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Textile Fabric in India: A Systematic Review

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Abstract

The objective of this research paper is to lay down the history of Indian Textile history and give a detailed review about the textile industry and the problems faced in two Maharashtrian cities – Kolhapur and Ichalkaranji. This paper will further also cover the potential of Indian textile industry in future with respect to competition and sustainability. One of the major problems in the 'manufacturing' area – yarn, and the rate fluctuations will also be discussed upon. The paper also talks about the government initiatives undertaken to boost the industry with the global scenario and where India stands with respect to the problems faced and solutions offered.

Keywords – Textiles industry, Manufacturing challenges, Waste management, Government schemes

Introduction

India's textiles sector has a rich history dating back centuries, with a diverse range of segments from hand-spun to capital-intensive mills. The industry's strength lies in its wide production base of natural and synthetic fibers, with the largest component being decentralized power looms/hosiery and knitting. The industry's close linkages with agriculture and cultural traditions make it unique. India has the capacity to produce a wide variety of textile products for domestic and global markets. The government has introduced schemes such as SITP, TUFS, and MITRA Park to attract private equity and generate employment.

Literature Review

The paper provides us with a knowledge on the traditional fibres and cotton used in the textile industry. The primary raw materials used in the production of clothing and textiles are fibres. Textile fibres come from either petroleum resources (synthetic or man-made fibres) or from natural sources, such as plant and animal fibres. As people around the world become more aware of the need to save the planet, many top fashion brands are trying to switch to new fabrics that are better for the environment. The biggest problem is that some of the traditional natural fibres, like cotton, require a lot of water and chemicals to grow, and the way silk is grown, by killing the silkworms, goes against the idea of sustainability. (Nayak et al., 2023)

Also, the government has started a number of programmes to help the textile industry after COVID. These programmes give the industry financial flexibility and business-friendly policies. The paper also talks about how recent changes in the prices of

cotton and cotton yarn have affected the textile business. Cotton and cotton yarn prices keep going up and down, which was already a source of worry. In the paper, the answer will be talked about. The paper helps us figure out why prices have been going up and how this is affecting the industry. The biggest problem is that cotton prices are very unpredictable.

The paper tries to solve the problem of waste in the Textile Industry by using Lean Manufacturing. This is because the process industry, and the textile industry in particular, has very rigid automatic machinery and a low range of products. Using Lean Manufacturing to keep getting better at getting rid of waste. With a mix of value stream mapping (VSM), kaizen, and visual tools. Using radar graphs, the possible levels of success before and after adopting lean were shown. Because the textile business is so complicated, it is hard to put lean manufacturing strategies into place. (Mohan Prasad et al., 2020)

It also talks about the problems the Indian textile and clothing business had before and after the coronavirus pandemic. To find a solution, it is important to study the internal and external barriers of traditional manufacturing micro-entrepreneurs during and after the pandemic. This will help policymakers make decisions that will help this vulnerable industry stay alive. The biggest problems are the lack of effective government policies, the demonetization of money, and the adoption of tax policies. The most important thing holding back the Indian handloom business is the lack of effective government policies. (Mishra et al., 2023). The challenges and limits of the textile business around the world, as well as what needs to be done in the future to improve productivity, quality, and safety in the process, are discussed. India's textile business isn't growing as fast as it could because there aren't enough power looms and enough government money. One key answer is to move money around in the budget. (Peter John & Mishra, 2023)

Promoting intra-regional trade through exchange of mutually agreed concessions by its member countries in APTA (Bangladesh, China, India, Republic of Korea, Lao People's Democratic Republic and Sri Lanka). To study the imports and exports scenario of textile industry in five member countries of APTA and to analyse where India stands in comparison to its four member countries of APTA. The justification and solution to the challenges will be discussed in paper with respective data collection and analysis. (Agarwal et al., 2017)

The objective of this research is to create a framework for understanding the impact of sustainable manufacturing (SM) adoption in the Indian textile industry. To achieve this, an instrument/questionnaire construct has been developed based on established principles of instrument design. This construct assesses factors such as Small and Medium Enterprises (SMEs), barriers to SM adoption, solutions to overcome these barriers, and SM performance factors. Data was collected from 64 Indian textile industries to develop this framework. Trust in manufacturers is crucial for the survival and competitive advantage of organizations. Data analysis was conducted using SPSS 18.0 software.(Roy et al., 2020)

Research Methodology and Design

Purpose of this research is to study the Textile industry in Kolhapur and Ichalkaranji and their dependency on the various variables

A. Research Objectives:

1. To have an overview on the History of Textiles in India
2. To assess problems in fabric manufacturing
3. To study the potential fabric markets for exports
4. To study the waste management styles
5. To analyse the government initiatives to support the textile industry

6. To have a scope of future expansion

B. **Research Design**:

1. Data Sources –
   Primary: Survey
   Secondary: Research papers, Online websites
2. Tools – Survey / Questionnaire

C. **Sample Selection**: Textile owners in in two Maharashtrian cities – Kolhapur and Ichalkaranji.

D. **Data Collection**: Data collection for analysis was done through survey. Since the research is qualitative in nature, we chose google forms as the instrument for data collection. The purpose of this survey is to provide a systematic review on the above-mentioned objectives.

Data collection and Analysis

1. **Economic Contribution of Textile Industry in India**

Accounting for approximately 38% of global cotton acreage and 23% of global production, India is known as the world's largest cotton producer. It is also the second largest cotton exporter and consumer. Maharashtra, Gujarat, and Telangana are the major cotton-growing states in India, accounting for 72% of the total cotton acreage. However, cotton production has declined, resulting in a decrease in closing stock. Due to higher cotton prices compared to other crops, acreage is expected to shift towards cotton in the upcoming season. Despite a decline in yield in the previous season, cotton production is estimated to rebound by around 17% in the next season with improved yield and acreage.

