



Report on Digital Textile Printing Industry in India

For Kaytex Fabrics Limited

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Executive Summary

Global fabric production increased from 112 million tonnes in CY 2021 to a record 116 million tonnes in CY2022, with projections reaching 147 million tonnes by CY 2030F at a CAGR of 12.8% from 2024E to 2030F. This growth supports the expansion of the global digital textile printing market, as higher fabric production volumes drive demand for advanced printing technologies. The Indian digital textile printing industry which is poised for significant growth, with projections indicating a compound annual growth rate (CAGR) of 11% between CY 2024E and CY 2030F. This growth is driven by the robust performance of the textile sector, technological advancements, and the increasing demand for customization and sustainability in fabric production. India hosts multiple digital textile printing services with expectations for substantial growth in the coming years. Currently, approximately 432.2 million square metres of fabric are printed digitally in India, which is dominated by the rotary printing technology, accounting to nearly half of all the printed fabrics.

The adoption of dye-sublimation digital printing on polyester fabrics, capable of achieving high printing speeds of 15,000 to 20,000 square metres, is a key driver for market expansion. This technology allows manufacturers to produce high-quality prints quickly and efficiently.

Factors that promote digital textile printing in India include the growing consumer preference for personalized textile products, which digital printing can provide through on-demand production capabilities. Secondly, digital textile printing is considered more environmentally friendly compared to traditional methods due to reduced water and energy consumption, aligning with global sustainability initiatives. Above all penetration of e-commerce that promotes fast fashion and customized designs, which make digital textile printing invincible in India.

Although Fashion and apparel is the dominating end-use segment using more than half of all digitally printed fabrics, home textiles have witnessed a revolutionary change through digital textile printing technology.

This market faces challenges of high initial investment and skill gap which is managed by supportive government incentive policies, integrated textile park, export promotion council and exclusive training to bridge skill gap. These initiatives help digital textile printing market in the long-run to witness steady consistent growth during forecast period.

The Indian digital textile printing market is expected to thrive due to:

- The emergence of fast fashion trends that necessitate quick production cycles.
- Increased investment in research and development to enhance technology and product offerings.
- A tech-savvy generation driving demand for innovative and customizable textile solutions.

In conclusion, the Indian digital textile printing industry is set for robust growth driven by technological advancements, changing consumer preferences, and sustainability initiatives. Addressing existing challenges will be crucial for stakeholders aiming to capitalize on this dynamic market landscape.

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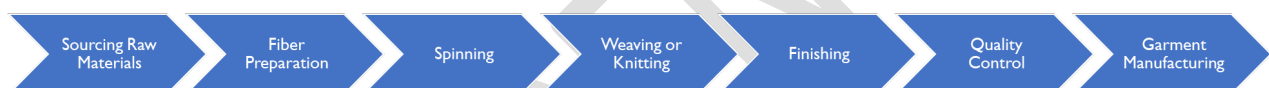
Overview of Fabrics in Digital Printing Market in India

Fabric Production Process

India is one of the world's largest producers of textiles and apparels. The country is world's largest producers of cotton and jute, second largest producer of silk, contributing to 95%¹ of the world's hand-woven fabric. The domestic apparel and textile industry in India contributes to approximately 2.3% of the country's GDP, 13% to industrial production, and 12% to exports. India has a 4% share of the global trade in textiles and apparel, where the textile exports are at USD 34.07 Billion in FY2024, and is likely to reach USD 100 Billion by 2030.

India's fabric production process is a comprehensive and multi-step procedure that transforms raw fibres into finished textiles. This industry is vital to the country's economy, leveraging both natural and synthetic fibres.

Fabric production process has a sequence of steps starting from raw materials to garment manufacturing, as the output in one process becomes the input for the next process.



1. Sourcing Raw Materials

The initial step involves sourcing raw materials, which can be classified into two main categories:

- **Natural Fibres**

These include cotton, wool, silk, and linen, primarily cultivated in various regions across India. Cotton is the most predominant fibre, accounting for approximately 90% of all-natural fibres used in the textile industry.

- **Synthetic Fibres**

These are produced from petrochemical sources and include polyester, nylon, and rayon. These fibres are increasingly used due to their versatility and durability.

2. Fibre Preparation

When the raw material is sourced, it is processed to make it suitable as a raw material for the next steps of making a fabric. This processing is done in two steps:

- **Opening and Cleaning** – For natural fibres, including cotton, bales are opened using machines to fluff the fibre and remove impurities like dirt and leaves. This is followed by a process called "ginning," where seeds are separated from the cotton lint.

¹ Invest India, an Initiative of Ministry of Commerce and Industries

- **Carding** – The cleaned fibres are then carded to disentangle and align them into a continuous web or sliver.

3. Spinning

The carded fibres are spun into yarn through a spinning process, which involves twisting the fibre strands together to create yarn. Machines called spinning frames are used to draw out the slivers and twist them into yarn. The quality of yarn produced can significantly influence the final fabric. India is the second largest player next to China with a capacity to produce 100% man-made fabric and blended yarn. Ludhiana and Surat have emerged as major centre for Polyester and Acrylic Spinning, Silvassa, Vapi & Daman have emerged as texturising units. Coimbatore and adjacent area have become key centers for Viscose Rayon, and Bhiwandi has emerged as a hub for Polyester/Viscose blend.

4. Weaving or Knitting

Following spinning is the process of converting yarn into fabric through either weaving or knitting. India has the largest number of looms with 64%² global installed capacity. About 5.0 lakhs units are operating in the country by employing about 22.56 lakh power-looms in 50 clusters.

- **Weaving** – This is the most common method where two sets of yarn (warp and weft) are interlaced on a loom. The process includes several stages:
 - **Warp Preparation** – Yarn is wound onto beams and treated with sizing agents to enhance strength.
 - **Weaving Process** – The warp threads are set on a loom, where they undergo shedding, picking, beat-up, let-off, and take-up operations to form fabric.
- **Knitting** – In this method, yarns are interlooped to create fabrics that are typically more elastic than woven fabrics. Knitting can be done using circular or flat knitting machines.

5. Finishing

After weaving or knitting, the fabric undergoes finishing processes to enhance its properties:

- **Dyeing** – Fabrics are dyed using various methods to achieve desired colours. This can occur before (piece dyeing) or after (garment dyeing) the fabric is made into garments.
- **Finishing Treatments** – These include processes such as softening, water-proofing, or adding flame retardants to improve performance characteristics.

6. Quality Control

The finished fabric is now subjected to quality control to ensure that the fabric meets the requirements for turning it into a garment. In this process, fabrics are inspected for defects during weaving and after finishing. Any imperfections are corrected before moving on to garment manufacturing.

² Report by Textiles Committee, Ministry of Textiles, Government of India

7. Converting Fabric into a Garment

The final stage involves converting fabric into finished products:

- **Cutting and Sewing** – Fabric is cut according to patterns and sewn together to create garments. This step often requires skilled labour for precision.
- **Final Inspection** – Completed garments undergo thorough inspection before being packaged for distribution

The fabric production process in India is a complex interplay of sourcing raw materials, transforming them through various mechanical processes, and ensuring quality control throughout. This industry not only supports local economies but also plays a crucial role in global textile markets.

Types of Fabrics

Fabrics are of different types where broadly these are classified as natural and synthetic fabrics.

Detailed list on the types of fabrics is given in the table below:

Type of Natural Fabric	Characteristics of the Fabric
Cotton	Soft, breathable, and versatile; commonly used in clothing, bed linens, and towels.
Linen	Made from the flax plant; strong and breathable, ideal for summer clothing and home textiles. Its property to become softer with each wash, more breathable and moisture-wicking makes it suitable for a wide range of textiles along with its usage for clothing. Linen is also amongst the strongest natural fibres, that can last for many years with proper care.
Wool	Warm and moisture-wicking; used in sweaters, blankets, and suits. Variants include cashmere, alpaca, and merino.
Silk	Luxurious and smooth; used for high-end garments like dresses and blouses.
Muslin	Lightweight cotton fabric; often used for baby clothes or as a base for patterns.
Bamboo	Soft, hypoallergenic, and antibacterial; used in clothing and eco-friendly products.

Denim	A sturdy cotton twill fabric; primarily used for jeans and casual wear.
Flannel	Soft fabric made from wool or cotton; commonly used in shirts and shorts.

Natural fabrics are durable and are more sustainable compared to synthetic alternatives, making them popular choices in eco-friendly fashion.

Type of Synthetic Fabric	Characteristics of the Fabric
Polyester	Durable and stain-resistant; widely used in clothing and home furnishings.
Nylon	Strong and elastic; commonly found in activewear, stockings, and outdoor gear.
Rayon	Semi-synthetic fabric made from wood pulp; soft and breathable, often used as a silk substitute.
Spandex (Lycra)	Known for its exceptional stretch; used in sportswear and fitted garments.
Satin	A weave rather than a fibre type; has a glossy surface, often used in evening gowns and lingerie.
Velvet	A soft pile fabric that can be made from various fibres; used in upholstery and formal wear.
Chiffon	Lightweight and sheer; commonly used in evening wear or layered garments.
Acrylic	A wool substitute that is lightweight and warm; often found in sweaters and blankets.

Synthetic fabrics such as polyester and nylon are highly durable, leading to longer product lifespans and potentially reducing the need for frequent replacements. Similarly, many synthetic fabrics can be recycled into new textiles, which helps reduce waste and conserve resources.

There is a constant debate on sustainability between natural and synthetic fabrics. Natural fabrics generally offer benefits like biodegradability and lower toxicity but face challenges regarding water use

and pesticide dependency. In contrast, synthetic fabrics provide durability and water efficiency but pose significant risks related to microplastic pollution and fossil fuel reliance.

Emerging Trends/Developments in Fabrics

Emerging developments in fabrics are increasingly focused on sustainability and eco-friendliness, driven by innovations that address environmental concerns associated with traditional textile production. Innovations in the textile industry are increasingly focused on making synthetic fabrics more eco-friendly. These advancements aim to reduce environmental impact, enhance sustainability, and promote a circular economy. Emerging trends in the development of fabrics include:

1. Plant-Based Innovations

Plant-based innovations represent a significant emerging trend in the fabric industry, driven by growing consumer demand for sustainable and eco-friendly materials. These innovations involve both reimagining traditional plant fibers like cotton and linen through new processing techniques and developing entirely new materials from diverse plant sources such as bamboo, pineapple leaves (piñatex), and agricultural waste. These new plant-based materials often offer unique properties like breathability and natural antimicrobial qualities. Beyond fibers, innovation is also occurring in plant-based dyes and finishes. This shift reflects a broader industry movement towards circularity and reduced reliance on synthetic fibers, addressing environmental concerns. These ongoing developments promise a more sustainable future for the fabric industry.

2. Fabrics of Recycled Materials

• Recycled Polyester

- **Description** – This fabric is made from post-consumer plastic waste, such as bottles and discarded textiles.
- **Benefits** – It reduces landfill waste, decreases the need for virgin polyester production, and conserves resources by repurposing existing materials.

• Econyl

- **Description** – A regenerated nylon made from discarded fishing nets, fabric scraps, and other nylon waste.
- **Benefits** – Econyl not only prevents ocean pollution but also creates a closed-loop system that minimizes water usage and waste during production.

3. Bio-Synthetic Fabrics

- **Kintra** – This bio-synthetic yarn performs like traditional polyester but is biodegradable and derived from renewable sources like corn or wheat sugar.
- **Clarus** – A technology that transforms natural fibres into high-performance fabrics while remaining biodegradable.

4. Advanced Fibre Technologies

- **Tencel (Lyocell)**
 - **Description** – Made from sustainably sourced wood pulp, Tencel is produced in a closed-loop process that recycles water and solvents.
 - **Benefits** – It is biodegradable, requires less energy and water than conventional fabrics, and has a low environmental impact overall.
- **Algae-Based Textiles**
 - **Description** – Fabrics derived from algae biomass, which is renewable and can be rapidly regenerated.
 - **Benefits** – These textiles are carbon-negative, as algae absorb carbon dioxide (CO₂) during growth, contributing to reduced greenhouse gas emissions.
- **Mycelium Leather**
 - **Description** – A leather alternative made from the root structure of mushrooms.
 - **Benefits** – It is biodegradable and reduces reliance on animal products while minimizing environmental pollutants typically associated with traditional leather tanning.

5. Digital and Three-Dimensional (3D) Printing Technologies

- **Digital Printing Technologies**
 - **Description** – This method significantly reduces water usage compared to traditional dyeing processes.
 - **Benefits** – Digital printing minimizes chemical runoff and allows for more precise designs without excess material waste.
- **3D Textile Printing**
 - **Description** – A production technique that eliminates raw material waste by using only what is necessary to create the fabric.
 - **Benefits** – This method not only speeds up production but also reduces labour costs and environmental impact.

6. Smart Textiles

Innovations in smart textiles are leading to developments such as fabrics that can monitor vital signs or change properties based on environmental conditions. These advancements not only enhance functionality but also promote sustainability through energy efficiency.

7. Greater Transparency and Traceability

The use of blockchain technology in the textile supply chain provides detailed information about the origins of materials and production processes, helping consumers make informed choices about sustainable practices.

The textile industry is witnessing a significant shift towards sustainability through these innovations in synthetic fabrics. By focusing on recycling, reducing resource consumption, and utilizing biodegradable materials, manufacturers are working to minimize their ecological footprint while meeting consumer demand for environmentally friendly products.

Transition in Printing Techniques in Textile Industry

Textile printing technology is based on traditional rotary screen textile printing, from which the market is transitioning towards digital textile printing. The transition from rotary screen textile printing to digital textile printing in India represents a significant evolution in the textile industry, driven by advancements in technology, changing consumer demands, and a growing emphasis on sustainability.

In the traditional rotary textile printing process, where the fabric passes under the rotating screens through which the printing paste is pumped. Nearly 65% of the textiles are printed globally using rotary machines, demonstrating competitive cost, high quality and consistency. This type of printing is fast paced, suitable for long runs of fabric which can produce hundred yards per minute.

Overview of Traditional Rotary Printing

Rotary printing has been a dominant method in the textile industry for decades. It involves the use of engraved cylindrical screens to apply designs onto fabric. While effective for mass production, rotary printing has few challenges such as:

- **High Setup Costs**
This initial setup for rotary printing is expensive due to the need for multiple screens and extensive preparation.
- **Limited Flexibility**
Changing designs requires new screens, making it less adaptable to quick changes in consumer preferences.
- **Resource Intensive**
This method typically consumes large amounts of water and energy, contributing to environmental concerns.

Digital Textile Printing

Digital textile printing has emerged as a revolutionary alternative. Digital textile printing was introduced in the late 1980s as a possible replacement for analog (screen) printing³ with the advent of inkjet technology and innovative ink that made it possible for printers to print directly on fabric. In early 1990, huge experimentation using inkjet technology combined with innovative and specially developed inks (dye-sublimation or disperse direct ink) were carried out to test different types of fabrics with different types of inks. Also, the development of a dye-sublimation printer in the early 1990s made it possible to use low energy sublimation inks and high energy disperse direct-inks to print directly onto textile media, as compared to using dye-sublimation inks on a transfer paper to print and, in a separate process using a heat press to transfer the print to the fabric. India had over 1,000⁴ digital textile printing services in operation in 2023, which is consistently increasing year-on-year.

Digital textile printing referred to as direct-to-garment or digital garment printing, is a process of reproducing variety of digital images/prints on textiles and garments using specialized or modified inkjet technology. Once the design is ready, digital textile printing allows to print anything from the computer directly on the fabric, the way it is printed on paper. Using digital printing technology, anything can be printed on fabric with ease, perfection and required precision. Digital printing on fabric works perfect for printing photos, detailed patterns, graphically complex designs and tonal transitions.

Adoption in India

India is actively transitioning towards digital textile printing technologies, where the market is likely to witness a CAGR of 11% from CY 2024E to CY 2030F. Companies are increasingly investing in digital textile printing technologies to meet rising consumer demands, for customization and quick turnaround times. Innovations such as pigment printing and sublimation techniques have gained traction, allowing manufacturers to produce high-quality prints on various fabrics without extensive resource consumption.

Challenges in Transitioning

Despite the benefits, transitioning from rotary to digital textile printing poses challenges such as skill gap and initial investment. The transition requires a workforce skilled in digital textile printing technologies, which may differ significantly from traditional textile printing methods. Companies often

³ Screen printing involves pressing the paint through a printing screen (made of either steel frame or a nylon mesh) and thus making a print on the fabric. In screen-printing the operation of squeezing the paint through screen is performed either manually or with through machine. In screen printing, one colour is printed at a time as each colour is a separate layer due to which digital textile printing works better and is recommended for multi colour print. Screen printing can be used for printing entire roll of fabric using (cylindrical) material beams in rotary screen-printing process and on ready-made clothing items (T-shirts, bags, accessories) using Flat screen-printing process. In rotatory screen printing, the initial cost is high as preparation of cylinders significantly raise the price and each colour requires the preparation of a separate screen which limit number of colours used but it is cost effective for bulk printing. Sample printing is difficult in rotary screen printing

⁴ Article on Digital Textile Printing Market in India, Textile Insights Magazine, December 2023

need to invest in training or hiring new talent familiar with digital textile printing workflows. Similarly, this transition too has high initial investment, as digital textile printing machinery costs more than traditional rotary machines.

The future of textile printing in India appears promising as digital textile printing technologies continue to evolve:

- **Sustainable Practices** – As environmental concerns grow; digital textile printing's eco-friendly attributes will likely drive further adoption across the industry.
- **Customization Trends** – With consumers increasingly seeking unique products, digital textile printing's ability to facilitate customization will enhance its appeal.
- **Integration with Automation** – The integration of automation and artificial intelligence into digital textile printing processes could streamline production further, enhancing efficiency and reducing waste.

In conclusion, the transition from rotary textile printing to digital textile printing in India signifies a pivotal shift towards more sustainable, efficient, and flexible manufacturing practice. As the industry embraces these changes, it is poised to meet evolving consumer demands while addressing environmental challenges.

Factors Facilitating Transition in Textile Printing Technologies

Textile market is witnessing a significant growth, driven by trends such as population growth, increasing disposable income, and changing fashion trends. The transition to digital textile printing in India is being driven by several key factors that align with current market trends and technological advancements.

- **Environmental Sustainability**

There is increasing pressure on the textile industry to adopt sustainable practices. Digital textile printing uses eco-friendly inks and significantly reduces water and energy consumption compared to traditional methods. This shift not only meets regulatory requirements but also aligns with consumer preferences for sustainable products. The industry's move towards greener technologies is becoming a critical driver for market growth.

- **Support from Government Initiatives**

The Indian government is actively promoting the textile sector through initiatives aimed at establishing textile hubs across the country. This governmental support enhances infrastructure and investment opportunities, encouraging more businesses to transition to digital textile printing technologies.

- **Growth of Fashion Industry**

The fashion industry in India is a significant contributor to the demand for digital textile printing. As the sector continues to grow, driven by trends like fast fashion, there is an increasing need for flexible production processes that digital textile printing can provide. The transition to digital textile printing in India is being propelled by a combination of economic efficiency, technological advancements, sustainability concerns, and changing consumer preferences. These factors collectively position digital textile printing as a crucial component of the future of India's textile industry.

Challenges of Traditional Rotary Textile Printing

Rotary printing, while widely used in the textile industry, faces several challenges that can impact its efficiency and effectiveness. The primary challenges associated with rotary textile printing are:

- **High Initial Setup Costs**

The initial investment required for rotary screen-printing equipment is substantial. This includes costs for screens, engraving, and machinery, which can be a barrier for small businesses and startups looking to enter the market.

- **Inefficiency for Small Runs**

Rotary screen printing is not cost-effective for short production runs. The setup time and costs associated with creating screens make it impractical for small orders or custom designs, leading to a preference for digital textile printing methods in such cases.

- **Limited Design Flexibility**

While rotary printing can handle various designs, it struggles with intricate patterns and fine details compared to digital textile printing. Complex designs may not be rendered accurately, and adjustments to designs can be cumbersome due to the need for new screens.

- **Colour Limitations**

Rotary screen printing typically works best with spot colours and may have limitations in achieving gradients or complex colour schemes. This restricts the creativity of designers who wish to use a broader palette or intricate colour transitions.

- **Registration Issues**

High-speed printing can lead to registration problems, where the alignment of colours does not match up correctly on the fabric. This can result in quality issues that affect the final products.

- **Environmental Concerns**

Rotary screen printing tends to consume more ink and water compared to digital methods, leading to higher environmental impacts. The traditional process often generates more waste and requires significant resources, raising sustainability concerns in an increasingly eco-conscious market.

- **Production Speed Vs Quality Trade-Off**

Although rotary printing is known for its speed, there is often a trade-off between speed and quality. To maintain high production rates, quality may suffer, particularly with complex designs that require careful attention.

- **Challenges with Difficult Designs**

Certain intricate designs pose challenges in rotary screen printing due to the interaction between the fabric, screen, and design raster structures. This can lead to moiré effects or other undesirable visual outcomes.

Despite these challenges, rotary screen printing remains a vital part of the textile industry due to its efficiency in large runs and cost-effectiveness for specific applications. These challenges necessitate careful consideration when choosing a printing method. Thus, digital textile printing in India provides a combination of cost savings, speed, quality, customization options, environmental sustainability, reduced waste, and versatility that collectively enhance its appeal in the modern textile landscape.

Digital Textile Printing – Process & Components

Digital Textile Printing Overview

Digital textile printing is a straightforward process, where a home-desktop type printer, converts a digital file into a design on a fabric by applying ink to fabric. Since fabric is less receptive to dyes than paper, the fabric is pretreated to make the dye permanent. Developing a printer that could print on a fabric is a technologically advanced and expensive option. So, the initial cost for digital textile printing is very high, as the machines are expensive, since digital textile printing is more sustainable and uses only a fraction of water and energy.

Process of Digital textile Printing

The overall process of digital textile printing involves several stages, from fabric batching to final finishing. Here's a comprehensive breakdown of these steps:

- **Order Reception**

The process begins with receiving an order from clients or buyers, which includes specific requirements for the design and fabric type.

- **Design Development**

This stage is when the design that needs to be printed on the fabric is developed. This is done in three steps.

- Creation – A digital design is created using graphic design software like Adobe Illustrator, utilizing the Cyan, Magenta, Yellow and Key (CMYK) colour model for accurate colour representation.
- Digitization – If necessary, existing designs can be scanned and digitized. The final design is saved in a format compatible with the printing system.

- Colour Separation – The design is separated into individual colour channels to ensure precise colour application during printing.

Once design is finalized, next steps of fabric preparation start and the design is printed on the fabric.

- **Fabric Preparation**

Once design is finalized, the process moves to transfer the design to the fabric. For this to happen, fabric needs to be prepared. This is done by appropriate fabric selection to suit the design, and this selected fabric is treated with chemicals to adapt to the design.

- Selection – Choose the appropriate fabric based on the design requirements.
- Cleaning – Removing any impurities or finishes that may hinder ink adhesion.
- Chemical Padding – Fabrics are often treated with sizing agents or other chemicals (known as padding) to enhance rigidity and improve ink absorption. This helps eliminate wrinkles and ensures smooth feeding into the printer.

- **Ink Selection**

Choosing the right ink is crucial for achieving desired results:

- Type of Inks – Common inks used in digital textile printing include reactive dyes for natural fibres, pigment inks for various fabrics, and sublimation inks specifically for polyester-based materials.
- Compatibility – The selected ink must be compatible with both the fabric type and the printing method being used.

- **Printing**

This step involves transferring the digital design onto the fabric:

- Direct-to-Fabric Printing – The prepared fabric is placed flat on a sticky printer belt, where specialized inkjet printers spray tiny droplets of ink directly onto the fabric according to the digital design.
- Sublimation Printing – For polyester fabrics, a mirrored image of the design is printed on a heat transfer paper, which is then transferred to the fabric using heat and pressure in a heat transfer machine.

- **Dye Fixation**

After printing, it is crucial to fix the dyes to ensure durability. The printed fabric undergoes a fixation process, typically involving steaming or curing. This allows dye molecules to penetrate deeper into the fibres, enhancing colour fastness and ensuring that the print withstands washing and wear.

- **Drying and Fixation**

After printing, it is essential to dry and fix these inks:

- Drying Methods – The printed fabric is dried using heaters attached to the printer or through other drying methods.
- Fixation – This step involves applying heat and pressure (e.g., steaming) to ensure that the ink bonds effectively with the fabric fibres, enhancing durability and colourfastness.

- **Post-Treatment**

Once dye fixation is complete, the fabric goes through the finishing processes, which includes:

- Washing – The printed fabric is washed to remove any excess dye or chemicals that may remain on the surface.
- Drying – The fabric is dried using heaters attached to the printing machine or through other drying methods.
- Final Finishing – Additional treatments may include steaming or ironing to achieve a smooth finish and prepare the fabric for delivery.

- **Quality Control**

Throughout the process, quality checks are performed to ensure that the printed fabric meets specified standards in terms of colour accuracy, design fidelity, and overall quality.

In summary, digital textile printing encompasses a series of well-defined steps that transform a digital design into a finished textile product, emphasizing efficiency, customization, and high-quality output.

Distribution Model of Digital Textile Printing

The distribution model of digital textile printing in India incorporates both Business-to-Business (B2B) and Business-to-Consumer (B2C) approaches, reflecting the diverse needs of the textile market.

