

# Conference Theme Paper

## Denim Talks: Denim Industry in line with Circular Fashion



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Prepared for  
Messe Frankfurt  
July 2019

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# 1. Denim Market Overview

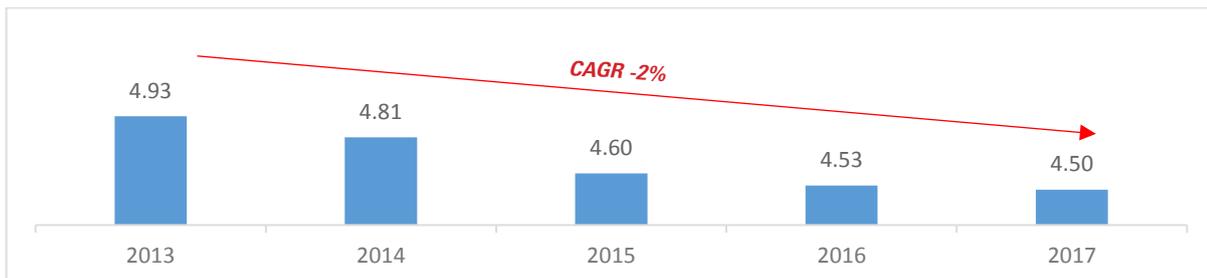
Denim has always been the most versatile and favourite category for all the age groups globally but in the last decade, India has also accepted denim as one of its own. The increasing influence of western culture on clothing style of the youth and present work culture, denim has become an important part of the wardrobe. The Indian denim market promises unparalleled growth in every aspect which will be discussed in depth in the following sections.

## 1.1. Overview of Denim Fabric Market

### Global Scenario

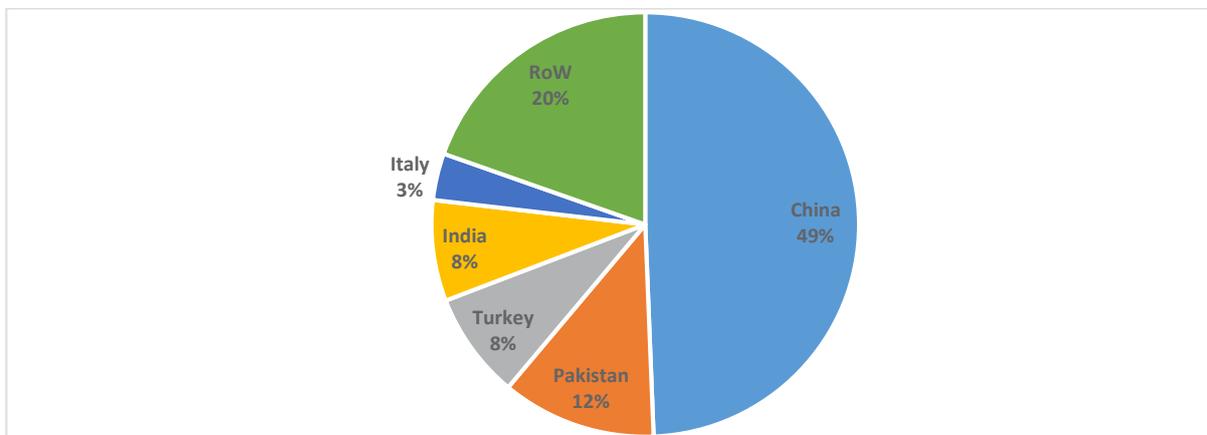
Denim fabric manufacturing has gradually shifted to the cost competitive nations like China, India, Vietnam, Pakistan and Bangladesh owing to cheap labour and ready availability of natural resources such as cotton. While the total global denim production capacity is around 7.7 billion metres, the global denim fabric trade has declined at a CAGR of 2% in the last 5 years from US\$ 4.93 billion in 2013 to US\$ 4.50 billion in 2017.

Figure 1: Global Denim Fabric Trade (US\$ Billion)



Source: UN Comtrade

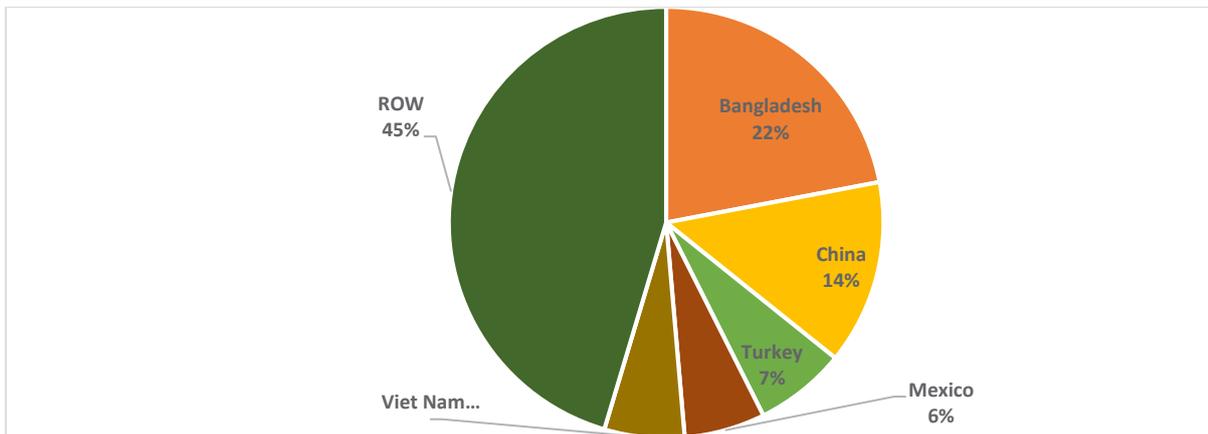
Figure 2: Major Exporters of Denim Fabric



Source: UN Comtrade

China among all the manufacturing countries, has successfully leveraged its low manufacturing cost and large scale infrastructure to achieve notable share of 49% in global denim trade followed by Pakistan with a share of 12%. It is then followed by Turkey and India, each having a share of 8%.

Figure 3: Major Markets for Denim Fabric



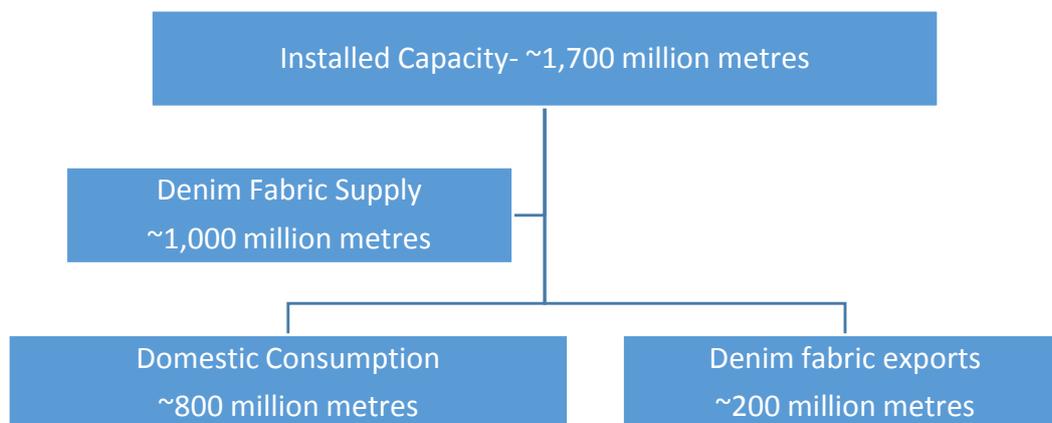
Source: UN Comtrade

Bangladesh with 22% share is the major export market for global denim fabric trade followed by China and Turkey with 14% and 7% share respectively. Bangladesh is also the largest exporter of denim apparel to EU with a market share of ~29% and value of US\$ 1.65 billion in 2018 and third largest supplier of denim apparel to USA after China and Mexico with a value of US\$ 566 million in 2018.