2. **Cotton Textile Industry – market size and growth**

- **Cotton as a raw material**

In 1991-1992, India produced 119 million bales of cotton, and this number rose significantly to 345 million bales in 2016-2017, marking a 190% increase. Maharashtra, Andhra Pradesh, Gujarat, and Telangana are the ‘Cotton Baskets’ of India. ‘Cotton Basket’ contribute to almost two-thirds of India's cotton production. In FY 2017, India accounted for 26% of the world's total cotton output, surpassing China which contributed 21%. Around 62% of cotton in India is grown in rain-fed areas, while 38% is grown on irrigated land. India cultivates all four types of cotton that are suitable for farming, and cotton can be exported from India without any restrictions. Major export destinations for Indian cotton include the US, Thailand, China, Pakistan, Vietnam, Indonesia, Taiwan and Bangladesh with Bangladesh being the largest buyer since FY 2015. In 2018-19, India's cotton exports are expected to increase by 43% to 10 million bales, largely driven by strong demand from China and other countries. Cotton made-ups, cotton garments, and cotton yarns constitute significant portions of global cotton goods trade, accounting for 40.10%, 48.19%, and 11.71% respectively.

Yarn rates in Indian Textile Industry

The yarn rates in the Indian textile industry vary based on several factors, including the type of fiber, quality, and demand. Some of the common fibers used in the Indian textile industry are cotton, polyester, nylon, and acrylic, and the prices of these fibers tend to fluctuate based on international market conditions. The cost of production, labour, and transportation also impact the yarn rates in India. As Indian process are low, textile manufacturing is attracted. However, it's important to note that yarn rates can be subject to change and it's always best to check with a reliable source for the latest prices.

- **Increasing Investments**

The Government has allocated substantial funds, totalling $184.98 million for Integrated Textile Parks (SITP) and $961.11 million for Technology Upgradation Fund Scheme, between 2015-16 and 2019-20, with the aim of promoting private investment and generating employment opportunities in the textile industry.

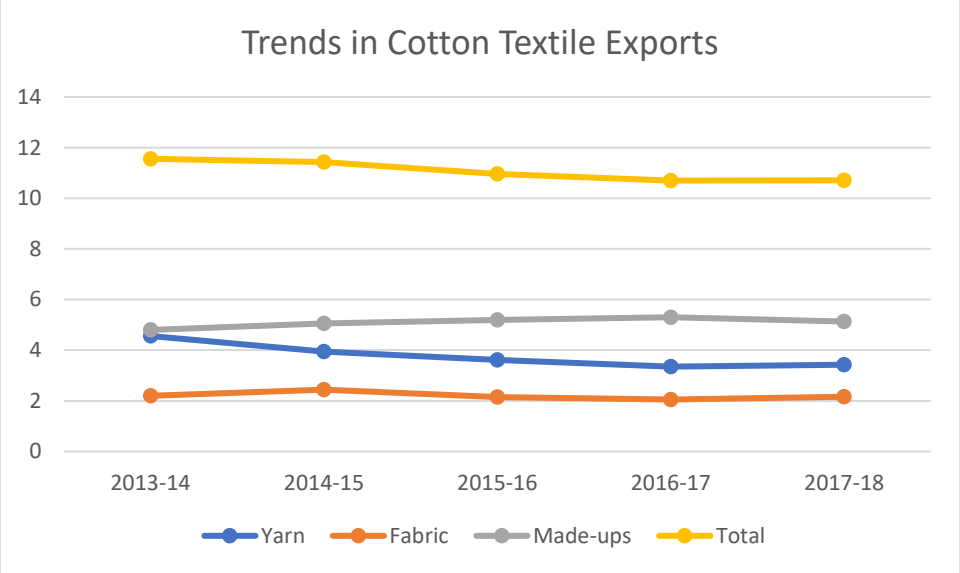

Figure 1. Trends in Cotton Textile Exports

Observed Trends:

- In the fiscal year 2017-18, cotton textile exports from India showed a slight increase of 0.09% to reach $10.71 billion, compared to $10.70 billion (2016-2017).
- Cotton yarns exports experienced a growth of 2.08% in terms of value during 2017-18.
- However, there was a decline of 3.20% in the value of cotton made-ups during the same period.
- On the other hand, cotton fabrics witnessed a growth of 5.36% in value during the fiscal year 2017-18.

3. Coronavirus and its impact

The coronavirus pandemic has had a significant impact on the textile industry in Maharashtra, which is one of the major textile hubs in India. Factory shut downs, low labour power, limited logistics have led to a fall in the performance of the textile industry. These issues were raised due to the lockdown measures which were to limit the spread of covid. Additionally, the cancellation of orders from overseas markets and a decrease in consumer spending have affected the textile industry's revenue.

The uncertainty surrounding the pandemic's duration and impact on the economy has also made it challenging for businesses to plan and invest in the future.

4. **Government Initiatives**

The Maharashtra government has taken several measures to support the textile industry, including providing financial assistance, relaxing certain regulations, and promoting domestic production. However, the industry is still facing challenges, and the road to recovery may be long and uncertain.

The Indian government has come up with several export promotion policies for the textiles sector. It has also allowed 100% FDI in the sector under the automatic route.