- **B2B Distribution Model**

- **Textile Manufacturers and Print Bureaus** – Digital textile printing is primarily utilized by manufacturers and print service providers who cater to fashion brands, home décor companies, and other businesses needing custom printed fabrics. These entities often operate as print bureaus, offering services to various clients who require unique designs and high-quality printing.
- **Collaborations and Partnerships** – Many companies engage in collaborations or joint ventures to enhance their market reach and operational capabilities. This includes partnerships between digital printer manufacturers and textile producers to streamline supply chains and improve service delivery.
- **Direct Sales to Brands** – Manufacturers may sell directly to fashion brands and retailers, allowing them to produce exclusive collections with customized prints. This direct relationship helps brands maintain a competitive edge by offering unique products tailored to consumer preferences.

- **B2C Distribution Model**

- **E-Commerce Platforms** – The rise of online marketplaces has enabled direct sales from digital textile printers to consumers. Customers can upload their designs or choose from existing patterns, facilitating a print-on-demand model that minimizes inventory costs.
- **Custom Design Services** – Many digital textile printing companies offer platforms where consumers can create personalized designs for various products, such as apparel, home textiles, and accessories. This model caters to individual consumers looking for unique or custom items.
- **Retail Outlets** – Some businesses operate physical retail locations where customers can see fabric samples, explore design options, and place orders for custom prints. This hybrid approach combines online convenience with in-person interaction.

Types of Digital textile Printing

There are two types of digital textile printing including:

- **Sublimation Digital Textile Printing**

Sublimation printing is a widely used digital textile printing method that involves transferring a printed design from a special type of paper onto the fabric. This process utilizes heat and pressure to transform the solid ink on the paper into a gas. This gaseous form of the ink then penetrates the fabric fibres, where it cools and solidifies, becoming permanently embedded within the fabric. Sublimation printing is particularly well-suited for polyester fabrics and other synthetic materials. The process offers several advantages, including vibrant and long-lasting colours, high image resolution, and the ability to produce intricate and detailed designs. It is commonly used in applications such as sportswear, home décor, and promotional items.

- **Direct Digital Textile Printing**

Direct digital textile printing, as the name suggests, involves directly printing the design onto the fabric using inkjet technology. In this method, specialized inks are sprayed directly onto the fabric fibres, creating the desired image.

Direct digital textile printing offers several advantages over traditional methods, such as greater flexibility in design, faster turnaround times, and reduced waste. It can be used on a wider range of fabrics, including natural fibres like cotton, silk, and linen, as well as synthetic materials. This versatility makes it suitable for a wide range of applications, from high-fashion apparel to home furnishings and industrial textiles.

Direct digital textile printing is constantly evolving, with advancements in ink technology and printing machinery leading to improved print quality, faster production speeds, and increased sustainability.

Types of Inks Used in Digital textile Printing

Digital textile printing utilizes various types of inks, each specifically formulated for different fabric types and printing processes. Here's an overview of the main types of inks used in digital textile printing:

Ink Chemistry	Ink Type	Fibre	Market Application	Pre and Post-Treatment
Reactive	Aqueous	Mainly Cellulosic and Protein	Apparel/Fashion	Pre-treatment – steaming fixation – washing
Acid	Aqueous	Protein and Nylon	Apparel/Fashion	Pre-treatment – steaming fixation - washing
Disperse	Dispersion	Polyester and Synthetic Fibres	Apparel/Fashion/Automotive/Home Textile	Pre-treatment-steaming or heat fixation – washing
Dye Sublimation	Dispersion	Polyester	Signage/Sportswear	Fixation with heat transfer
Pigment	Dispersion	Cellulosic and Synthetic Fibres	Home Textile/Direct-To-Garment/Low Quality Apparel	Pre-treatment-fixation

• Reactive Inks

- Application – Primarily used on natural fibres such as cotton, viscose, and sometimes silk.
- Characteristics – Reactive inks form a chemical bond with the fibres, resulting in vibrant colours and excellent wash fastness. They are favoured in fashion applications due to their high-quality output.
- Post-Processing – Requires steaming after printing to fix the dye, followed by washing to remove excess dye.

• Acid Inks

- Application – Best suited for protein-based fibres like silk and wool, as well as synthetic fibres like nylon.
- Characteristics – Acid inks provide bright colours and are resistant to chlorine and salt water, making them ideal for swimwear and activewear. They bond well with the fabric, ensuring good colour retention.
- Post-Processing – Similar to reactive inks, they often require steaming and washing to fix the colours properly.

• Disperse Inks

- Application – Primarily used for synthetic fibres, particularly polyester and polyamide.
- Characteristics – Disperse inks are known for their ability to achieve high colour brilliance and wash fastness. They are commonly used in conventional printing but have also found applications in digital textile printing.
- Process – The ink is applied to the fabric and then steamed to allow it to penetrate the fibres before being washed.

• Dye Sublimation Inks

- Application – Specially designed for synthetic fabrics, particularly polyester.

- Characteristics – Dye sublimation inks work by converting solid dye into gas without passing through a liquid state when heat is applied. This process allows the dye to bond at the molecular level with the fabric, resulting in vibrant colours that are embedded within the material.
- Process – Typically involves printing on transfer paper first, which is then heat-pressed onto the fabric.
- **Pigment Inks**
 - Application – Versatile and can be used on various fabric types, including cotton, polyester, and blends.
 - Characteristics – Pigment inks consist of tiny colour particles suspended in a binder. They offer excellent colour fastness and are more environmentally friendly than some other ink types.
 - Process – Unlike reactive or acid inks, pigment inks do not require steaming but may need heat setting after printing to ensure durability.

The choice of ink in digital textile printing is crucial as it directly affects the quality, colour vibrancy, and durability of the printed fabric. Each type of ink serves specific applications based on fibre composition and desired outcomes.

Types of Machinery Used in Digital Textile Printing

Digital textile printing involves various types of machinery designed to cater to different fabric types and printing techniques. Comprehensive overview of the type of machines are listed below:

- **Direct-to-Fabric (DTF) Printers**
 - These machines print directly onto fabrics, making them suitable for both natural and synthetic materials such as cotton, silk, and nylon.
 - They typically use piezoelectric inkjet technology to achieve high-quality prints with vibrant colours.
 - Machines from manufacturers like Epson and Mimaki are known for their efficiency and quality in direct-to-fabric printing.
- **Dye Sublimation Printers**
 - Ideal for printing on polyester fabrics, these printers use a heat transfer process where dye is sublimated onto the fabric.
 - The dye is first printed onto transfer paper and then applied to the fabric using heat, allowing the dye to penetrate the fibres.
 - Commonly used for sportswear, promotional items, and home textiles due to their ability to produce durable and vibrant prints.
- **Hybrid Printers**

- These versatile machines combine the capabilities of direct-to-fabric and dye sublimation printers, enabling printing on a variety of materials.
- Hybrid printers allow businesses to switch between different printing methods, accommodating a broader range of applications.
- The Mimaki TX300P-I800MkII is a notable hybrid printer that can handle both fabric and paper for dye sublimation.
- **Reactive Ink Printers**
 - Specifically designed for printing on natural fibres like cotton, these printers use reactive inks that chemically bond with the fabric.
 - They provide excellent colour vibrancy and wash fastness, making them suitable for fashion applications.
 - Industrial-grade machines like the ColorJet Metro are equipped to handle various ink types, including reactive inks.
- **Pigment Ink Printers**
 - These printers utilize pigment inks that are suitable for a wide range of fabrics, including cotton and polyester blends.
 - Pigment inks offer good colour fastness without requiring extensive post-processing, making them efficient for quick production runs.
- **Multi-Pass Industrial Printers**
 - These printers use clusters of moving printheads that travel back and forth across the substrate to create high-quality prints.
 - They are ideal for large-scale production with high demands for quality and speed, often used by textile manufacturers looking to scale their operations.

The machinery used in digital textile printing includes a variety of specialized printers designed for different fabrics and applications. From direct-to-fabric and dye sublimation printers to hybrid models and industrial-grade machines, each type plays a crucial role in meeting the diverse demands of the textile industry.

End Use Application of Digital Printed Fabric

Digital printed fabric has a wide range of end-use applications across various industries due to its versatility, customization capabilities, and high-quality output. Here are the primary applications of digitally printed fabric:

- **Fashion and Apparel**
 - **Customized Clothing** – Digital textile printing allows for the creation of personalized garments, including t-shirts, dresses, activewear, and swimwear. Customers can choose their designs or have custom graphics printed directly onto the fabric.

- **Haute Couture** – Designers in the high-fashion sector utilize digital textile printing to produce unique, intricate patterns that enhance the exclusivity of their collections.
- **Quick Turnaround Fashion** – The ability to print on demand enables brands to respond quickly to fashion trends, reducing lead times and inventory costs.
- **Home Textiles**
 - **Curtains and Drapery** – Digital textile printing is used to create custom designs for curtains, drapes, and other window treatments, allowing homeowners to personalize their interiors.
 - **Upholstery Fabrics** – Custom printed upholstery fabrics for furniture provide unique design options that cater to individual tastes.
 - **Bedding** – Digital textile printing allows for vibrant designs on bed linens, comforters, and pillowcases, enhancing bedroom aesthetics.
- **Interior Design**
 - **Wall Coverings** – Digital textile printing is employed to create custom wall coverings and wallpapers with intricate designs that can transform spaces.
 - **Table Linens** – Unique designs for tablecloths, napkins, and placemats can be produced using digital textile printing technology.
- **Advertising and Promotional Materials**
 - **Banners and Flags** – Businesses use digitally printed fabrics for banners, flags, and promotional displays that require high-quality graphics and vibrant colours.
 - **Point-of-Sale Displays** – Custom printed textiles are utilized in retail environments for signage and displays that attract customer attention.
- **Sportswear and Activewear**
 - **Performance Apparel** – Digital textile printing is increasingly used in sportswear to create lightweight, breathable fabrics with customized designs that enhance brand identity.
 - **Team Uniforms** – Sports teams can have unique uniforms with personalized graphics printed directly onto moisture-wicking fabrics.
- **Accessories**
 - **Bags and Wallets** – Custom printed fabrics are used in the production of bags, purses, and backpacks, allowing for unique styles that reflect personal branding.
 - **Scarves and Ties** – Digital textile printing enables intricate designs on scarves and ties, offering consumers fashionable accessories.
- **Industrial Applications**
 - **Technical Textiles** – Digital textile printing is applied in creating technical textiles used in various industries such as automotive (e.g., seat covers) and medical (e.g., surgical gowns).

- **Smart Textiles** – Integration of electronics into textiles (e.g., conductive threads) allows for innovative applications in wearables and smart clothing.
- **Home Décor**
 - **Artistic Fabrics** – Artists can create fabric art pieces using digital textile printing techniques, allowing for high-resolution reproduction of their artwork on textile surfaces.
 - **Custom Pillows** – Decorative pillows with personalized designs can be produced using digital textile printing technology.

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Digital Textile Printing – Attributes

Comparative Advantage of Digital Textile Printing Over Conventional Printing

Digital textile printing is a recent technology which is disrupting the fabric printing market. Digital textile printing offers several advantages over conventional printing methods, making it increasingly popular in the textile industry. The numerous advantages offered by digital textile printing encourages its adoption across textile printing both in international and Indian market. Despite high initial investment cost, the advantages of digital textile printing outweigh the challenge of high initial investment. The key advantages of digital textile printing are:

- **High-Quality Printing**

Digital textile printing delivers exceptional print quality with sharp, vibrant colours and precise detailing. Unlike traditional methods, where colour bleeding and blurring can occur, digital textile printing ensures that intricate designs are reproduced with clarity and accuracy, maintaining the fabric's softness and flexibility.

- **Customization and Flexibility**

The key advantage of digital textile printing is its ability to customize designs easily. Designers can print any pattern or image on the fabric without the need for screens or plates, allowing for unique and personalized creations. This flexibility is particularly advantageous for small or independent designers who want to offer distinct products.

- **Time Efficiency**

Digital textile printing significantly reduces production time. The process eliminates many traditional steps, such as screen preparation and colour separation, allowing for quicker turnaround times. This speed is beneficial for responding to fast-changing trends and fulfilling urgent orders.

- **Cost-Effectiveness**

Digital textile printing is generally more cost-effective for small runs compared to conventional methods. There are no setup costs or screen fees associated with digital textile printing, making it accessible for smaller businesses and independent designers who may not have large budgets. Additionally, the reduced waste and lower ink consumption further contribute to cost savings.

- **Environmental Sustainability**

Digital textile printing has a lower environmental impact than traditional methods. It uses significantly less water, produces less waste, and emits fewer pollutants. This sustainability aspect aligns with growing consumer demand for eco-friendly practices in the fashion industry.

- **Versatility in Fabric Types**

Digital textile printing can be applied to a wide range of fabrics, including cotton, silk, polyester, and blends. This versatility allows designers to create unique textiles suitable for various applications, from fashion to home décor.

- **Consistent Quality**

Digital textile printing ensures consistent quality across multiple prints. The same design can be reproduced repeatedly with high fidelity, which is crucial for maintaining brand identity and product uniformity.

- **Access to Global Market**

With digital textile printing technology enabling small-batch production of custom-designed fabrics, designers can cater to niche markets and reach a global audience. This democratization fosters creativity and diversity in fabric design.

The digital textile printing provides significant advantages over conventional printing methods, including high-quality output, customization capabilities, time efficiency, cost-effectiveness, environmental sustainability, versatility in applications, consistent quality, and expanded market access. These benefits make it an attractive option for designers and manufacturers in the textile industry.

Key Challenges in Digital textile Printing

The key challenges in digital textile printing are influencing its adoption and efficiency in the textile industry.

- **High Ink Costs**

Digital inks can be significantly more expensive than traditional inks used in conventional printing methods. This high cost impacts the overall production expenses, particularly for large-scale operations where ink consumption is considerable.

- **Production Speed**

The speed of digital textile printing is often slower compared to conventional methods like rotary screen printing. This can lead to higher costs per metre of fabric printed, making it less competitive for large production runs where speed is critical.

- **Fabric Compatibility**

Not all fabrics are suitable for digital textile printing, which can limit the versatility of this technology. While advancements are being made to expand the range of compatible materials, challenges remain with certain textures and properties that may not yield high-quality prints.

- **Initial Investment and Maintenance Cost**

The installation of digital textile printing technology requires a substantial initial investment, which can be a barrier for small businesses. Additionally, ongoing maintenance costs and the need for specialized equipment can add to the financial burden.

- **Skill Shortages**

There is often lack of trained personnel who are proficient in operating digital textile printing machinery and understanding its complexities. This skills gap can hinder effective implementation and operation, leading to inefficiencies in production.

- **Quality Control and Consistency**

Achieving consistent print quality across different batches can be challenging. Variations in fabric quality, ink application, and printer settings may lead to discrepancies in colour accuracy and overall print fidelity.

- **Environmental Concerns**

While digital textile printing is generally more sustainable than traditional methods, it still faces scrutiny regarding environmental impacts, particularly concerning the disposal of inks and chemicals used in the process. Ensuring eco-friendly practices remains a challenge for many producers.

- **Market Acceptance**

Some established textile manufacturers may be reluctant to transition from traditional methods to digital textile printing due to concerns about quality, reliability, and the learning curve associated with new technologies. This resistance can slow down the adoption of digital solutions in the industry.

The digital textile printing offers innovative solutions and benefits. It also encounters significant challenges related to costs, speed, compatibility, investment requirements, skill shortages, quality control, environmental impacts, and market acceptance. Addressing these challenges is crucial for maximizing the potential of digital textile printing in the competitive textile landscape.

Key Technology Developments in Digital Textile Printing

Key technological developments in digital textile printing are shaping the future of the textile industry, enhancing efficiency, quality, and sustainability. The technological developments implemented in digital textile printing includes:

- **High-Speed and High-Precision in the Machinery**

Recent innovations have led to the development of high-speed digital printers capable of producing large volumes of printed fabric quickly. For example, printers like the HPRT DA186T Plus can achieve production speeds of up to 1080 square metres per hour. These advancements meet market demands for efficient production while maintaining high precision in print quality.

- **Intelligent and Automated Systems**

Modern digital textile printers are increasingly equipped with intelligent features that enhance operational efficiency. Innovations include smart printhead protection systems, constant temperature control for printheads, and automated cleaning systems that conserve water. These technologies improve product quality and reduce downtime in production processes.

- **Enhanced Colour Accuracy and Detail**

Technological improvements have significantly enhanced colour accuracy and detail in digital textile printing. The ability to reproduce intricate designs with vibrant colours and smooth gradients is now a standard expectation. This capability allows designers to create more complex patterns that were previously challenging to achieve with traditional methods.

- **Versatility in Fabric Compatibility**

Advancements in ink formulations have expanded the range of fabrics compatible with digital textile printing. New inks are being developed to work effectively on both natural fibres (like cotton and silk) and synthetic materials (like polyester), allowing for greater flexibility in product offerings.

- **Eco-friendly Innovations**

Digital textile printing technology has become more environmentally friendly, with reduced water usage, lower chemical consumption, and minimized waste compared to traditional textile printing methods. This shift aligns with growing sustainability concerns in the textile industry, making digital textile printing a more attractive option for eco-conscious brands.

- **Integration of 3D Printing Technologies**

Emerging technologies, such as 3D printing, are beginning to influence digital textile printing by introducing new textures and functionalities into fabrics. This integration opens up creative possibilities for designers, allowing them to experiment with interactive elements in textiles.

- **Direct-to-Garment (DTG) Innovations**

DTG printing technology has evolved to allow for direct application of designs onto garments using advanced inkjet technology. This method supports intricate patterns and vibrant colours while enabling quick turnarounds for custom orders.

- **Hybrid Printing Solutions**

Hybrid printers that combine direct-to-fabric and sublimation printing capabilities are gaining popularity. These versatile machines can handle a variety of fabric types and printing techniques, catering to diverse market needs while maximizing production efficiency.

The key technological developments in digital textile printing include advancements in speed and precision, intelligent automation, improved colour accuracy, expanded fabric compatibility, eco-friendly practices, integration with emerging technologies like 3D printing, innovations in DTG printing, and the rise of hybrid solutions. These developments collectively enhance the capabilities of digital textile printing, making it a vital component of modern textile manufacturing.

Key Trends in Digital textile Printing Domain

The digital textile printing domain is experiencing several key trends that reflect advancements in technology, changing consumer preferences, and market dynamics. Some of the key trends are listed below:

- **Advancements in Inkjet Technologies**

Continuous improvements in inkjet printing technologies are enabling high-quality, vibrant, and precise prints on various fabrics. This enhances the overall visual appeal of printed textiles, making them more attractive to consumers and designers alike. Thus, with this trend of digital textile printing consistent high-quality output is made possible.

- **Customization and Personalization**

Digital textile printing allows for quick adjustments to designs and smaller batch production, catering to the rising demand for personalized products in fashion and home décor. This trend enables brands to offer unique items tailored to individual consumer preferences offering on-demand production.

- **Sustainability Focus**

There is a growing emphasis on using sustainable practices in digital textile printing, including the adoption of eco-friendly inks that minimize environmental impact. This aligns with increasing consumer awareness regarding sustainability in the fashion industry.

- **Rise of E-Commerce and On-Demand Printing**

The growth of e-commerce platforms is driving demand for digital textile printing as businesses seek to offer personalized and varied product lines without holding large inventories. On-demand printing technologies allow for designs to be printed only when needed, significantly reducing inventory costs and waste. This trend is leading to direct-to-customer business model.

- **Faster Turnaround Times**

Digital textile printing eliminates many traditional setup steps, resulting in remarkably faster turnaround times. This capability is crucial for meeting the fast-paced demands of modern fashion cycles and consumer expectations.

- **Enhanced Detail and Resolution**

Digital textile printing sets new standards for detail and resolution, allowing for intricate designs to be reproduced with impeccable precision. This capability enhances the quality of textile products and appeals to discerning customers.

- **Increased Adoption of Hybrid Solutions**

Hybrid printers that integrate both direct-to-fabric (DTF) and dye sublimation capabilities are gaining popularity, providing versatility in handling different fabric types and printing techniques.

- **Global Market Expansion**

The digital textile printing market is expanding rapidly in both developed and emerging markets, driven by increasing investments in technology and rising popularity among manufacturers looking to innovate their product offerings.

- **Integration of Emerging Technologies**

Innovations such as 3D printing and nanotechnology are being explored to introduce novel textures, functionalities, and interactive elements into textiles, further enhancing creative possibilities for designers.

The key trends in the digital textile printing domain include advancements in a wide range of factors from technology to adoption of hybrid solutions. These trends collectively indicate a dynamic shift towards more innovative and consumer-centric approaches in the textile industry.

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Overview of the Indian Textile Industry

India's textile industry is one of the oldest with evidence of clothing dating back to several centuries. So, the country is among the world's largest producers of textiles and apparels. Today, the industry has evolved and has adopted the technological upgradations effectively. This sector is broadly divided into several segments including fibre and yarn, processed fabrics, garments, and technical textiles. The garment sector is divided into ready-made garments and customized tailoring.

Indian textile industry is engaged in manufacturing of fabric from both natural fibres such as cotton, flex, jute, silk, wool and coir which are available naturally and man-made fibres which are made from polyester, viscose, acrylic, polypropylene and nylon. The Indian textile industry is a vital and complex sector that significantly contributes to the nation's economy. Spanning the entire spectrum from raw material production to the final product, this industry integrates several stages, including yarn production, weaving, and fabric manufacturing. Below is a detailed analysis of the key attributes of this value chain. The textile value chain in India can be segmented into the following primary activities:

- **Raw Material Production**

- **Natural Fibres:** India is one of the world's largest producers of cotton and jute, which are fundamental to the textile industry. The cultivation practices of these fibres directly impact the quality and sustainability of the raw materials.
- **Synthetic Fibres:** Man-made fibres, supplied by the petrochemical industry, have gained prominence since the mid-20th century. These fibres are crucial for producing a wide range of textile products, including easy-care clothing and furnishings.

- **Spinning**

The spinning stage involves converting raw fibres into yarn. This process is pivotal as it determines the quality and characteristics of the yarn, influencing the final textile product. India boasts a robust spinning sector that integrates both natural and synthetic fibres, catering to a wide array of market demands.

- **Weaving and Knitting**

- **Weaving:** This process involves interlacing yarns to create fabric. India has a significant number of weaving units, although challenges related to quality and cost often result in the importation of woven fabrics.
- **Knitting:** The knitting sector in India is more integrated, with many facilities capable of producing finished garments directly from yarn. This segment has experienced substantial growth, with local production meeting a significant portion of domestic demand.

- **Fabric Processing**

After fabric creation, it undergoes various treatments such as dyeing, printing, and finishing to enhance its properties. This stage is crucial for adding value to the fabric, making it suitable for the final product market. The processing sector plays an essential role in ensuring the fabric meets consumer expectations in terms of quality and aesthetics.

- **Apparel Manufacturing**

The final stage of the value chain involves converting fabric into finished garments. India's apparel manufacturing sector is diverse, ranging from traditional handloom products to modern, mass-produced clothing. This segment is labour-intensive, employing millions and serving as a vital component of the economy.

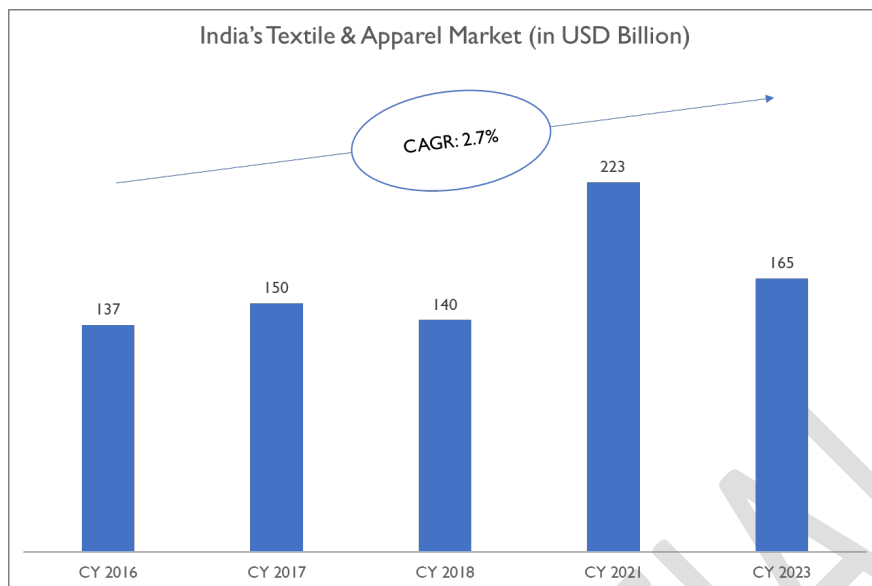
- **Marketing and Distribution**

Effective marketing and distribution are critical for the success of textile products. This includes branding, sales strategies, and logistics to ensure products reach consumers efficiently. The Indian textile industry is increasingly focused on enhancing its marketing capabilities to compete effectively in global markets.

The Indian textile industry is thus too diverse with hand-spun and hand-woven sectors on one end of the spectrum, while capital-intensive sophisticated mills sector at the other end. The country is the largest cotton producer globally, with 23%⁵ of global share with highest area under cotton cultivation of 38% of world area, second largest consumer of cotton globally, and third largest exporter of textiles and apparels globally. Cotton is sustaining the livelihood of around 6.5 million cotton farmers, with 40-50 million people engaged in cotton processing and trade activities. Similarly, the country is the largest manufacturer⁶ of personal protective equipment (PPE) and producer of polyester, silk and fibre in the world. The Indian textile sector currently contributes 2.3% to India's GDP and contributes to 7% of industry's output.

