue not only for the revival of our ceiling textile industry, but also a direction, ways and means to sustain and thrive in near future both in the domestic as well as global market and textiles have huge impact on the economy both in terms of export and employment generation.

India is emerging as the manufacturing hub of the world. Indians have proven that they can produce end-products of world standards and quality. In fact India has surged ahead in the field of information technology, automobiles, textiles and business process outsourcing in the last few years. India as a world mart for the market leaders in textile can scout for more efficient production systems, modern adaptive technology
and competitive advantage in the integrated global market. When comparing to China, though India has smaller capacities, lower productivity and less average industry efficiency, it is self sufficient in cotton, has skilled and cheap labour force and high fashion awareness. India has the potential to become cost competitive against China in cotton textiles, provided it tackles the problem of rising cost, infrastructure and power in the processing sector.

In the quota-free world, India is necessarily to build up its strength to capture export markets that are suddenly opening up. Export led growth in textile in a global market scenario is possible only with large investments in processing, the key area of industry. The technology in these critical sub-sectors of the textile industry needs immediate upgradation to international levels and value addition needs to be ensured along the entire value chain right from the raw material stage. High productivity is the key to survival in the competitive economy and the vibrant Indian textile industry with its unique advantages, gaining strength with growing investments and modernization can emerge as a major supplier to the world only when processing sector in textile value chain draws due importance.

1.4 STATEMENT OF THE PROBLEM

A proper vertical integration of the textile sector has not only ensured that our textile materials and intermediate products are used for improving the competition of our own finished goods, but also to help in retaining the entire value addition within the country. With global trade getting liberalized, India’s textile industry has to face stiff competition not only in the export market from China, Pakistan, Bangladesh, Srilanka and others but, also in the domestic market due to free flow of foreign goods.
Though Tirupur now supplies 35-40 percent of India’s knitwear and has achieved a dominant position in the export market too, India’s knitters do not possess capacity to perform dyeing, processing and finishing to international standards because of the high capital costs associated with the purchase of modern machinery. Yarn processing in the form of hank yarn dyeing, cone yarn dyeing and cheese yarn dyeing, Knitwear processing and Fabric processing have peculiar problems. Therefore the processing sector of textile industry should be given due consideration.

At this juncture, the country’s second largest employer after the agriculture sector the textile industry has seen an alarming rise of their closures. Government statistics reveal that, in July 1999 there were about 220 closed textiles mills in the country, in November 2002, 338 mills were closed, with the number soaring to 469 by July 2004. Also a number of mills owned by the federal and the state governments are closed, including 66 owned by the National Textile Corporation [NTC].

**Figure 1.1**

*Value Chain in Textiles*

http://www.fibre2fashion.com/industry-article/9/895/indias-textile-wet-processing.asp
During this five year period, textile mills have continued to shut at the rate of 51 mills every year or roughly, one every week; 60 per cent that is 273 of the total 469 mills closed down so far, have done so because of financial difficulties, declining domestic and export demand, a global recession, rising production costs, reduced profits and government imposed labour market rigidities.\(^9\)

Yarn Processing viz hank yarn dyeing, cone yarn dyeing and cheese yarn dyeing, knit wear processing and fabric processing have peculiar problems. The Indian government estimated that these closures resulted in the loss of approximately 575 million kg. of yarn production, 736 million sq mts of fabrics production and more than 3,62,180 jobs.\(^{10}\) The closure of these mills had affected the textile industry to a great extent not only in terms of its production but also the basic living of its work force.

Among various institutions functioning in Tamil Nadu, under the administrative control of the Department of Handlooms and Textiles viz. 1232 Handloom Weavers’ Cooperative Societies, 133 Powerloom Weavers’ Cooperative Societies, 5 Cooperative Spinning Mills, Tamil Nadu Handloom Weavers’ Cooperative Society Limited (Co-optex), Chennai, Tamil Nadu Zari Limited, Kancheepuram, Tamil Nadu Handloom Development Corporation Limited, Chennai, Tamil Nadu Cooperative Textile Processing Mills Limited, Erode, Tamil Nadu Textile Corporation Limited, Coimbatore and Tamil Nadu Cooperative Spinning Mills Federation Limited (TANSPIN), Chennai, Tamil Nadu Cooperative Textile Processing Mills Limited, Erode, is the only unit focusing on textile processing.


\(^{10}\) [www.texmin.nic.in](http://www.texmin.nic.in)
Taking India as a whole, there are only two processing mills run by the state governments, the other such mill is situated at Itchalkeranji, a city in Kolhapur District of Maharashtra.11

Table 1.1

State Wise Number of Textile Mills Closed and Affected Installed Capacity & Workers for Non SSI Units as on 31.03.2011

<table>
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<tr>
<th>Sl. No</th>
<th>State</th>
<th>Number of Mills closed</th>
<th>Spindles</th>
<th>Looms</th>
<th>Workers</th>
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<td>720</td>
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<tr>
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<td><strong>9844612</strong></td>
<td><strong>37185</strong></td>
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Source: O/o the Textile Commissioner updated on 20.05.2011

The Tamil Nadu Cooperative Textile Processing mills Limited, (TCTP Mills Ltd) Erode, the study unit chosen for study, thriving and performing better than its counterpart, spinning mills under the administrative control of the Government of Tamil Nadu, has vital role to fill the gap in textile supply chain by value addition. Its role gains momentum, as it has a significant role in the execution of all the schemes of the Government of Tamil Nadu as to value addition. Therefore it is worth analysing its real stand and to appraise its financial and production performance and eco-friendly conscious-ness and socio economic status, performance and attitude of its employees and to offer suggestions for improvement.

1.5 REVIEW OF LITERATURE

The research in any field remains incomplete, if due significance is not given to the previous studies associated with the current area of study. In the field of textiles, in general, a number of studies have been done in India and abroad. The earlier reviews are grouped into three categories viz., (i) International Studies, (ii) National Studies and (iii) Reports.

1.5.1 International Studies

“Application of Dyestuffs to Textiles, Paper, Leather and Other Materials” by J. Merritt Matthews deals with different techniques of dyeing over ages.12

Anjana Bose in her paper ‘Restrictions on US imports of Apparels, Cost and Consequences’ analysed the effectiveness of the trade barriers in relation to the import of apparel by US. The approach involves a comparison of the losses or gains for the parties due to relaxation of the restrain.\textsuperscript{13}

V Sreedhar in his study “Indian export - A Riddle of Regulation” evaluated the export performance of knitting industry in India and revealed that the Indian government did not have sufficient resource to improve exports. Although, it was crucial for the economy, export development had not been assigned adequate priority in resource allocation.\textsuperscript{14}

The book edited by Roderick Mc Donald entitled “Colour Physics for Industry” had dealt in detail with the aspects of colour science that were important to the colour technologist in the day-to-day manufacture and control of coloured product and the colour science behind the generation of colour in visual displays.\textsuperscript{15}

\begin{itemize}
\end{itemize}
“Legal Structure on International Textile Trade” by Henry R Zheng, dealt with a comprehensive treatment of legal structure to assist those who need to acquire a basic understanding of the laws.16

Kathryn Anne in her study “The Allocation of Import Restraints Evidence from the Textile and Apparel Industries” had expressed the optimal division of the import restraint among exporting countries and concluded that the import market would be allocated primarily according to historical market share.17

Sara Umberger Douglas and Arathi Narayanan in their study on “Comparative Analysis of the Textile and Apparel Industries in India and the United States” observed that there is potential for continued growth for textile apparel industries in India and respondents displayed realistic perceptions of India’s problems. Technology, foreign competition and raw material issues may be more serious problems and steady supply of competitively priced raw materials, technology enhancement, product upgrading including high quality fabrics and creative designs will result in production of higher value added items which in turn would capture new international markets and yield higher unit values.18