Some of the commonly known schemes and subsidies that have been implemented by the Indian government to promote and ease textile manufacturing in Maharashtra, which is one of the leading states in textile production in India. These schemes/subsidies may vary over time and it is recommended to check the latest information from official government sources for up-to-date and accurate information. Some of the schemes/subsidies that may be relevant for textile manufacturing in Maharashtra are:

- **Textile Upgradation Fund Scheme (TUFS):** This scheme provides financial assistance in the form of interest subsidy and/or capital subsidy for modernizing and upgrading textile machinery and technology to enhance productivity and competitiveness.
- **Integrated Textile Parks (ITPs):** The government has established Integrated Textile Parks (ITPs) to provide modern infrastructure facilities such as common effluent treatment plants, design centres, testing laboratories, etc., to textile manufacturers. These parks are designed to promote textile manufacturing clusters and attract investment in the textile sector.
- **Technology Upgradation Fund Scheme for Textile Industry (TUFS-TexMin):** This scheme aims to promote technology upgradation and modernization in the textile industry by providing capital and/or interest subsidy for the installation of new textile machinery.
- **Maharashtra State Textile Policy:** The state government of Maharashtra has formulated its own textile policy to promote textile manufacturing in the state. This policy provides various incentives, subsidies, and concessions to textile manufacturers in Maharashtra, such as land allotment, electricity tariff concessions, and tax benefits.
- **Goods and Services Tax (GST) Benefits**: The implementation of the Goods and Services Tax (GST) in India has brought about several benefits for textile manufacturers, including simplified tax procedures, reduced tax rates on certain textile products, and improved ease of doing business.

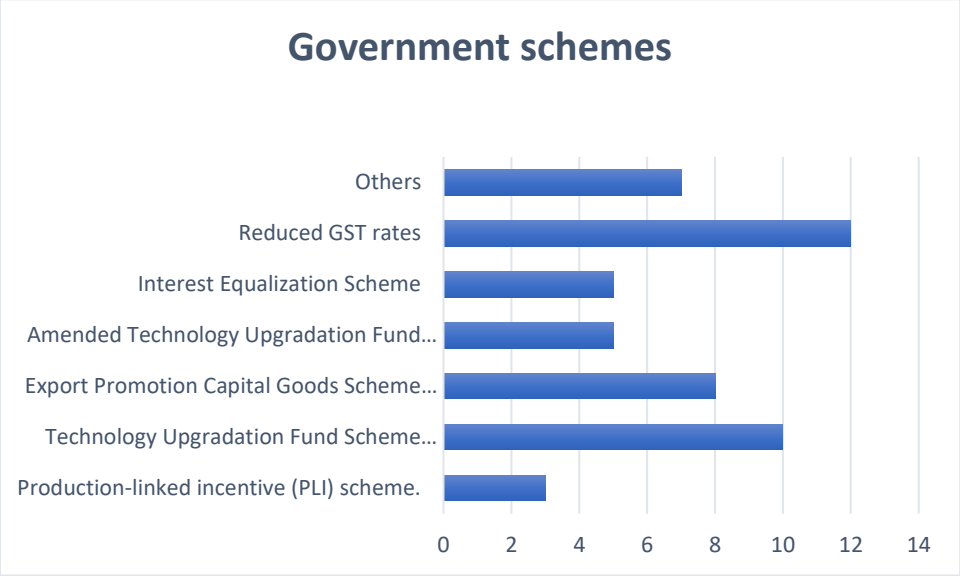

Figure 2. Government schemes

The above chart shows us how well the industrialists we surveyed are aware and use the schemes/subsidies provided by the Indian government for their own benefit. Based on the survey, reduced GST rates are used by the maximum but yet the number could be more. Only 12 (38.7%) use this feature to their benefit. The next is the TUF - Technology Upgradation Fund Scheme which again is only used by 10 (32.3%). Export Promotion Capital Goods Scheme (EPCG) stands at 25.8% while ATUFS and Interest Equalization Scheme are at 16.1% each with 5 respondents. 5 respondents do not use any of the schemes mentioned nor do they use any other scheme.

Overall, it can be concluded that there is huge scope of increasing the awareness regarding the availability of these additional benefits. This could be done via direct messaging and encouraging them to visit government websites where this information is mentioned.

5. Global Scenario - Textiles

The textile industry market includes yarns and fabrics, and its value is determined by domestic production, imports, and excludes exports. In 2015, the global textile industry market was valued at $667.5 billion, with a 1.1% increase from 2014. The market has grown at a compound annual growth rate of 4.4% between 2011 and 2015. Asia-Pacific accounted for 54.6% of the market, while Europe contributed 20.6%. By 2020, the global textile industry market is projected to reach $842.6 billion, with a compound annual growth rate of 4.8% from 2015 to 2020.

Table 1. Global textile industry market value forecast.

Year	Market value ($)	Growth % (From previous year)
2017	746.1	4.5%
2018	778.2	4.3%
2019	810.4	4.1%
2020	842.6	4.0%

This indicates the growth of textile industry worldwide and the consumption of textile products. The increase in consumption of textile products (**Independent variable**) will lead to the increase in production of textile products (**Dependent variable**).