⁵ Invest India, Ministry of Commerce and Industries

⁶ Invest India, Ministry of Commerce and Industries



Source: Industry Sources, D&B estimates

The Indian textile and apparel market size was estimated to be approximately USD 165 billion in CY 2023, with the domestic market accounting for USD 125 billion and exports contributing USD 40 billion. The market witnessed a 7-year CAGR of 2.7% between CY 2016 and CY 2023. This growth is driven by increasing domestic demand, favourable government policies, and the rising preference for sustainable and ethically produced textiles, positioning India as a key player in the global textile industry.

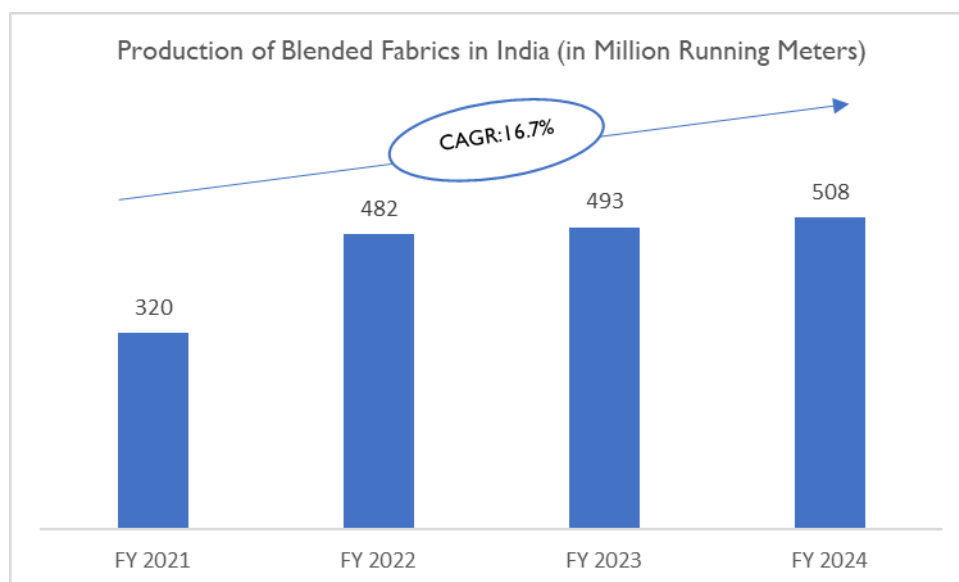
Growth Drivers Contributing to India's Textile Industry

The Indian textile industry has witnessed steady growth and has positioned itself as a global leader in textile production. With strong government initiatives, the industry propelled to massive growth in the past decade, making it an important country at the global scale. Key factors that contribute to the growth of Indian textile industry are:

- Presence of world class infrastructure.
- Increasing focus on industrial textile segment.
- Abundance of raw material both for natural and synthetic fibre categories.
- Availability of skilled and semi-skilled manpower.
- Well established set-up of complete value chain to support the growing domestic market.
- Availability of established facilities offering cost-effective manufacturing costs.
- Increasing demand from organized retail and e-commerce landscape.
- Urbanization, and increasing disposable income leading to the preference of brands.

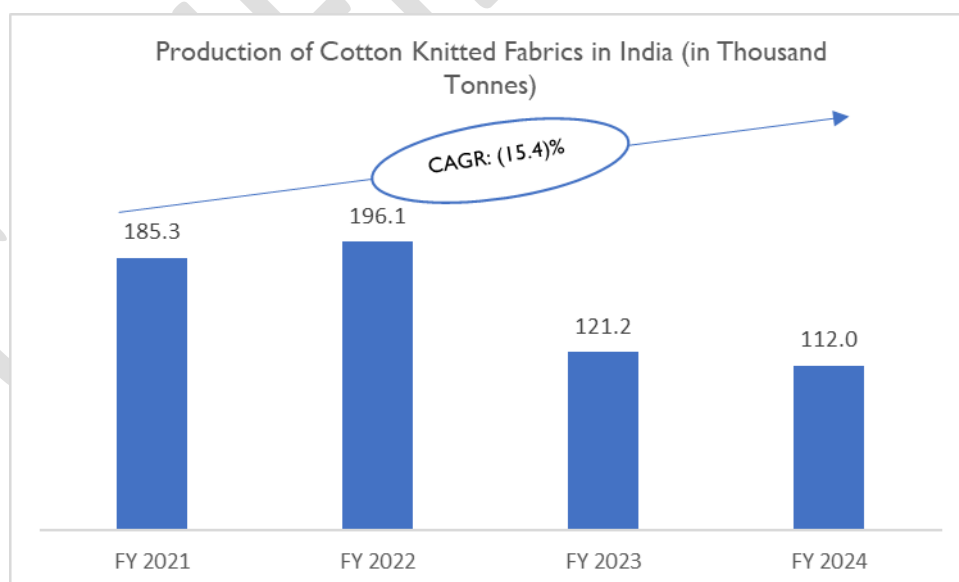
Fabric Production by Type of Fabric

The total annual production of fabric (comprising of cotton woven fabrics and polyester/viscose blended fabric) in India is estimated to be nearly 508 million running metres⁷ in FY 2024. Between FY 2021-24, the production has increased at 16.7% CAGR, indicating a positive trend.



Source: CMIE Industry Outlook (sourced from Central Statistics Office Data)

Meanwhile the annual production of knitted cotton fabric is estimated to be nearly 112 thousand tonnes in FY 2024.



Source: CMIE Industry Outlook (sourced from Central Statistics Office Data)

⁷ Specialized unit of measurement used in textile industry. It refers to the length of continuous material or fabric that is typically uncut or unaltered

Readymade Garment

The Indian readymade garment industry is a significant segment within the broader textile and apparel market. The ready-made garment (RMG) industry in India is a vital sector that significantly contributes to the country's economy. India is one of the largest consumers and producers of cotton, with the highest acreage of 12.5 million hectares, accounting for 38% of the global area under cotton cultivation. It encompasses a wide variety of products catering to diverse consumer needs both domestically and internationally. This report outlines the key product segments in the Indian readymade garment industry, highlighting their characteristics, market dynamics, and contributions to the economy.

Product Segment	Overview
Men's Wear	The men's wear segment is a major component of the readymade garment industry, catering to various categories including formal wear, casual wear, ethnic wear, and sportswear. This segment includes <i>shirts, trousers, suits, blazers, t-shirts, jeans, shorts, and traditional attire such as kurta-pajamas and sherwanis</i> . The demand for men's wear is driven by a growing urban population, increasing disposable income, and evolving fashion trends. Formal wear and casual wear dominate the market, with a rising preference for branded apparel. Men's wear is a substantial contributor to the overall market size and plays a crucial role in driving sales in retail and export markets.
Women's Wear	Women's wear is a vibrant and dynamic segment, characterized by its wide range of products and significant contribution to the industry. This segment includes <i>sarees, salwar kameez, lehengas, kurtis, tops, dresses, skirts, jeans, and activewear, etc.</i> The women's wear market is influenced by cultural diversity, changing fashion trends, and increasing participation of women in the workforce. Ethnic wear remains a strong segment, while Western wear is gaining popularity. Women's wear is one of the largest segments in the readymade garment industry, driving both domestic consumption and exports, particularly in categories such as ethnic and fusion wear.
Kids' Wear	The kids' wear segment caters to the clothing needs of infants, toddlers, and children up to the age of 14. This segment includes <i>t-shirts, shorts, dresses, skirts, pants, school uniforms, and traditional attire for children</i> . The demand for kids' wear is driven by factors such as increasing birth rates, rising disposable incomes, and greater emphasis on child fashion. Parents are increasingly opting for branded and high-

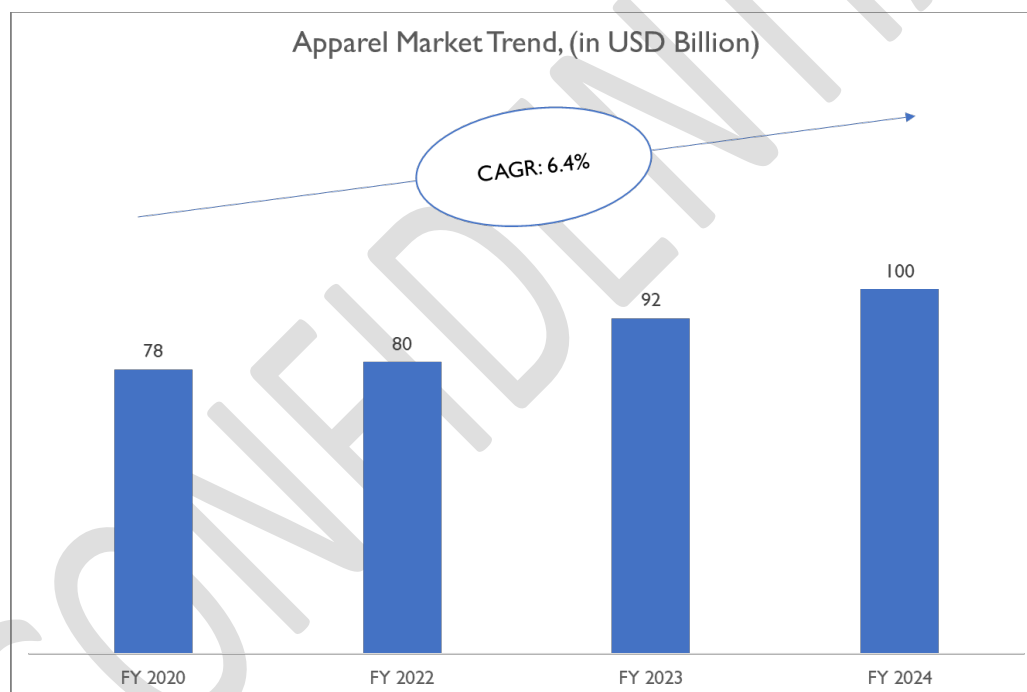
	quality garments for their children. Kids' wear is a fast-growing segment, with significant potential for expansion in both urban and rural markets. It is a key focus area for retailers and brands looking to capture a younger demographic.
Activewear and Sportswear	This segment includes garments designed for physical activities and sports, catering to the growing demand for fitness and active lifestyles. <i>This segment includes t-shirts, track pants, shorts, leggings, sports bras, jackets, and specialized sports gear.</i> The activewear and sportswear market is expanding rapidly due to increasing health consciousness, the popularity of sports, and the athleisure trend. Technological advancements in fabric and design also drive this segment. Activewear and sportswear are significant growth areas within the readymade garment industry, attracting investment from both domestic and international brands.
Innerwear and Lingerie	The innerwear and lingerie segment caters to the intimate apparel needs of men, women, and children. This segment includes undergarments, vests, briefs, boxers, shapewear, and thermal wear. The innerwear market is evolving with increasing consumer awareness about comfort, quality, and fashion. There is a rising preference for branded innerwear, driven by changing lifestyles and improved retail experiences. Innerwear and lingerie are essential product segments that offer high margins and consistent demand, contributing significantly to the overall revenue of the readymade garment industry.
Denim Wear	Denim wear is a popular segment known for its versatility and wide consumer base across different age groups. <i>This segment includes jeans, jackets, shirts, skirts, and shorts.</i> Denim is a staple in wardrobes globally, with demand driven by its durability, style, and comfort. The segment benefits from continuous innovation in fabric technology and design. Denim wear is a key export product and a significant segment in the domestic market, contributing substantially to the revenue and growth of the readymade garment industry.

The Indian readymade garment industry is a diverse and dynamic sector, encompassing various product segments that cater to a wide range of consumer needs. Each segment plays a crucial role in the overall growth and development of the industry, driven by factors such as changing fashion trends, increasing

disposable incomes, and evolving consumer preferences. The industry's ability to innovate and adapt to market demands ensures its continued significance in both domestic and global markets.

Indian Readymade Garment Market Size

Rapid urbanization in India, where nearly 40%⁸ of the population is expected to live in cities by 2036 and the number of megacities in India is expected to increase from five to seven or more by 2030 are the factors which directly influence the demand for readymade garments. Similarly, increasing disposable incomes coupled with the wide product range available through e-commerce are the other two factors driving the demand for readymade garments. The apparel market has shown steady growth from FY 2020 to FY 2024. Starting at USD 78 billion in FY 2020, the market size increased to USD 80 billion in FY 2022, reached USD 92 billion in FY 2023, and is estimated at USD 100 billion by FY 2024. This trend reflects a CAGR of 6.4%.



Source: Industry report, D&B Estimate

Several factors contribute to the steady growth observed in the apparel market. Rising disposable incomes have enabled consumers to increase their spending on apparel. Increasing fashion awareness and the desire to keep up with trends have fuelled demand. Additionally, the expansion of online retail platforms has facilitated easier access to a wide range of apparel options, further boosting market growth. This consistent upward trend highlights the robust potential and expanding nature of the apparel industry.

⁸ World Bank Group

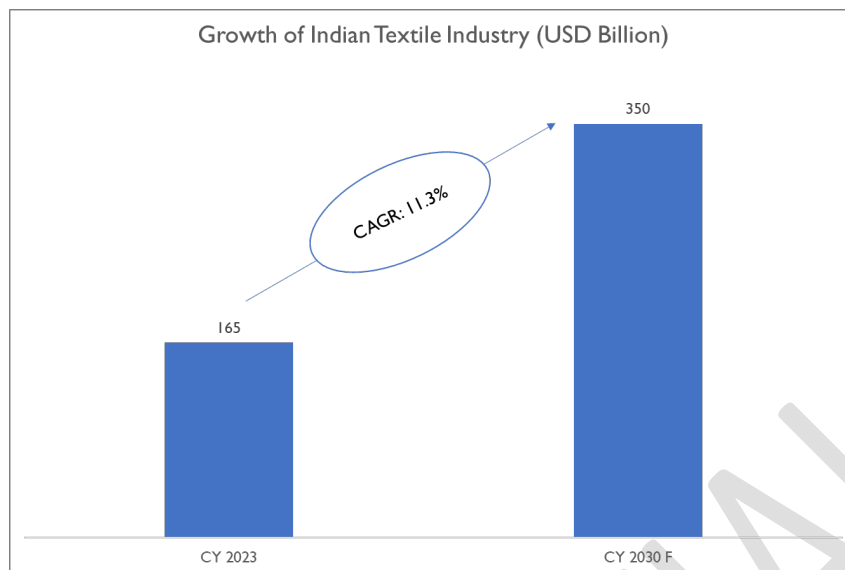
India's readymade garment sector continues to exhibit robust growth within the country's textile industry. The sector remains a significant contributor, driven majorly by domestic demand including kid's wear. Rising disposable incomes and evolving fashion preferences among Indian consumers have bolstered domestic consumption of kids' readymade garments and the overall readymade garments (RMG) industry. Major manufacturing hubs are concentrated in cities such as Tirupur, Bengaluru, Mumbai, and Delhi-National Capital Region (NCR), facilitating efficient production and distribution.

However, the sector faces challenges, including stiff competition from countries such as Bangladesh and Vietnam, as well as susceptibility to global economic fluctuations. To support growth, the Indian government has implemented initiatives aimed at promoting exports, upgrading technological capabilities, and fostering sustainable manufacturing practices. There is also a growing focus on integrating digital textile printing technologies to adapt to changing retail dynamics, particularly with the rise of e-commerce platforms in the market. The RMG industry, with a significant focus on the kid's wear segment, continues to be a vital and growing component of India's textile industry, driven by strong domestic demand and strategic government support.

Growth Forecast

In 2023, the Indian textile industry faced significant challenges, including fluctuating cotton prices, declining demand, under-utilized capacity, and stiff competition from imported fabrics and garments from China and Bangladesh. Gurudas Aras, an independent director and strategic advisor, highlighted these issues and suggested measures for recovery in 2024. Major global markets, such as the United States of America (the U.S) and European Union (EU), saw sharp declines in apparel imports, impacting Indian exporters. For instance, US apparel imports dropped by 21% to USD 6.5 billion in October 2023, and EU imports fell by 20% to USD 7.2 billion.

The global garment industry is contracting, with predictions of a continued decline in US garment imports by 25% to 30%. This trend is exacerbated by major US retailers reducing imports and maintaining minimal stock levels. Bangladesh's strategic import of cheap raw materials from China and its tax-exempt status as a least developed country have further strained Indian exports, which stagnated at around USD 16.5 billion, while Bangladesh's exports surged past USD 44 billion.



Source: Industry Sources, D&B Estimated

Despite these challenges, the Indian textile industry is on a growth trajectory, with its market size projected to nearly double from USD 165 billion in CY 2023 to USD 350 billion by CY 2030F, reflecting a compound annual growth rate (CAGR) of 11.3%. Increasing disposable incomes and a growing middle class are driving demand for textile products, including kid's wear. This segment is particularly buoyed by changing fashion trends, a preference for branded items, and the expansion of e-commerce platforms. Government initiatives such as the Production Linked Incentive (PLI) scheme and Prime Minister Mega Integrated Textile Region and Apparel (PM MITRA) are promoting modernization and enhancing global competitiveness.

Moreover, strategic trade agreements and advancements in quality standards are improving India's position in international markets, supporting export growth alongside rising domestic consumption. Technological innovations and sustainable practices further enhance the industry's efficiency and quality. These factors position the Indian textile sector, including the kid's readymade garment market, as a robust engine of economic growth and global competitiveness.

Evolving Landscape of Retail & E-commerce Sector

The growth of the retail and e-commerce sectors in India is significantly influencing the apparel market in 2024, with several key trends emerging that are reshaping consumer behavior and market dynamics. India's e-commerce market is projected to grow by over 20% in 2024, driven by increased internet access and a shift towards online shopping. Telecom Authority of India reported 954 million internet subscribers in March 2024, which is an 8.3% year-on-year growth from 2023. This surge is particularly notable in the fashion segment, encouraging domestic and international retailers such as Flipkart, Amazon, Myntra, leading to a trend in increasing share of e-commerce sales in apparel market. Fast fashion is emerging as a standout performer within the retail market, experiencing growth rates of 30-40% in 2024. The rise of e-commerce is notably fueled by demand from Tier-II and Tier-III cities, where online shopping is gaining traction. In these regions, spending on fashion has increased

significantly, reflecting a growing appetite for diverse product categories. The increased internet penetration and improved logistics networks are enabling consumers in smaller cities to access a wider range of apparel options, contributing to overall market growth.

With a valuation of USD 70 billion, online shopping in India accounts to 7% of the country's total retail market. With a staggering 954 million internet subscribers, which is consistently on the rise, the country is likely to emerge as the third-largest online retail market by 2030.

Role of E-commerce in Indian Apparel Market

E-commerce plays a pivotal role in the growth of the Indian apparel market, significantly transforming consumer behavior and market dynamics, offering accessibility and convenience.

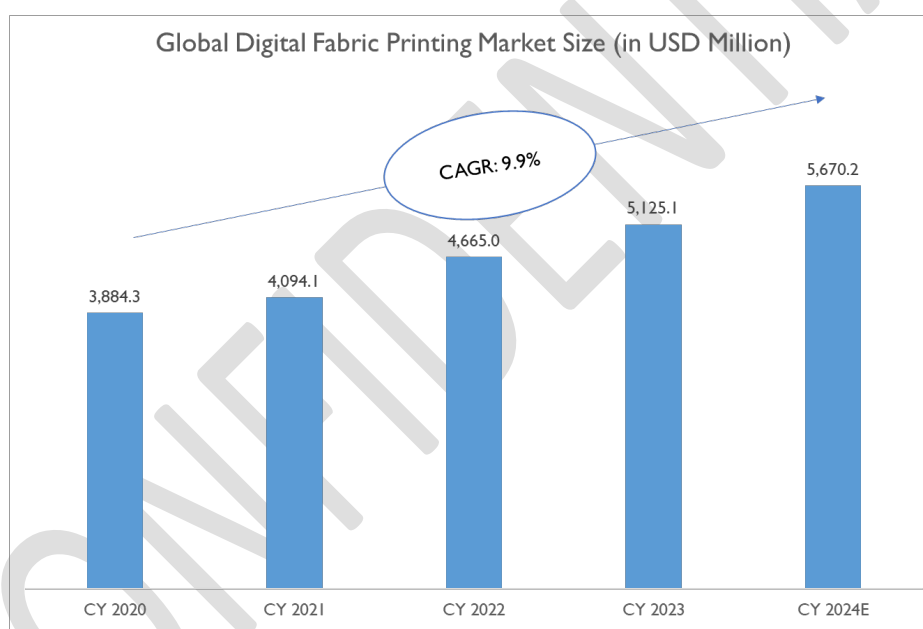
- **Democratization of Fashion:** E-commerce has removed geographical barriers, allowing consumers from all regions, including remote areas, to access diverse fashion options. This accessibility has led to a wider variety of products available online, catering to various tastes and preferences.
- **24/7 Shopping Experience:** Online platforms provide consumers the flexibility to shop anytime, enhancing convenience and encouraging impulse purchases. This shift has fundamentally altered shopping habits, with consumers increasingly favouring online purchases over traditional retail.
- **Shift Towards Online Retail:** The convenience of browsing extensive catalogues and comparing prices has drawn more consumers to e-commerce platforms. The ability to access exclusive discounts and promotions further incentivizes online shopping.
- **Rise of Fashion Start-ups:** E-commerce has enabled numerous start-ups to flourish by offering unique designs and personalized experiences. These new entrants challenge established brands, fostering competition and innovation within the apparel market.
- **Social Media Influence:** Platforms like Instagram and Facebook have become essential for fashion brands to engage with customers and drive sales. The integration of social commerce allows brands to reach a broader audience while facilitating direct-to-consumer sales.
- **Omni-channel Retailing:** The concept of an "endless aisle" allows retailers to offer a broader inventory online than what is available in physical stores, enhancing customer choice and satisfaction.

E-commerce is not just a channel for sales; it is reshaping the entire landscape of the Indian apparel market. By enhancing accessibility, driving consumer engagement through technology, and fostering a competitive environment for both established brands and new entrants, e-commerce is a critical driver of growth in this sector. As it continues to evolve, its impact on the Indian apparel market will likely expand further, unlocking new opportunities for both consumers and businesses alike.

Global Digital Textile Printing Market

Current Market Scenario

The Global Digital Textile Printing Market is on a strong growth trajectory, with revenues consistently increasing from CY 2020 to the projected figures for CY 2024E. Starting at USD 3,884.3 million in CY 2020, the market is expected to reach USD 5,670.2 million by CY 2024E. This indicates a robust CAGR of 9.92% over the four-year period. The global digital textile printing market is experiencing significant growth, disrupting the traditional textile printing industry and transforming it into a dynamic sector. This transformation is particularly evident in the home décor and soft signage applications. Digital textile printing technology empowers businesses to print intricate and customized designs directly onto fabric, revolutionizing the textile industry. This capability has unlocked a new era of innovation, enabling the creation of unique and personalized products that cater to diverse consumer preferences.



Source: Primary Research, D&B Analysis

The ability to print any design onto fabric has opened up a vast array of possibilities for both businesses and consumers. Businesses can now produce small batches of customized products, reducing inventory costs and minimizing waste. This agility is particularly valuable for businesses operating in fast-paced industries like fashion, where trends change rapidly. Consumers, on the other hand, can now access a wider range of personalized products, from custom-designed apparel to unique home décor items. This level of customization was previously unattainable with traditional textile printing methods.

The market's growth is further fueled by several key factors. Firstly, the increasing demand for sustainable and eco-friendly production processes is driving the adoption of digital textile printing. Digital textile printing methods often require less water and generate less waste compared to traditional techniques, making them a more environmentally friendly option. Secondly, the rise of e-

commerce and social media has empowered consumers to seek personalized experiences. Digital textile printing perfectly aligns with this trend, enabling the creation of unique and customized products that cater to individual preferences.

The impact of digital textile printing extends beyond the textile industry. It is also transforming related sectors such as interior design, advertising, and retail. Interior designers can now create bespoke fabric designs for curtains, upholstery, and wall coverings, adding a unique touch to any space. Advertisers can utilize digital textile printing to produce eye-catching and large-scale soft signage, making their messages more impactful. Retailers can offer personalized products to their customers, enhancing the overall shopping experience.

The key trends that are contributing to high growth of global digital textile printing includes:

- **Sustainability**

Environmental consciousness is driving the adoption of digital textile printing. Traditional textile printing methods often involve significant water usage and generate substantial waste. Digital textile printing, on the other hand, offers an eco-friendlier alternative. By reducing water consumption and minimizing waste production, digital textile printing aligns with the growing demand for sustainable practices across various industries.

- **Customization and Personalization through Direct-to-Customer (DTC) Business Model**

The rise of e-commerce and social media has empowered consumers to seek personalized experiences. Digital textile printing excels in meeting this demand, enabling the creation of unique and customized products. From personalized apparel to bespoke home décor, digital textile printing offers high-resolution, versatile designs that cater to individual preferences. This trend is particularly evident in the fashion and home décor sectors, where consumers increasingly seek products that reflect their unique style. This trend has led to DTC business model in the U.S, where customers can directly print their designs and customize the apparel or home décor they choose.

- **On-demand Printing**

The ability to print on demand is a significant advantage of digital textile printing. Traditional textile printing methods often require large production runs, which can be costly and time-consuming. Digital textile printing eliminates this limitation, allowing for the production of smaller quantities as needed. This flexibility is particularly valuable for businesses that cater to niche markets or offer customized products.

- **Home Décor and Soft Signage**

Digital textile printing has revolutionized the home décor and soft signage industries. The fast-printing capabilities of digital technology enable the rapid production of high-quality textiles, making it easier to create unique and eye-catching designs for curtains, upholstery, wall coverings, and other soft furnishings. This trend is further fueled by the increasing popularity of personalized home décor and the demand for visually appealing commercial spaces.