Chandan Shah and Mohan Singh in their study on “Hosiery export” observed that presently, the Indian hosiery and readymade garment products are mainly exported to US and European economic countries, though exporters are realizing tough competition from other countries.19

Cawthorne Pamela M stated in “The Rise and Rise of a South Indian Town - the Example of Tirupur’s Cotton Knitwear Industry” that Tirupur in India, is the centre for a tightly clustered range of activities related to the cotton knitwear industry. Clustering and dense inter firm networks provide advantage for firms of all sizes since process specialization is spatially divided.²⁰

Colin Simmons and Christos Kalantardis observed in their study “Entrepreneurial Strategies in Southern Europe Rural Workers in Garment Industry of Greece” stated that over the last 25 years, garment production has shifted to those countries with cheapest and most adaptable source of labour. Less developed countries and newly industrializing countries especially in South East Asia took advantage of competitively easy and exit conditions and posed a serious threat to levels of employment in western countries.²¹

Darlie O Koshy in his book “Garment Exports Winning Strategies” emphasised that ‘India is poised to emerge as the largest clothing producer in terms of number of units produced in the world, if both domestic and export sector are taken into consideration.²²

Ryan S and John K in “Global Marketing in the New Millennium”, focused on the changes in global marketing and global business operations for the year 2000 and beyond. These included the euro, industry concentration, global oligopoly, greater focus on the supply chain and logistics, the challenge to the importance of marketing, the challenge of

managing the conflict between the internet and national sovereignty.23

Lep T Tarmidi and Mutiadi Widjaja in their study titled “Study on Strengths and Weakness of Indonesian Garment Industry” analysed the peculiar strength and weakness of Indonesian garment industry.24

Vijayabaskar M in his paper “Garment Industry in South Asia Rages or Niches?” enunciated that in the initial phases of Indian apparel exports, USSR and Europe were the largest markets, but by 1999, a major share of Indian garment exports was destined to the US and European markets. The study also outlined the possible elements of the strategy to be followed in the post-MFA environment for enhancing competitiveness. They are promotion of mass marketing for achieving the scale of economy, enforcement of international labour standards, moving up these value chain by targeting the specific niches; and creation of a competitive environment in the domestic market through promotion of fashion design facilities.25

Samar Verma in his study on ‘Export Competitiveness of Indian Textile and Garment Industry”, observed that perhaps the most draconian of all govt. policies that has scuttled the growth of garment industry is reservation of garment manufacture for small scale industry. It has not only prevented expansion, but also impeded technological upgradation of the garment manufacturing units. As a result, the garment units could neither attain optimal economies of scale, nor produce international quality garments.26

“The Textile Book” by Colin Gale & Kaur analysed with the cultural place of textiles and its role in global, social and industrial context.27

Water Fung, Collins and Aikman in their book “Coated and Laminated Textiles” had made a comprehensive description of the production methods and processes involved in a wide range of coated and laminated products including apparel, domestic, medical, military and industrial applications.28

Manisha Awasthi and Anitha Singh, in their article “Global Competitiveness Hinges on Product Quality” suggested that the Indian garment industry can become globally competitive, if the quality assurance system is implemented strictly.29

Environmental Impact on Textiles: Production Process and Protection” by Keith Slater elucidated the effect of textiles on natural exposure, thermal exposure, chemical and microbial attack protection of or by textiles from environmental damage.30

Narain Boodhoo, in his article “Africa Hit Hard as Global Textile Market Opens” opined that ‘a study by WTO reveals that India and China will grab about 80 per cent of the world market and the remaining 20 per cent will have to be shared by the rest of the world.31

“Growth Prospects for India’s Cotton Textile Industries” by Maurice Landes, Stephen Mac Donald, Santosh K Singh and Thomas Vollrath highlighted the unique structure of the Indian textile industry, its policies, technical efficiency, international competitiveness and prospects.32

The article titled “Patent Statistics on the World Textile Industry and a look at Germany’s Position” by Jan Hausding illustrated the distribution of worldwide economic power and patent applications from the textile sector compared to that of other industries.33

The book “Design and Manufacture of Textile Composites” edited by A C Long has dealt with processing technology.34

“Art Textiles of the World: Canada” edited by Matthew Koumis dealt with the survey of some of Canada’s leading artists working across the spectrum of contemporary textile art.35

“Digital Printing of Textiles” the book edited by H Ujiie detailed fundamental technical explanations along with current research and printer software required for successful colour design, cost-effective prints and management.36

The book “Tufted Carpet: Textile Fibres, Dyes, Finishes and Process” by Howard L Needles discussed all aspects of the preparation and manufacture of carpets, carpet construction, coatings and dyes.37

“World Clothing Retailers - Strategies for Growth” by Billie Payne presented over 50 case studies of leading players from Europe, North America and the Pacific Rim in the world of clothing retail. This major new strategic study provided information for all who were concerned with these aspects of corporate survival, the actual and potential competitors, their initiatives and imperatives, partners, investors and suppliers.38

1.5.2 NATIONAL STUDIES

Bhogendranath had traced the history and development of textile industry. He insisted that the mill sector should act as a complementary force for the well-being of the handlooms and suggested the need for the development of a new device which could be operated by power to the handloom sector and stressed that South Indian mills should concentrate their attention to the production of yarn only, leaving the entire weaving to the handloom sector.39

K. Bharathan in the paper titled” The cotton Handloom Industry in Tamil Nadu Some Characteristics and Aspects of Change from the Post Independence Census Date” highlighted the factors why Tamil Nadu remained the most important handlooms region in the country.

According to him the industry formed an important part of the industrial profile of the state in terms of persons employed in general. The largest part of the employment in the industry was to be found in the household sector, both in rural and urban areas. The urban share in total employment in the industry was appreciably higher than the rural share which is different from that at the all India level and female participation in the industry was very low, but this rate in the state was higher that than at national level.40

Lawrence Prybil p, in his article “Job Satisfaction in Relation to Job Performance and Occupational Level” has discussed various factors that influenced job satisfaction and performance.41

Sathyanarayana Murthi, in his thesis “Costing in Selected Cooperative and Private Cotton Mills in Andra Pradesh” described the manufacturing process and costing methods and procedures in textile industry with special reference to spinning activity.42

Sri Kanthiah, Seshadri and Jeyraman recommended the setting up of the technical cells in each state, which should be made responsible for collection and discrimination of information with regard to good practices, to provide necessary facilities for training, etc., They suggested for the supply of “Hank’ by the mills to the handloom, which would help

to reduce the cost. They emphasized the need for cost control and recommended for modification of the machines and processes, quality control and diversification.\textsuperscript{43}

M A Arulanandam studied the various aspects of the Handloom industry in Tamil Nadu and suggested for the revival of the industry on humanitarian grounds to the economic viability. He identified that the lack of standardization, the poor finish coupled with higher price than the mill sector were the major obstacles in marketing the handloom products. He recommended for improving the quality and reducing the cost of handloom fabrics. He also suggested that Rebate Schemes which are beneficial to the cooperative sector must be extended to the handlooms outside the preview of cooperative sector.\textsuperscript{44}

Rakesh Khurana et al analysed the concepts of production mix, raw material management and profit formulations. Further they dealt with the marketing problems, planning and control organizational structure, human resources management and the ideal and practical corporate strategy of the handloom industry.\textsuperscript{45}