### Domestic Scenario

India’s installed capacity for denim fabric manufacturing is estimated to be around 1,700 million metres with an additional 300 million metres manufacturing capacity is in the pipeline.

Figure 4: Indian Denim Fabric Manufacturing Capacity

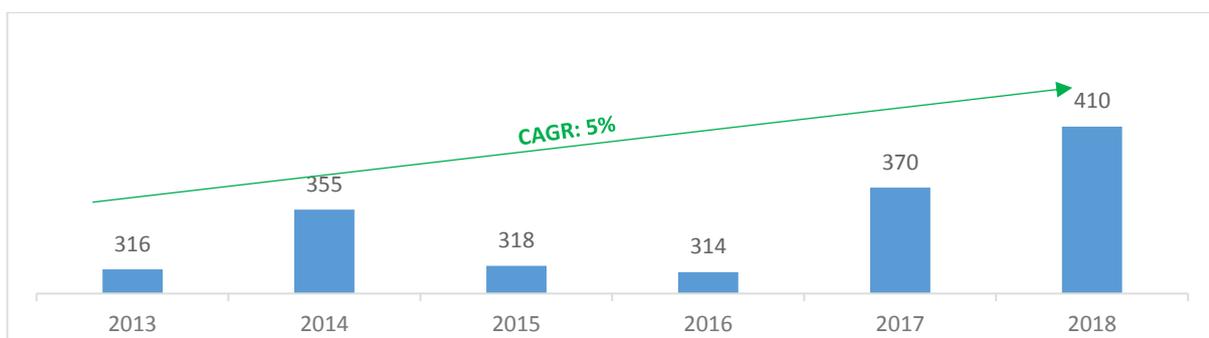


Data Source: Wazir analysis on Published Data

The industry, due to overcapacity & GST implication in the unorganized sector is currently working at 60-70% capacity utilization and producing around 1,000 million metres of denim fabric annually. The domestic demand for denim fabrics is estimated at 800 million metres, while the rest 200 million metres is exported.

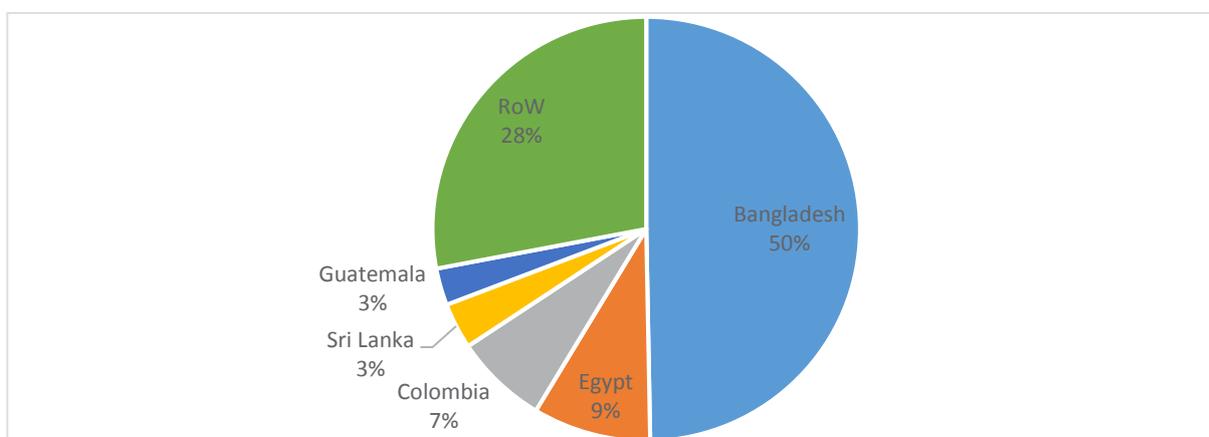
India's denim fabric exports have increased at a CAGR of 5% in last six years to reach US\$ 410 million. However, the last 6 years saw a lot of fluctuation trade wise with decline in 2015 & 2016 (Y-o-Y 10% & 1% respectively) and increase in 2017 (Y-o-Y 18%). The trade maintained the growth in 2018 which is expected to further grow in the coming years.

Figure 5: India's Denim Fabric Trade (US\$ Million)



Source: DGCI&S

Figure 6: India's Major Markets for denim fabric (2018)

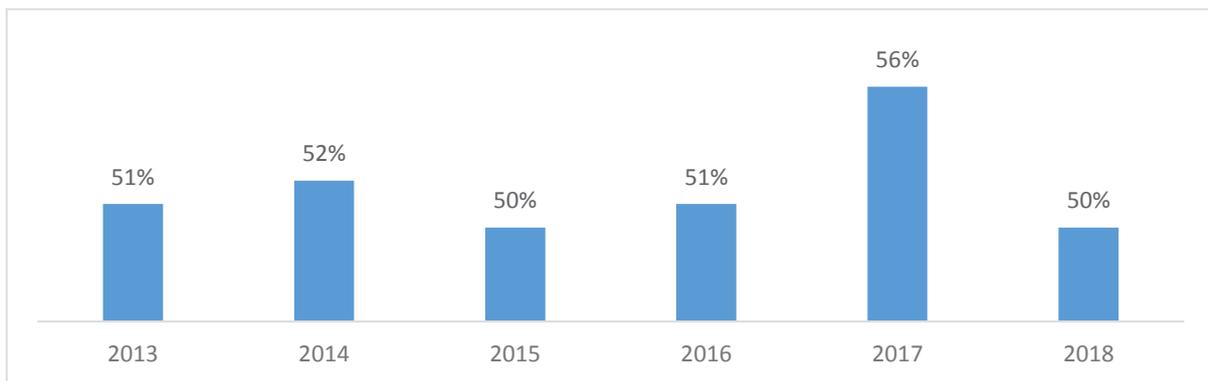


Source: DGCI&S

Bangladesh, the largest market for India’s denim fabric exports with a share of 50% followed by Egypt & Colombia with 7% and 3% respectively. The exports of denim fabric to Bangladesh saw a minor decline in 2015 and 2016 due to China capturing India’s share and denim fabric capacity expansion in Bangladesh. However, the exports saw an upwards trend in 2017, which attracted the further capacity expansions.

Bangladesh over the last decade has been the biggest market for Indian denim fabric with a 50%+ share in India’s exports for 6 years running.