- **High-speed Digital Printers**

Advancements in digital textile printing technology have led to the development of high-speed printers. These machines can handle large orders more efficiently, making digital textile printing a viable option for mass production. This increased speed and efficiency have narrowed the gap between digital and traditional textile printing methods, particularly for businesses that require large-scale production.

- **Single-pass Printing**

Single-pass printing is a relatively new technology that significantly enhances the speed and efficiency of digital textile printing. By printing multiple colours simultaneously in a single pass, single-pass printers can produce high-quality prints at a much faster rate than traditional multi-pass systems. This technology is particularly beneficial for businesses that require rapid turnaround times and high-volume production.

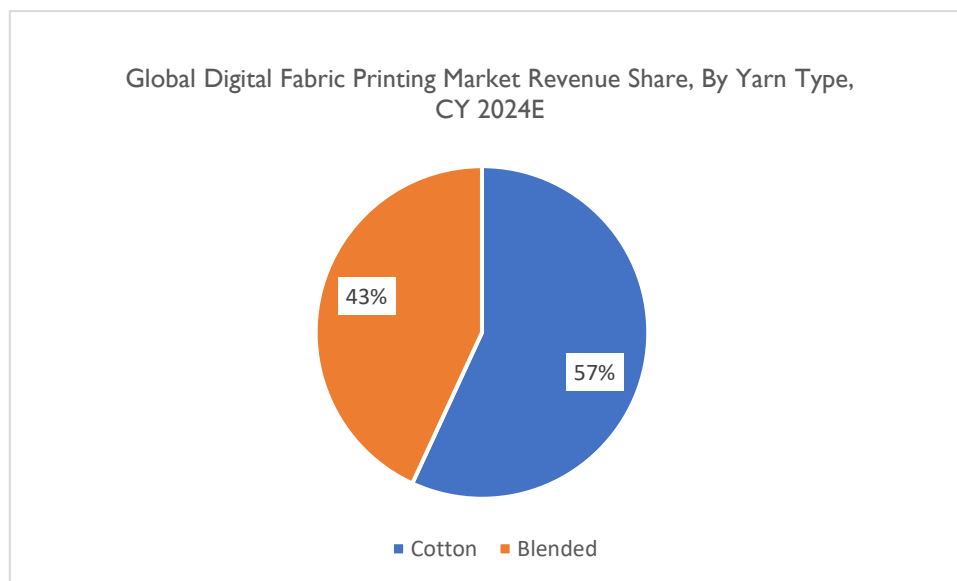
- **Cotton**

Cotton remains the dominant material in the global digital textile printing market due to its numerous advantages. Cotton is known for its excellent moisture management properties, making it comfortable to wear in various climates. Additionally, cotton is a durable and long-lasting fabric, ensuring that digitally printed designs retain their vibrancy and quality over time. These properties, combined with the versatility of cotton, make it a popular choice for a wide range of applications, from apparel to home décor.

Market Segmentation

By Yarn Type

The global digital textile printing market revenue share in CY 2024E is dominated by cotton-based fabrics, generating an estimated revenue of USD 3,232.01 million, representing a 57% market share. This dominance can be attributed to the widespread use of cotton in various textile applications, including apparel, home décor, and industrial textiles. Cotton's dominance can be attributed to several factors. Firstly, it is a widely available and relatively affordable natural fibre. Secondly, cotton possesses excellent breathability and moisture-wicking properties, making it comfortable to wear in various climates. Thirdly, cotton is a versatile fabric that can be used for a wide range of applications, from casual wear to high-end fashion.



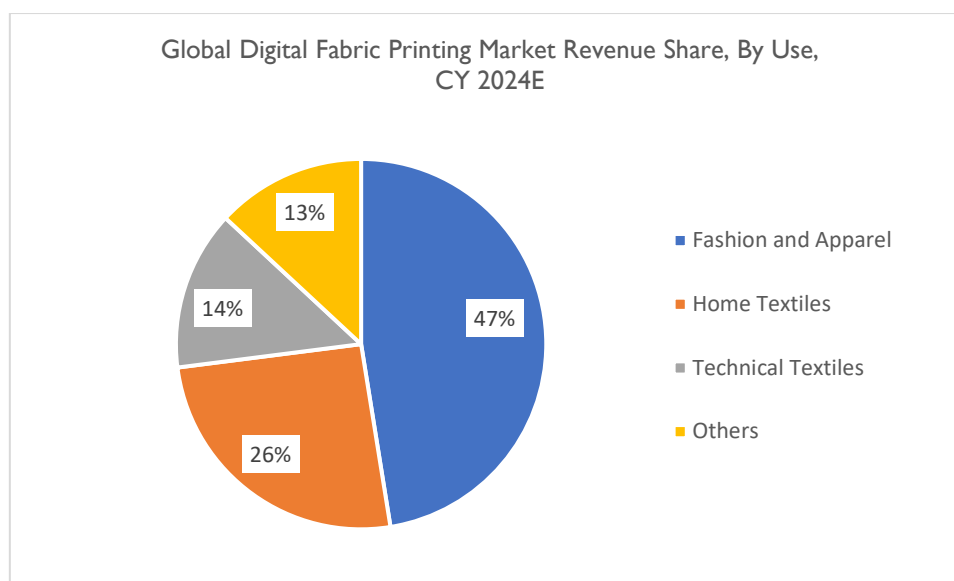
Source: Primary Research, D&B Analysis

While cotton holds a significant market share, blended fabrics also contribute substantially, representing 43% of the market revenue, generating an estimated revenue of USD 2,438.19 million. Blended fabrics, which combine cotton with other fibres like polyester, offer a unique set of properties. Blended fabrics often offer enhanced performance characteristics, such as improved wrinkle resistance, enhanced durability, and enhanced moisture management. The growing demand for performance fabrics in sportswear, workwear, and other specialized applications is driving the growth of the blended fabric segment.

The market segmentation by yarn type highlights the diverse range of fabrics used in digital textile printing. While cotton remains the dominant material, the growing popularity of blended fabrics demonstrates the evolving preferences of consumers and the adaptability of digital textile printing technology to accommodate a wide range of textile substrates.

By Use

The fashion and apparel segment is projected to be the largest end-use application for digital textile printing in CY 2024E, commanding a significant market share of 47% and generating an estimated revenue of USD 2,665.0 million. This segment's dominance is driven by the increasing demand for personalized and on-demand apparel, coupled with the growing popularity of fast fashion trends. Digital textile printing enables the rapid production of customized designs, allowing fashion brands to quickly respond to changing consumer preferences and offer unique, limited-edition collections.



Source: Primary Research, D&B Analysis

Home textiles, including curtains, upholstery, and bedding, are expected to account for 26% of the market share, generating an estimated revenue of USD 1,474.3 million. The growing trend towards personalized home décor and the increasing demand for unique and visually appealing home furnishings are driving the growth of this segment. Digital textile printing allows for the creation of intricate and customized designs for home textiles, enabling homeowners to express their individual style and create personalized living spaces.

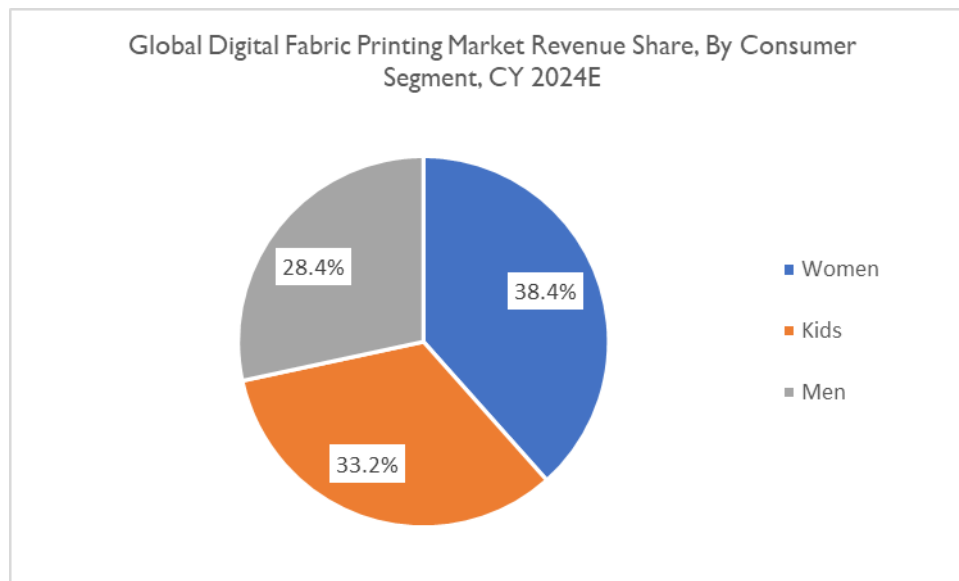
Technical textiles, which encompass a wide range of applications such as sportswear, workwear, and medical textiles, are projected to account for 14% of the market share, generating an estimated revenue of USD 793.8 million. The increasing demand for high-performance fabrics in these sectors is driving the adoption of digital textile printing. Digital textile printing allows for the precise application of functional coatings and finishes, such as water repellency, flame retardancy, and anti-microbial properties, enhancing the performance and durability of technical textiles.

The "Others" category, which includes applications such as automotive textiles, industrial textiles, and promotional items, is expected to account for 13% of the market share, generating an estimated revenue of USD 737.1 million. This segment is driven by the increasing demand for customized and functional textiles in various industrial and commercial applications. Digital textile printing offers the flexibility and precision required to produce high-quality and customized textiles for a wide range of specialized applications.

By Consumer Segment

The women's segment is projected to hold the largest revenue share in the global digital textile printing market in CY 2024E, at 38.4%, equivalent to USD 2,177.4 million. This dominance can be attributed to factors such as the increasing trend of fast fashion, where women are major consumers, and the

growing demand for personalized and customized clothing and accessories. Additionally, the rise of e-commerce platforms has made it easier for women to access a wider range of digitally printed fabrics and products.



Source: Primary Research, D&B Analysis

Kids represent the second-largest consumer segment, with a 33.2% market share and USD 1,882.5 million in revenue. This segment is primarily driven by the demand for colourful and playful designs on children's clothing and accessories. Additionally, the increasing awareness of sustainability and eco-friendly practices in the textile industry is also driving the growth of this segment, as digital textile printing is often considered a more sustainable alternative to traditional textile printing methods.

Men follow closely, accounting for 28.4% of the market share and USD 1,610.3 million in revenue. This segment is driven by the increasing popularity of athleisure wear and sportswear, which often feature digitally printed designs. Moreover, the growing interest in men's fashion and the desire for unique and personalized clothing items are contributing to the growth of this segment.

The Indian Textile and Printing Market

Overview of Indian Textile and Printing Landscape in terms of Revenue in CY 2023	
Indian Textile Industry	USD 165 Billion
Indian Textile Printing Market	USD 54.3 Billion
Indian Digital Printing Market	USD 602.8 Million

Source: Primary Research, D&B Analysis

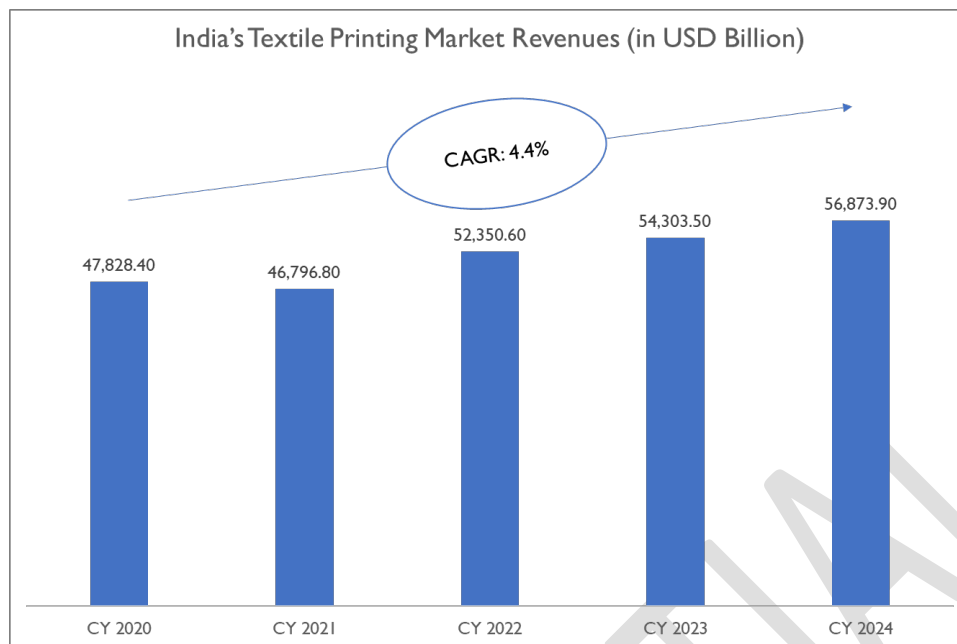
The Indian textile industry serves as a vital pillar of the nation's economy, generating a substantial USD 165 billion in revenue in CY 2023. This vast sector encompasses a diverse range of sub-industries, from the cultivation of raw materials like cotton to the manufacturing of finished apparel and home textiles. The industry plays a crucial role in providing employment opportunities, particularly in rural areas, and contributes significantly to India's exports.

Within this expansive industry, textile printing holds a significant share, contributing USD 54.3 billion to the overall revenue in CY 2023. Textile printing involves the application of designs and colours onto fabrics, adding aesthetic value and enhancing their marketability. Traditional methods like screen printing and rotary printing have long been prevalent, but in recent years, digital printing has emerged as a transformative technology.

The Indian digital printing market, while still a relatively nascent segment, is experiencing rapid growth. In CY 2023, it generated USD 602.8 million in revenue, showcasing its immense potential. Digital printing offers several advantages over conventional methods, including greater design flexibility, faster turnaround times, and reduced environmental impact. As technology continues to advance and costs decrease, digital printing is poised to become increasingly prevalent across various textile applications, from apparel and home furnishings to industrial textiles.

Current Market Scenario

The Indian textile printing market is a significant contributor to the country's economy, with revenues steadily increasing from USD 47.8 billion in 2020 to USD 56.9 billion in 2024, exhibiting a CAGR of 4.4%. Within this expansive market, digital textile printing, while still a relatively small segment, is gradually gaining traction.



Source: Primary Research, D&B Analysis

From CY 2020 to CY 2023, the revenue share of digital textile printing in India hovered around 1%, indicating a modest penetration rate. This can be attributed to factors such as the higher initial investment costs associated with digital printing equipment and the ongoing preference for traditional printing methods like rotary screen printing and roller printing, which are often perceived as more cost-effective for large-scale production runs.

Penetration of Digital Textile Printing in Overall Indian Textile Printing					
Year	CY 2020	CY 2021	CY 2022	CY 2023	CY 2024E
India Textile Printing Market, Revenues (USD Million)	47,828.4	49,796.8	52,350.6	54,303.5	56,873.9
India Digital Textile Printing Market Contribution (%Share)	1.04%	1.06%	1.08%	1.11%	1.14%

Source: Primary Research, D&B Analysis

However, digital textile printing offers several compelling advantages that are driving its gradual adoption in the Indian market. Firstly, it provides unparalleled design flexibility, enabling the creation of intricate and personalized patterns with exceptional colour accuracy and vibrant colour gradients. This is particularly appealing to fashion brands and designers seeking to differentiate themselves with unique and on-trend designs. Secondly, digital printing eliminates the need for costly screens and

preparation processes, reducing production time and minimizing waste. This translates to faster turnaround times and improved efficiency for businesses.

Furthermore, digital printing is well-suited for short production runs and on-demand printing, making it ideal for catering to the growing demand for customized and personalized products. This agility is crucial in today's fast-paced fashion industry, where trends evolve rapidly and consumer preferences are constantly shifting. As the Indian textile industry increasingly focuses on niche markets, catering to specific consumer demands, and embracing shorter production cycles, the demand for digital printing is expected to rise significantly.

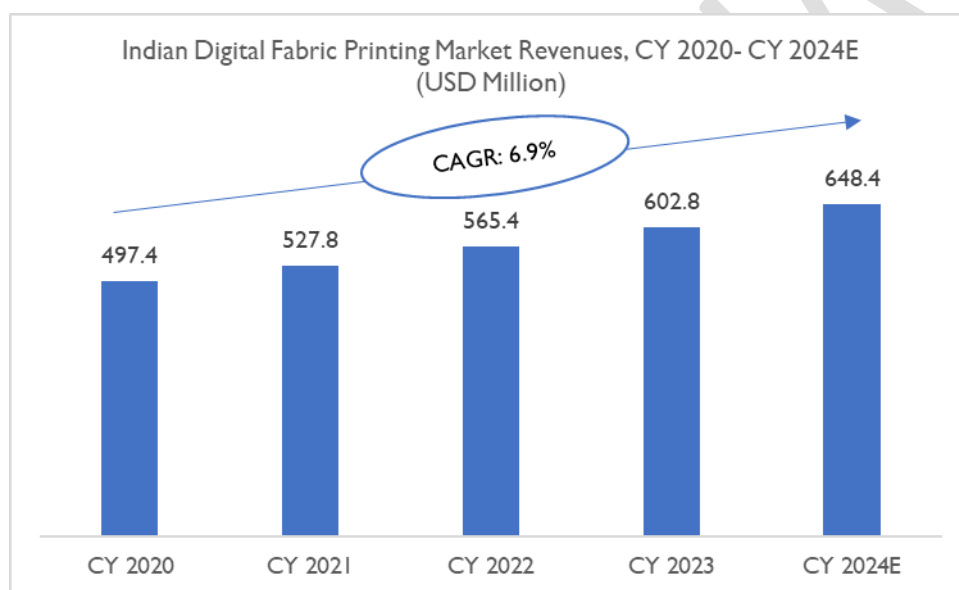
In conclusion, while the penetration of digital textile printing in India is currently modest, its inherent advantages in terms of design flexibility, efficiency, and sustainability are poised to drive its adoption in the coming years. As technology continues to advance and costs associated with digital printing equipment become more competitive, we can expect to witness a significant shift towards digital printing within the Indian textile industry.

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Indian Digital Textile Printing Market

Current Market Scenario

The Indian digital textile printing market has been steadily growing, with revenues projected to reach USD 648.4 million in CY 2024E from USD 497.4 million in CY 2020 at a CAGR of 6.85%, demonstrating a consistent upward trajectory. This growth can be attributed to several factors, including increasing demand for personalized and customized fabrics, rapid advancements in digital textile printing technology, and a growing preference for sustainable and eco-friendly printing methods. Additionally, the rising popularity of fast fashion and e-commerce platforms has further fueled the demand for digitally printed fabrics in India.



Source: Primary Research, D&B Analysis

Indian textile industry is a strong, well-established sector, with multiple clusters operating across the country contributing to the supply chain effectively for many centuries. In this well-established sector, launch of digital textile printing has opened roads for many new possibilities to suit the demands and expectations of new-age apparel designers along with the preference of the present generation. The rise of fast fashion in India has created a demand for quick and flexible production processes, which digital textile printing can meet. Similarly, digital textile printing technology allows manufacturers to produce customized and on-demand textile products.

India currently hosts over 1,000⁹ digital textile printing services as of CY 2023, while this is increasing significantly year-on-year. The usage of dye-sublimation technology in digital textile printing on polyester fabrics is a game changer, as it offers high printing speeds ranging from 15,000 to 20,000 square metres/day. Being a recent technology, digital textile printing has a contribution less than the

⁹ Textile Insights of India, Dec 2023

traditional rotary printing technology, while it is expected to compete with rotary printing process by 2030.

Insights on Spread of Digital Textile Printing in India

The digital textile printing market in India is witnessing a transformative shift, characterized by rapid adoption and significant growth. This evolution is driven by various qualitative factors that reflect changing consumer behaviors, technological advancements, and industry dynamics.

Customer Demand for Customization

One of the most prominent drivers of digital textile printing in India is the rising consumer demand for personalized and unique products. As urbanization increases and the younger population becomes more fashion-conscious, there is a growing trend towards customized textiles that reflect individual preferences. Digital textile printing technology allows for on-demand production, enabling brands to offer tailored solutions that traditional methods cannot efficiently provide. This shift is particularly evident in the fashion industry, where fast fashion trends necessitate quick turnaround times and the ability to adapt to rapidly changing styles.

Technological Advancement

The integration of advanced technologies in digital textile printing has significantly enhanced its capabilities. Innovations in printing equipment, inks, and software have improved print quality, speed, and efficiency. For instance, digital textile printing excels at producing intricate designs with vibrant colours, which appeals to both manufacturers and consumers together. Additionally, advancements like 3D printing are beginning to emerge, offering even more creative possibilities for fabric design.

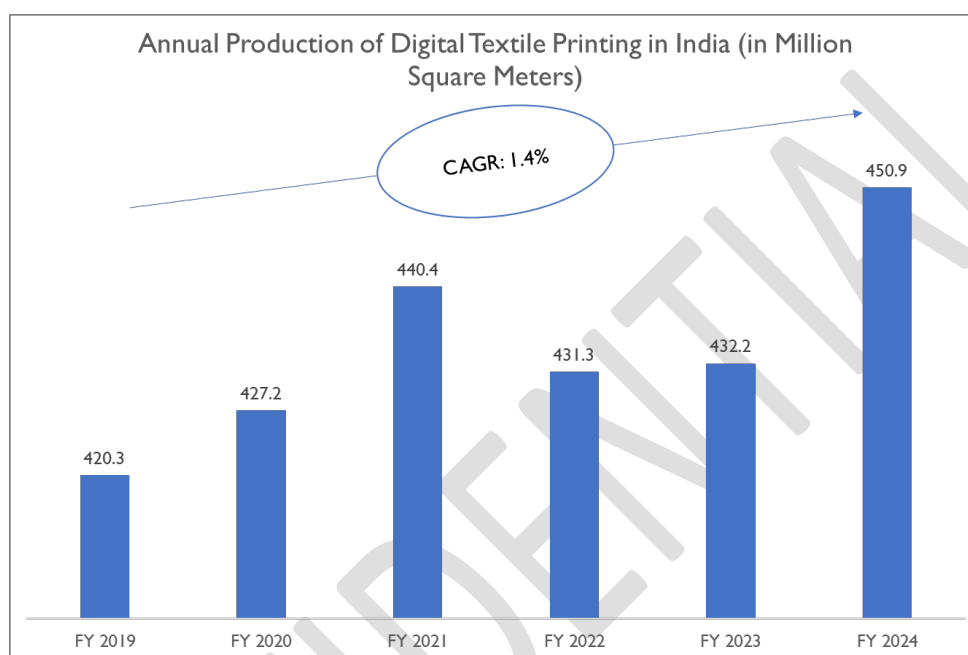
E-Commerce and Market Accessibility

The rise of e-commerce has also played a crucial role in the spread of digital textile printing. Online platforms facilitate easy access to customized textile products, allowing consumers to order personalized items from the comfort of their homes. This trend not only expands market reach but also encourages manufacturers to adopt digital textile printing technologies that support shorter production runs and reduced inventory costs. The seamless integration of digital textile printing with e-commerce has propelled its adoption across various sectors, including fashion and home décor.

The spread of digital textile printing in India is driven by a confluence of factors including consumer demand for customization, technological advancements, sustainability considerations, and the rise of e-commerce. As these trends continue to evolve, digital textile printing is expected to play an increasingly pivotal role in shaping the future of the Indian textile industry.

Annual Production of Digital Printed Fabric in India

Digital textile printing in India is in prevalence for almost two decades and relatively a new entrant technology in a market that is existing for many centuries. So, many conventional traditional participants are in a wait and watch mode to analyze the potential of this technology before investing on this capital-intensive process. However, there are participants who have adopted to this technology and are thriving well, which indicates a growth potential for this technology in long-term.



Source: D&B Analysis

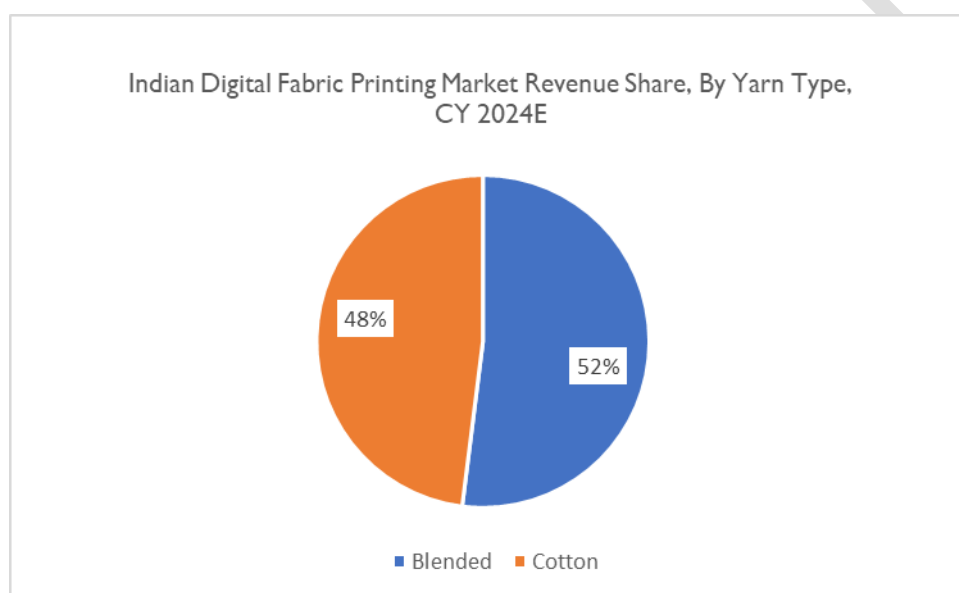
Demand Pattern in Analysis

Digital textile printing was witnessing steady growth in India, since early 2010, where in 2012, the production volume was around 380 million square metres. From then, the market witnessed steady growth and was at 420.3 million square metres in FY 2019 (which is between April 2018 and March 2019). Similarly, following this trend, the year FY 2020 also witnessed steady, consistent growth pattern, producing 427.2 million square metres of digitally printed fabric between April 2019 and March 2020. The year FY 2021 witnessed its highest growth rate, till the pandemic hit the industry badly with lockdowns, and the strong production in FY 2021, led to fabric getting stocked up in the warehouse. The slump caused by the pandemic, led to low production in FY 2022, where the focus was to clear the stocks and start the production, and so FY 2022 had a declining production, which regained in FY 2023. The year FY 2023 witnessed a rebound after the pandemic, where textile industry faced major slowdown. This was year of a bounce back from a declining production, caused due to lockdown that led to fabric materials getting stored up in the warehouse, as the entire supply chain got halted due to lockdown. This backlog was cleared and the industry started to accelerate from FY 2023, and so the year FY 2023 witnessed growth of the digital textile printing production.