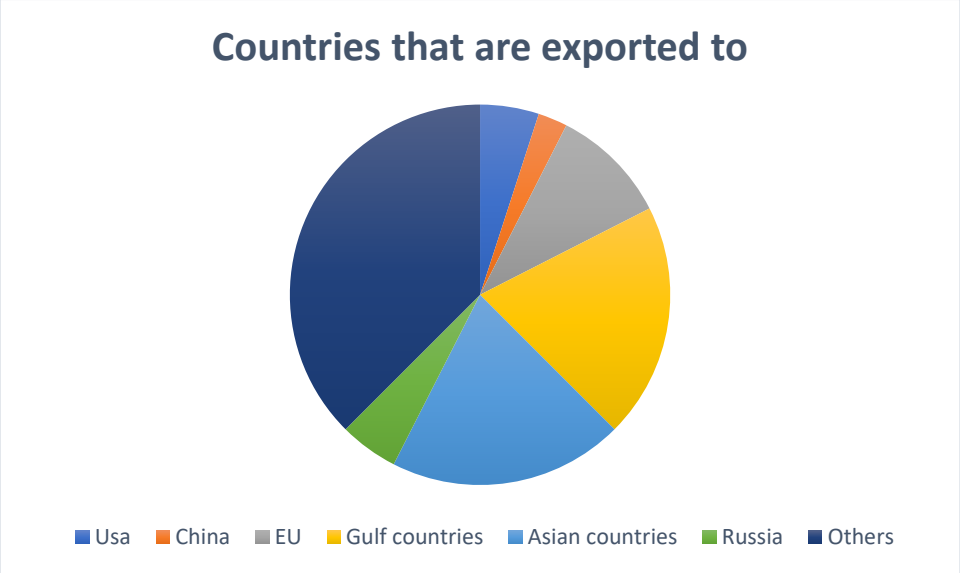

Figure 3. Countries that are exported to

The above mentioned are the countries are the major importers of Indian textiles. The maximum exports are done to Gulf countries (UAE, Kuwait, Saudi Arabia, and Oman) and Asian countries (Nepal, Pakistan, South Korea, Bangladesh, etc.), 25.8% each. The exports depend on the countries' policies, competition, demand, etc. Asian countries are highly friendly in terms of Indian exports and therefore the response. The EU is also a major market for the textiles. More exports could be made here but only 4 (12.9%) participate here due to the ongoing civil situations – Brexit. Other countries include USA, China and Russia. Few respondents also answered as 'none'. These trading nationally and trade with local firms.

6. Future

The Indian textiles industry has a promising future due to strong domestic consumption and export demand. Initiatives to boost the technical textiles sector are underway, with increased demand for PPE due to the pandemic. The government is providing support through funding and machinery sponsorship. Sustainability is a focus for top players, with the retail sector experiencing rapid growth. Demand for textiles is driven by rising household income, population growth, and sectoral demand. The technical textiles market for automotive and industrial textiles is projected to grow, and the overall Indian textiles market is expected to exceed $209 billion by 2029.

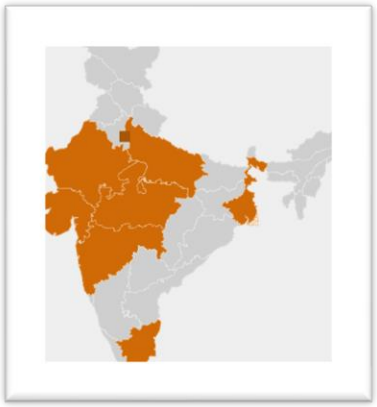

Figure 4. Major textile hubs in India

NCR, Uttar Pradesh, Gujarat, Rajasthan, Maharashtra, Tamil Nadu, West Bengal, , Madhya Pradesh are the major hubs in India.

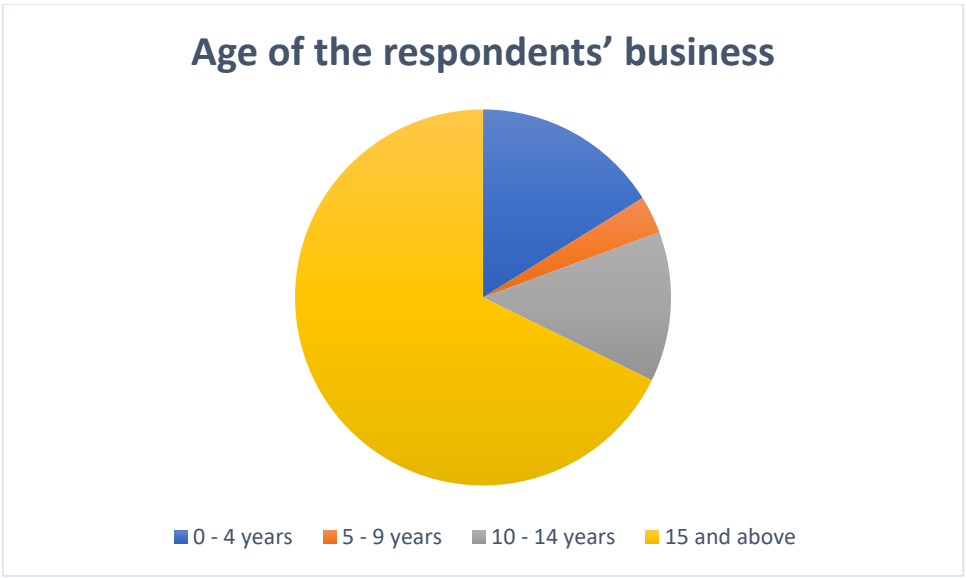

Figure 5. Age of the respondents' business

The majority of the textile owners have been in the industry for 15 years or more (67.7%). 16.1% are less than 5 years. This implies that people are still entering in this industry. Out of the 31 responses, 12.9% have been in the industry more 10 to 14 years. The gap of 5 to 9 years can be explained by the repressive nature of businessmen in the in the early 2000.

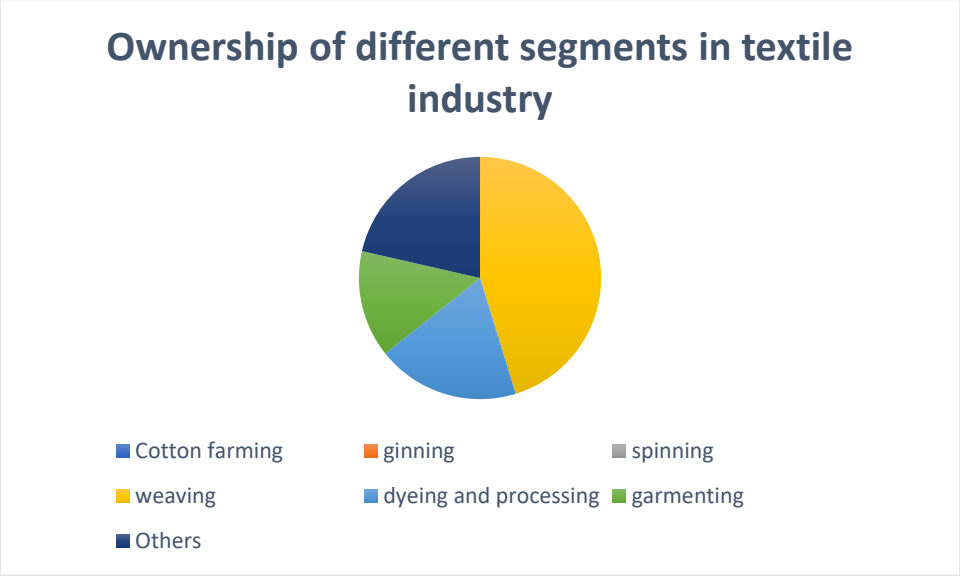

Figure 6. Ownership of different segments in textile industry.