Shanmuga Sundaram classified the organizations of the industry into four sectors viz., i) The master weavers’ sector, ii) The independent weavers’ sector, iii) The cooperative sector and iv) The department sector.\textsuperscript{46}

\begin{flushleft}
\textsuperscript{43} Sri Kanthiah, Seshadri and Jeyraman, “A Study of Handloom Sector to Increase Productivity, Reduce Costs and Increase the Quality”, SITRA, Coimbatore, 1978.
\end{flushleft}
Sunder Singh had attempted an empirical study on handloom industry. He considered that organization, functions, uniqueness and problems are the four important factors of the industry. He broadly classified the organization of handloom industry into two sectors viz., the cooperative sector and the non-cooperative sector which is further divided into i) Master weavers, ii) Petty master weavers and iii) Independent weavers. He has studied the inter-relationship among the functionaries of the industry. According to him, though certain events go out of business and some events are mis-managed, the industry as a whole was vigorous, self reliant and quite profitable.47

Kasthuri Sreenivasan, in his article “India’s Textile Industry”, dealt with the various aspects of the textile industry such as its historical background, sickness modernization and industrial relations.48

Selvanathan K in his article “Technological Change and Labour Displacement” emphasized that the textile industry was a labour intensive industry, adoption of advanced technology, which was not appropriate to our conditions and should be discouraged.49

V R Sivakumar and T V Rathnam in their study titled “Knitting Industry in India” identified the major problems inhibiting the growth of knitting industry in India.50

C Vijayakumar in his study “A Study of the Hosiery Entrepreneurs at Tirupur, Tamil Nadu”, has compared successful entrepreneurs, the self starters with the unsuccessful entrepreneurs.\(^{51}\)

Began C Das found that most of the traditional weavers in the state of Assam already left their practice of weaving and changed to other professions and trade, still majority of the looms were outside the cooperative fold; certain non-governmental agencies played a vital role for the development and preservation of the industry. He clarified the market mechanism for handloom fabrics in the state into four broad heads viz., i). marketing under the cooperative organization, ii) marketing under government owned corporation / departments, iii). Marketing by independent weavers, iv) Marketing under master weavers.\(^{52}\)

A. Venkatachalam examined the promotional steps jointly taken by the government and the exporters and the factors affecting the competitive strength of the handloom cloth in the export market.\(^{53}\)

A. Seetharaman, in his paper “Optimization of Making, Production - Financing System for Handloom Textiles” makes an attempt to evolve a strategy for optimizing marketing, production and financing system for handloom cooperatives in Tamil Nadu.\(^{54}\)


S. Solaiappan made an empirical attempt on the silk industry in Tanjore District. He limited his study mostly on the cooperative societies. He found a number of irregularities in the management of cooperative societies such as increased office expenses and misuse of power. He recommended for the creation of an agency for the procurement and supply of silk yarn by the Government and the supply of adequate yarn to the weavers outside the cooperative sector. According to him the growth and development of silk handloom industry is much affected by the non availability and increasing prices of yarn.\(^{55}\)

M Radhakrishna, his study on “The Textile Industry and Trade” examined the export performance of Indian garment industry between 1981 to 1989 and concluded that the total export earnings of the country improved from 8 per cent in the early 1980s to 13per cent in 1988. Between 1981 and 1988, the total value of garment export doubled but, the unit price remained constant.\(^{56}\)

TV Rathnam in his article on “Knitting Industry - A Bright Future” observed that for the industry to progress particularly in the export field, a high priority should be given to improve quality and diversity production with better finishes.\(^{57}\)

Kilment analysed knitting cotton goods under operational conditions in the application of knitting technique and long term success in knitted fabric manufactures necessitates production of high grade of fabric, colour and quality.\(^{58}\)

P Jeyaram, in “A Study of Handloom Industry with particular Reference to Its Problems and Prospects in Coimbatore District”, concluded that the handloom industry in the unorganized sector is a sound and highly profitable one as against the general belief that it is a perennial sick child requiring constant patronage and motherly treatment from the Government, though the industry is witnessing both prosperity and problems.59

Iranna Hatti, in the paper “The Cotton Textile Industry in India” traced the story of the Indian textile industry down through the colonial rule to its present set up.60

Omkar Goswami, in his article “Sickness and Growth in India’s Textile Industry Analysis and Policy Options” examined the problems of Indian textile sector and trends revealed that even in the poorest income group there has been market stagnation in meters of cotton cloth purchased per capita. Despite the shift to man-made fibres, the cotton still accounts for almost 68 per cent of the total purchase of textile in metres in 1986.61

Gopalakrishnan R surveyed and analysed the apparel industry in India. According to his study, the industry has recorded a spectacular growth over the past few decades particularly in export performance. The share of knitted in overall exports in 1990 was 40 percent in quantity and 25 per cent in value, out of which cotton knit wear forms around 94 per cent in quantity and 86 per cent in value.62

Kothari D.D, in his study “Indian Textile Industry ‘Cooperation between Knitwear and Textile Finishers Knitting Technique” stated that even at the lowest projection of the world fibre demand would be of 50 million tonnes per annum by the year 2000. More than 50 per cent of the total cloth consumption will be in the developing countries compared to 30 per cent in 1960 and the necessity to re-evaluate the future perspective in the textile industry in Asia, in the context of the changes taking place in the geographic distribution of production, in the pattern of world trade, in the consumption of raw material inputs and in technological development.63

Hussain Ashraf S in his article “What Ails the Textile Industry” observed that the textile industry occupies a predominant place in the Indian economy contributing about 23.5 per cent of the country’s industrial production and stressed the need of both the government and the trade unions to endure a conciliatory strategy to save the dyeing industry.64

Parampal Singh, in his study “Problems and Prospects of Exploring International Markets - perceptions of small exporters” examined the perception of small exporters about the problem areas and their motivation in exploring international markets in the light of recent steps taken by the

government for trade liberalization. Enhancing the company’s image by improving the product through technological updating is the main motivational force enticing small exporters to explore international markets.\textsuperscript{65}

Ashok Gehlot in his article “Towards a New Thrust to Textile Export” explained the Special Value Advance License Schemes that has been introduced to improve the performance of exporters and the decision of the government to increase the permissible level of investment in the garment sector from Rs.75 lakhs to Rs.3crores with a corresponding increase in the export.\textsuperscript{66}

Thanapal Tare, in his paper “Prospects for Powerloom Sector Textile Exports - Challenges and Opportunities” revealed the enhanced importance of the powerloom sector in the total production pattern of cloth.\textsuperscript{67}

Kalirajan K P in his article on “Small Enterprise and Firm Level Technical Efficiency in the Indonesian Garment Industry” examines the technical efficiency in Indonesian garment industry based on the country’s 1986 census of small industry and found that there is significant level of labour and capital substitution in the industry.\textsuperscript{68}


\textsuperscript{66} Ashok Gehlot, “Towards a New Thrust to Textile Export”, Yojana, 31.3.1993

\textsuperscript{67} Thanapal Tare, “Prospects for Powerloom Sector Textile Exports -Challenges and Opportunities”, Journal of the Textile Association, July 1993, pp 81-82.