Market Segmentation

By Yarn Type

The Indian digital textile printing market is projected to be valued at USD 648.4 million in CY 2024E, with blended fabrics leading the market share at 52% and USD 337.2 million in revenue. This dominance can be attributed to the versatility of blended fabrics, which often combine natural fibres like cotton with synthetic fibres like polyester. These blends offer enhanced durability, wrinkle resistance, and performance properties, making them suitable for a wide range of applications, from sportswear and performance wear to technical textiles



Source: Primary Research, D&B Analysis

Cotton, while slightly behind, still holds a significant market share at 48% and USD 311.2 million in revenue. This dominance can be attributed to the widespread use of cotton in Indian textiles, its natural breathability and comfort, and its suitability for a wide range of applications, from casual wear to home furnishings.

This trend is limited to India, as at the global market, cotton dominates than blended fabric for digital printing. Although the contribution of blended textiles is on the rise from CY 2020, in CY 2024, cotton has higher share of revenue at USD 3,232.01 Million, witnessing a CAGR of 8.1%.

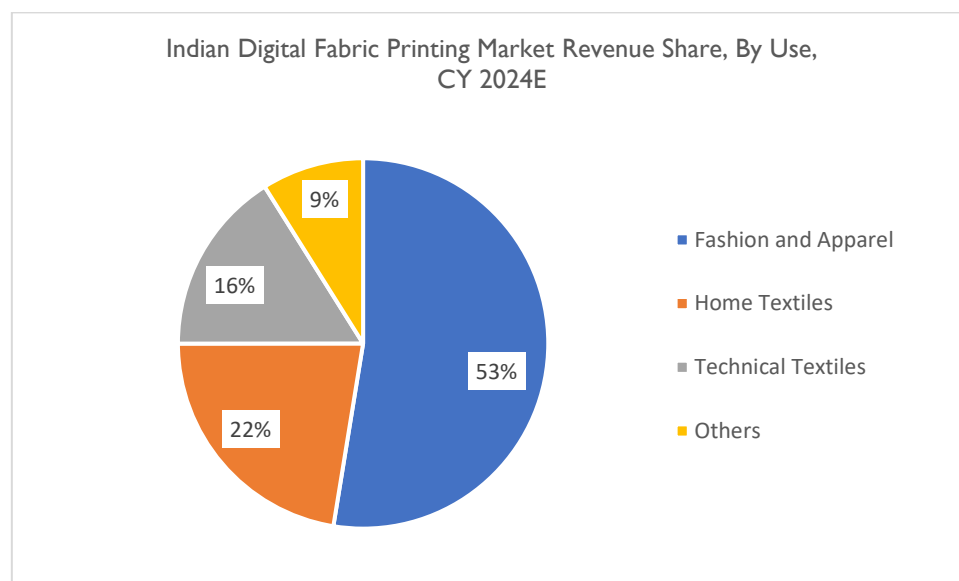
Yarn in India is largely of blended type, which is preferred for digital textile printing, and so the demand for blended textile has increased from USD 154.0 Million in CY 2020 to USD 193.8 Million in CY 2024, witnessing a CAGR of 5.9%

By Use

The global digital textile printing market is estimated at USD 5,670.2 million in CY 2024E, with fashion and apparel dominating the market share at 47% and USD 2,665.0 million in revenue. This dominance

can be attributed to the increasing demand for personalized and customized clothing, the rise of fast fashion, and the growing popularity of e-commerce platforms.

The Indian digital textile printing market also follows similar pattern with market size estimated at USD 648.4 million in CY 2024E, with fashion and apparel dominating the market share at 53% and USD 343.65 million in revenue. This dominance can be attributed to the increasing demand for personalized and customized clothing, the rise of fast fashion, and the growing popularity of e-commerce platforms.



Source: Primary Research, D&B Analysis

Home textiles follow closely, accounting for 22% of the market share and USD 142.65 million in revenue. This segment is driven by the increasing demand for unique and personalized home décor items, such as curtains, upholstery, and bed linens.

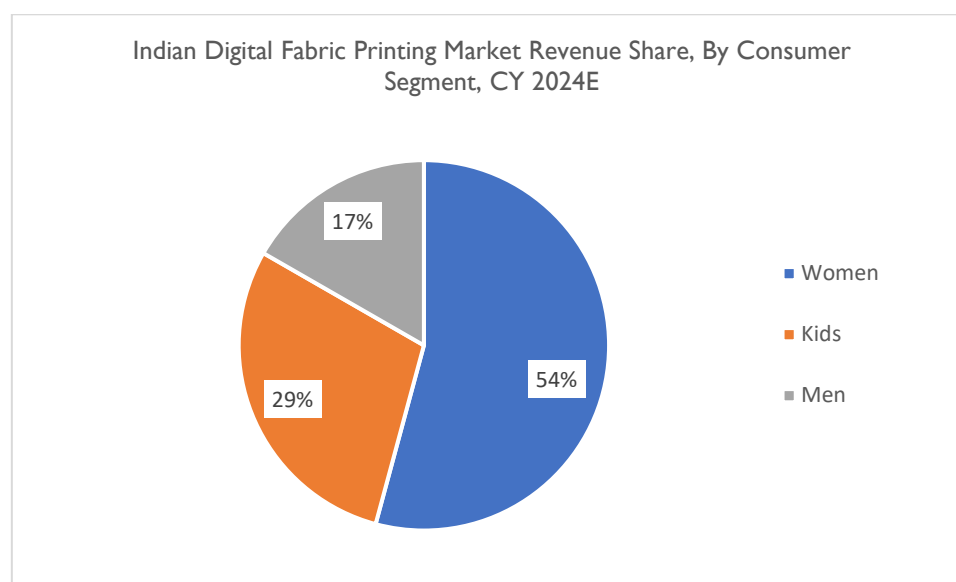
Technical textiles represent the third-largest segment, with a 16% market share and USD 103.74 million in revenue. This segment is driven by the growing demand for high-performance fabrics in various industries, such as automotive, healthcare, and sports.

Others, which include segments such as signage and banners, account for the remaining 9% of the market share and USD 58.36 million in revenue. This segment is driven by the increasing demand for digitally printed materials for various commercial and industrial applications.

By Consumer Segment

The global digital textile printing market is expected to be valued at USD 5,670.2 million in CY 2024E, with women's apparel dominating the market with a 38.4% market share and USD 2,177.4 million in revenue.

The Indian digital fabric printing market is expected to be valued at USD 648.4 million in CY 2024E, with women's apparel dominating the market with a 54% market share, thus contributing to a revenue of USD 350.14 million in CY 2024E. This dominance can be attributed to the strong presence of the women's wear segment in the Indian fashion industry, coupled with the growing demand for trendy, personalized, and customized clothing among Indian women.



Source: Primary Research, D&B Analysis

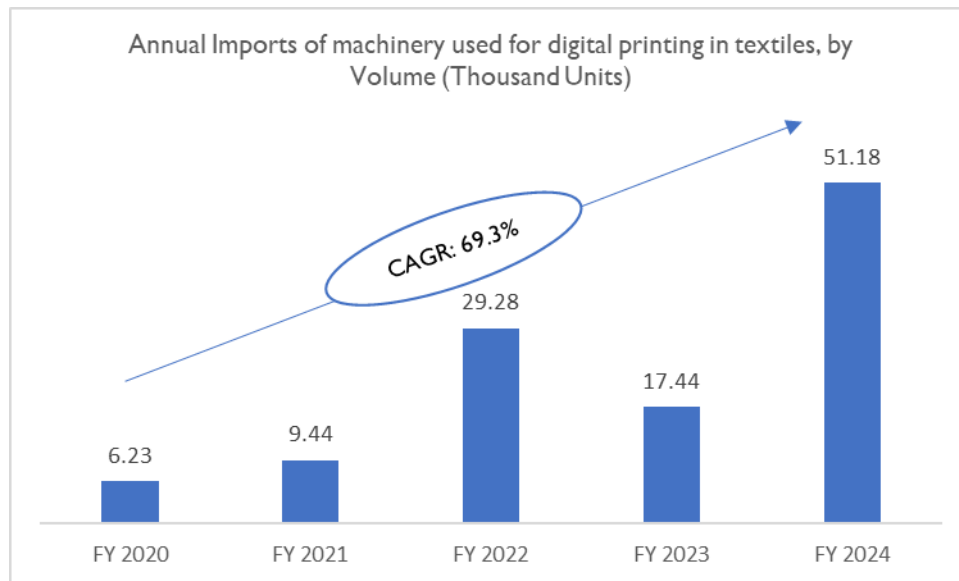
Kidswear follows closely, accounting for 29% of the market share and USD 188.04 million in revenue. This segment is driven by the increasing disposable incomes of Indian households, leading to higher spending on children's clothing and accessories. Additionally, the growing awareness of fashion trends among children and the preference for unique and personalized clothing items are contributing to the growth of this segment.

Men's apparel represents the smallest consumer segment, with a 17% market share and USD 110.23 million in revenue. This segment is gradually gaining traction, driven by the increasing interest in men's fashion and the growing demand for stylish and personalized clothing options among Indian men.

Kid's apparel had the highest CAGR of 8.4% between CY 2020 and CY 2024E, followed by women's segment with 8.2% CAGR followed by men's segment at a nominal growth of 5.0% CAGR between the same period.

Historical Growth Trend of Digitally Printed Fabric

Import volumes of printing machinery used for digital printing in textiles in India from FY 2020 to FY 2024 reveal a compelling trend of significant growth, indicative of a burgeoning demand for digitally printed textiles within the Indian market.



Source: Ministry of Commerce & Industry, Department of commerce

In FY 2020, imports stood at 6,230 units. A notable surge occurred in FY 2021, with imports increasing to 9,440 units, signalling an early adoption of digital textile printing technology. However, the most dramatic leap took place in FY 2022, witnessing a substantial jump to 29,280 units. This substantial increase underscores a growing recognition of digital textile printing's advantages among Indian textile manufacturers.

While FY 2023 saw a slight dip to 17,440 units, the overall trajectory remained upward. A remarkable resurgence is evident in FY 2024, with imports skyrocketing to 51,180 units. This substantial increase at a CAGR of 69.3% from 6,230 units in FY 2020 to 51,180 units in FY 2024 reinforces the notion that digital textile printing is rapidly gaining traction within the Indian textile industry.

The consistent growth in imports of printing machinery over the past four years strongly suggests a burgeoning demand for digitally printed textiles in India. This trend can be attributed to several factors, including the increasing popularity of digital textile printing due to its versatility, efficiency, and ability to cater to customized designs. As more and more textile manufacturers embrace this technology, the demand for digital textile printing machinery is likely to continue its upward trajectory, solidifying the position of digital textile printing as a key driver of growth within the Indian textile industry.

Impact on Raw Material Cost in the Growth of Digital Textile Printing Market

Raw material costs significantly influence the pricing of digital textile printing, affecting various aspects of production and overall market dynamics.

Fabric Type and Quality

The choice of fabric is a primary determinant of the overall cost in digital textile printing. Natural fibres, such as cotton and silk, generally incur higher costs compared to synthetic materials like polyester. This is due to the additional pre-treatment processes required for natural fabrics to ensure optimal print quality. The base fabric cost depends on the material's quality and type, which directly impacts the final pricing for customer.

Ink and Chemical Expenses

Inks used in digital printing are specialized and can be quite costly. Eco-friendly inks, while beneficial for sustainability, can be up to 30% more expensive than standard inks. These ink costs contribute significantly to the overall pricing structure of printed textiles.

Production Efficiency

Digital textile printing is known for its flexibility and ability to produce complex designs without substantial setup costs, unlike traditional methods such as screen printing. However, the efficiency of production can be affected by raw material costs; if fabric or ink prices rise, manufacturers may need to adjust their pricing models to maintain profitability. For instance, while digital printing allows for smaller runs without high setup fees, increased raw material costs can lead to higher per-unit prices for smaller orders.

Market Dynamics and Supply Chain

The volatility in raw material prices can create challenges in pricing strategies for digital textile printers. As demand for specific fabrics and inks fluctuates, suppliers may increase prices, impacting manufacturers' cost structures. This can lead to adjustments in retail pricing as companies strive to balance competitiveness with profitability. Additionally, the shift towards sustainable materials may further influence raw material costs, as eco-friendly options often come at a premium.

Overall Cost Structure

Understanding the total cost of ownership is essential for businesses engaging in digital textile printing. This includes not only raw material costs but also equipment maintenance and labour expenses. With labour costs varying based on skill levels and location, manufacturers must consider these factors when determining pricing strategies.

In summary, raw material costs are a critical factor influencing the pricing of digital textile printing. The type and quality of fabrics, the cost of specialized inks, production efficiencies, and market

dynamics all play significant roles in shaping how prices are set in this sector. As the digital textile printing market continues to evolve, manufacturers must navigate these complexities to maintain competitive pricing while ensuring profitability.

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Digital Textile Printing Becoming Cost-Effective

Digital textile printing is in use for the past three decades since early 1990, however, with the technological improvement to the information technology, digital textile printing market has witnessed rapid transformation paving way for customized fabrics, with faster production cycle, easier printing process, thus reducing the overall operating cost.

Digital textile printing gives a free hand to designers without worrying about the colour variants, sharp and minute edge details, along with the advantage of faster turnaround cycles facilitating mass production, mass customization, leading to low overall cost due to high volumes. Additionally, it has also speeded up the production cycle as much sampling is not needed, thereby reducing the cost and simplifying the process.

Digital textile printing is a new possibility in the textile printing space, as it enables designers to create beautiful multicoloured artistic designs which are not possible to weave or knit on a fabric. Although, this could be done through rotary printing as well, digital textile printing is a lot easier, faster and can be done with less manpower. Thus, the cost of printing keeps reducing as the volumes increase.

Although the machines and inks used for digital textile printing are expensive compared with traditional textile printing technologies, the overall cost of printing is based on factors such as:

- **Digital Textile Printer Machine Innovations**
 - Launch of new machines offering faster and sustainable way to print on the textile, addressing the major issues of supply chain challenge.
 - Innovations supporting single-step direct-to-fabric printing without printing glitches on fashion markets and home décor designs, eliminating the need for pre and post treatment of fabric, thus reducing operating cost of the printing process.
 - Innovations towards high-speed printing, which enable the company to deliver high-volume printed fabric with high-quality printed textiles.
 - Digital textile printing machines have evolved to an extent that the machine can print directly on the garment, while larger print can be printed directly to the fabric.
 - Innovations to the machinery and inks have reached a stage where, machines are capable of printing directly on the t- shirts in just 27 seconds, with a high precision printhead.
 - Such innovations are making digital textile printing affordable and scaling up to volumes, allowing even startups to venture into the market offering cost-effective solutions.
- **Machine Cost**

As of August 2023, the price of digital textile printing machines in India vary widely based on several factors, including the brand, specifications, and features of the machine. Generally, the price range can be as follows:

- **Entry-level machines:** Approximately INR 5 lakhs to INR 15 lakhs.
- **Mid-range machines:** Around INR 15 lakhs to INR 50 lakhs.
- **High-end industrial machines:** These can cost anywhere from INR 50 lakhs to several crores, depending on the capabilities and technology used.

The usage of digital or sublimation printing unit requires just 2,000 to 2,500 sq.ft of built-up area, which is a fraction of the space needed for conventional printing units. Additionally, lower upfront investments in machinery, enables smaller players to enter the digital textile space with ease. So, depending on the scale of operations, startups can start with the entry level machines, while depending on the volumes it can scale up to high-end machines. Thus, eliminating the barrier of entry for startup companies.

With increasing technological innovations, more and more companies are venturing into digital textile printing space, posing stiff competition to the traditional rotary printing companies, and bringing down the overall cost of printing, leading to wider adoption of digital textile printing to meet the demand from customization and fast fashion. Due to this trend, the price gap of final textile product is reducing leading to the affordable, customizable, and cost-effective trending apparels and home fabrics that appeal to the taste and aesthetic sense of the masses.

Online Sales of Digital Textile Printing Apparel Through E-Commerce

India's e-commerce market is witnessing a remarkable growth through smartphone and internet penetration. As of June 2023, internet connections in India reached 895 million driven by 'Digital India' program, while the smartphone base is likely to reach 1.1 billion by 2025. This level of growth and penetration is supported by Government policies to enable the country reach USD 1 Trillion by 2030.

Rapid rise in internet and smartphone penetration is promoting India's e-commerce sector, which has opened various segments of channels such as:

- Business-to-Business (B2B).
- Direct-to-Consumer (D2C).
- Consumer-to-Consumer (C2C).
- Consumer-to-Business (C2B).

Among these segments, D2C and B2B have witnessed remarkable growth in the fast fashion and apparel category, where consumers can directly order customized apparels from the manufacturer. India's D2C market is likely to generate USD 60 billion by FY 2027, where the overall e-commerce market is likely to reach USD 325 billion by FY 2030.

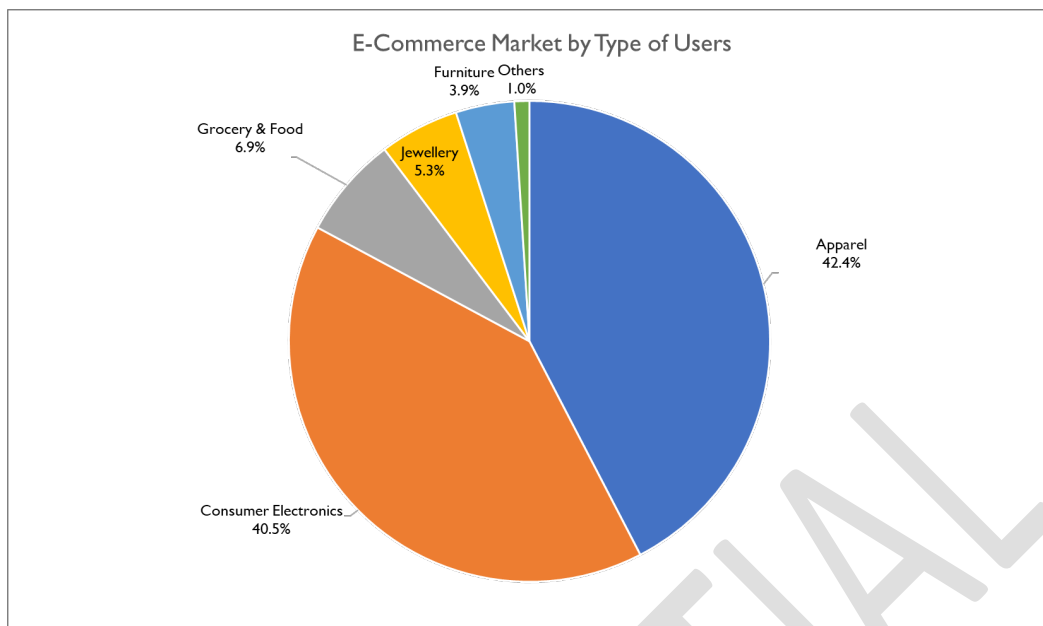
Surge of e-commerce drives demand for digital textile printing, since online retail creates the space for customized fabrics and apparels. With increasing consumption in online retail, the need for fast, reliable and personalized fabric printing grows. Expansion of e-commerce through social media and influencers have a far wide reach among the rural and urban population. In the first half of 2024, 246 active D2C startups have emerged offering customization. 60% of India's population under 25 prefer customization and is willing to pay a price premium of almost 20% more for personalised products. Some of the apparel brands opting for online customization include:

- **WYO – Wear Your Opinion**

Offers wide range of customizable clothing such as T-shirts, and hoodies for men, women and children through online platform that allows users to create their own designs reflecting their personal style and customization.

- **Sky Street Fashion**

Sky street fashion manufactures and exports customized apparel for brands, private labels, and events offering complete customization from yarn selection to packaging through their online platform.



Source: Primary Interview; D&B Analysis

Apparels are the most widely procured product through e-commerce online platform and this trend is likely to continue in future as well. Increasing preference for customization and the reach of fast fashion to rural and urban areas through e-commerce platform is augmenting sales of digital textile printing garments to a wide customer base. The growth of e-commerce, social media influence and technological advancements are driving demand for customized products in India, reshaping the digital textile printing market and offering business opportunities for innovation and growth.

Key Demand Drivers

Access to large urban population, young demography of India, availability of raw materials, existence of total value chain, Government support and technology up-gradation are major factors that contribute to the growth of overall textile sector including the textile printing sector.

Access to Large Base of Urban Population: India is undergoing rapid demographic changes for over three decades. With a population of 1.44 billion, India has become the most populous country in the world. An emerging middle class with higher discretionary spending power and increased appetite for consumer goods is fueling the overall textile industry in the domestic market. Growth in domestic textile market has a high degree of correlation with the rise of affluent middle class centered in urban markets. With increasing population, the trend of urbanization is also increasing. More and more people are migrating to cities every year, thus increasing urban population along with increasing disposable income. India's capital New Delhi is identified as the world's fastest growing city, surpassing Tokyo, and Shanghai. Urban population increased from 278 million to 373 million during the past decade (2001-11) and the proportion of urban population to total population increased from ~27.8% to ~31%. In the last decade, urbanization in India has increased at an average annual rate of about 2.4%.

By 2030, the share of urban population is estimated to grow to about 41.7% of the population of India i.e., 625 Million where 5 state in India namely Tamil Nadu, Gujarat, Maharashtra, Karnataka, and Punjab will have more than 50% urbanization. Also, the number of metropolitan cities in India is projected to increase from 46 in 2011 to 68 by 2030. Similarly, urbanization of India is only at 33%¹⁰, which is an indicator that there is still a lot of rural divide in the country, which has the potential to become urban as tier II and tier III cities in the long term. Increasing urbanization indirectly increases disposable income and access to fashionable clothing. This trend coupled with high presence of young working population, will drive demand for digitally printed fabric during the forecast period.

Favourable Demographics: Nearly 61% of India's population was in the working age group of 16-59 years in 2011 which is expected to rise to 65.1 percent in 2036 with the total population growing from 121.1 crores to 151.8 crores during the period 2011-2036. The population in this age group is more aspirational and aware. Rising working age population coupled with growing literacy rate in the country is leading to newer and better-quality jobs and higher remuneration, which in turn is leading to higher spending. India is likely to have 55% of its population in the middle-income group (which could be the largest in the world in terms of number of people) by 2025.

Higher demand from Rural Areas: Traditionally, demand for textile products was lower in rural areas because of lower disposable income of rural consumers compared to their urban peers. However, the difference in disposable income has been improving in favour of rural consumers due to higher employment by means of government sponsored job outreach programs like MGNREGA. Consequently, rural consumer base has increased. Rural income growth has been supporting the growth of unbranded textile products.

Growth in Fashion Industry: Fashion industry is evolving with increasing demand for fast fashion products witnessing a surge in India. This is driven by changing consumer preferences, increasing disposable incomes, and the influence of social media. This growth trend is reshaping the retail landscape and creating significant opportunities for both established and emerging brands.

The primary drivers of this demand for fast fashion are Millennials and Gen Z (Generation Z) consumers, who are increasingly seeking affordable yet trendy clothing options. Fast fashion brands cater to this demographic by offering a constant stream of new styles that align with current trends. Reports indicate that these consumers are not only purchasing more frequently but are also experimenting with diverse styles, influenced heavily by social media platforms like Instagram. The ability of fast fashion brands to quickly identify and capitalize on viral trends has become a crucial factor in their success.

¹⁰ U.N Population Fund "State of World Population" Report, 2023

Rapid Changes in Fashion Trends: With better integration of developing economies, including India with developed ones, the flow of ideas and trends between the two is frequent. This scenario led to faster acceptance of global fashion trends among Indian consumers. Consequently, higher adoption of global fashion trend meant higher consumption of readymade garments as fast-moving fashion cycles speed up faster cloth replacement. Moreover, in today's time consumers have evolved as more demanding with specific choices relating to style, design, and colour combinations while the rising preferences for personalized gifting both at retail and corporate level has observed sharp surge which has benefitted the rapid growth of DTG digital textile printing. Quick turn-around, cost advantage on short run cycles, creative designs, flexibility, high resolution prints and reduced wastage are few major factors that are driving the market for direct to garment digital textile printing.

The organized sector of fast fashion can be segmented into three main categories: ultra-value, mid-value, and premium brands. This is largely based on the product offering, pricing, fabric type, whether fabric design is based on digital print, rotary print and fabric type.

- **Ultra-Value Brands**

These brands focus on low-priced products and high-volume sales, enabling them to maintain profitability despite lower margins.

- **Mid-Value Brands**

Brands like H&M and Snitch are thriving in this space, attracting consumers with unique offerings and digital-first strategies.