Indian textile industry has the following segments and people own one or more than one business at the same time. The chart above shows us the distribution of textile owners in the selected region mentioned above. From the above we seek the distribution of textile owners in the various segments. 'Weaving' has the maximum weightage with 19 of 31 (61.3%) the reason being availability of infrastructure and willingness to do the businesses. The later stage – 'Dying and processing' has 8 (25%). The succeeding stage 'Garmenting' has 6 (19.4%). Then we see that only 4 (12.9%) are part of the 'Trading' segment. The 'Yarn trading', 'Fabric trading', 'Trading and commission', 'Sourcing', 'Manufacturing and trading of Fashion fabric' have 1 each (3.2%).

If you add up the total streams it is 42 while the responses taken are 31. This explains that several owners have multiple businesses within the textile industry

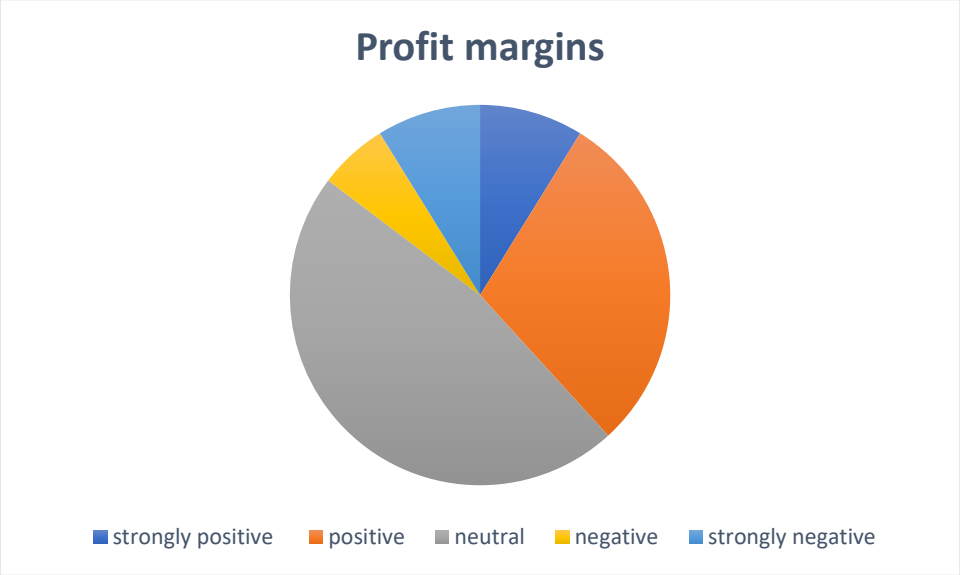

Figure 7. Profit margins

The profit margin in this industry depends on the segments mentioned above. As you move down, the margin increases. For example, the weaving industry, though easy to set up but has a very low profit margin as the product is sold in bulk quantity. Considering the working environment in the region, 51.6% of the respondents are neutral. A little around one-third believe that the profit margin is good but not great compared to other businesses. No respondent strongly feels that the margins are negative but some still do. The reason for this could be direct working environment and the competition and the company policies.

On conducting the hypothesis testing for the same, we kept our Null Hypothesis as

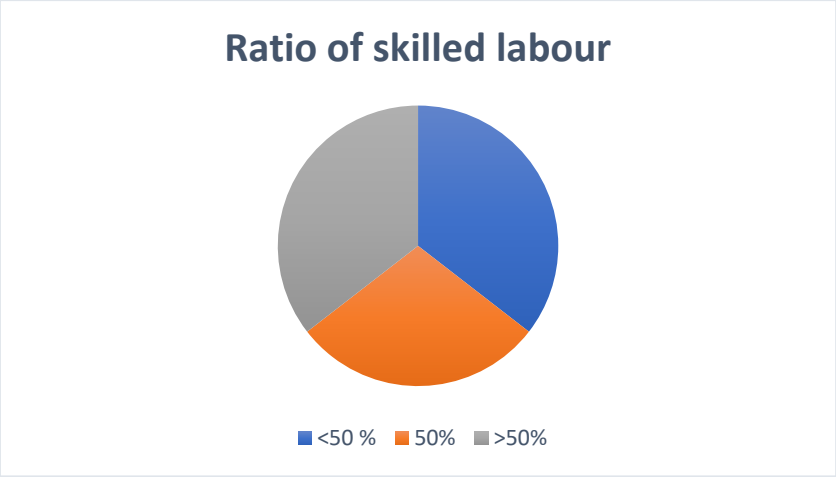

Figure 8. Ratio of skilled/unskilled labour

The textile industry employees both skilled and unskilled labour. The ration fairly depends upon the segment of the industry. For example, if it is the weaving sector, more skilled workforce is required to efficiently manufacture using the technology. Technicians are the majority part while sweepers, cleaners, etc, make up the unskilled workforce.