Figure 7: Breakup of India’s denim fabric exports to Bangladesh over the last six years

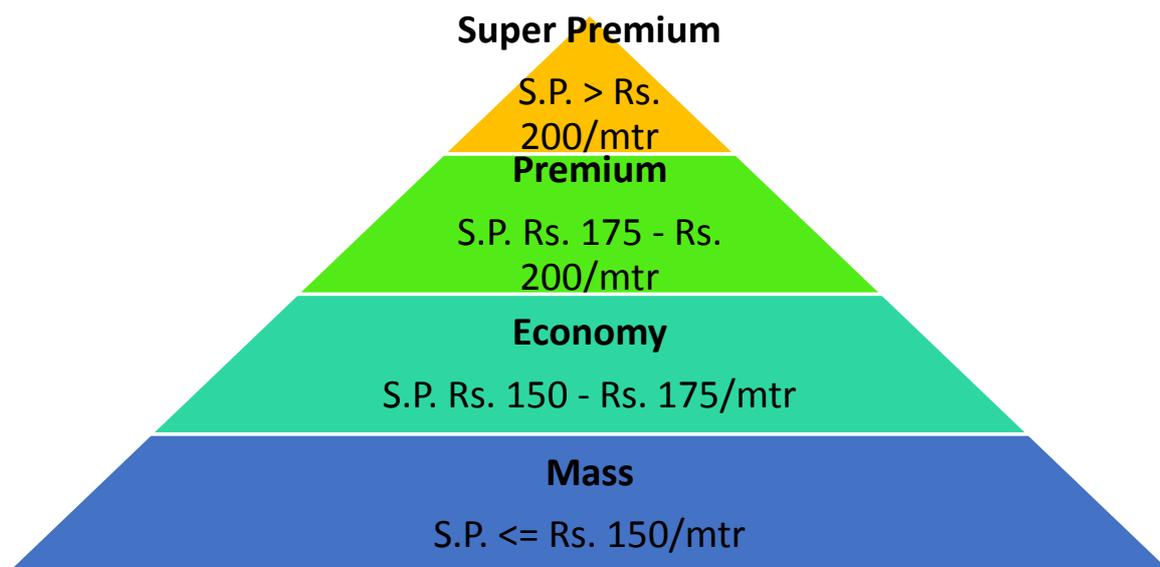


Data Source: UN Comtrade & Wazir Analysis

## Denim Fabric Segmentation

The denim fabric sold in India can be broadly classified into four segments; mass, economy, premium and super premium.

Figure 8: Market segmentation of Indian Denim Fabric Manufacturing Mills



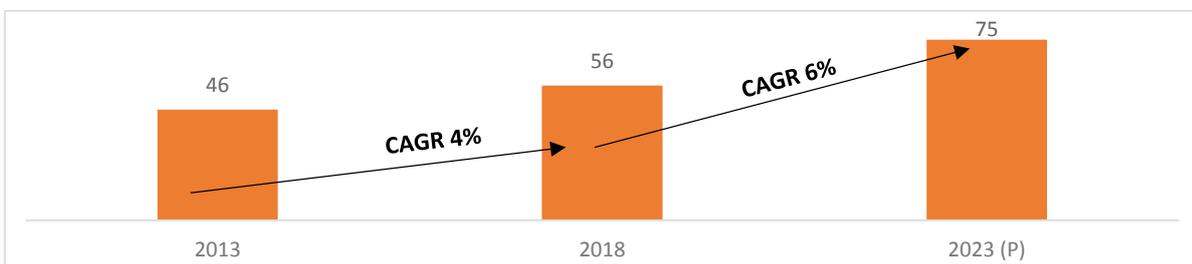
The top of the pyramid is formed by premium and super premium segment respectively. Increasing adaptability of western wear in India is helping retail brands to grow at an exponential rate thus fueling the growth of fabric manufacturing. As the number of players in the niche denim segment are low, there are high future growth prospects in the segment.

## 1.2. Overview of Denim Apparel Market

### Global Scenario

The global market of denim was valued at US\$ 56 billion in 2017 and is expected to witness a 6% CAGR growth during 2018-2023 to reach US\$ 75 billion. Europe and USA are the biggest markets for denim fashion even as new-age economies such as China and India are witnessing a steady rise in demand.

Figure 9: Global Denim Apparel Market (US\$ Billions)



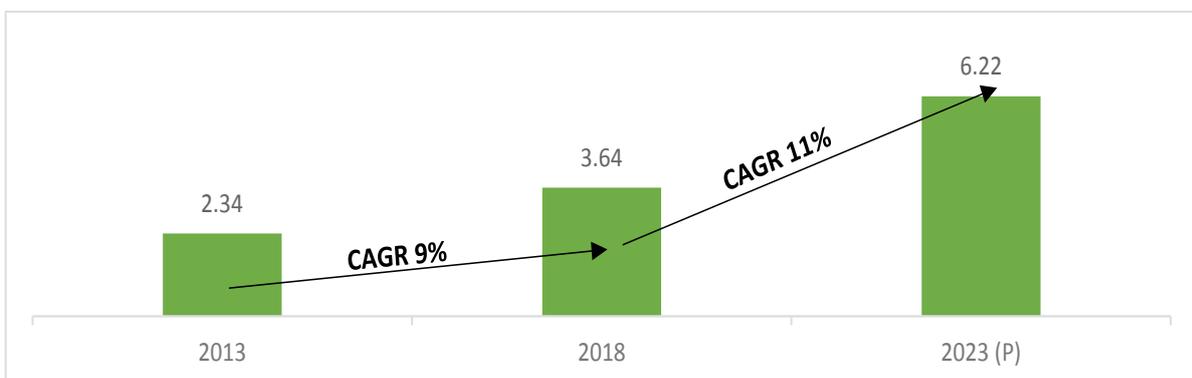
Source: Wazir analysis on Published Data

### Domestic Scenario

Domestically, denim is anticipated to grow at the fastest rate in terms of both volume and revenue. The expanding urban populations, increases in the number of white-collar employees, a growing base of women in the workforce and the resulting acceptance of jeans as business casual attire will continue to fuel the growth of this segment. The number of Indians who say they “love or enjoy wearing denim” has grown significantly between 2003 and 2018, from 22 percent to 53 percent in India according to the Global Lifestyle Monitor Survey.

Denim market in India is estimated at US\$ 3.64 billion in 2018 growing from US\$ 2.34 billion in 2013 by a CAGR of 9% and it is further projected to grow at a CAGR of 11% to reach US\$ 6.22 billion by 2023.

Figure 10: Indian Denim Apparel Market (US\$ Billions)



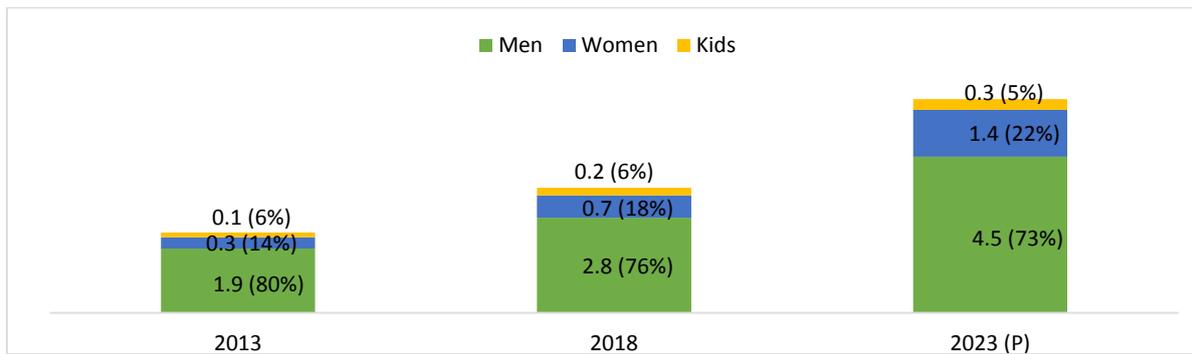
Source: Wazir Analysis on Published Data

## Domestic Denim Apparel Segmentation

The denim market in India is dominated by the men's segment with a massive 76% share in 2018. The men's segment will however slow-down in coming years while still holding more than 70% share in the entire market. Strong prevalence of ethnic and traditional wear among Indian women is the reason behind women's denim market being much smaller than men's denim.