G R Karthikeyan in his article “Growth of Textile Industry”, elaborated the contributions of textile industry towards foreign exchange earnings and the role of the government to make more provisions to increase the export of textiles as a whole and investment in modernisation that should be substantially increased.69

Shri Ram Khanna in “Globalization of Indian Textile Industry”, reviewed the globalization of Indian textile industry and the problems of uncertainty in policies and investment climate in India vis-a-vis other countries.70

Padmini Swaminathan and J. Jeyaraman in their working paper traced the growth formation of knitwear clusters of the industrial district of Tirupur, the strong linkage the industrial cluster has given itself to competition and cooperation and issue of child labour.71

Dr Pradipa Kumar Datta, in the article “Social and Economic Values of Textile Fibres” presented an overview of textile industry in India. Social and economic values of textile fibres such as cotton wool, silk, jute and synthetic are analysed. Their relative contribution to textile industry was studied in detail.72

Mahesh Nanavathi, in her article explained the new textile policy is quite liberal and bold if it is implemented quickly, because the Indian textile industry is plagued at home by prolonged sickness due to unprofessional management and out dated machinery.73

Lal and Jayati in their study titled “The politics of Gender at Work Flexibility, Skill and the Re-organisation of the Labour Process in the Indian Garment Industry” examined the politics of gender at work in the context of current transformation of Indian garment industry.74

Ramachandran Jaikumar, in the article “Beyond the MFA-Strategies for Indian Apparel Industry” emphasised on the future of the apparel industry beyond the Multi Fibre Agreement the need for quality, speed and responsiveness. The global competitive environment and the business processes of apparel with separate attention or woven and knitwear apparels were carried out.75

A R Gurusamy in his article “Textile Industry in Tamil Nadu” analysed the textile industry and its position in the economy of Tamil Nadu.76

M Sivasubramanian in his research titled “A Study of Spinning Mills in Tirunelveli Kattabomman District-A sector-wise Performance Appraisal”

focused the comparative performance of public sector, private sector and cooperative sector spinning mills between 1981-1993, measured performance in terms of cost structure analysis, inventory management, capital structure, capital efficiency, profitability and productivity.\textsuperscript{77}

Rastogi P.N, in his study “New Product Innovation Strategy and Technology Management” revealed that new product provides a leading edge to the corporate strategy of many successful manufacturing firms who open up new markets and new business opportunities.\textsuperscript{78}

YR Shah, in his article “Importance of Raw Materials Management Textile Industry” observed that the profitability of any industrial establishment depends on its capacity to market, more profitable products followed by an excellent raw material management.\textsuperscript{79}

Jaun Carlos Hiba “Improving Working Conditions and Productivity in the Garment Industry - An Action Manual” observed that improving working conditions and productivity in this industry could result in making its small and medium sized enterprises more competitive, efficient and safer and also extend better protection to women workers.\textsuperscript{80}


Singh S and Lakshman N, in their study ‘Comparative Study of Environmental Pollution in Tanneries and Hosiery Industries in Tamil Nadu, India’, stated that hosiery is an important export oriented industry in India, but dyeing and bleaching required large amount of chemicals harmful to workers and nearby residents. Plant, animals, and even human life are placed at risk.  

Sinha Ajay Kumar in his study “India must adjust to Global Trade Pacts”, dealt with the factors accounting for the decline in unit value realization [UVR] that has been attributed to demand declaration in major international markets.

“Sustaining the Rag Trade” published in 2000 by IIED, Nick Robins and Humphry identified four key elements of the sustainability of the clothing supply chain as eliminating environmental hazards, improving energy and water efficiency cutting pollution and waste establishing social justice.

Nallasivam, in his paper on “Garment Export in SSI-A Scenario, Tirupur”, pointed out the areas where there are problems and shortfalls in Hosiery industry.

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R. Ravimohan, stated in his article ‘Service to Power loom Sector’ that the textile processing is weak in India. Hence, the international technology and modernization become necessity in India.  

Himanshu Vaidya in his article “Brands and Collective Brands: The path through Design” revealed that the Brands however like Rome were not built in a day, nor are they built by communication alone. Brands stood on the strong foundation of functional excellence and these after they fly beyond, implanting intangibles into the product.

Gopal Joshi, in his study, ‘Garment Industry in South India Rags or Riches?’ stated that for improving productivity through high value addition and high quality, the garment industry can be pursued through a combination of various measures. Investment in new technology and equipment upgradation of skill among the workers, improvement in production, organization and processes, carrying out productivity campaigns and emphasis on quality improvement, improvement in job quality.

Malleshwaran in ‘The Textile Committee Meet 2002’ observed that technology upgradation is an essential requirement to achieve quality and product diversification, to meet the changing demands in a professional manner.

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Dr K Nagendra Baby in “Analysis of Marketing Cost in Spinning Mills”, revealed that the success of any industry, was based on the marketing function, which plays an important role. If the cost management in an industry is effective, the company can survive even amidst cut throat competition.\(^8^9\)

The paper titled “Metal Ions and their Associated Problems in the Textile Processing” by Dr Usha Sayed, Sanjey Banerjee and Saikat Majumder elucidated the harmful effects of metal ions in wet processing and different commercially valuable sequences.\(^9^0\)

Reddy R.C.M, in his study “Indian Textile and Clothing Industry Strategy for Competitiveness beyond Quotes” observed that the developed countries which are likely to lose their market share after phasing out of quota restrictions had consciously initiated several measures by which their political and economic interests were protected.\(^9^1\)

Harleen Sabharwal, in his article “Making Waves in Trend Forecasting” observed that the west has embraced trend forecasting in fashion garments ages ago, whereas India is catching, up with the


fashion wave albeit slowly, but surely and provides assured market for fabrics. 92

K. Sreenivasan and Indira Duraiswamy studied the organizational, economic and technological aspects of hosiery industry. They summarized that the hosiery industry in India, promised a very good growth potential. However, the industry is technically backward, lacking in motivation and organizationally weak. Hosiery industry is a highly labour-intensive process and lends itself easily to mechanization, considering these factors; they felt that the knitting sector of textile industry should be given special encouragement. 93

Dr Neve. Greet, in the article “Great Expectations and Rewards of Modernity; Commitment and Mobility among Rural Migrants in Tirupur, Tamil Nadu - Contributions to Indian Sociology” found in anthropological and historical accounts, that stereotypes rural labour migrants as unreliable workers who were not yet fully committed to industrial work regimes and who keep prioritizing rural responsibilities above industrial needs. 94

Gorakhia R.R. in his article “Structural Adjustments for Future Garment Trade” revealed that closer contacts by participating in international trade fairs / exhibitions will expose our garments to buyers in those countries and to have two way relationships between Indian exporters and foreign designers.95

Rahul Chaudhri, in his article “Indian Garment Industry ‘What is the Real Competitive Edge?’” observed that the Indian garment industry long been harping on the low cost advantage ‘which in the real sense is not so low, when the productivity norms are applied. He also observed that there must be shift from cost advantages to competitive advantages to face the global competitions.96

Keith Slater in his book “Environmental Impact of Textiles: Production Process and Protection” explained the effect of all phases of textile production and their uses on the earth around us, by considering its results.97

Nanda and Meera in their article ‘Post–Fordist Technologies and the Changing Patterns of Women’s Employment in Third world’, stated that, ‘literate but unskilled and largely female labour has thus far fuelled the tremendous increase in manufactured exports of

96. Rahul Chaudhri, “Indian Garment Industry ‘What is the Real Competitive Edge?’”, Clothes Line, Sep 2003, p 76.
garments and microelectronic products from third world to the industrially advanced economic of the North.\textsuperscript{98}

Dr. Chandan Chatterjee, in his article “Ready Made Garments in the Post Quota Regime” had drawn the comments of MC Kinsey, saying that though China is expected to garner a bigger share in the global textile and apparel trade, India could be the second largest supplier to EU and US in the post quota regime.\textsuperscript{99}

Pooja J Rajaney, in her article “Post MFA challenges to Textile Management” suggested that, TUF initiated by the Government of India in April 1999 sanctioned Rs.25,000 crores to be utilized by March 2004 and the garment exporters need to work harder on the implementation of such incentives.\textsuperscript{100}

Veena Jha in her article titled “Textiles in India - A Player or A Winner” has suggested to unleash the potential of India, the need of the hour was domestic reforms and a strong dose of import competition, which alone can give the much needed push to the production capacity.\textsuperscript{101}