From the pie chart above, we can understand that 29% of the respondents have exactly the same ratio for both skilled and unskilled. Another observation is that an equal proportion of the respondents (35.5%) have skilled labour less than 50% and the other half have skilled labour more than 50%. We can conclude from this that the difference in the responses is due to the varieties of sectors in the industry and their employee hiring pattern.

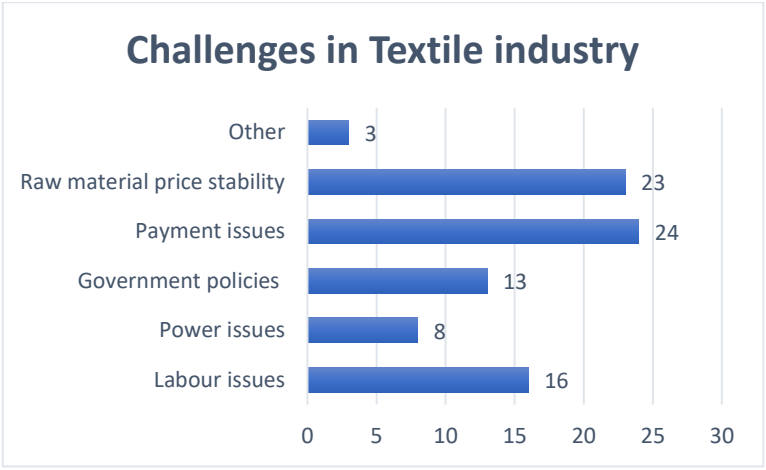

Figure 9. Challenges in Textile industry

After focusing on the internals of textile industry, we move on to a much wider aspect and shift the focus to a macro-economic standpoint. We found out the major problems faced by the textile industry which includes labour electricity, government, monetary and product issues. The analysis is as follows:

16 respondents (51.6%), suffer from labour issues. These issues can be:

- Wage disputes: Textile industry workers often earn low wages, which can lead to disputes over pay and working conditions. Workers may demand better wages and benefits, which can increase the cost of production for management.
- Labour shortages: Many textile factories struggle to find enough skilled workers to meet demand. This can result in delays in production and increased labour costs as management may need to offer higher wages or invest in training programs.
- Poor working conditions: High temperatures, loud decibels, overcrowding, etc. are some of the main reasons for a negative employee well-being. For this, proper ventilation, lighting, and adequate safety measures are taken.
- High employee turnover: Textile industry management may face challenges with high employee turnover rates. The above-mentioned reasons often are the cause for the high turnover. This can cause production issues and increase the overall cost of the firm.
- Labour laws and compliance: This includes minimum wage requirements, safety standards and overtime rules. To avoid potential legal and financial consequences, a firm must follow them.
- Moving on to power, the most essential infrastructure involved in textiles, without which it's impossible to manufacture. Power issues in India have been prominent but seeing the response only 8 (25.8%) responded with issue

7. Wastage in Textile Industry

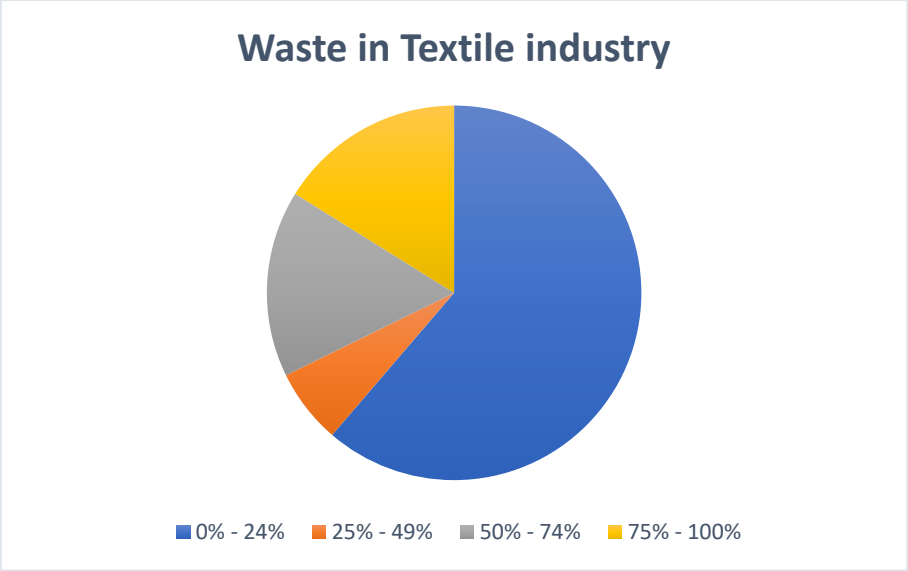

Figure 10. Waste in Textile industry

The textile industry is a major contributor to the economy of Maharashtra, India. However, like many other industries, it generates a significant amount of waste. The textile industry produces various types of waste, including solid waste, wastewater, and air emissions.

- Solid waste generated by the textile industry includes scraps of fabric, yarn, and other materials, which are often disposed of in landfills or incinerated. This waste can cause environmental problems such as soil contamination, air pollution, and greenhouse gas emissions.
- Wastewater generated by the textile industry can contain harmful chemicals such as dyes, bleaches, and heavy metals, which can pollute water bodies and harm aquatic life. In Maharashtra, the textile industry is a major contributor to water pollution in rivers such as the Godavari, which is heavily polluted with untreated industrial effluents.
- Air emissions from the textile industry include volatile organic compounds (VOCs), particulate matter, and greenhouse gases, which can contribute to air pollution and climate change.