- **Premium Brands**

Companies such as Zara leverage brand loyalty and quality to appeal to affluent consumers who are increasingly willing to invest in premium products.

The rise of e-commerce has further fuelled the demand for fast fashion. Online shopping provides accessibility to a wider range of consumers, including those in Tier II and III cities, where there has been significant growth in order volumes during festive seasons. Increased exposure to global fashion trends coupled with rising disposable incomes in these regions is driving demand for both established brands and new direct-to-consumer player.

Other Macro/Micro Factors Influencing Demand

Other factors influencing and driving demand for digitally printed fabric are listed as follows:

Macro Factors

- **Economic Growth:** India's textile and apparel industry is projected to grow significantly, with estimates suggesting a market value of USD 350¹¹ billion by 2030. This overall economic growth

¹¹ Ministry of Textiles, Government of India

creates a favourable environment for digital textile printing technologies as manufacturers seek efficient production methods to meet rising demand.

- **Sustainability Considerations:** Growing awareness of environmental issues has led consumers to prefer sustainable practices in textile production. Digital textile printing is often seen as an eco-friendlier option due to its lower water and energy consumption compared to traditional methods, aligning with the increasing demand for sustainable fashion.
- **Government Initiatives:** The Indian government's support for the textile sector, including subsidies and incentives for adopting modern technologies, encourages the growth of digital textile printing. PM Mega Integrated Textile Region and Apparel (PM MITRA) Parks across the country and Production Linked Incentive (PLI) scheme are two prominent government initiatives influencing digital textile printing market. This support helps manufacturers upgrade their capabilities and improve production efficiencies.

Micro Trends

- **Option of Customization:** There is a notable shift towards customization and personalization in consumer behavior, particularly among younger demographics who seek unique designs that reflect their individual tastes. Digital textile printing allows for on-demand production, catering to this demand effectively.
- **Reduction in Overstock and Warehousing:** Nowadays, textile service providers are moving away from longer runs to a short, varied, targeted production volume in order to meet client's specific product need in an efficient manner. Digital textile printing allows textile companies to get the printed clothing as needed rather than in bulk order, preventing such companies to spend less on inventory that may or may not sell. Thus, digital textile printing has resulted in a new type of fabric supplier – On-Demand manufacturers. Such companies use a Purchase Activated Manufacturing business model, whereby production process commence only after an order is confirmed and paid for in advance. Digital textile printing is thus transforming the textile business with better workflow and shortened and improved inventory planning that prevents overstocking and reduces warehousing needs.
- **Technological Advancements**

For decades, digital textile printing application in fashion, décor, industrial, and graphics industry was largely confined to sampling and short-run printing. Today, advanced, and specialized Inkjet technology is available in the market that allows direct digital textile printing on textiles for bulk production that too on most of the fabrics. Thermal inkjet, continuous inkjet, piezoelectric inkjet, thermal transfer, electrostatic and electrophotography are some of the developments that has happened in inkjet technology which has revolutionized the digital textile printing industry. Moreover, advances in digital textile printing equipment such as printheads, ink dispersion

techniques, ink supply systems and components and automated nozzle maintenance etc. has benefitted the growth of the digital textile printing industry. Improvement in pigment dispersion techniques and printheads has accompanied the development of pigment-based ink in digital textile printing. This along with advanced colour management software has helped the industry to produce complex designs in multiple colours. Today, backed by innovation, digital textile printing has evolved to provide novel printing solutions that include shimmering, shadow, reflection, blurring, layering, and superimposing. Innovations in digital textile printing technology has allowed textile industry to deliver environmentally sustainable output at high-speed and shortening the overall supply chain cycle which is likely to drive the digital textile printing technology.

- **Market Structure**

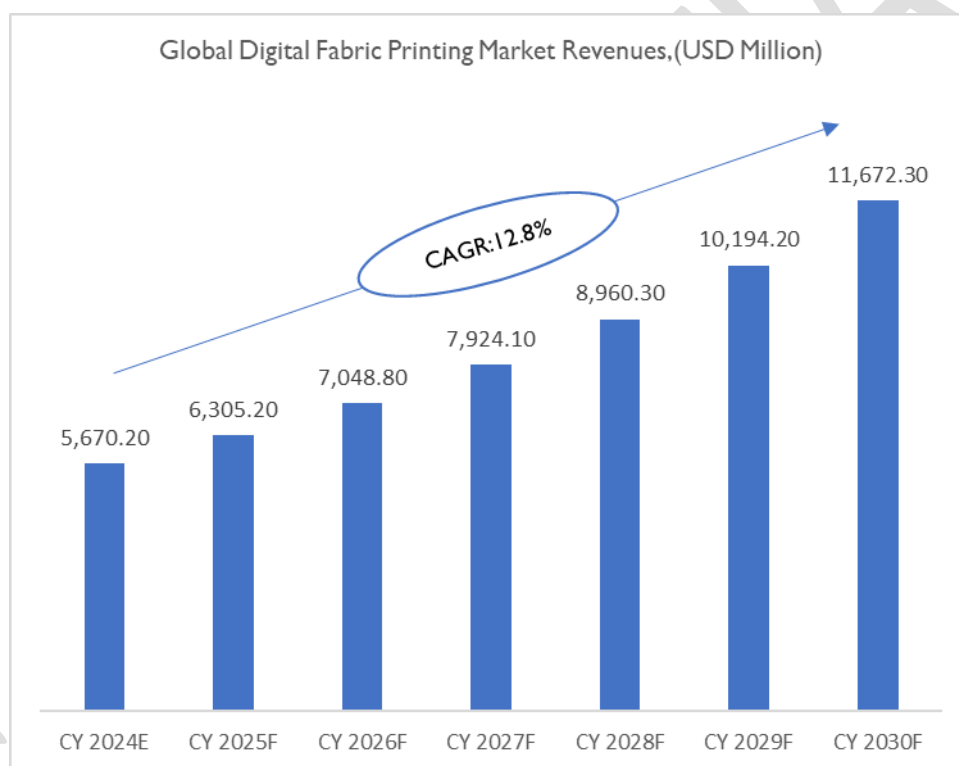
A significant portion of the Indian textile market comprises of unorganized sector players and MSMEs (Micro, Small, and Medium Enterprises). Digital textile printing offers these smaller players an opportunity to enhance their production capabilities with lower setup costs and the ability to handle small order quantities efficiently.

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Growth Forecast of Digital Textile Printing

Expected Growth in Global Digital Textile Printing Market

The global digital textile printing market is poised for a period of sustained growth, with revenues projected to reach USD 11.67 billion by CY 2030F, up from USD 5.67 billion in CY 2024E. This robust growth trajectory is underpinned by several key factors. The increasing demand for personalized and customized products is a major catalyst. Consumers are increasingly seeking unique and distinctive designs, and digital textile printing technology enables the creation of highly individualized and intricate patterns that are not easily achievable with traditional textile printing methods. This trend is particularly evident in the fashion industry, where consumers are eager to express their individuality through clothing and accessories.



Source: Primary Research, D&B Analysis

The global digital textile printing market is undergoing significant transformation, characterized by rapid growth and technological advancements. Asia Pacific region dominates the digital textile printing market, holding a significant share due to its established textile manufacturing hubs in countries like India and China. The region is expected to exhibit substantial growth as local governments promote the adoption of advanced printing technologies through subsidies and incentives. The U.S and European regions are also key markets, with increasing investments in sustainable technologies driving demand for digital textile printing solutions. The U.S. market is characterized by a diverse consumer base with a growing preference for customized products.

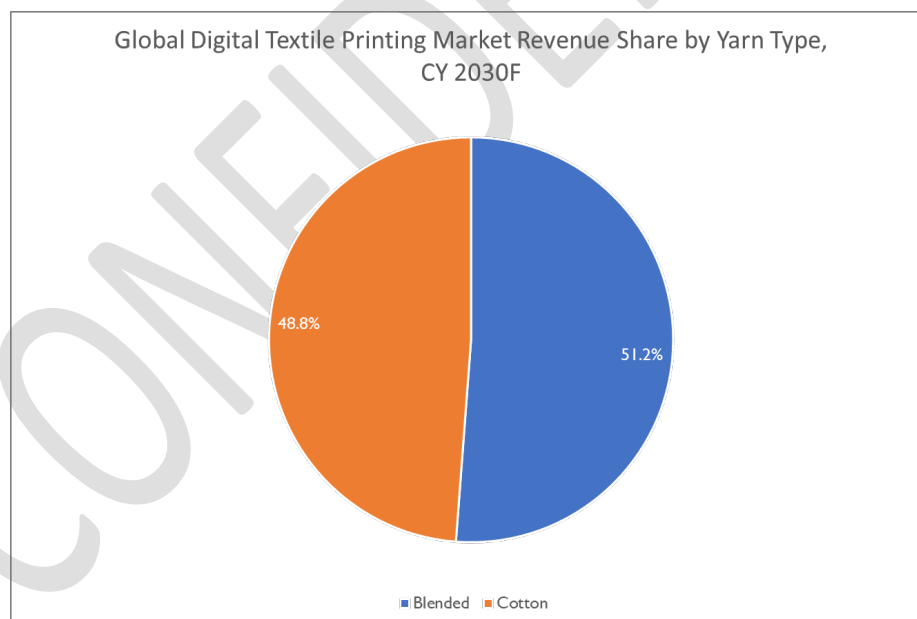
Despite its growth potential, the market faces challenges of high initial investment where the cost associated with advanced digital textile printing machinery can be prohibitive for small manufacturers and skill gap, where there is a shortage of skilled labour capable of operating sophisticated digital printers effectively.

Overall, the global digital textile printing market is poised for impressive growth driven by consumer demand for customization, sustainability initiatives, and technological advancements. As the industry continues to evolve, it presents numerous opportunities for manufacturers willing to innovate and adapt to changing market dynamics.

Global Future Market Segmentation

By Yarn Type

The global digital textile printing market is projected to be valued at USD 11,672.3 million in CY 2030F, with blended fabrics leading the market share at 51.2% and USD 5,976.2 million in revenue. This dominance can be attributed to the versatility of blended fabrics, which often combine natural fibres like cotton with synthetic fibres like polyester. These blends offer enhanced durability, wrinkle resistance, and performance properties, making them suitable for a wide range of applications, from sportswear and performance wear to technical textiles.



Source: Primary Research, D&B Analysis

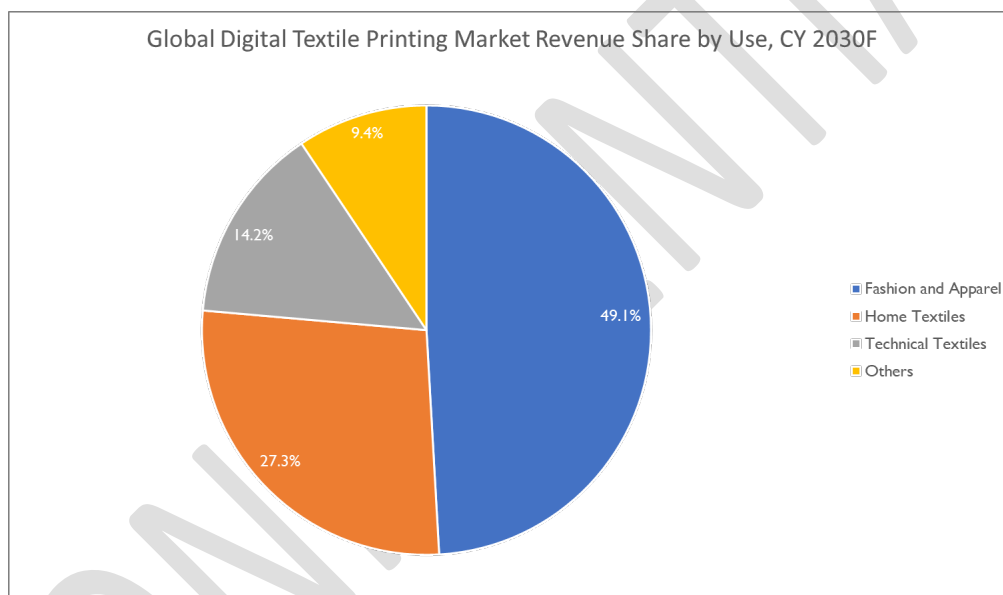
Cotton, while slightly behind, still holds a significant market share at 48.8% and is expected to generate USD 5,696.1 million in revenue. This dominance can be attributed to the widespread use of cotton in textiles, its natural breathability and comfort, and its suitability for a wide range of applications, from casual wear to home furnishings. The contribution of blended textiles is likely to witness steady rise

from CY 2024E to CY 2030F, and is expected to witness a surging CAGR of 16.1% between CY 2024E and CY 2030F, while cotton is likely to grow at a CAGR of 9.9% during the same period.

By Use

The global digital textile printing market is expected to reach a market revenue of USD 11,672.3 million in CY 2030F, with fashion and apparel dominating the market share at 49.1% and USD 5,731.1 million in revenue. This dominance can be attributed to the increasing demand for personalized and customized clothing, the rise of fast fashion, and the growing popularity of e-commerce platforms.

Textiles used in home décor categorized as home textiles is the second important segment which is likely to witness a CAGR of 13.7% between CY 2024E and CY 2030F. This dominance can be attributed to the increasing demand for personalized and customized designs of home décor coupled with trends such as e-commerce and direct-to-customer business models.



Source: Primary Research, D&B Analysis

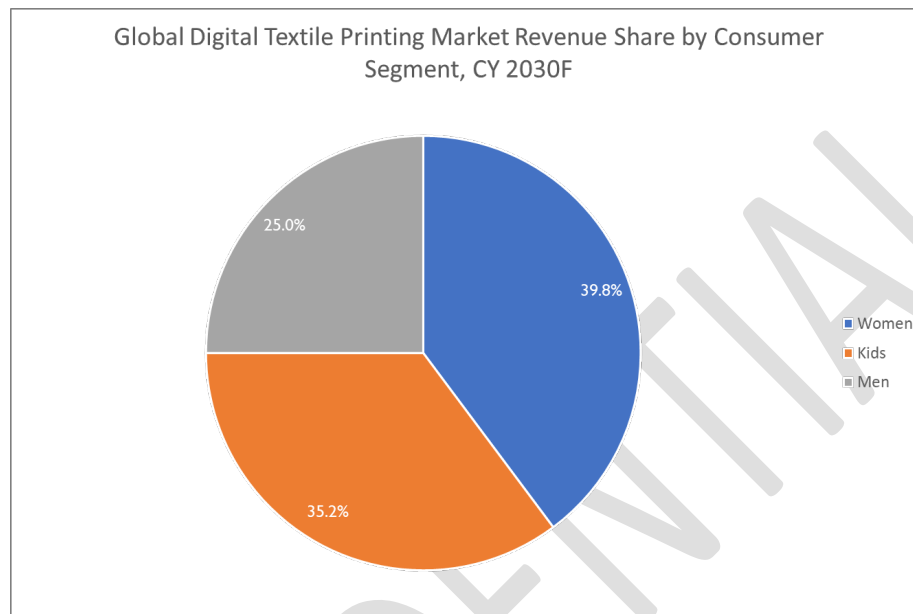
Home textiles follow closely, accounting for 27.3% of the market share and USD 3,186.5 million in revenue in CY 2030F. This segment is driven by the increasing demand for unique and personalized home décor items, such as curtains, upholstery, and bed linens.

Technical textiles represent the third-largest segment, with a 14.2% market share and USD 1,657.5 million in revenue. This segment is driven by the growing demand for high-performance fabrics in various industries, such as automotive, healthcare, and sports.

Others, which include segments such as signage and banners, account for the remaining 9.4% of the market share and USD 1,097.2 million in revenue by CY 2030. This segment is driven by the increasing demand for digitally printed materials for various commercial and industrial applications.

By Consumer Segment

The global digital textile printing market is expected to be valued at USD 11,672.3 million in CY 2030F, with women's apparel dominating the market with a 39.8% market share and USD 4,645.58 million in revenue. This segment is likely to grow at a CAGR of 13.5% which is attributed to the high demand for women's wear segment in the global fashion industry, coupled with the growing demand for trendy, personalized, and customized clothing among women.



Source: Primary Research, D&B Analysis

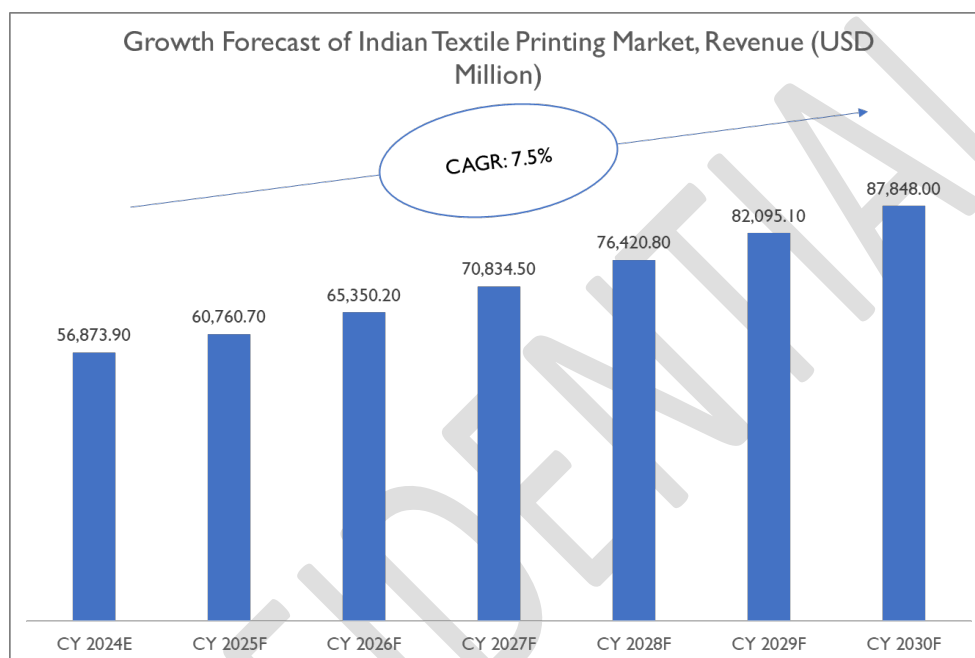
Kidswear is likely to continue its growth pattern and is expected to contribute to 35.2% of the market share and USD 4,108.65 million in revenue by CY 2030F. This segment is driven by the increasing disposable incomes of Indian households, leading to higher spending on children's clothing and accessories. Additionally, the growing awareness of fashion trends among children and the preference for unique and personalized clothing items are contributing to the growth of this segment.

Men's apparel represents the smallest consumer segment, with a modest share of 25% and is expected to reach a market size of USD 2,918.08 by CY 2030F. This segment is gradually gaining traction, driven by the increasing interest in men's fashion and the growing demand for stylish and personalized clothing options among Indian men.

Kid's apparel had the highest CAGR of 13.9%, between CY 2024E and CY 2030F, followed by women's segment with 13.5% CAGR followed by men's segment at a nominal growth of 10.4% CAGR between the same period.

Expected Growth in Indian Textile Printing Market

The Indian textile printing market is poised for significant growth in the coming years, with revenues projected to reach USD 87.85 billion by CY 2030F, driven by a robust CAGR of 7.5% from CY 2024E to CY 2030F. This growth is attributed to factors such as rising domestic consumption, increasing exports, and a growing preference for branded and high-quality textiles. While traditional printing methods will continue to dominate, digital textile printing is expected to witness substantial growth, albeit from a relatively small base.



Source: Primary Research, D&B Analysis

The penetration of digital textile printing in the Indian market is projected to increase gradually, reaching 1.38% by CY 2030. This growth will be driven by several factors, including the increasing demand for personalized and customized products, the growing popularity of e-commerce and fast fashion, and the need for shorter production cycles.

Penetration of Digital Textile Printing in Overall Indian Textile Printing		
Year	CY 2024E	CY 2030F
India Textile Printing Market, Revenues (USD Million)	56,873.9	87,848.0
India Digital Textile Printing Market Contribution (%Share)	1.14%	1.38%

Source: Primary Research, D&B Analysis

Digital printing offers several advantages that are increasingly appealing to textile manufacturers and brands. These include:

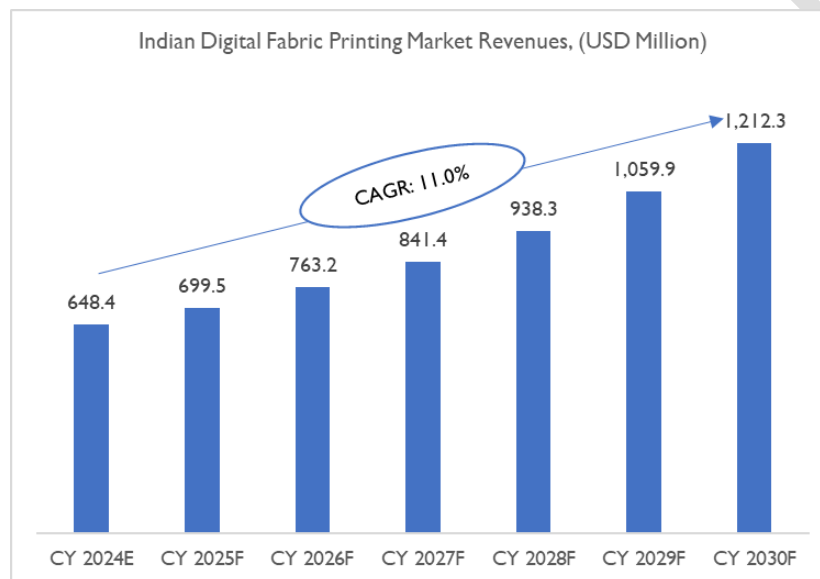
- On-demand printing: Enables short production runs and quick turnaround times, reducing inventory costs and minimizing waste.
- Reduced water consumption: Digital printing is an eco-friendlier process compared to traditional methods, which often involve significant water usage.
- High-resolution printing: Allows for the creation of intricate designs with vibrant colours and sharp details, catering to the growing demand for high-quality and aesthetically appealing products.
- Versatility: Enables the printing of a wide range of fabrics, including cotton, polyester, silk, and blends, making it suitable for various applications.

As technology continues to advance, leading to improved print quality, faster speeds, and lower costs, the adoption of digital printing is expected to accelerate. Furthermore, government initiatives aimed at promoting sustainable manufacturing practices and supporting the growth of the textile industry can further incentivize the adoption of eco-friendly digital printing technologies.

While challenges such as high initial investment costs and the need for skilled operators persist, the long-term prospects for digital textile printing in India appear promising. As the technology matures and its benefits become more widely recognized, it is poised to play an increasingly important role in shaping the future of the Indian textile printing industry.

Expected Growth in Indian Digital Textile Printing Market

The Indian digital textile printing market is poised for significant growth in the coming years, with revenues projected to reach USD 1,212.3 million by CY 2030F, up from USD 648.4 million in CY 2024E. The burgeoning Indian textile industry itself is a major driver of growth. India is a major player in the global textile market, with a strong presence in both domestic and international markets. The increasing demand for textiles, driven by factors such as rising disposable incomes, growing population, and changing consumer preferences, is creating a strong demand for efficient and innovative printing technologies, such as digital textile printing.



Source: Primary Research, D&B Analysis

In India, there is a boom for natural fabric production, which aligns with the increasing demand for high-quality sustainable materials in digital textile printing. Similarly, the rise in adoption of blended fabrics including cotton-polyester blending and usage of fabrics from recycled materials support the growth of digital textile printing by offering enhanced printability, better sustainability and durability. These factors contribute to the smooth, consistent, steady growth in production volumes of digitally printed fabrics in India.

Secondly, the government's initiatives to promote the textile sector are creating a favourable environment for growth. The Indian government has implemented various policies and initiatives to boost the competitiveness of the textile industry, such as providing subsidies and incentives to manufacturers and promoting skill development programs. These initiatives are expected to further drive the adoption of digital textile printing technology within the Indian textile industry.

Thirdly, the increasing focus on sustainability and eco-friendly practices within the Indian textile industry is creating a strong demand for digital textile printing. Digital textile printing is generally considered a more sustainable alternative to traditional textile printing methods, as it reduces water

consumption, energy usage, and chemical waste. This aligns with the growing emphasis on sustainability within the Indian textile industry, as well as the increasing demand for eco-friendly products among Indian consumers.

Fourthly, the growing popularity of e-commerce and the rise of online retail platforms are providing new avenues for growth. Online platforms offer a convenient and accessible channel for Indian consumers to purchase digitally printed fabrics and products, while also providing manufacturers with a wider reach and access to new markets. This trend is expected to continue to drive the growth of the digital textile printing market in India.

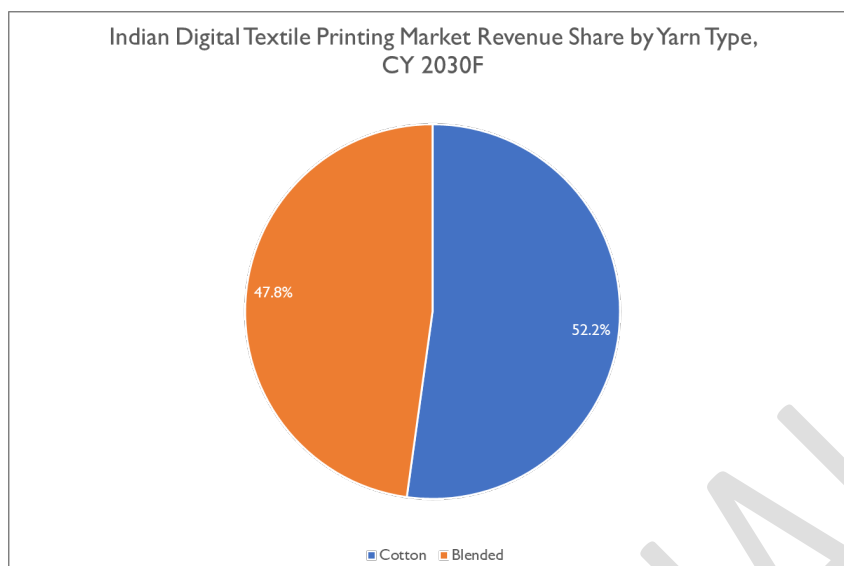
Fifthly, the increasing demand for personalized and customized products among Indian consumers is creating new opportunities for growth. Digital textile printing technology enables the creation of highly individualized and intricate designs, which are increasingly in demand among Indian consumers. This trend is particularly evident in the fashion industry, where Indian consumers are increasingly seeking unique and distinctive clothing and accessories.