\textsuperscript{99} Dr.Chandan Chatterjee, “Readymade garments-the post quota regime”, Clothes Line, Nov2004, p 68.
\textsuperscript{100} Pooja J Rajaney, Post MFA Challenges to Textile Management”, The Textile Magazine, May 1999, p 81.
\textsuperscript{101} Veena Jha, Programme Coordinator, UNCTAD, New Delhi, “Textiles in India - A Player or A Winner”, Yojana, February 2005.
Vinod Shanbhag and Nandita Abraham, in their study “Suitable Product Strategy for India”, observed that textile and clothing exports could hit at an average annual growth rate of 18 per cent by 2010. To harness this, the country needed to shift focus to value-added products, particularly in the apparel segment, through a well designed strategy.102

D K Nair in his article entitled “Textiles - the Road Ahead” analysed the major problems in the ports, roads and energy sector and the need to upgrade them to international standards for better marketing of textiles at global level.103

Kaleem Mohammed Khan and Mohammed Afaq khan, in their study titled “Opportunities and Challenges for Indian Textiles and Garments Sector in Post Quota - Regime”, dealt with the preparedness of India to become the market leader in Indian textiles and garment sector.104

Narendra Singh and Surinder Singh in their paper “Competitiveness of Indian Cotton Textile Industry in Global Textile Market-A Perceptual Analysis” explored the components of competitiveness of Indian cotton textile industry, which is the

103. DK Nair, “Textiles - the Road Ahead”, Secretary General, Indian Cotton Mills Federation, YOJANA, February 2005.
driving force assuring survival and growth in this rapidly changing environment.\textsuperscript{105}

Karam Pal and Surender S Kundu in their paper titled “International Competitiveness vis-a-vis Indian Cotton Textile Industry in Post MFA Regime” had analysed India’s position in world textile trade and the impact of Multi Fibre Agreement.\textsuperscript{106}

S R Bhatt, AK Dave and B S Parikh, in their paper “Problems and Prospects of Total Dissolved Solids -TDS Removal from Industrial Waste Water” have expressed the water pollution and analysed the problems of textile industries and the industry friendly and innovative approaches to be evolved to prevent and control pollution.\textsuperscript{107}

‘V L Sohani, in his paper titled “Total Quality Management with Special Reference to Textile Industry” elucidated the quality concept that has changed a lot with the growing global competition for business growth and survival.\textsuperscript{108}


RM Sankar, in his paper titled “Preparedness of Indian Textile Industry for the WTO Regime” detailed the existing position of Indian textile industry across key result areas and the projected opportunities offered by the liberalized trade regime.109

B P Yadav, in his paper titled “Cost Reduction in Chemical Processing - Few Case Studies” had advocated the necessary preventive/corrective measures for economizing the processing cost for the desired fabric quality to have an edge over others in the global competitive market.110

Dr A A Ansari, in his paper titled “Recycling of Textile Effluent in Reactive Dyeing” has stressed the steps to be taken to reduce pollution load on effluent treatment plant offering a scope of reclamation of dilute wash effluent through minor treatment.111

Pradeep Joshi, in his article “Post WTO and the Indian Clothing Industry” observed that importing countries will no longer be able to discriminate between exporters by applying safeguard measures to individual countries as this sector is integrated into WTO rules by 2005.112


Dr F R Alexander Pravin Durai, in his article “A Study on the Functional Problems Faced by the Handloom Cooperative Societies in Tamil Nadu” analysed the critical production and marketing problems faced by the handloom cooperative sector in Tamil Nadu.\textsuperscript{113}

Kothari D.D, in his study “The Indian Textile Industry - Reasons for Optimism” observed that it was imperative for India to take effective steps to sustain the ongoing vigorous export growth and the measures to be taken to make the Indian textile industry an engine of growth.\textsuperscript{114}

Mr. Hemang Shanghavi, in his article “Need to Modernize Powerloom Sector” revealed that at most 68 per cent of the total cloth production in India comes from decentralized powerloom sector and so powerloom entrepreneurs should access the export market, compete against the imported fabric and make the weaving industry economically viable, by providing fabrics with consistent quality and value addition on schedule and at an affordable price.\textsuperscript{115}

“A Study on Performance Related Issues of Hosiery Garment Exporting Units in Tiruppur” by A Somu dealt with the several issues affecting the performance of exporting units and how efficiently and effectively they are managed.\textsuperscript{116}

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\textsuperscript{114} Kothari D.D, “The Indian Textile Industry -Reasons for Optimism”, Clothes Line, July 2005, p 85.  \\
\textsuperscript{115} Mr. Hemang Shanghavi, “Need to Modernize Powerloom Sector”, Textile Magazine, July 2005, p30.  \\
\end{flushright}
“Export of Home Furnishings Fabrics, A Study on Problems and Prospects” by S Mathivanan, suggested that the manufacturing units must be able to develop their infrastructure to suit the technological advancements and domestic environment.117

Mr. P Chidambaram, the then Finance Minister of India, in his article “Budget Boost to Textile Industry” expressed appreciation of the current rate of growth of the textile industry particularly, the encouraging response to the TUF and Scheme of Integrated Textile Parks [SITP].118

Dr. Sudha Babel, P Gupta, and Meenu Shrivastava in their article “Existing Status of Handloom Weaving Units of Rajasthan Man-made Textile in India” analysed the status of handloom weaving units, their setup, functioning and problems faced by them.119

Dr. Sathy Sundaram, in the article ‘Handlooms Seek Direct Marketing’ described that the handloom cloth was the most suited to our climate and socio-economic conditions.120

Asim Kumar Roy Choudhury in his book “Textile Preparation and Dyeing” dealt with the classical processes of textile dyeing, material preparation before dyeing and recent technologies.121

118. Mr. P Chidambaram, the then Finance Minister of India, “Budget Boost to Textile Industry”, Textile Magazine, March 2006, p 12.
An article on “Steam Consumption Norms for Textile Process Houses” published by BITRA, Mumbai provided useful guidelines to conserve thermal energy for the textile wet processing.  

Anasuya Sahoo and Kamal kumar Gupta in their article “Electrochemical Dyeing- An Overview and Techniques” explained how electrochemical dyeing process results in product savings, less chemicals with special safety requirements, unsurpassed environmental compatibility and better fastness properties.

Dr Padma S Vankar in his book “Hand Book on Natural Dyes for Industrial Applications” explained about extraction of natural dyestuffs from 19 common flowers, weeds, bark or leaves and its application on cotton, silk and wool fabrics for textile industry with photographs.

Gordhan K Saine in his study on “Non-Tariff Measures Affecting India’s Textiles & Clothing Exports: Findings from the Survey of Exporters” delineated the prospects and challenges of Indian textile exporters.

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1.5.3 Reports

Report of the Fact Finding Committee of 1942 on “Handloom and Mills” found that a number of middle men were in the marketing of handloom products and their profit was also considerable, ranging up to 47 per cent. The committee considered the various economic, social, military factors that were responsible for fostering the handloom industry.\textsuperscript{126}

Report of the Textile Enquiry Committee 1954, Government of India, examined the structure and organization of the various sectors of the cotton textile industry. The important findings of the committee was that the master weavers had fulfilled and was fulfilling a necessary function with regard to the handloom industry and strongly recommended abolition of exploiting middlemen.\textsuperscript{127}

Report of the Working Group (Study team in 1959) Government of India assessed the progress of the handloom industry during the Second Five Year Plan and obtained lessons for the programmes to be drawn for the third plan. The group satisfied itself with the progress in bringing more looms into the cooperative fold as well as the progress made by the societies and recommended for the pursuit of the same policy in future.\textsuperscript{128}

Report of the Power-loom Energy Committee 1964, Government of India, insisted on the need for bringing in a larger number of weavers

\textsuperscript{126} Report of the P.J.Thomas Committee, Govt. of India. wikipedia.org/wiki/Dr.P.J.Thomas.