Although, Men's segment dominates the market, women's segment is the fastest growing at 15% CAGR due to increase in penetration. The kids segment is expected to hold a ~5-6% share over the course of next 5 years, growing at a CAGR of 10%.

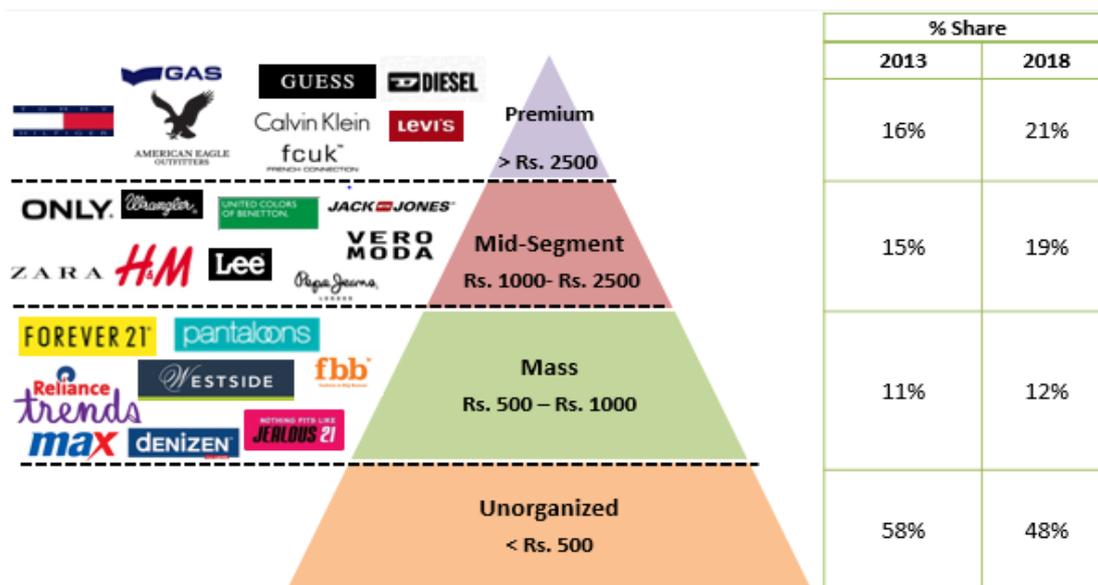
Figure 11: Size of Different Segments in Denim Apparel (in US\$ Billion)



Source: Wazir Analysis on Published Data

The overall market is dominated by unorganized & mass segment with around 60% market share in 2018. The share has reduced from ~70% to 60% owing to increasing brand awareness and disposable income.

Figure 12: Price wise segmentation of Indian Denim Apparel Market



Source: Wazir Analysis on Published Data

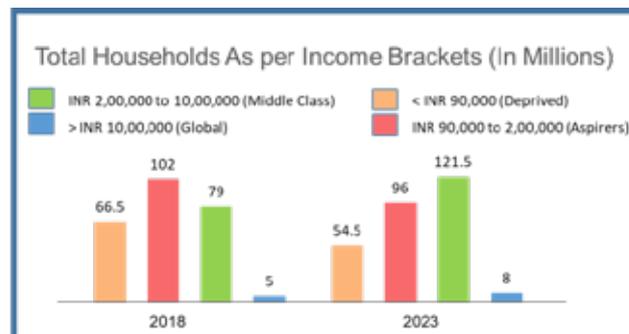
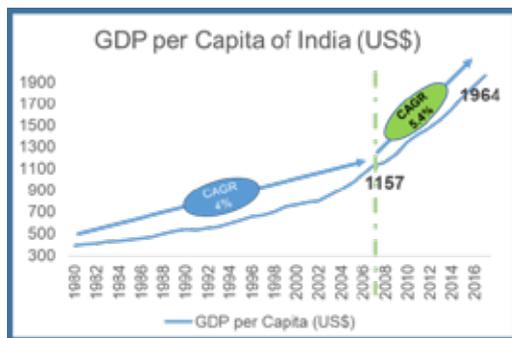
Most of the unbranded players operate on the lower price segment of the market where awareness of quality of fabric, finishing and washes, design and fit are relatively low. The share of organised brands in denim market stands at ~40%. The key factors responsible for the growth for this part of the market is the volume of sales coming from the increasing penetration of these brands into Tier -II and -III cities and the rising aspirations of consumers from smaller cities to follow the latest trends like their peers from metros.

### 1.3. Trends Shaping the Denim Industry

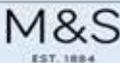
Jeans have been and are an imperative item of garments. Denim clothing appeared in the 18th century, where there was plentiful generation of cotton. From the place of normal clothing, denim has ascended to become a style symbol. As sustainability is a crucial issue in the denim field, the focus of the fabric mills as well as apparel manufacturers on better practices, more sustainable raw material & technology to reduce the waste generation will serve as the breeding ground for the denim market in the future.

#### Retail Trends

Denim retail is expected to grow parallel to the projected volume growth of the denim apparel market. The growing per capita consumption, both in terms of value and volume is increasing due to improving financial status of the masses.



India's per capita GDP has grown at rate CAGR 4.5% since 1980. However, the growth since 2006 has been fairly rapid at 5.4% CAGR. Simultaneously, the spending power of Indians is also, on the rise. By 2023, 38% of the Indian population is expected to be living in urban areas, rising from 33% in 2018. Together Urbanisation and Rurbanisation are adding new consumers to middle class whose soaring aspirations are changing the dynamics of the apparel market. By 2023, the middle class consumers will form 43% of total targetable customer base will contribute about 55-60% share of total apparel market size. The middle class consumers spend relatively higher amounts than aspirers on discretionary apparel consumption. This indicates that the purchasing powers are increasing thus adding to the growth in apparel market of India, thus boosting organized and unorganized retail in India.

Brand	Launch Year	No. of Stores	Revenue
	2012	~330	~Rs. 4,500 Cr.
	2010	~1,300	~Rs. 3,800 Cr.
	1997	~270	~Rs. 2,900 Cr.
	2015	~40	~Rs. 1,100 Cr.
	2010	~18	~Rs. 1,000 Cr.
	2001	~55	~Rs. 850 Cr.

## Product Trends

### • Fits

In the recent seasons, cropped and flared versions of denim with embroidery, patchwork and embellished surfaces are replacing the skinny fit jeans that have been ruling the market since almost a decade.

90s Denim is making its way in the market and attracting a lot of eyeballs especially from the youth segment. The nineteens are serving as a vintage trend concept to attract millennials by major brands and designers by tapping into the nostalgic idea. A looser fit – varying from baggy, high-waisted jeans, oversized and slightly ill-fitted are talk of the town since last few months.

The sale of straight leg jeans are also gaining momentum over the last few months making it a sought after trend in the coming time.