Sixthly, the growing influence of global fashion trends and the increasing exposure of Indian consumers to international brands are driving the demand for high-quality and innovative printing technologies. Digital textile printing technology enables the creation of high-quality prints that can compete with international brands, thereby enhancing the competitiveness of Indian textile manufacturers in the global market.

Market Segmentation

By Yarn Type

The Indian digital textile printing market is projected to be valued at USD 1,212.3 million in CY 2030F, with cotton leading the market share by 52.2% at USD 632.8 million. Whole blended fabrics contribute the market share at 47.8% and USD 579.5 million in revenue. Although blended fabrics dominated the market during the historic period, it is likely to be surpassed by the contribution from cotton during the forecast period.

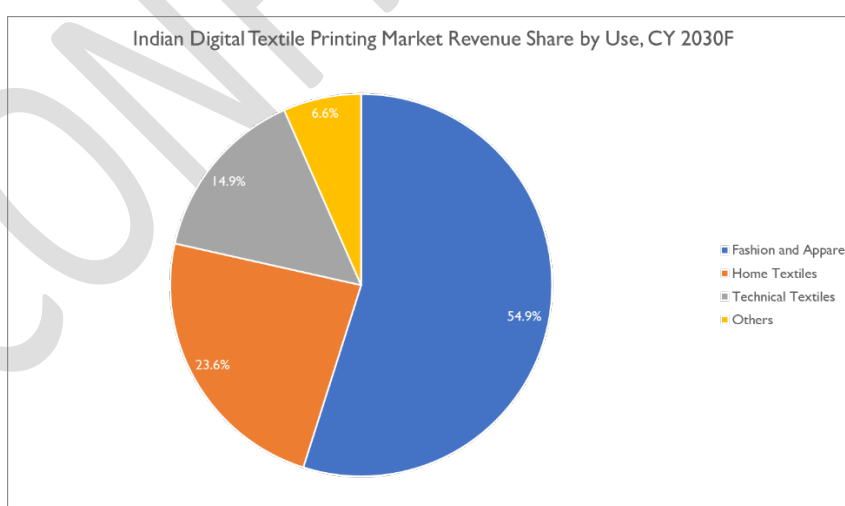


Source: Primary Research, D&B Analysis

Cotton's increasing demand and market share is largely attributed to the widespread use of cotton in Indian textiles, its natural breathability and comfort, and its suitability for a wide range of applications, from casual wear to home furnishings.

By Use

The Indian digital textile printing market continues to follow the historic pattern where fashion and apparel is expected to have highest market share of 54.9% with a revenue contribution of USD 665.6 million by CY 2030F. This dominance can be attributed to the increasing demand for personalized and customized clothing, the rise of fast fashion, and the growing popularity of e-commerce platforms.



Source: Primary Research, D&B Analysis

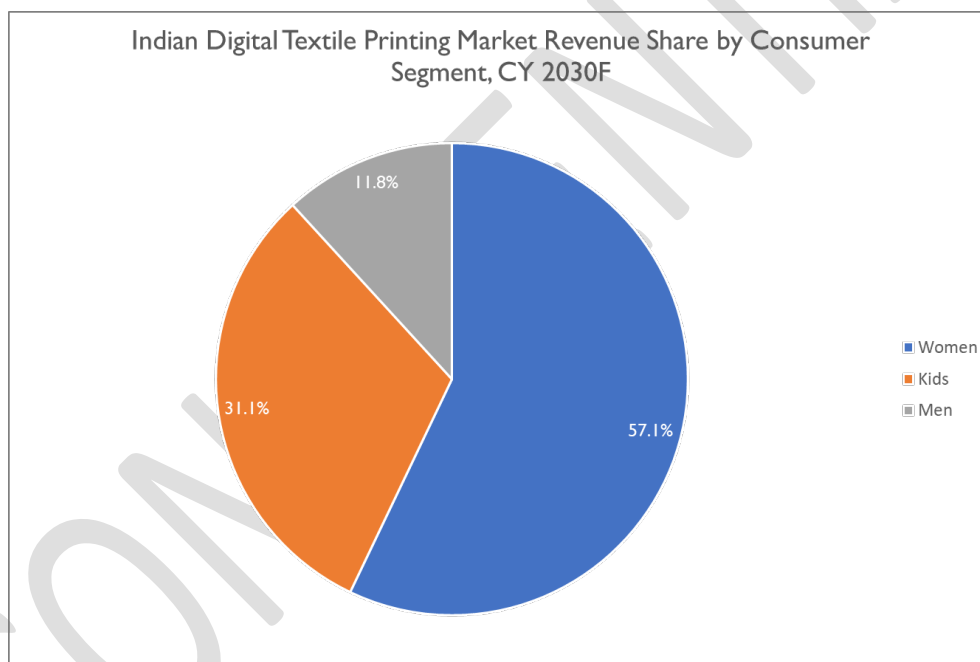
Home textiles follow closely, accounting for 23.6% of the market share, with market revenues to reach USD 286.1 million by CY 2030F. This segment is driven by the increasing demand for unique and personalized home décor items, such as curtains, upholstery, and bed linens.

Technical textiles represent the third-largest segment, with a 14.9% market share and USD 180.6 million in revenue. This segment is driven by the growing demand for high-performance fabrics in various industries, such as automotive, healthcare, and sports.

Others, which include segments such as signage and banners, account for the remaining 6.6% of the market share and USD 80.0 million in revenue. This segment is driven by the increasing demand for digitally printed materials for various commercial and industrial applications.

By Consumer Segment

The Indian digital textile printing market is expected to be valued at USD 1,212.3 million in CY 2030F, with women's apparel dominating the market with a 57.1% market share, and USD 692.2 million in revenue. This dominance can be attributed to the strong presence of the women's wear segment in the Indian fashion industry, coupled with the growing demand for trendy, personalized, and customized clothing among Indian women.



Source: Primary Research, D&B Analysis

Kidswear is at a distant second with 31.1% market share and USD 377.0 million in revenue. This segment is driven by the increasing disposable incomes of Indian households, leading to higher spending on children's clothing and accessories. Additionally, the growing awareness of fashion trends among children and the preference for unique and personalized clothing items are contributing to the growth of this segment.

Men's apparel represents the smallest consumer segment, with a 11.8% market share and USD 143.1 million in revenue by CY 2030F. This segment is gradually gaining traction, driven by the increasing

interest in men's fashion and the growing demand for stylish and personalized clothing options among Indian men.

In conclusion, the Indian digital textile printing market is poised for significant growth in the coming years, driven by a confluence of factors specific to the Indian market, including the growth of the Indian textile industry, government initiatives, the increasing emphasis on sustainability, the rise of e-commerce, the growing demand for personalization, and the influence of global fashion trends. These factors are expected to drive the market to new heights, creating exciting opportunities for innovation and growth within this dynamic sector.

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Regulatory Landscape

Regulatory Policy Framework Governing the Industry

Indian textile sector is poised for significant expansion, which is supported by government policies and regulatory framework, to accelerate domestic participants towards growth, product expansion and in turn exports. This growth could employ 35 million people in this sector, which will contribute to the country's economic growth.

The Government of India has launched number of regulatory policies and initiatives for the textile industry which are listed below:

- Textile Policy 2024 – Focuses on labour-intensive units that employ at least 4,000 registered individuals under Employee Provident Fund (EPF) scheme.
- PM MITRA – A Government of India initiative to establish Mega Integrated Textile Regions and Apparel Parks across India.
- PLI Scheme – A government initiative that incentivizes companies based on cumulative sales of domestically manufactured goods.
- Samarth Initiative – A skill development program for the textile sector led by the Ministry of Textiles to address the skill gap in the textile sector.
- National Technical Textiles Mission (NTTM) – A four-year mission that focuses on improving technical education, promoting research and innovation, and promoting market growth.
- Make in India Investment Cell – In pursuance of the Make in India initiative of the Government of India, an investment facilitation cell has been set up in the Office of the Textile Commissioner, in line with Invest India Cell of Department of Industrial Policy & Promotion, Government of India.
- OEKO-TEX Certification – This certification ensures that textiles are free from harmful substances. It is widely adopted in India to meet global safety standards for printed fabrics used in garments and home textiles.

Other Regulations exclusively to promote fashion industry are:

- The Trade Marks Act, 1999 – An act to amend and consolidate the law relating to trade marks, to provide for registration and better protection of trade marks for goods.
- The Designs Act 2000 – An act to consolidate and amend the law relating to protection of designs.
- The Copyright Act 1957 – An act to amend and consolidate the law relating to copyright, which protects original literary, dramatic, musical and artistic work.

Policy Initiatives/Government Incentives to Promote Industry Activity

The key policy initiatives and government incentive schemes that promote textile industry activity in India are listed below:

- **Amended Technology Upgradation Fund Scheme (ATUFS)¹²**

ATUFS is aimed at technologically upgrading the machinery used in textile industry. Upgrading machinery used in textile industry improves quality of products and reduces the manufacturing cost, which will make Indian textile industry more competitive in the global arena. With the aim of 'Make in India' and 'Zero Defect and Zero Effect' in manufacturing, the government provides credit linked capital investment subsidy. This scheme would facilitate augmenting of investment, productivity, quality, employment, exports and import substitution in textile industry. It will also indirectly promote investment in textile machinery manufacturing.

- Eligibility – Units that meet the lending norms of financial institutions and the scheme's benchmark criteria are eligible.
- Subsidy Rates – Depends on the type of unit and capital investment and are classified as:
 - Garments and technical textiles – 15% Central Sector Interest Subsidy (CSIS) up to INR 30 Crore.
 - Weaving, processing, jute, silk, handloom – 10% CIS up to INR 20 Crore.
 - Multiple composite units/segments – 10% or 15% CIS depending on the capital investment.
- Repayment Period – 3 Years.
- Budget Allocation – INR 17,822 Crores for FY 2023.

- **PM MITRA Scheme**

The PM Mega Integrated Textile Region and Apparel (PM MITRA) scheme is a government initiative to create modern textile value chain in India. This scheme is aimed at making the sector globally competitive by building best-in-class manufacturing infrastructure, upgradation of technology, fostering innovation, enhancing skills and reducing costs in the sector. So, the Government of India approved 7 PM MITRA parks for the textile industry. These parks will provide 1,00,000 jobs directly and 2,00,000 jobs indirectly, in addition to attracting an investment of INR 10,000 Crore.

¹² Ministry of Textiles, Government of India

The list of parks that are approved by PM MITRA scheme by state and allocation are listed below as a table:

Textile Park	State	Allocation
Kashmir Wool & Silk Textile Park	Jammu & Kashmir	INR 48 Crore
Shahlon Textile Park	Gujarat	INR 103.2 Crore
Hinganghat Textile Park	Maharashtra	INR 108.3 Crore
Eastern India Garment Manufacturers & Exporters Federation (EIGMEF) Apparel Park Limited	West Bengal	INR 130.5 Crore
Hindupur Vyapar Apparel Park	Andhra Pradesh	INR 102.2 Crore
Pallavada Textile Park	Tamil Nadu	INR 106.5 Crore

- **PLI Scheme¹³**

The production linked incentive (PLI) scheme aims to boost production of technical textiles, manmade fibres (MMF) and MMF apparel. This is at a budget of INR 106.83 billion, for the timeline of FY 2025-26 to FY 2029-30. Companies that meet the performance and investment targets one year early can become eligible one year earlier. The scheme focuses on technical textiles, MMF Fabrics, and MMF apparels. It aims to create 7,50,000 jobs, achieve a turnover of INR 3 Lakh Crore and attract an investment of INR 19,000 Crore.

¹³ PLI for Textiles, Ministry of Textiles, Government of India

Trade Scenario

Since, digital textile printing is applied across wide range of textile products, the overall textile export growth has a positive impact on digital textile printing and vice-versa. So, it is imperative to understand the broader textile trade overview and performance trend of the Indian textile industry.

India has emerged as one of the leading destinations for sourcing textile products, with majority of textile retail chains across the world having a procurement presence in India. India's ascent in global textile and garment trade is partly credited to the removal of textile export quotas in trade among members of World Trade Organization in 2004. Since then, exports of textiles and garments from India have increased significantly.

Today, India is the 6th largest exporter of Textiles & Apparels in the world, with a share of 3.91% of the global exports in textile and apparel. Indian made textile and apparel products are exported to more than 100 countries with the US and countries in EU region being the largest markets. Major textile export destinations are the U.S, and the EU accounting for nearly 47% of India's textiles and apparels in FY 2023-24.

Presence of a well-developed garment manufacturing infrastructure has helped the sector to effectively exploit the emerging opportunities. Ample availability of cotton / man-made fibre and a strong textile processing sector ensured a stable raw material supply while a cheap labour pool helped in keeping the production cost low. In addition, manufacturing practices in the sector is on par with global quality standards. Consequently, Indian garment manufacturers were able to produce international quality products at a lower production cost.

Following are the list of export promotion councils that work to promote textile exports from India:

- Apparel Export Promotion Council (AEPC).
- Cotton Textiles Export Promotion Council (TEXPROCIL).
- Synthetic & Rayon Textiles Export Promotion Council (SRTEPC)/Manmade and Technical Textiles Export Promotion Council (MATEXIL).
- Wool & Woollens Export Promotion Council (W&WEPC).
- Wool Industry Export Promotion Council (WOOLTEXPRO).
- Indian Silk Export Promotion Council (ISEPC).
- Carpet Export Promotion Council (CEPC).
- Export Promotion Council for Handicrafts (EPCH).
- Powerloom Development & Export Promotion Council (PDEXCIL).
- Handloom Export Promotion Council (HEPC).
- Jute Products Development Export Promotion Council (JPDEPC).

The textile industry being an export-oriented sector is important for the country's economic development as it provides direct employment for over 45 million people and source of livelihood for over 100 million people indirectly including women along with people from rural parts of the country. This sector aligns with the Government initiatives of Make in India, Skill India, Women Empowerment and Rural Youth Employment.

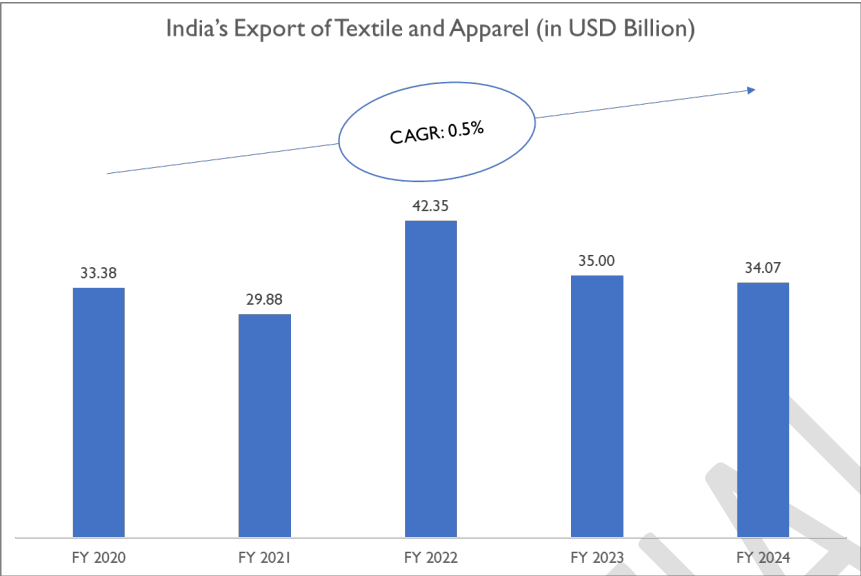
India's Export Performance

The detailed value of exports of textile and apparels from India in the past five years is captured in the table below, as reported by the Ministry of Textiles, Government of India, in its Annual Report every year.

Values in USD Million	2019-20	2020-21	2021-22	2022-23	2023-24
India's Export of Textile and Apparel	33,379	29,877	42,347	34,997	34,072
Export of Handicrafts	1,798	1,708	2,088	1,689	1,802
Total of T&A and Handicrafts	35,177	31,585	44,435	36,686	35,874
India's Overall Exports	3,13,361	2,91,808	4,22,004	4,51,070	4,37,072
% Share of Exports in Overall Exports	11.2%	10.82%	10.53%	8.13%	8.21%

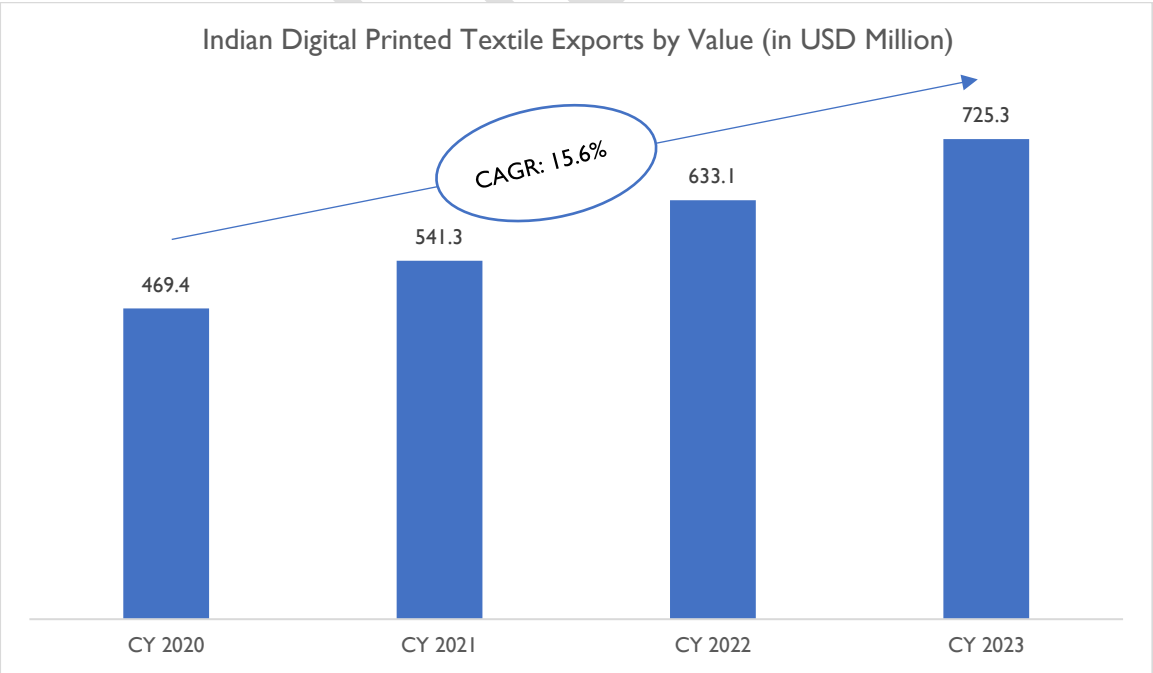
Source: Ministry of Textiles, Annual Report

After a robust post pandemic recovery in FY 2022, the annual value of overall textile and apparel products exported from India moderated in the past two years owing to geopolitical issues across major market, high interest rates and escalated logistic costs due to Red Sea crisis collectively impacted the global demand. The annual export value of overall textile and apparel stood at USD 34.07 billion in FY 2024, witnessing a y-o-y decline of 2.7% in FY 2024 while in the previous year the exports were down by over 17%. Readymade garments which accounted for 42% of the export basket, declined 10% in FY 2024 to USD 14.5 billion.



Source: Ministry of Textiles, Annual Report

However, Indian textiles and apparel export trends over the past five years highlight India's strategic position in the global textile supply chain, leveraging its rich heritage in fabric production and craftsmanship to meet international demands effectively. The demand for textile products is expected to grow strong in the current fiscal. As per department of commerce's trade statistic data, India's export of textile and allied product for April-October 2024 stood at USD 20.54 billion, exhibiting 6.5% growth over the corresponding period in the previous fiscal, supported by robust recovery in the readymade garment demand. During the above period, the readymade garment exports was up by over 11.6% over the same period last fiscal and amounted USD 8.73 billion during 7M' FY 2025.

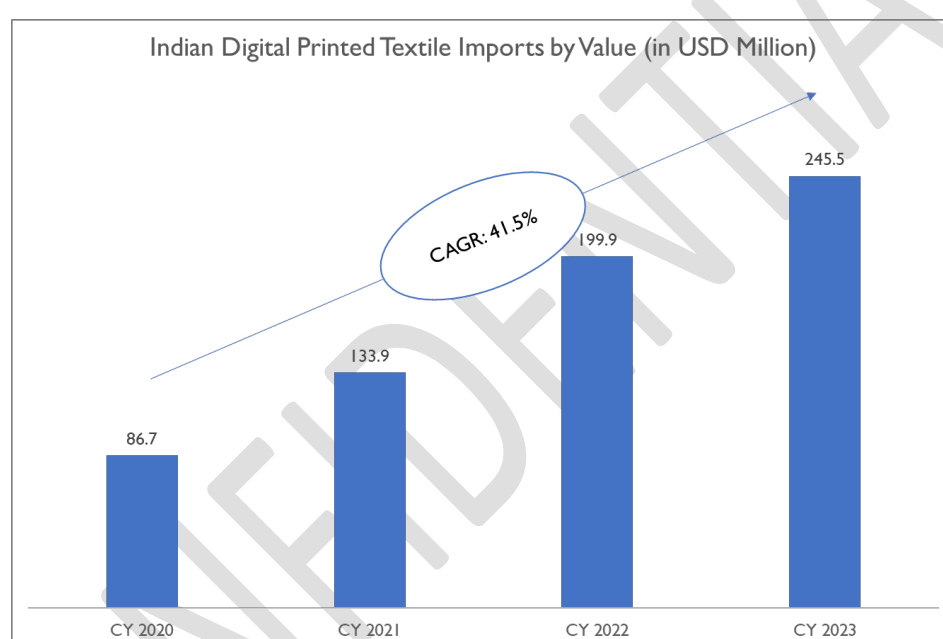


Source: UN Comtrade

Digital printed textiles exports from India witnessed remarkable growth from CY 2020 to CY 2023. Government initiatives, coupled with PLI schemes offering globally cost-competitive products have made India an important country exporting digital printed textile to Middle East and African countries.

Additionally, growing importance of India as a major textile manufacturing hub is expected to support the growth of Indian textile sector. Buoyed by favourable demographics, shift in lifestyle choices and structural shift in industry structure, the demand for various textile products and ready garments is likely to grow at a healthy rate which is likely to benefit the overall textile printing industry.

Imports of digitally printed textiles is much smaller market compared with exports. Imports witnessed steady growth from USD 86.7 Million in CY 2020 to USD 245.5 Million in CY 2023, which is a CAGR of 41.5%.



Source: UN Comtrade

Top Five Export Market Countries & Its Trend

The traditional markets viz. USA, the United Kingdom (the UK) and EU together account for 53% (USA 28%, the UK 6% & EU 19%) of India's Textiles and apparel including handicrafts exports. Within EU, Germany, France, Netherland accounts for 4%, 3%, 3% share respectively of India's textile and apparel including handicrafts.

The top five export countries that are importing textiles and apparels from India are dynamic and kept changing during the period of pandemic. However, the number of countries remained the same, it kept changing positions during the pandemic. This trend is captured in the table below, along with the value of exports to these countries.

Country	USA		UAE		Bangladesh		U.K		China		EU-27	
	USD Mn	%	USD Mn	%	USD Mn	%	USD Mn	%	USD Mn	%	USD Mn	%
2019-20	8,255	22%	2,279	6%	2,172	6%	2,071	6%	1,441	4%	-	-
2020-21	8,009	26%	2,186	7%	2,133	7%	1,579	5%	1,561	5%	-	-
2021-22	11,388	26%	2,625	6%	5,178	12%	2,032	5%	1,616	4%	-	-
2022-23	10,468	29%	2,087	6%	2,533	7%	2,105	6%	-	-	7,670	21%
2023-24	10,047	28%	2,019	6%	2,816	8%	-	-	-	-	6,985	19%

Source: DGCI&S, Ministry of Textiles

The U.S, United Arab Emirates and Bangladesh were the top 3 importers of Indian textiles and apparels during the years of 2019, 2020 and 2021. This trend changed post covid, when EU-27 countries replaced UAE to become the second largest importer of Indian textiles & apparels, while UAE slipped to the 4th place next to Bangladesh from the years of 2022 and 2023. The other countries that are part of top 10 importers of Indian textiles and apparels include China, Sri Lanka, Turkey, Australia, and Saudi Arabia. These countries have all have single digit share to the exports, with Saudi Arabia being ranked the 10th country for importing Indian textiles and apparels, having a share of 2% of the total exports, with a value of around USD 551 Million for the year 2023-24.

Among the digital printed textiles, China has the largest share of around 90% of imports into India. No other country has consistent importing trend of all the different subcategories within digitally printed textiles. Import of the rest 10% of digitally printed textiles are demand based from different countries depending on the product texture, pricing, volume and it keeps varying.