\textsuperscript{128} Report of the Working Group, Study Team, 1959, Government of India.
in the cooperative fold and suggested for the establishment of cooperative spinning mills for the supply of yarn of the desired counts, to the cooperative societies and reservation of the manufacture of colour sarees exclusively for handloom sector.\textsuperscript{129}

Report of the Working Group, 1964, Government of India, to work out the Fourth Five Year Plan observed that the principal aim of handloom development should be to increase the earnings of weavers’ and it would be impossible to achieve their production to ordinary plain fabrics made of course counts of yarn.\textsuperscript{130}

Report of the Programme Evaluation Organisation 1967, Government of India, stressed the impact of Handloom Development Programme on employment and earnings amongst the weavers on the basis of the number of looms in the cooperative fold. It felt that, even after the advent of modern techniques and growth of cooperative institutions, the hereditary nature of the industry hardly changed and weavers did not generally take interest in getting themselves trained in the improved methods of weaving.\textsuperscript{131}

“Survey of India’s Export Potential of Textile and Made up Garments” conducted by Economic and Scientific Research Foundation, pointed out the woeful share of India in global garment trade due to poor technology and marketing. The survey recommended special schemes for improvement.\textsuperscript{132}

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\textsuperscript{130} Report of the Working Group, 1964, Government of India.
\textsuperscript{132} Economic and Scientific Research Foundation, Ministry of Commerce, Export Promotion Division, Government of India, March 1969
\end{flushleft}
Report of the Sivaraman Committee, 1974, Govt. of India recommended for the establishment of a high powered statutory, All-India handloom Board to discharge the several functions and a separate Directorate under a Development Commissioner for Handlooms in the Ministry of Commerce charged with the responsibility of dealing with handlooms alone.  

Report of the Expert Committee on Handloom Industry (Santhanam Committee) 1975 Government of Tamil Nadu, suggested for the protection of the Handloom industry against mill and powerloom sectors by registering and bringing the handlooms under the control of the State Government. It suggested for the establishment of six Assistant Directors of Handlooms and Textiles with head quarters at Salem, Coimbatore, Trinelveli, Madurai, Kancheepuram and Trichy. The other recommendations were the establishment of cooperative spinning mills to produce the required yarn quality, credit sales of handloom cloth to Government servants, reduction of the rate of interest charged by Tamil Nadu Handloom Finance and Trading Corporation, Training and Designing Establishment and quality control.  

Market Research Wing of Textile Committee, Ministry of Textiles, Govt of India, 1989, surveyed and analysed the aggregate household consumption of hosiery goods in the country increased from Rs.7,753 millions in 1985 to Rs.12,431 millions in 1987. The quantity wise consumption of hosiery items rose from 774 metres in 1985 to 951 metres in 1987. Thus there is an increase of 27.8 per cent in

133. Report of the Sivaraman Committee, 1974, Planning Commission, Govt. of India
quantity terms and 60.3 per cent in value terms between 1985 and 1987. The consumption of hosiery items in rural areas is in the range of 6,997 million rupees compared to 5,550 million rupees in urban areas.\textsuperscript{135}

Government of India on 3, Aug, 1999 recommended setting up of 400 new processing units about 200 high-tech units and 200 medium-tech units financed under TUFS, infrastructural Report of the Expert Committee on Textiles, grants for setting up processing parks, import of high-tech processing machines with concessional duty, a committee to examine the issue in depth and recommend appropriate uniform, desirable and pragmatic norms and guidelines to encourage pollution control.\textsuperscript{136}

A national survey on ‘Market for Textiles and Clothing’ conducted by Textile Committee, Ministry of Textiles, Government of India, during 2002 had placed the overall domestic textile market size, per capita consumption of all textiles at the national level, per capita consumption of pure silk, woolen, man-made and blended / mixed textiles and ready-made garments.\textsuperscript{137}

The Textile Committee Report on ‘Rural Vs Urban’ in 2008 highlighted the fact that Rural India contributed Rs 89,366 crores to the textile basket by its purchase in 2007 - a growth of 9.5 per cent over 2006, that urban India spent Rs 79,929 crores on textiles during 2007.

\textsuperscript{135} Report of the Textile Committee, Ministry of Textiles, Govt of India, pp 56-60.
\textsuperscript{137} Market for Textiles and Clothing National Household Survey, 2002, Textile Committee, Mumbai, India.
compared to Rs 74,011 crores in 2006, despite the change in dressing patterns of women in South and East India, where sari market grew by 6.7 per cent in 2007, while women in rural India had a 61.51 per cent share in the market, those in urban pockets had 38.49 per cent share.\footnote{Textile Committee Report on ‘Rural Vs Urban’ 2008. w.retailangle.com.}

Confederation of Indian Textile Industry in the “Vision for Indian Textiles and Clothing Industry 2007-12” has thrown light on the need to increase the output for investment to the tune of Rs 1,94,000 crores during 2007-12 where processing sector attracts Rs 51,000 crores and India requires 468 process houses with 1,00,000 metres / day capacity and additional processed Fabric Demand 37 bn. sq. metres.\footnote{“Vision for Indian Textiles and Clothing Industry 2007-12” Confederation of Indian Textile Industry.}

The Textile Committee, Ministry of Textiles, in the Annual Report on National Household Survey 2010 analysed the domestic demand pattern of textiles and created a useful data base for policy makers, researchers, trade and industry.\footnote{Annual Report on National Household Survey 2010, Textile Committee, Ministry of Textiles, Government of India}

Though there are umpteen number of studies made relevant to textiles viz., spinning mills, weaving mills, knitting hosiery marketing, exports, co-operatives, primary weavers, master weavers, handlooms, power looms and only a very few studies about textile processing are available. Hence the researcher considers it is worth studying textile processing which remains a neglected sector even in research studies and needs focus to get the significance it deserves.
1.6 SCOPE OF THE STUDY

This study gives an insight into the performance appraisal of the study unit in terms of finance, production, turnover and human resource. The study in its purview highlights the leading role of the study unit in making the rigorous changes in the textile processing sector.

1.7 OBJECTIVES OF THE STUDY

1. To assess the contribution of textiles processing units to India’s economy.
2. To examine the predominant role of textile processing in Erode District.
3. To analyse the production, financial and sales performance of the study unit.
4. To examine the contribution of human resources of the study unit to the performance.
5. To make a comparative analysis of the working of the study unit with private units in Erode region.
6. To study the impact of eco-friendly approach in processing units.
7. To offer suggestions based on findings.

1.8 OPERATIONAL DEFINITIONS OF CONCEPTS

For the purpose of the study the following terms are defined:

1.8.1 B O D

Biochemical Oxygen Demand is the amount of dissolved oxygen needed by aerobic biological organisms in a body of water to breakdown organic material present in a given water sample at
certain temperature over a specific time period.\textsuperscript{141}

1.8.2 C O D

Chemical Oxygen Demand’s application determine the amount of organic pollutants found in surface water or waste water.\textsuperscript{142}

1.8.3 Calico

Calico an important commodity traded between India and Europe in the 17th and 18th centuries, originated in Calicut, India by the 11th century is the cotton fabric woven in plain or tabby, weaves and printed with simple designs.

1.8.4 Cellulose

Cellulose is carbohydrate forming the main constituent of plant cell walls, used in the production of textile fibre.

1.8.5 Cotton

Cotton is a soft, fluffy staple fibre that glows in a protective capsule, around the seeds of cotton plants.

1.8.6 Effluent

Effluent is the liquid waste flowing out of a factory, farm, commercial establishment or a household into a water body such as a river, lake, lagoon or a reservoir.