### • Colors

Over the last few years, there has been a decline in the variety of washes and the demand for solid color jeans have considerable grown. The classic blue wash & greys are making a comeback. White is also making its mark on the denim sector as searches for white denim rose 42% since the beginning of March as per Global Fashion Search Platform, Lyst.

The monochromatic trend is gaining momentum, the wide acceptance of the same has encouraged brands to continue the same in the future seasons.

### • Design

Denim are going all sassy with the eye catching details on the bottom i.e. hem. Ruffled trims, embroidered patches, knots, cigarette hem ankle length, jeans with slits etc. The popularity of athleisure wear has influenced street wear in the last few years and denim has started following the same trend by incorporating side stripes, ribbons & pin-tucks etc. to lend a sporty chic feel to the pieces.

### • Fashion Trends

The one trend has been going on for ages now is denim on denim, one can easily carry a casual look while wearing their favorite denim with a denim shirt. This trend ensures that the consumption of denim will grow at a higher rate in the coming years. In a report by Edited, the outerwear category in denim has grown 101% in the last two years. The printed and embroidered denim are appealing to the youth, designs like slangs, flora & fauna are popped out over denim jeans, jackets etc.

The culottes are gaining a lot of popularity among as smart casuals in the working populations as denim is making a strong hold as a part of corporate wear.

• Fabric

Denim fabric is primarily made up of cotton but in the last decade or so, the demand of stretch and soft handle denim is growing exponentially. People are looking for feel good factor in their denim, so comfort and stretch fabrications take center stage. Mills continue to invest in elastic fabrications be it stretch in the warp, bi- stretch or hyper-stretch. The use of blended fabric with lycra, modal & tencel in denim will grow rapidly in the coming times.

One of the uprising concepts is how sustainability can be clubbed with functionality and more comfort. The use of recycled cotton, recycled polyester, man-made cellulosic fibres made from more innovative sources, such as agricultural residues and recycled textiles rather than forests, sustainable method of dyeing by water and energy savings will set the course for the future of sustainable denim.

## 2. Environmental Implications of the Textile Industry

The textile and apparel industry in general is among the largest contributors to the global pollution. China, the largest textile manufacturing hub in the world has polluted 90% of its groundwater. It is estimated that till 2050 global fashion industry will account 25% of the carbon budget. On an average, 12.8 million tons of global textile waste ends up in landfills emitting methane gas which is more potent than carbon when it comes to harming the environment. Every washing cycle of synthetic clothes accounts for around 1,900 microfibers in the ocean and as per an estimation, there are already 1.4 trillion microfibers in our ocean. These facts reflect a global challenge which needs to be mitigated immediately. Denim Industry in itself has major environmental implications.

### Water Scarcity



**95 bn. liters**  
–The water required for one year’s worth of global textile production



**20,000 litres**  
– amount of water needed throughout the

### Environmental Pollution



**90%**  
– of local ground water in China is polluted, mostly due to the textile industry



**92 mn. tons**  
-Textile waste that ends up in landfills each year globally



## 3. Can Sustainability Offer an Option?

With all the above mentioned implications of denim industry on the environment, there is no denying that denim manufacturing has one of the worst images when it comes to environmentally thoughtful manufacturing and has to make a lot of strides before any results show up. A simple denim jeans goes through various chemical and cosmetic changes before ending up on sales floor. However, it is not just the denim that goes through a lot, the environment does too. With the continuous growth of the denim industry globally, a major concerns for the industry is the sustainability of denim manufacturing.

### What is Sustainability?

The word sustainability in itself has various meanings, one of them being 'the ability to be maintained at a certain rate or level' and the other meaning states 'the pursuit of global environment sustainability'. While talking about the denim industry the latter of these interpretations of the word is of utmost important.

The lack of sustainability in the denim industry does not only lead to environmental pollution, but also has adverse effects on the rights of the labour associated with manufacturing it.

### Major concerns are:

- Use of unsafe pesticides and chemicals for growing cotton
- Pollution through air and water transmission
- Waste products ending up in landfills
- Packaging that is not recyclable or biodegradable
- Labour rights violations across value chain

So, sustainable manufacturing in isolation may not be the only solution to the broader picture. Let us have a look at the possible solutions to fight this challenge.

### How can the balance be maintained?

Sustainability is the solution to maintain harmony between increasing global demand and decreasing natural resources. To achieve it, a combined effort from every value chain member starting from fibre production to manufacturing to consumption will be required. In the coming years, sustainability will be driven by the following four wheels:

1. Finding Alternate Raw Materials
2. Manufacturing Responsibly
3. Changing Consumption Practices
4. Adhering to Compliances

### Finding Alternate Raw Materials

Global fibre consumption has increased from 29 million tons in 1980 to 97 million tons in 2018, and the growing market has brought with it a remarkable change in the consumption patterns. The industry has been witnessing a gradual shift from cotton to synthetic fibres over the past few decades.

## What is the need?

Cotton, which is the primary raw material for manufacturing denim, has been used to create clothing since millennia because of the perfect combination of its inherent lightness, softness, and breathability. However, cotton has some inherent limitations which have led to the decline in its consumption share.

- I. Cotton production over the years has not grown proportionately to global consumption, is now unable to meet the global fibre demand. Further, there is a limitation in land area for cotton cultivation for future use.
- II. Cotton production requires a large amount of water and pesticides which is detrimental to the environment. It is estimated that around 20,000 litres of water is needed to produce 1kg of cotton.
- III. Chemical and physical properties of cotton made its application area limited and unsuitable for several growing product categories like technical textiles, sports textiles etc.
- IV. Cotton production in Central Asian countries involves large amounts of forced labour and disregard for human rights. Moreover, the groundwater shortage in these countries is increasing.

Over the years, the supply gap left by cotton has been suitably filled by synthetic fibres especially polyester. However, in Denim's case, the gap left by cotton cannot be fulfilled by polyester, it demands development of newer fibres.

Various alternative fibres for denim manufacturing have surfaced in the recent years, including the use of Lyocell (Tencel), Bamboo Fibre, Banana Fibre, etc. Various studies have reflected that through the modern technologies, these alternate fibres can be made to replicate cotton's behaviour and even give better results. Although the production of these fibres is not much more sustainable than cotton, the objective of finding alternatives is not to replace cotton, but to lessen the strain on one single fibre.

## Manufacturing Responsibly

As responsible humans, it is our responsibility to look after the nature and the rights of the workers. This gives birth to the concept of "Responsible Manufacturing". It simplifies into taking responsibility not only for their own products, for the environment and the region, but also for their customers and employees. Responsible Manufacturing/Production has become a part of company philosophies all over the world.