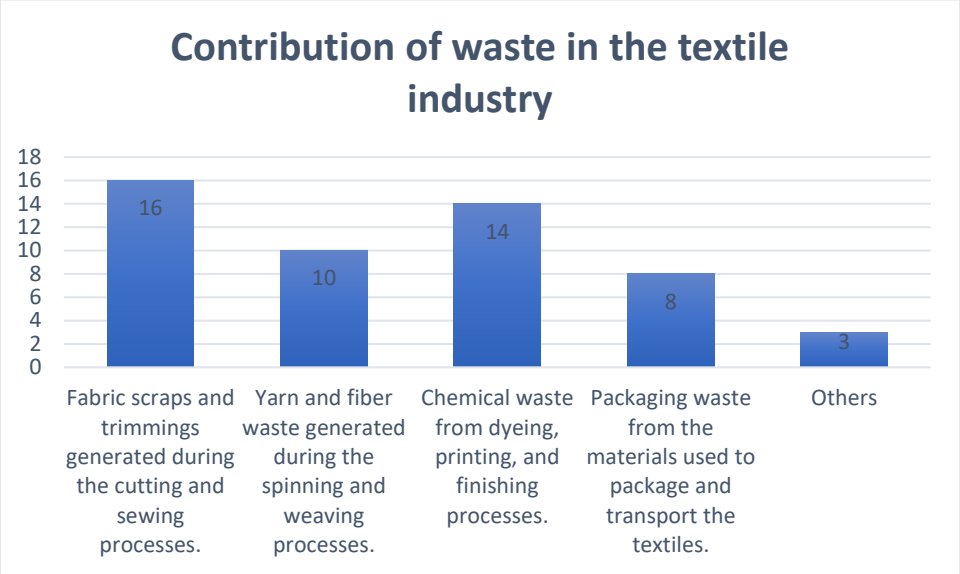

Figure 11. Contribution of waste in the textile industry

While talking about the wastage contribution, it will depend again on the sector of the textile industry. Fabric scraps, trimmings which are generated during the sewing and cutting processes have 16 respondents (51.6%). Thus, more than half of the respondents are occupied in the cotton farming and ginning industry. Yarn and fiber waste has 10 respondents (32.3%) which is generated during the spinning and weaving processes. The dyeing, processing and finishing unit suffers from chemical waste which has 14 respondents (45.2%)

Lean manufacturing is a solution for the waste produced. It is an approach that emphasizes the reduction of waste within manufacturing systems while optimizing productivity.

Figure 12. Waste management reforms

Lean manufacturing is a solution for the waste produced. Lean manufacturing is a methodology that focuses on minimizing waste within manufacturing systems while simultaneously maximizing productivity. Waste management reforms used in the textile industry also follows the same pattern as that of the contribution. As the type of waste, the reform method is used for the same. The first one is the source reduction which means minimizing the wastage in the very initial stage. Out of 31 responses, 8 (25.8%) follow this reform. Next is the reuse and recycling. More than half of the sample, 17 (54.8%) responded with this reform. Composting means utilizing biodegradable waste material efficiently. Only 5 (16.1%) use this reform because this does not turn up in major textile segments. Waste disposal by partnering with certified waste management companies is only done by 4 (12.9%) because this will add up to the costs and many feel that waste management can be done via the members within the firm. Circular Economy helps to increase efficiency through closed-loop production systems and focuses on reducing waste. 19.4% responded with this reform. And lastly, we have Sustainable Packaging by using eco-friendly materials. This is part of almost all segments as each of them transfers their respective finished goods to the succeeding one. 22.6% use this reform. Lean manufacturing is a solution for the waste produced. Lean manufacturing is a methodology that focuses on minimizing waste within manufacturing systems while simultaneously maximizing productivity. With this we can analyze the participants in each segment of the textile industry.

The Maharashtra Pollution Control Board (MPCB) has implemented various measures to control textile industry wastage. These include mandatory installation of effluent treatment plants (ETPs) to treat wastewater before it is discharged into the environment, and guidelines for the safe disposal of solid waste.

Despite these efforts, the textile industry continues to generate significant amounts of waste in Maharashtra. More efforts are needed to reduce the environmental impact of the industry, such as promoting sustainable production practices and encouraging the use of eco-friendly materials.

Waste management

Waste management is an essential aspect of the textile industry in Maharashtra, as the industry generates a significant amount of waste that can have harmful environmental impacts if not properly managed. The following are some of the waste management practices adopted by the textile industry in Maharashtra:

- Effluent Treatment Plants (ETPs): The Maharashtra Pollution Control Board (MPCB) has mandated that textile mills in the region must install ETPs to treat the wastewater produced during their production processes. ETPs are designed to eliminate harmful chemicals and pollutants from the wastewater prior to its release into the environment.
- Zero Liquid Discharge (ZLD): Numerous textile mills in Maharashtra are progressively embracing ZLD systems, with the goal of recycling and reusing wastewater to reduce freshwater consumption and eliminate the discharge of wastewater into the environment.
- Recycling and Reusing Textile Waste: Various strategies are being implemented in Maharashtrian textile mills to recycle and reuse textile waste in order to reduce the overall amount of waste generated. Examples include collecting and recycling fabric and yarn scraps to create new textile products.
- Landfill Management: Textile mills in Maharashtra are implementing effective landfill management practices to ensure that solid waste generated during production is safely and responsibly disposed of in designated landfills.
- Energy Efficiency: The textile industry in Maharashtra is implementing energy efficiency measures to reduce the energy consumption during the production process. These efforts aim to lower the carbon footprint of the industry and minimize its environmental impact.

The textile industry in Maharashtra is taking steps to improve waste management practices and reduce the environmental impact of its operations. However, more efforts are needed to promote sustainable production practices and encourage the use of eco-friendly materials to minimize waste generation.

The pie chart here explains that out of the 31 respondents, 61.3% reuse the waste generated up to 24%. 16.1% of the population reuse to the extent starting from 50% to 100%. The above-mentioned solutions for waste management are just a few examples to the many ways in which an industry could contribute the safety of the environment.