1.8.7 Flax

Flax is a plant that has been grown for fibre which is soft, lustrous and flexible, stronger than cotton fibre but less elastic, used in damasks, race, nets, twine, rolling paper for cigarettes and so on.

\textsuperscript{141} wikipedia.org/wiki BOD

\textsuperscript{142} en.wikipedia.org/wiki COD
1.8.8 **Green House Gases**

Green House Gases are the gases which capture radiant heat from the sun that frequently affect the temperature of the earth like water vapour, carbon dioxide, methane, nitrous oxide and so on, emitted from natural sources and human.\(^{143}\)

1.8.9 **Handloom**

It is a loom that is operated by hand or manually.

1.8.10 **Hemp**

It is a herbaceous plant, its fibre extracted from the stem used in making rope and fabrics.

1.8.11 **Ingeo**

Ingeo is a plant fibre that is recyclable, biodegradable, breathable and balances strength and resilience with comfort, softness and drape in textiles and can be composted. It is naturally flame retardant and apparels made from this fibre have odour control, superior wicking properties, low pilling and stain resistant.\(^{144}\)

1.8.12 **ISO 14001**

ISO 14001 is an international standard that specifies a process for controlling and improving a company’s environmental performance and confirms its global relevance. It consists of general requirement, environmental policy, planning, implementation and operation, checking and corrective action and management review.\(^{145}\)

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144. [www.google.co.in](http://www.google.co.in).
145. [www.ISO14001SSO,environmental.com/htm](http://www.ISO14001SSO,environmental.com/htm)
1.8.13 **Linen**

Linen refers to a cloth woven from flax.

1.8.14 **Loom**

Loom is an apparatus or a devise used for weaving yarn or thread into fabric. The basic function of any loom is to hold the warp threads under tension to facilitate the inter weaving of the weft threads.

1.8.15 **Manchester**

Manchester is a place in England, famous for textiles and a flourishing wool market in sixteenth century, ideal for the construction of water powered cotton mills, which industrialized the spinning and weaving of cloth, natural distribution and trade centre for raw cotton and spun yarn.\(^{146}\)

1.8.16 **Myrobalan**

Myrobalan is a dried plum like fruit of a Tropical tree, extracts of which is used in dyeing.

1.8.17 **Oeko-Tex Standard 100**

Oeko-Tex Standard 100 is an international testing and certification system for textiles, limiting the use of certain chemicals.

1.8.18 **Poncho**

Poncho is a cloak made of a blanket like piece of cloth with a slit in the middle for the head.

\(^{146}\) wikipedia.org/wiki/history-of-Manchester
1.8.19 **Powerloom**

Powerloom is a loom that is operated mechanically or electrically.

1.8.20 **Reps**

Reps is a textile fabric with a cored surface used in curtains and upholstery.

1.8.21 **Reverse Osmosis**

Reverse osmosis the process of removing or separating all particles and solids down to the smallest invisible salt particle from liquids.

1.8.22 **Royal Court**

Royal court was the place where the cloud brocade, yunjin, a unique production of Nanjing was monopolized during the Yuvan, Ming and Qing dynasties in China. The incredibly rich textures and fantastic designs of the so called cloud brocade fascinate people even today.\(^{147}\)

1.8.23 **Sisal**

Sisal is a Mexican plant, with large fleshy leaves used for fibre extraction.

\(^{147}\) The cloud Brocade and Yangzhou – Ying Wang University of Wisconsin- Milwaukee, yingwang@uwm.edu. Textile society of America symposium proceedings 01.01.2008, 11\(^{th}\) Biennial Symposium. September 4-7, 2008. Page1
1.8.24 **Spindle**

Spindle is a device to spin fibre into thread. Spindle in a wooden spike (known as shaft) used for spinning wool, flex, hemp, cotton on other fibres.\(^{148}\)

1.8.25 **Squeegee**

Squeegee is a rubber-edged implement set on a handle and used for cleaning.

1.8.26 **Sumptuary Laws**

Sumptuary made for the purpose of restraining luxury or extravagance particularly against inordinate expenditures in the matter of apparel, food, furniture and so on.

1.8.27 **Silk Road**

The Silk Road is the trade route, got its name from the lucrative Chinese silk trade, a major reason for the connection of an extensive transcontinental network across the Asian continent, the Mediterranean World and Europe, which began during Han Dynasty 206 BC – 220 CE.

1.8.28 **TDS**

The dissolved minerals in water are commonly referred to as Total Dissolved Solids and drinking water becomes unpalatable when the TDS level is above 500mg/l.

1.8.29 **Textile or cloth or fabric**

Textile or cloth or fabric is a flexible material consisting of a network by weaving, knitting, crocheting, interlacing, knotting or

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pressing of natural or artificial fibres often referred to as thread or
yarn to a finished piece of fabric used for a specific purpose.

1.8.30 Ultra-filtration

Ultra-filtration is a variety of membrane filtration in which
hydrostatic pressure forces a liquid against a semipermeable
membrane. Suspended solids and solutes of high molecular weight are
retained, while water and low molecular weight solutes pass through
the membrane.

1.8.31 Upholstery textile

Upholstery textile is the covering, padding springs and so on for
furniture.

1.8.32 Vat Dyes

Vat Dyes are resistant to light, acids, alkalis and strong
oxidizing bleaches, expensive because of the initial cost and the
method of application, refer to dyeing in a bucket or vat whenever a
liquid or shade over the entire garment is designed.149

1.8.33 Water Year

Water Year any 12 month period usually selected to begin and
end during a relatively dry season, used as a basis for processing
stream flow and other hydrologic data.150

1.8.34 Woad

Woad the dye chemical extracted from woad is indigo. Woad
found even in the time of the ancient Egyptians, who used it to dye the

149. wikipedia/vat_dye

150. www.answers.com/topic/water-year
cloth wrapping applied for the mummies. A plant in the mustard family cultivated or its leaves that yield a blue dye.\textsuperscript{151}

1.8.35 Yarn

Yarn is produced by spinning raw fibres of wool flax, cotton or other raw middle for the head.

1.9 DESIGN OF THE STUDY

This section describes the methodology of the present study, which includes collection of data, sampling design, period of study and framework of analysis.

1.10 COLLECTION OF DATA

Census survey is adopted to collect primary data in relation to socio-economic status, performance and attitude of the workers of the TCTP Mills. Judgment sampling is followed by collecting primary data from two private mills A and B, for the comparative study of the socio-economic status, performance and attitude of the workers with the study unit. Secondary data were collected from the publications the Government of India, Government of Tamil Nadu, Department of Handlooms & Textiles and the records of the study unit and the two private mills for comparison to examine the working performance of the mills.

\textsuperscript{151}  www.the free dictionary.com/woad
1.10.1 Census Method

Census survey method is used to collect data from all the 250 permanent workers of the study unit regarding their socio-economic status, performance and attitude towards the TCTP Mills.

The judgment sampling method is used to collect data from the workers of the two private units for the comparative analysis. Out of 130 workers employed in Mills A and 150 workers employed in Mills B, a sample of 25 workers from each unit is chosen for interview in the comparative analysis of socio-economic status, performance and attitude of human resource.

1.11 PERIOD OF STUDY

The performance evaluation for the study unit was done for a period of 13 years from 1998-99 to 2010-11. The comparative performance analyses with the two private mills in the same locale are done for a period of five years 2005-06 to 2009-10. The primary data were collected from December 2010 to February 2011 for the TCTP Mills and the two private mills.