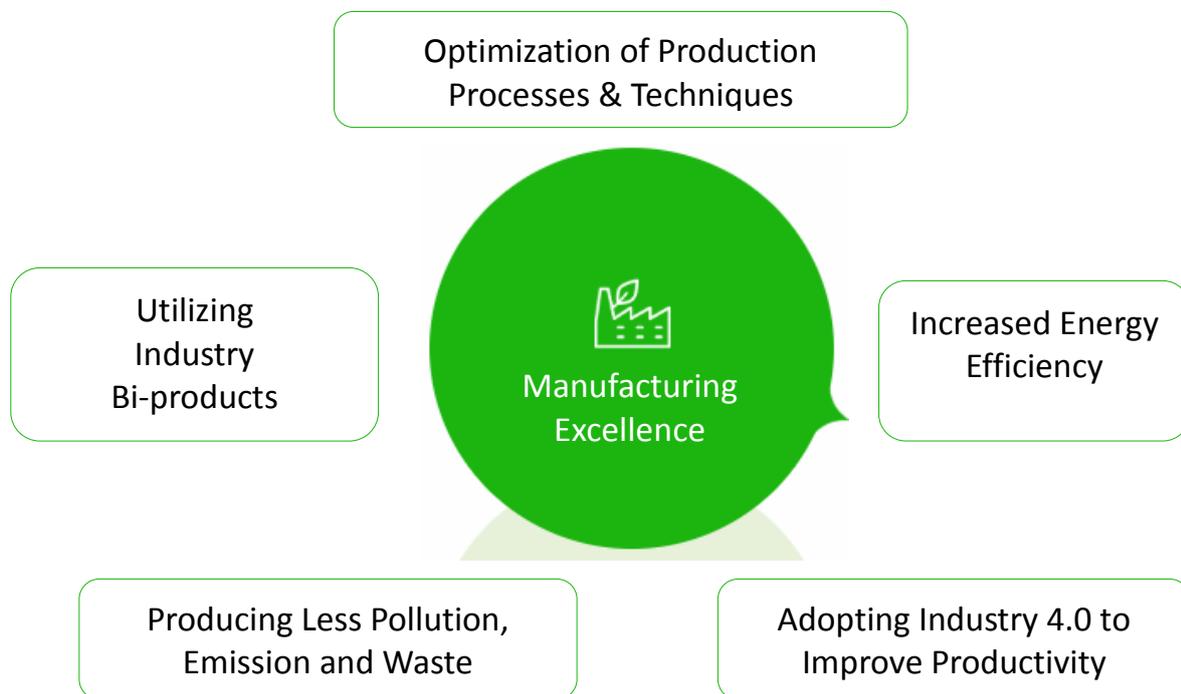
Companies are facing ethical challenges over their sourcing of raw materials and products. This has led them to ensure that they manufacture products in the most humane way possible. Manufacturing is the part of the supply chain which is most vulnerable to unethical and inhuman practices.

## Aspects of Responsible Manufacturing

### i) Manufacturing Excellence

Manufacturing Excellence is the process of manufacturing where strategic use of works on the principle of producing more and wasting less. Adopting manufacturing excellence is the first step towards achieving manufacturing sustainability. It is a combination of small but significant steps such as:

- Efficient production planning to enhance operational efficiencies and resource utilization
- Use of new and improved technology to obtain maximum production efficiency, output quality, and cost optimization
- Incorporating product lifecycle management to achieve material saving and obtain zero defects
- Integration with IT for achieving the best process control
- Skill training to improve productivity and reduce wastage



## ii) Environmental Responsibility

It translates to manufacturing with the motive of not disturbing the ecology surrounding the supply chain. The fashion and textile industry is responsible for creating a lot of pollution with each stage of production being a threat to the environment. Polyester production for fabrics releases about 800 Billion kgs of Greenhouse Gases into the atmosphere annually. Fortunately, there are a number of brands and business that are creating sustainable fashion.

## iii) Ethical Conduct

Ethical behavior is not just the right thing to do, it is the key to sustainable growth and forms the foundation of a strong sense of purpose to do good for everyone. Companies should manufacture responsibly to ensure the health and safety of their employees, associates and the customers. It also means that all the workers and employees are treated fairly, with balanced working hours, appropriate, compensations, and thorough protection against injuries. This includes a fair selection of workers and a firm stand against child labor and human rights protection.

## iv) Responsible Sourcing

Responsible sourcing for manufacturers is a business critical function in which, participating actors are equally accountable for the ethicality and sustainability during the supplying of the raw material and services. Sourcing has become an area of increasing focus for procurement teams globally and has become a differentiator of the brands that create success through sustainability, and those who fade to the background of popular acceptance.

## How Manufacturers and Brands are going about it

Responsible manufacturing has grown out from being just a concept to being an ideology. More fashion companies are jumping on board as they come to the realization that being known as an ethical fashion brand with a healthy supply chain leads to a massive gain in competitive advantage, customer loyalty and brand reputation.

Traditionally, consumers would state their preference for organic/sustainable cotton or other sustainable fabrics, but in reality, it is often a secondary concern after price and style. Today, however, the millennial have a significant impact on the retail industry, as they understand the desperate need for sustainable and ethically sourced products, and are more willing to pay for it than former generations. Additionally, retailers have a responsibility to educate their customers about the importance of sustainable sourcing and give their customers the opportunity to purchase products that are good for the environment and society.

As a result of this many brands and companies have formulated sourcing and manufacturing policies. These policies include guidelines that ensure worker rights, environmental protection and transparent supply chain. The need for these practices has also given birth to various certification agencies and standards that assure the buyer that fair practices have been used in manufacturing of the product.

Recently, more than 40 international denim retailers and manufacturers including, Gap, H&M, Lee, Mud Jeans, Tommy Hilfiger, and Reformation have agreed upon new circular principles for denim design guidelines launched by the Ellen MacArthur Foundation. These guidelines have been developed by over 40 denim experts from academia, fashion brands, retailers, manufacturers, collectors, sorters, and NGOs.

## Adhering to Compliances

Due to growing concerns about the environment and improving transparency in the supply chain due to IT integration, adherence to compliances and standards is no longer an option. International brands use these compliances as a filtering tool for selecting their suppliers and demand strict adherence across the value chain. Environmental compliance is an issue of grave importance owing to its positive impact on our ecosystem. Use of pesticide-free cotton, incorporation of zero water discharge, recycling and reuse of wastes and by-products, etc. are components of environmental compliances. Complying with these standards helps in creating an environmental balance which is the need of the hour.

## Changing Consumption Practices

The efforts required to achieve sustainability are not just limited to the manufacturer and brands, consumer awareness about the impact of product lifecycle on the environment also has an important role to play in sustainability. The principles of the circular economy i.e. Recycle, Reuse, Resale, and Rentals are re-defining the ways in which people consume fashion. Changing the end-consumption patterns will definitely cause a ripple effect across the supply chain.

# 4. Modern Day Solution - Circular Fashion

Recent years have seen the idea of circular economy doing the rounds across the major consumption hubs of the world, namely, Europe USA and Asia. A derivative of this concept, Circular Fashion has emerged as a flagship idea for change in the apparel industry. The concept can be defined as:

'Circular fashion' can be defined as clothes, shoes or accessories that are designed, sourced, produced and provided with the intention to be used and circulate responsibly and effectively in society for as long as possible in their most valuable form, and hereafter return safely to the biosphere when no longer of human use.

The concept is based on the main principles of circular economy and sustainable development, and relates to the fashion industry in a wide sense, i.e. not only to fashion but also apparel, sportswear and outdoor wear. The stakeholders for this concept are not just the manufacturers and brands, but also the consumers, who play an important part in this cycle.

## Approaches for Circular Fashion:

**1. Recycle:** New breakthrough have happened in the area of material recycling wherein used polyester clothing can be recycled through chemical processing to re-produce base raw material i.e. polyester granules which can be used further in the value chain. This technology holds the potential to disrupt the recycle denim industry with introduction of recycled polyester blended cotton yarns for producing denim jeans. One such jeans is expected to utilize 8-10 plastic bottles worth of plastic. Looking at the big picture, over 400 billion plastic bottles are put into use every year. Even if a fraction of these can be recycled, there could be enough raw material to reduce the pressure on the cotton value chain.