8. Political Influence

The textile industry in Maharashtra is influenced by political factors in various ways. The government plays a crucial role in providing policy support, financial incentives, and infrastructure to the textile industry. Here are some of the political influences on the textile industry in Maharashtra:

- Government Policies: The textile industry in Maharashtra has been influenced by various government policies, such as the National Textile Policy, the Maharashtra Textile Policy, and the Make in India initiative. These policies provide incentives, tax benefits, and subsidies to encourage investment in the textile industry and promote its growth.

- Financial Support: The government of Maharashtra provides financial support to the textile industry in the form of loans, grants, and subsidies. These funds are used for various purposes such as modernizing machinery, research and development, and skill development.
- Infrastructure Development: The government has invested in infrastructure development such as setting up industrial parks, developing textile parks, and improving road and rail connectivity to support the growth of the textile industry.
- Political Representation: Politicians representing textile-producing regions in Maharashtra often lobby for the interests of the industry. They may raise issues such as subsidies, tax exemptions, or labour laws to benefit the industry.
- Labour Laws: Labour laws in Maharashtra, such as the Minimum Wages Act and the Factories Act, impact the textile industry. The government may enforce these laws to ensure better working conditions for workers, while the industry may lobby for exemptions or relaxations to reduce costs.

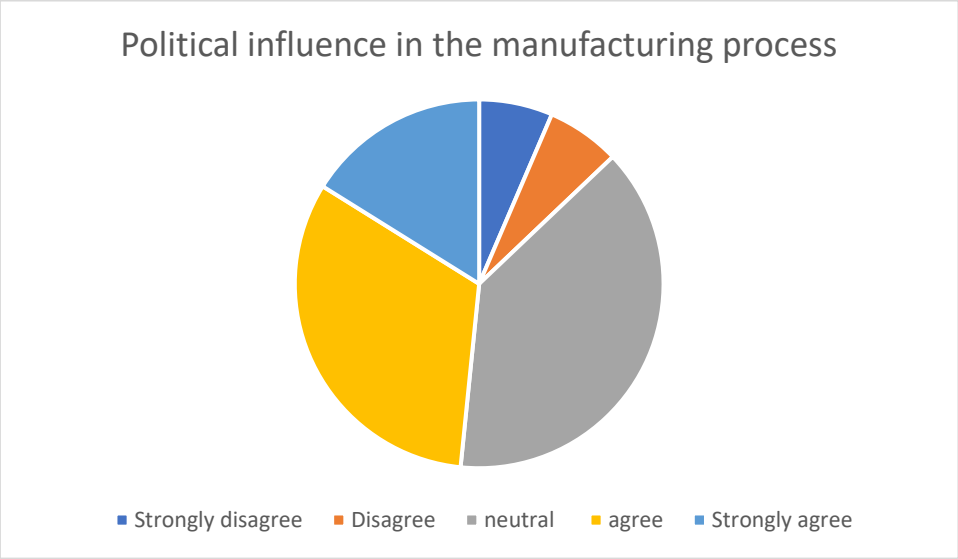

Figure 13. Political influence in the manufacturing process

On conducting the survey we have found out that government have been a very active influcencer in the industry. Around 50% feel that politics does affect thr manufacturing process, Government policies about exchange rates strongly impact the exporting capacity of the firms. If the rupee value falls, the exports become relatively easy as the demand is high and vice versa. A majority of the respondents are neutral to the same question, the reason for which is unknown. The remaining who feel that there is little or no political influence may be due to the size of the firm or due to the lack of awareness of the political support.

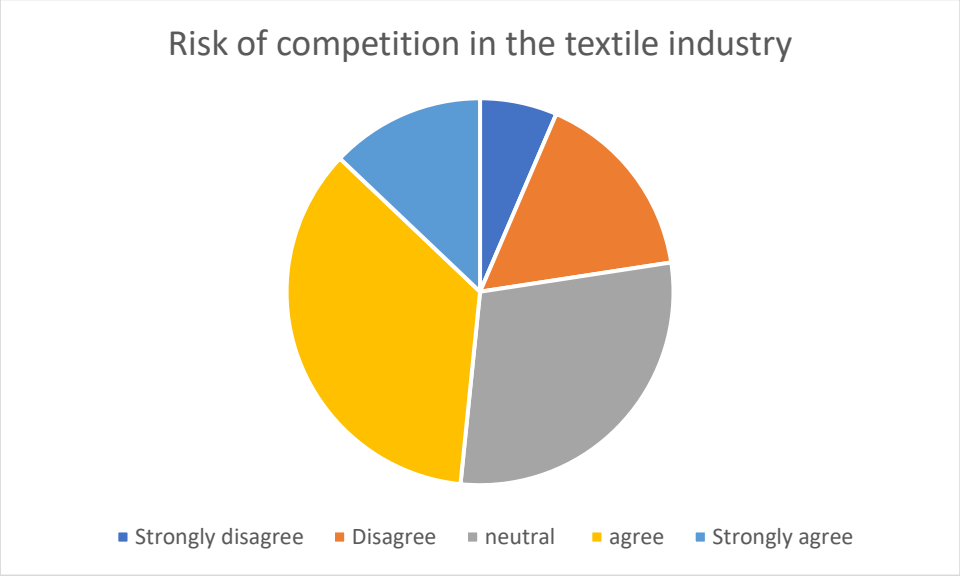

Figure 14. Risk of competition in the textile industry

On analyzing the results of our study, nearly half the textile industrialists interviewed feel threatened and under pressure from foreign competitors, fearing they would capture their market share through lower pricing made possible through cheaper labour and lenient laws in countries like China, Vietnam and Bangladesh. Only 23% of respondents feel that their business is secure and Indian governance laws would protect domestic industries from being capsized by international giants.

A major reason for these 23% respondents feeling secure is government incentives and subsidies like reduced GST rates, Technology Upgradation Fund, Export Promotion Capital Good.

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