1.12 HYPOTHESIS

Hypotheses are framed to analyse

(i) the effect of personal variables viz., gender, age, marital status, caste, educational status, hereditary nature of occupation, monthly income and experience on the workers’ performance in the average rating of supervisors,

(ii) the difference between the workers’ performance in the self assessment and in the assessment by the supervisors,
(iii) the effect of personal variables viz., gender, age, marital status, caste, educational status, hereditary nature of the occupation, different income groups, welfare facilities availed of, days spent on social functions, overtime wages earned, Experience and work taken up during leisure time on the workers’ attitude towards the various HR practices followed in the mills,
(iv) the difference between the workers employed in different mills as to their educational qualification in the family, number employed in the family, monthly income, monthly income of the household, average monthly savings and average years of experience in the mills and
(v) the difference between the workers’ performance in different mills in the self assessment and in the assessment by the supervisors.

1.13 FRAMEWORK OF ANALYSIS

1.13.1 Ratio Analysis

Ratio analysis is used to a) test the liquidity, stability, profitability and turnover of the study unit, b) compare the performance status of the study unit with that of mills ‘A’ and ‘B’ and c) interpret the labour turnover.

1.13.2 Trend Analysis

Used to analyse and estimate production and turnover of TCTP mills LTD. One of the most important tasks of analysis is to make estimates for the future. The statistical data, collected at successive intervals of time are used in mathematically fitting a straight line or a parabolic trend. Therefore, the same situation continues i.e. nothing extraordinary happens in business,
climate, social set up, customs and habits, the trend calculated will be more or less true.

\[ Y_c = a + bx \]

Where \( Y_c \) is used to designate the trend, values to distinguish them from the actual \( Y \) values, ‘\( a \)’ is the intercept when \( x=0 \) and ‘\( b \)’ represents the slope of the trend line.

### 1.13.3 ‘t’ Test

Used to analyse a) the difference between self and supervisors in the assessment of workers’ performance, b) average rating of supervisors on the basis of gender, age, hereditary nature of occupation and income, c) workers’ attitude towards the study unit on the basis of gender, hereditary nature of the occupation, income, welfare facilities and work taken up during leisure time.

The “t-statistic” is defined as: \[ t = \frac{\bar{x} - \mu}{\sqrt{n}} \]

Where \[ S = \sqrt{\frac{\sum(x-x)^2}{n-1}} \]

The t-distribution has been derived mathematically under the assumption of a normally distributed population.

### 1.13.4 Multiple Regression

Multiple Regression analysis is applied to find a) the effect of personal variables on the workers’ performance rated by self and b) the effect of personal variables on the workers’ average performance rated by supervisors, c) the effect of personal variables on workers’ attitude towards the overall performance of the mills. The general purpose of
multiple regressions is to learn more about the relationship between several variables and a dependent variable.

\[ Y = a + b_1 X_1 + b_2 X_2 \ldots \ldots \ldots b_n X_n \]

where, 
\[ b_1, b_2 \ldots b_n \] are the parameters of independent variable to be estimated;
\[ a = \text{regression constant} \]
\[ R^2 = \text{measure of closeness of fit of the regression line to the actual points and rarely calculated. Closer the value of } R^2 \text{ to 1, the better is the fit.} \]

1.13.5 Chi-square Test

Chi-square test is used to compare a) the workers in the TCTP mills Ltd with that of Unit ‘A’ and ‘B’ in terms of socio-economic factors viz., education, number employed in the family, monthly income of the workers’ and monthly income of the households and b) workers’ performance assessed by self.

The \( \chi^2 \) test was first used by Karl Pearson in the year 1900. The quantity \( \chi^2 \) describes the magnitude of the discrepancy between theory and observation. It is defined as:

\[ \chi^2 = \sum \frac{(O-E)^2}{E} \]

with \((r-1)(c-1)\) degrees of freedom, where \(O\) refers to the observed frequencies and \(E\) refers to the expected frequencies.

1.13.6 F Test or Analysis of Variance

The technique of one-way analysis of variance is used to analyse a) the workers’ performance in the average rating of supervisors
on the basis of age, marital status, age, educational status and workers’ experience, b) workers’ attitude towards the working of the study units on the basis of age, marital status, caste, educational status, member of days spent on social functions, overtime wages earned and workers’ experience and to compare a) the socio economic factors such as monthly savings of the workers, workers’ experience and b) workers’ average performance rated by supervisors.

\[
F = \frac{\text{Between - Column Variance}}{\text{Within - Column Variance}}
\]

Variance between the samples (SSC) divided by degrees of freedom, \( \nu = k - 1 \) where, \( k \) = number of samples and variance within the samples (SSE) divided by degrees of freedom \( \nu = N - K \), where \( K \) refers to the number of samples and \( N \) refers to the total number of all the observations.

The calculated value of \( F \) is compared with the table value of \( F \) for the degrees of freedom at a certain critical level to know whether the difference arises due to fluctuation in sampling.

### 1.13.7 Likert Scaling

Likert scale is a psychometric scale commonly used in questionnaire or is the most widely used scale in survey research. Respondents specify their level of agreement or disagreement or a symmetric agree-disagree scale for a series of statements. Thus the scale captures the intensity of their feelings.

### 1.13.8 SWOT Analysis and TOWS Matrix

SWOT and TOWS analysis are used to frame future strategy emphasizing on internal and external environment. SWOT analysis is
an effective way of identifying strengths and weaknesses, and of examining the opportunities and threats faced by the study unit. T stands for Threats, O stands for Opportunity, W stands for weaknesses and S stands for strengths.

TOWS analysis is an effective way of combining a) Internal strengths with external opportunities and threats, and b) Internal weaknesses with external opportunities and threats to develop a strategy considering all strength one by one listed to the SWOT analysis.\textsuperscript{160} Tows matrix; proposed by Heinz Weihrich, has a wider scope, as a conceptual framework for a systematic analysis that facilitates matching the external threats and opportunity with the internal weaknesses and strengths of the organisation. It indicates four conceptually distinct alternative strategies, tactics and actions.\textsuperscript{161}

1.14 LIMITATIONS OF THE STUDY

The present study is limited to the evaluation of TCTP mills, the study unit in terms of financial and production performance and socio-economic status and attitude workers. The findings derived from the study are based on the socio-economic conditions of the area around the mills, and the information supplied by the mills for 1998-99, 2010-11 and the primary data collected through interview schedules, being concerned with the income, saving and investment, might have their own qualitative limitation.

Regarding the appraisal of the socio-economic status, attitude and performance of the human resource, the study unit is confined to

\textsuperscript{160} www.shahzadtc.com/pdf/swottows.pdf.

\textsuperscript{161} The TOWS MATRIX-A Tool for Situational Analysis-Heinz Weihrich2008 www.tools and technologies 24 x ls.com/en 113
the permanent workers directly involved in the processing activities. It
does not cover the administrative staff of the study unit.

The comparative performance evaluation done with private mills
in the same area are based on the information supplied by the units for
five years from 2005-06 to 2009-10 only and the comparative analysis
of socio-economic status, performance and attitude of the workers
based on the sample size.

1.15 CHAPTER SCHEME

The report of the present study - An analysis into the working of
TCTP Mills Limited Erode has been organized and presented in six chapters.

Chapter I contains the introduction, importance of textiles,
significance of the study, statement of problem, review of literature,
objective of the study, operational definitions of concepts and
methodology.

Chapter II consists of the historical perspective of textiles,
contributions of Major countries towards textile industry, textile
industry in India, textile industry in Tamil Nadu, textile industry in
Erode District and the textile processing functions.

Chapter III analyses the financial, production and turnover
performance of the study unit.

Chapter IV deals with the socio-economic status, performance
and attitude of the employees of the study unit.

Chapter V deals with the eco-friendly measures followed by the
textile processing units and the steps taken by the study unit.

Chapter VI summarises the findings of the study unit,
suggestions and conclusion.