**Example:** Tommy Hilfiger in early 2019 unveiled a 100% recycled luxury jeans. The jeans is made from materials salvaged from other uses. Recycled plastic bottles and buttons were used to make the yarn for these jeans, while the zipper and rivets were made using recycled metal.

**2. Re-Use:** Reuse of garments or other textile products either by fixing or transforming them is another way of extending the lifecycle of textile commodities. Re-using of waste generated throughout the manufacturing of textile products is another way of getting closer towards achieving sustainability.

**Example:** Kilim, a leading denim manufacturer based out of Turkey, proposes denim textiles made with “post-consumer jeans”, i.e. yarns from recycled jeans transformed into new yarns. The jeans made by them contain 80% organic cotton, 10% cotton and 10% post-consumer jeans.

**3. Re-Sale:** Another way of utilizing used clothing is through second-hand sales (resale and thrift & donations). In the US, approximately 15% of the discarded clothing is given for resale. Currently, the African population is the major consumer of these second-hand garments mainly imported. However, 12-15% of Americans are estimated to shop for their clothing at the resale stores, indicating a shift in consumption patterns. Currently, the second sales market stands at US\$ 24 billion and is expected to reach a level of US\$ 51 billion by 2023 (16% CAGR). The Resale market is expected to register high growth (36% CAGR) during the same period to reach a level of US\$ 23 billion by 2023. Reselling of used garments is both an ecological and economical way of achieving consumption sustainability in the future.

**Example:** Nudie Jeans, a Swedish denim brand, has come up with an innovative solution to boost circular economy. The brand buys used pair of denim jeans from users in exchange for a 20% discount coupon on new jeans. The brand then repairs the returned jeans to restore them and then retails them at a lower price than a new jeans. The worn-out appeal of the used jeans has helped the brand in selling 55,173 pairs of repaired jeans. These many jeans, if bought new, would require 380 million litres of water, which is enough to fill 154 Olympic sized pools.

**4. Rentals:** In present day scenario, renting your outfits is no longer a stigma but is surely a sign of changing and evolving mindset towards textile consumption. The global online clothing rental market was valued at ~US\$ 1.1 billion in 2018 and is estimated to reach US\$ 1.8 billion by 2023, with a CAGR of 10% from 2018 to 2023. Fashion rental has the potential to reduce waste and increase the lifespan of garments, but the most important factor that can lead this trend in future is the engagement and openness to change of consumer and business practices. Adopting sustainable practices is the need of the hour and it reflects an outstanding opportunity for companies to make a significant difference environmentally, economically and socially.

**Example:** MUD Jeans, a denim brand based out of Netherlands has introduced a membership system for its customers, where the customers can lease a jeans for 12 months and then opt to continue their lease or return the jeans back to the brand. The brand then repairs/cleans the jeans and the jeans is then put up on rent again.

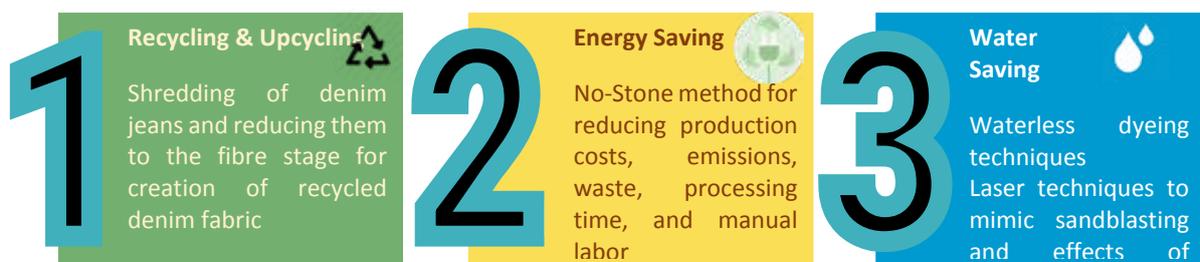


Source: ThredUP Annual Report 2018

## 5. Technology Changing the Landscape of Denim Manufacturing

As discussed in the previous section, a major component of achieving sustainability is to manufacture responsibly. A few years back, the manufacturers did not have much choice or intent to manufacture sustainability, but the recent years have seen the introduction of technology and innovations that have made sustainable manufacturing possible. Various manufacturers and brands have research facilities dedicated to finding better ways to manufacture denim products.

### Technology has made Sustainability Possible



Modern technology has made all these ways of achieving sustainability possible.

**Recycling of fibre:** Industrial shredding machines can shred clothing items into fine fibres that can be utilized again for manufacturing other textile products. However, the fibre produced using this method are shorter in length and can only be put into use for limited purposes of manufacturing low quality products and pillow fills, etc. Modern shredding techniques and machines can shred fabric/clothing into fibres that retain their fibre length. These fibres with longer staple lengths can be used for making a wider range of products. These fibres can also be blended with recycled polyester fibres

**Energy Saving:** Stone washing is a process of providing a worn-out look to the fabric. The look is achieved by washing the denim with pumice stones. However, it takes multiple washes to entirely get rid of the silt accumulated throughout the process. Multiple washes in real world scenario reflect into more usage of water and also wastage of electricity. To tackle this issues, manufacturers are resorting to more modern and ecological options. Stone wash finish can be provided with the help of enzymes like cellulase, through a process called Enzymatic Stone Wash. It not only replaces the kilograms and kilograms of stones required, but also increases the shelf life of the denim products and it does not scrub the fabric in any way. It ensures the same result with minimum amount of water, waste, time, volume and damage to machines.

Alternatively, Perlite washing treatment is also used by manufacturers to provide the same effect. Perlite is the form of naturally occurring silicon rock. It has the distinctive property of expanding to 4 to 20 times its initial volume when heated at a particular temperature. Many jeans manufacturing companies, in the place of enzymatic treatment, use Perlite, which reduces the rate of wearing out of jeans when used. It gives throughout uniform worn-out and old look to the denim and not just the upper part of the garment.

**Water Saving:** Dyeing of denim fabric does not only requires a lot of water but also requires a multitude of dyes and chemical that are not eco-friendly. Hence, the elimination of process-water and chemicals would be a real breakthrough for the textile dyeing industry. The modern technique of waterless dyeing has made this idea a reality. Introduction of dyeing machines that use super carbon dioxide (CO<sub>2</sub>) as a replacement for water has brought a significant change in dyeing of denim fabrics.

The process of providing a faded look to the denim jeans involves the use of processes like sandblasting and Potassium Permanganate (PP) Spray which in particular are not water friendly. These processes have been replaced by automating the time-consuming, labor-intensive and chemical-reliant process of hand-finishing through the use of lasers.

## 6. Way Forward for Denim Manufacturing

Recent years have seen various companies go out of their way to ensure sustainability. H&M and Levi's Strauss & Co. are the pioneers of bringing in sustainability in their business. These brands have set the standards for brands internationally to follow sustainability alignment.

**H&M:** World's second-largest clothing retailer has pledged to become 100% 'climate positive' by 2040 by using renewable energy and increasing energy efficiency in all its operations and by 2030 it aims to use only recycled or other sustainability sourced materials.

Around 57% of all materials used to make garments are recycled or other sustainably sourced materials, while 95% of cotton used by the H&M Group came from sustainable sources. H&M group is the second biggest user of recycled cotton in the world, the sixth biggest user of recycled polyester and they also work with 100% regenerated nylon fibre material. They collect used garments in almost all the stores across countries and give a 10-15% discount to customers against that.

Push towards circular fashion: They have started working on circular economy and plan to shift 100% on the model; **Design, Material Choice, Production Processes, Product Use and Product Reuse & Recycling.**

H&M Foundation and the Hong Kong Research Institute of Textiles and Apparel (HKRITA) in 2018 opened a recycling facility, using a hydrothermal method, for recycling cotton and polyester blends into new fibres. H&M donates 50% of the collected garments to research on textile recycling.

For Man-Made Cellulosic Fibres (Viscose, Rayon, Lyocell): They are taken an initiative to eliminate sourcing from ancient and endangered forests, as well as closing the loop for textiles and supporting the development of alternative MMC fibres made from more innovative sources, such as agricultural residues and recycled textiles. They are working on Dyes & Chemicals and water consumption rigorously, like 30.8% of our denim products have achieved a green level EIM (Environmental Impact Measurement), which means they used a maximum of 35 litres of water per garment during the treatment processes.

**Levi's Strauss & Co.:** One of the first multinational company to establish Global Sourcing and Operating Guidelines, which outline the company's commitment to responsible business practices everywhere it conducts business. The guidelines include two parts:

- i) Country Assessment Guidelines, which help assess potential issues associated with conducting business in specific countries
- ii) Terms and Conditions, which help to identify business partners who follow workplace standards and business practices that are consistent with the company's values.

So far, they've saved more than 1.8 billion liters and recycled more than 129 million liters of water. As of today, more than 40% of all Levi's® products are made with Water<Less® techniques. Moreover, they are RDS Certified (Responsible Down Standard), which indicates that the feathers come from the animal without plucking or force-feeding. For reducing environmental adverse effects screened chemistry method is adopted by the brand. They have recently implemented Climate Action Strategy, for reducing carbon emissions in our owned-and-operated facilities across our global supply chain.

**The company has these targets set for 2025:**

- Sourcing 100 percent renewable electricity
- A 90 percent reduction in greenhouse gas emissions in all owned-and-operated facilities
- A 40 percent reduction in GHG emissions in the supply chain

Levi's Strauss run several campaigns from time to time in order to save water and increase consumer awareness. They introduced Denim Recycling for Consumers in partnership with Cotton Incorporated's Blue Jeans Go Green program. The consumer brought used denim will be transformed into insulation for schools, libraries, or low-income housing built by Habitat for Humanity.

What Indian Denim Manufacturers and Brands Should do to Attain Sustainability			
<b>Raw Material Stage</b> 	Use of Organic Cotton that is sourced from sustainable sources	Use of recycled polyester as blend or completely in denim manufacturing	
<b>Manufacturing Stage</b> 	Use of organic dyes and chemicals that do not have an adverse effect on ecology	Use of special washes and techniques that conserve water	Use of technologies like laser and ozone treatment to provide-worn out look
<b>Retail Stage</b> 	Development of re-use schemes for customers to promote circular economy	Promoting repair and rentals options to customers to decrease production demand	Promotion of the sustainable practices used to manufacture through tags and certifications

Denim manufacturing, thanks to the growing technology and consumer awareness is expected to see a major shift. The manufacturers need to source their materials responsibly while keeping in mind all the entities of the cotton value chain. Moreover, manufacturers should start introducing recycled materials into their production systems. Going forward in the value chain, Indian denim apparel manufacturers need to implement the concept of responsible manufacturing and leveraging the technology available to them. And lastly, the retailers and brands should follow similar practices as the abovementioned pioneers of sustainability and look forward to incorporate these practices into their own businesses and even create an environment of change around the customers. The onus now comes upon the Indian manufacturers, brands and retailers to be a partner in this change as sustainability is no more just an option, but a necessity.

## About Messe Frankfurt

Messe Frankfurt is the world’s largest trade fair, congress and event organizer with its own exhibition grounds. With more than 2,500 employees at 30 locations, the company generates annual sales of around €718 million. We have close ties with our industry sectors and serve our customers’ business interests efficiently within the framework of our Fairs & Events, Locations and Services business fields. One of the Group’s key USPs is its closely knit global sales network, which extends throughout the world. Our comprehensive range of services – both onsite and online – ensures that customers worldwide enjoy consistently high quality and flexibility when planning, organizing and running their events. The wide range of services includes renting exhibition grounds, trade fair construction and marketing, personnel and food services. Headquartered in Frankfurt am Main, the company is owned by the City of Frankfurt (60 percent) and the State of Hesse (40 percent).

## About Wazir Advisors

Wazir Advisors is a Management Consulting company assisting its clients in strategy formulation and implementation, forming alliances and joint ventures, investments and market understanding, sector analysis and due diligence-therby providing end to end solution spanning the complete business cycle in the textile value chain. Having worked with leading Indian and International companies, public sector organizations, Government departments, development agencies, trade bodies, etc., Wazir has a deep understanding of global textile sector dynamics and right connect with the decision makers. Wazir’s team of textile experts possess experience across function – projects, operations, sourcing, and marketing in the sector. The team members have worked on strategy and implementation assignments in all major textile and apparel manufacturing and consumption base. Wazir leverages its body of knowledge, contact and combined expertise of its team to deliver value to clients.

Strategy	Implementation	Alliances
		
<p>Wazir delivers practical, implementable strategies for clients to meet their objectives. We assist clients to conceptualize, evaluate and select business opportunities in the textile and apparel sector. Be it corporate strategy intending to enhance profitability or new market opportunity identification or sector growth strategy to support MSMEs, we are geared to advise our clients efficiently and effectively.</p> <ul style="list-style-type: none"> <li>• Corporate Strategy</li> <li>• Market Opportunity Assessment</li> <li>• Market Entry Strategy</li> <li>• Location Analysis</li> <li>• Business Performance Enhancement</li> <li>• Product Diversification</li> <li>• Marketing and Distribution Strategy</li> <li>• Sector Mapping and Growth Strategy</li> <li>• Policy Formulation Support</li> </ul>	<p>Wazir provides implementation services to textile and apparel sector entities to convert the plans into reality. Wazir has the capability to execute every strategy that it recommends. Whether it is to manage a Government scheme or to improve productivity in apparel factories or to identify the most suitable technology; we have in-house competence to cover all the critical elements of implementation.</p> <ul style="list-style-type: none"> <li>• Project Management and Monitoring</li> <li>• Re-modelling of Manufacturing Plant</li> <li>• Process Re-engineering</li> <li>• Productivity Improvement</li> <li>• Supply Chain Optimization</li> <li>• Feasibility and Techno-Economic Viability (TEV) Study</li> <li>• Investment Promotion</li> <li>• Cluster and Industrial Park Development</li> </ul>	<p>Partnerships and collaborations are ways to achieve accelerated growth, expand market reach and attain technical advancement. Realizing the importance and need for inter-organization alliances in the textile and apparel sector, Wazir has developed broad range of services to support companies and organizations looking for inorganic growth globally.</p> <ul style="list-style-type: none"> <li>• Company Due-diligence</li> <li>• Joint Venture</li> <li>• Marketing Tie-up</li> <li>• Technology Transfer</li> <li>• M&amp;A Execution</li> <li>• Strategic and Financial Funding</li> </ul>