Threat & Challenges

Threats & Challenges Impacting Overall Textile Industry

The textile industry, particularly in India, faces a multitude of threats and challenges that are impacting its performance and growth potential.

- **Fluctuating Raw Material Prices**

The Indian textile sector is heavily reliant on cotton, and fluctuations in cotton prices significantly affect production costs. Currently, Indian cotton is a bit more expensive than global prices, making domestic manufacturers less competitive on the international stage.

- **Import Competition**

The Free Trade Agreement (FTA) between India and Bangladesh allows for duty-free access to Bangladeshi textiles in India, which has resulted in a surge of imports that are often 15-20% cheaper than locally produced goods. This situation is detrimental to local manufacturers who struggle to compete with these lower-priced imports.

- **Capacity Underutilization**

Many textile manufacturers are facing high underutilization rates due to reduced domestic consumption and lower export orders. This underutilization affects profitability and operational efficiency within the industry.

- **High Operating Costs**

Recent geopolitical tensions have led to a staggering increase in freight costs due to unrest in key shipping routes like the Red Sea, raising operational expenses for textile manufacturers.

- **Technological Adaptation Challenges**

The need for modernization through automation and advanced manufacturing technologies is critical; however, many firms face barriers related to investment and skill gaps within the workforce.

- **Global Economic Factors**

Geopolitical tensions, inflation, and economic downturns have led to reduced imports from key markets, affecting overall demand for textiles globally.

Competitive Landscape: Digital Textile Printing

Post lifting of production restriction which followed implementation of economic reforms changed the face of the Indian textile sector. Entry of private players helped in improving the technological base as well as production capacity as textile mills with large processing and production capacity were set up. Supportive government initiatives such as PM-Mega Integrated Textiles and Apparel Park (PM-MITRA), Textile Cluster Development Scheme, Integrated Processing Development Scheme, PLI, amongst others are helping in improving the production technology, which is driving the overall production volume as well as competition in the sector.

The textile processing industry including the textile printing sector in India is highly fragmented with many companies, small to large, companies operating in the value chain. The value chain of a textile printing industry broadly comprises of manufacturer and supplier of printer, printing ink, dye & pigment-based ink, fabric manufacturer and printing service provider. As compared to other segments in the value chain, companies engaged in fabric printing services are more fragmented because the investment required to set up printing services is comparatively lower than that needed for other business operations. Since the entry barriers are low in terms of investment, particularly in DTG printing segment, large number of companies operate in MSME segment as a proprietorship firm. Some large players that are engaged in digital textile printing service may have integrated their operation backwards in terms of having presence in fabric manufacturing, pigment and dye manufacturing or printing machine or parts manufacturing but then revenue contribution from printing business job work is comparatively lower than other segments. The clientele for digital textile printing companies generally includes individuals, institutions like corporates, and leading fashion designers who avail short-medium production run services while readymade manufacturers largely avail roll-to-roll digital textile printing services.

Key Factors Shaping Competition

The digital textile printing market is influenced by various competitive factors that shape its dynamics. Here are the key competitive factors impacting this market:

- **Technological Advancements**
 - **Innovation in Printing Technologies:** Continuous improvements in digital textile printing technologies, such as better ink formulations and high-speed printers, enhance print quality, efficiency, and versatility. These advancements allow manufacturers to produce intricate designs and meet growing demand more effectively.
 - **Integration of Software and Hardware:** Enhanced integration of software with printing hardware enables more complex designs and faster production cycles, making digital textile printing more appealing to manufacturers.

- **Sustainability Considerations**
 - **Environment Impact:** Increasing awareness of environmental sustainability drives demand for eco-friendly printing solutions. Digital textile printing typically uses less water and energy compared to traditional methods, aligning with the growing consumer preference for sustainable practices.
 - **Waste Reduction:** The ability to produce on-demand textiles reduces waste associated with overproduction, making digital textile printing a more sustainable option for manufacturers and consumers alike.
- **Market Demand Dynamics**
 - **Customization and Personalization:** The rising consumer demand for personalized products is a significant driver for digital textile printing. This technology allows for small batch production and customization without the high setup costs associated with traditional methods.
 - **Fast Fashion Trends:** The fast fashion industry's need for quick turnaround times and rapid adaptation to trends fuels the adoption of digital textile printing technologies, as it offers shorter production cycles and flexibility in design.
- **Competitive Landscape**
 - **Market Entry Barriers:** The initial investment required for digital textile printing setups can be a barrier for some companies, particularly smaller manufacturers. However, those who invest in these technologies can gain a competitive edge through enhanced capabilities.
 - **Established Players Vs New Entrants:** Established textile manufacturers may be reluctant to transition from traditional methods due to previous investments, creating a competitive landscape where newer entrants can capitalize on the latest technologies and trends.
- **Consumer Behaviour**
 - **Shift Towards Online Retail:** The growth of e-commerce platforms has expanded access to digitally printed fabrics, allowing consumers to easily order customized products. This shift influences purchasing behavior and increases demand for innovative printing solutions.
 - **Fashion Industry Influence:** The fashion sector is a significant driver of demand for digital textiles, as brands seek to differentiate themselves through unique designs and quick response times to market trends.

The competitive factors in the digital textile printing market are multifaceted, encompassing technological advancements, sustainability considerations, market demand dynamics, competitive landscape challenges, and evolving consumer behaviors. As these factors continue to evolve, they will significantly influence the growth trajectory and strategic direction of companies within this sector.

Competitive Profile: Digital Textile Printing

Shrijee Lifestyle Private Limited

Company Overview

Shrijee Lifestyle Private Limited is a textile manufacturing company based in Mumbai, India. Incorporated on March 4, 1944, specializing in the production of various fabrics and home textiles. With a strong emphasis on quality and innovation, Shrijee Lifestyle caters to both domestic and international markets.

Business Segments

Shrijee Lifestyle operates in several key areas within the textile sector:

- **Fabric Manufacturing:** Produces a variety of textiles including cotton, silk, polyester, and blends.
- **Garment Production:** Offers ready-made garments and made-ups for home textiles.
- **Dyeing and Printing Services:** Provides conventional and digital printing services along with dyeing processes.
- **Embroidery Services:** Specializes in embroidered textiles for various applications.

Product Offerings

The company's product range includes:

- **Fabrics:** Various types including woven fabrics for shirting and home textiles.
- **Garments:** Ready-to-wear clothing items.
- **Made-Ups:** Home textile products such as curtains, bed linens, and upholstery.

Shrijee Lifestyle Private Limited with a focus on quality and customer satisfaction serves a diverse clientele both domestically and internationally, leveraging its extensive experience in textile manufacturing. Shrijee Lifestyle is committed to sustainable practices within its operations, focusing on waste management and responsible resource utilization to minimize environmental impact.

Krishna Alkali (Bombay) Private Limited

Incorporated in 1980, Krishna Alkali (Bombay) Private Limited is a player in the digital textile printing industry in India, known for its innovative approach and comprehensive in-house capabilities.

Headquarters:

- Design Studio – 422-425 Kewal Industrial Estate, S.B. Marg, Lower Parel, Mumbai 400013, India.

- Production Unit – 13/3 Ravindra Corp. Comp., Opp.Tata Powerhouse, Pishivli, Kalyan 421306, Thane Dist, India.

Core Competencies

- **Digital Textile Printing**

Krishna Alkali specializes in digital textile printing, boasting an installed capacity of over 20,000 metres per day.

- **In-House Processes**

All processes from fabric processing to printing and dispatch are managed in-house, which allows for consistent quality control and faster turnaround times.

- **Design Capabilities**

The company has a robust design studio with over 25 graphic and fashion designers, enabling quick and precise design work tailored to client needs.

Technological Infrastructure

- **Printing Machinery**

- Two Konica Minolta Nassenger 10 machines (Japan).
- One Reggiani ReNoir and one Reggiani Compact (Italy).

- **Pre and Post Processing Equipment**

The facility is equipped with advanced machinery including boilers, bleaching machines, hot air stenters, and fabric inspection machines.

- **Temperature Control Systems**

The production environment is maintained with over 150 tonnes of ductable air conditioning, ensuring optimal conditions for printing.

Strategic Partnerships

Krishna Alkali has established collaborations with design studios across Europe (Italy, France, UK) to stay updated with the latest trends and provide clients with innovative concepts.

Krishna Alkali has positioned itself as a reliable partner for businesses seeking high-quality printed fabrics. The company's focus on eco-friendly practices and customization aligns well with current market trends favouring sustainability.

Kankariya Textile Industries Private Limited

Kankariya Textile Industries Private Limited is a significant player in the textile manufacturing sector in India, known for its production of various fabric types and garments.

Company Overview

- Name: Kankariya Textile Industries Private Limited (KTIPL)

- Incorporation Date: December 1, 2006
- Type: Private Limited Company
- Headquarters: Ahmedabad, Gujarat, India
- Industry: Textiles

Kankariya Textile Industries was incorporated in 2006 and has built a strong reputation in the textile processing industry. The company is promoted by Mr. Prithviraj Kankariya and Mr. Mahavir Kankariya, who have over two decades of experience in grey cloth trading, processing, and export of textiles. KTIPL has diversified its operations and has been involved in the manufacturing of sarongs and processing fabrics for shirts on a job-work basis.

Product Portfolio

- **Sarongs:** The primary product manufactured by KTIPL.
- **Fabric Processing:** Includes printing, designing, and processing cotton grey fabric.
- **Job Work:** Processing of fabric for shirts, contributing to a portion of the company's total operating income.

Manufacturing Capabilities

The company operates a processing facility located in Ahmedabad with a total installed capacity of 23 million metres per annum (MMPA) as of March 31, 2021. KTIPL has in-house design capabilities that allow it to create new designs tailored to market trends.

The company exports its products to several countries, including Indonesia, Malaysia, Singapore, Thailand, and Dubai. This geographical diversification helps mitigate risks associated with domestic market fluctuations.

Kankariya Textile Industries Private Limited particularly known for its sarong manufacturing and fabric processing capabilities.

Financial Analysis of Digital Textile Printing Segment

Financial Snapshot	Kaytex Fabrics			Krishna Alkali Pvt Ltd			Kankharia Textile Industries			Shrijee Lifestyle Pvt Ltd		
INR Million	FY2022	FY2023	FY2024	FY2022	FY2023	FY2024	FY2022	FY2023	FY2024	FY2022	FY2023	FY2024
Total Income	823.44	993.44	1250.33	677.92	851.94	713.90	997.77	2144.96	1260.29	2,952.1	3,312.7	2,827.1
Revenue from Operations	822.58	991.88	1249.41	675.35	847.99	711.35	965.77	2141.68	1255.40	2,873.3	3,269.9	2,771.5
EBITDA	87.24	127.88	224.26	165.09	145.17	53.87	17.56	56.38	42.33	123.5	204.5	238.1
EBITDA Margin	10.6%	12.9%	18.0%	24.4%	17.1%	7.6%	1.8%	2.6%	3.4%	4.3%	6.3%	8.6%
PAT	39.22	55.91	113.08	86.88	88.46	25.10	0.68	4.66	7.60	11.8	36.8	30.8
PAT Margin	4.8%	5.6%	9.1%	12.9%	10.4%	3.5%	0.1%	0.2%	0.6%	0.4%	1.1%	1.1%
Operating Cash Flow	52.12	78.03	8.05	84.50	146.84	122.34	96.44	-33.06	176.81	111.5	185.0	239.8
Net Worth	155.5	211.4	335.5	546.99	633.44	658.55	275.86	280.52	288.12	1,260.0	1,296.8	1,985.3
Long Term Borrowing	118.15	155.60	184.69	21.18	9.81	1.10	24.25	22.00	16.40	529.1	624.4	519.4
Debt Equity Ratio	1.39	1.28	1.06	0.07	0.04	0.01	0.46	0.68	0.93	1.15	1.31	0.88
Return on Capital Employed	18.82%	22.72%	27.77%	21.3%	18.3%	5.5%	-5.2%	4.0%	4.8%	0.8%	3.3%	3.6%
Return on Equity	25.2%	26.5%	33.7%	15.9%	14.0%	3.8%	0.2%	1.7%	2.6%	0.9%	2.8%	1.6%
Return on Assets	6.4%	7.8%	11.8%	10.8%	10.1%	2.8%	0.1%	0.6%	1.2%	0.3%	0.9%	0.6%

Source: Company Annual Report, MCA

Competitive Profile: Fabrics

Raymond Lifestyle Limited

Company Overview

Raymond Lifestyle Limited (RLL) is a leading Indian fashion and retail company with a rich heritage dating back to 1925. Formerly a part of Raymond Consumer Care Limited, RLL was formed after the demerger of the lifestyle business from the parent company in September 2024. RLL is synonymous with class, elegance, and individuality, offering a diverse range of men's fashion products and services. The company has a dominant position in the worsted suiting business and a strong presence in branded apparel, garmenting, and high-value cotton shirting. RLL boasts a vast retail network across India and overseas, making it a prominent player in the Indian fashion industry.

Products and Services Offered

RLL's product portfolio encompasses a wide spectrum of men's fashion needs:

- **Branded Textiles:** RLL is a B2C brand for suiting and shirting fabrics, holding the highest market share in the worsted suiting fabric industry.
- **Branded Apparel:** The company offers ready-to-wear brands like Park Avenue, ColorPlus, Parx, Raymond Ready to Wear, and Ethnix, catering to formal, casual, and ethnic wear needs.
- **Garmenting:** RLL is a white-labeled integrated manufacturer and exporter of high-value clothing products like suits, jackets, and trousers.
- **High-Value Cotton Shirting:** The company operates a B2B business as a manufacturer of high-value shirting cotton fabrics, including premium cotton and linen.

Raymond Lifestyle Limited (RLL) benefits from several key strengths that solidify its market leadership. A dominant position in the suiting business, bolstered by a strong track record, established brand

image, and an extensive retail network, provides a solid foundation. Diversified revenue streams across branded textiles, apparel, garmenting, and high-value cotton shirting further contribute to RLL's financial stability. One of the largest retail store networks in India and overseas, encompassing The Raymond Shop (TRS) outlets, Made-to-Measure (MTM) stores, and exclusive brand outlets (EBOs), ensures broad market reach. The long-standing reputation of the Raymond brand for quality, style, and heritage has cultivated trust among consumers. Finally, RLL's integrated operations across the textile value chain, from yarn manufacturing to retailing, offer operational flexibility and opportunities for cost optimization.

Donear Industries Limited

Company Overview

Donear Industries Limited, established in 1977, is a leading player in the Indian textile industry, specializing in the production of high-quality fabrics for suiting and shirting. With a legacy of over 40 years, Donear has emerged as a domestic powerhouse, catering to a vast network of retailers and customers across India and globally.

Business Segments

Donear operates through several key segments:

- **Fabrics:** Offers a wide range of fabrics under various brand names such as Donear, Mayur, Ferrino Mizzoni and Eurico. The company is known for innovative finishes like wrinkle resistance and moisture absorbency.
- **Ready-to-Wear Collection:** Donear NXG and D'cot cater to the youth market with stylish ready-to-wear apparel.
- **Yarn Production:** Specializes in dyed polyester and cotton yarn, including space-dyed yarns that showcase exceptional quality.

Donear has a robust distribution network across India, with over 1 million retailers, including 30+ agents and 250 dealers. The company has established significant presence in the North and West regions of India and exports to more than 20 countries across five continents, achieving an annual export volume of approximately 6 million metres. The company is committed to continuous innovation in its product offerings. It has introduced unique concepts like combo boxes for gifting and maintains a strong focus on sustainability by acquiring relevant certifications for environmental responsibility. Donear's dyeing plant employs advanced technology to ensure high-quality production while minimizing environmental impact.

Donear caters to various industries, including automotive, aviation, defense, government bodies, and educational institutions. It provides customized solutions for corporate clients, ensuring quality uniforms for both blue-collar and white-collar workers.

Financial Analysis of Fabrics Competitors¹⁴

Financial Snapshot	Kaytex Fabrics			Raymond Lifestyle		Donear Industries		
(INR Million)	FY2022	FY2023	FY2024	Q2 2025	Q3 2025	FY2022	FY2023	FY2024
Total Income	823.44	993.44	1250.33	13,447.2	13,741.6	5,817.0	8,358.2	8,079.5
Revenue from Operations	822.58	991.88	1249.41	13,154.8	13,400.4	5,694.6	8,256.6	7,991.4
EBITDA	87.24	127.88	224.26	1,718.1	1,516.6	473.7	754.9	809.1
EBITDA Margin	10.6%	12.9%	18.0%	13.1%	11.3%	8.3%	9.1%	10.1%
PAT	39.22	55.91	113.08	261.4	532.9	227.7	362.4	347.1
PAT Margin	4.8%	5.6%	9.1%	2.0%	4.0%	4.0%	4.4%	4.3%
Operating Cash Flow	52.12	78.03	8.05	-	-	-244.2	39.6	706.7
Net Worth	155.5	211.4	335.5	94,783.3	95,355.0	1,358.9	1,710.6	2,045.5
Long Term Borrowing	118.15	155.60	184.69	2,000.0	-	145.4	225.7	138.7
Debt Equity Ratio	1.39	1.28	1.06	0.11	0.07	2.31	2.07	1.65
Return on Capital Employed	18.82%	22.72%	27.77%	1.2%	-	8.6%	12.7%	12.8%
Return on Equity	25.2%	26.5%	33.7%	0.3%	-	16.8%	21.2%	17.0%
Return on Assets	6.4%	7.8%	11.8%	0.2%	-	3.7%	5.5%	4.9%

Source: Company Annual Report

Competitive Profile: Garments

Kewal Kiran Clothing Limited

Company Overview

Kewal Kiran Clothing Limited (KKCL), established in 1981 and headquartered in Mumbai, India, is branded apparel manufacturer in the country. The company is renowned for its diverse range of clothing brands, including Killer, Lawman, Easies, and Integriti, which cater to both men and women.

Business Segments

KKCL operates primarily in the apparel sector with a focus on:

- **Branded Jeans and Casual Wear:** Specializing in denim and semi-formal wear.
- **Women's Apparel:** Including stylish kurtis and tops.
- **Innovative Fabrics:** Utilizing advanced manufacturing techniques for quality production.

Manufacturing Capabilities

Kewal Kiran Clothing boasts robust manufacturing facilities across multiple locations:

- **Production Units:** Located in Mumbai, Vapi (Gujarat), and Daman (Union Territory).

¹⁴ Raymond underwent a demerger in September 2024 and hence, two quarters of financials are available for this company which are unaudited. Hence, the performance before and after demerger is provided for reference. Some figures are left blank as these figures are unavailable

- **Capacity:** Produces over 3 million apparel pieces annually.
- **Certifications:** Facilities are ISO 9000 certified, ensuring adherence to international quality standards.

Pearl Global Industries Limited

Company Overview

Pearl Global Industries Limited (PGIL) is a garment exporter, specializing in the manufacturing, sourcing, distribution, and export of ready-to-wear apparel. Founded in 1987 and headquartered in Gurgaon, India, the company has developed a strong international presence with operations spanning multiple countries, including Bangladesh, Vietnam, and Hong Kong. PGIL provides end-to-end supply chain solutions to global fashion brands and corporate customers.

Business Segments

Pearl Global operates in various segments of the apparel industry:

- **Knits and Woven Garments:** Producing a wide range of clothing items.
- **Denim and Outerwear:** Specializing in denim apparel and outer garments.
- **Activewear and Athleisure:** Catering to the growing market for fitness and leisure clothing.
- **Children's Wear and Workwear:** Offering products across different demographics.

Manufacturing and Sourcing Capabilities

The company has established manufacturing facilities in India, Bangladesh, Vietnam, and China. It also operates fabric development centers in China and India, along with design teams located in key markets such as the UK, US, and Hong Kong. PGIL has a combined capacity to handle approximately two million garments per month through its warehousing and processing units in the UK and US.

Financial Analysis of Garments Competitors

Financial Snapshot	Kaytex Fabrics			Kewal Kiran Clothing			Pearl Global		
(INR Million)	FY2022	FY2023	FY2024	FY2022	FY2023	FY2024	FY2022	FY2023	FY2024
Total Income	823.44	993.44	1250.33	6,244.7	7,997.0	8,974.7	9,658.2	11,341.3	9,959.9
Revenue from Operations	822.58	991.88	1249.41	6,076.1	7,794.5	8,605.0	9,337.7	11,037.7	9,536.7
EBITDA	87.24	127.88	224.26	1,000.4	1,519.4	1,771.8	475.4	805.7	426.3
EBITDA Margin	10.6%	12.9%	18.0%	16.5%	19.5%	20.6%	5.1%	7.3%	4.5%
PAT	39.22	55.91	113.08	816.5	1,192.8	1,545.2	271.6	538.2	282.4
PAT Margin	4.8%	5.6%	9.1%	13.4%	15.3%	18.0%	2.9%	4.9%	3.0%
Operating Cash Flow	52.12	78.03	8.05	569.1	750.9	1,359.1	-233.366	907.7	622.8
Net Worth	155.5	211.4	335.5	4,781.9	5,474.2	6,766.0	3,434.8	3,808.6	3,741.3
Long Term Borrowing	118.15	155.64	184.69	0.0	0.0	0.0	833.4	577.8	583.3
Debt Equity Ratio	1.39	1.28	1.06	0.16	0.09	0.00	0.76	0.54	0.62
Return on Capital Employed	18.82%	22.72%	27.77%	16.8%	24.0%	24.4%	25.4%	24.2%	28.2%
Return on Equity	25.2%	26.5%	33.7%	17.1%	21.8%	22.8%	7.9%	14.1%	7.5%
Return on Assets	6.4%	7.8%	11.8%	11.0%	14.6%	18.4%	3.1%	6.9%	3.4%

Source: Company Annual Report. MCA

Company Profile – Kaytex Fabrics Limited

Kaytex Fabrics Limited is a textile manufacturer based in Amritsar, Punjab, India. Founded in 1996 by Shri Krishan Kumar Kandhari, the company has evolved into a modern textile processing house known for its high-quality fabrics and innovative manufacturing techniques. Kaytex Fabrics specializes in a wide range of textiles, including cotton, polyester, and blended fabrics.

Business Focus

Kaytex Fabrics' business focuses on three core pillars that define their strategic approach and market presence:

- **Brand enabler for other apparel brands:** Kaytex Fabrics works as a trusted partner for apparel brands, helping them create trendy and appealing products for their customers. By providing quality fabrics and innovative designs inspired by global trends, the company supports brands in building collections that connect with their target audience. Their expertise covers a wide variety of fabric types, allowing it to cater to both well-established market leaders and new brands trying to make a name for themselves. With a strong infrastructure and experience, the company takes care of product development and smooth execution, so brands can focus on their core strengths. This collaborative approach helps brands stay competitive and succeed in a fast-changing market.
- **Own Brands:** Kaytex Fabrics also has its own brands such as “Rasiya”, “Kaytex” and “Darbaar-e-Khaas”, primarily catering to North Indian markets with a growing presence in rural and semi-urban areas. By managing everything from fabric production to unstitched garments, the company ensures quality, stays updated with the latest fashion trends, and offers affordable prices that meet customer needs. These brands combine modern designs with quality, offering great value that appeals to a wide range of customers, specifically in Tier II and Tier III cities of Northern India. With the growing presence, Kaytex Fabrics has reached the hinterlands of Northern India, built brand recognition, and earned the trust of diverse customer groups.
- **Non-Branded Segment:** In the non-branded segment, Kaytex Fabrics caters to bulk buyers, wholesalers, and retailers by supplying quality fabrics and garments such as ready-to-stitch suits and accessories such as shawls and stoles without specific branding. This segment focuses on delivering solutions to customers who prioritize flexibility and cost efficiency. The ability to adapt to diverse market requirements and provide scalable solutions ensures the company remains a preferred supplier in the competitive textile industry.

The flexible business model allows Kaytex Fabrics to serve different market segments, offering both branded and cost-effective non-branded solutions. The company supports its own brands while also helping partner brands achieve their goals. This approach strengthens its position as a versatile,

innovative, and customer-focused company, capable of meeting the diverse and constantly changing demands of the textile and fashion industries.

Kaytex Fabrics leverages advanced technologies such as digital printing for vibrant, customizable designs, jacquard weaving for intricate patterns, computerized embroidery for precise detailing, and sustainable processing techniques to create eco-friendly fabrics. These innovations ensure high-quality, efficient, and versatile solutions tailored to meet the dynamic needs of the textile industry. Following are the key technologies that Kaytex Fabrics uses:

- **Digital Printing:** Digital printing has emerged as a groundbreaking innovation in the textile manufacturing industry, revolutionizing the way designs are applied to fabrics. This technology offers unmatched versatility, precision, and efficiency, catering to both mass production and niche markets. It is a process where digital designs are directly printed onto fabrics using advanced inkjet technology. Unlike traditional printing methods, such as screen printing, digital printing eliminates the need for screens or rollers, enabling faster setup times, reduced waste, and intricate design capabilities. Digital printing allows for highly personalized designs, offering unique patterns, gradients, and photographic-quality images and it can be applied to a variety of materials, including cotton, silk, polyester, viscose, linen, and blends, catering to diverse end-use applications. Further through this technology, complex patterns, sharp details, and vivid colours can be achieved with high resolution, making it ideal for premium and designer textiles. The technology enhances the appeal of apparels such as salwar suits, sarees, dress materials, and more by offering modern, intricate designs and is a quick trend adaptation, meeting the demands of fast-fashion consumers.
- **Weaving:** Weaving is one of the most essential processes in textile manufacturing, forming the structural foundation of fabrics. By interlacing two sets of yarn—warp (lengthwise) and weft (crosswise)—weaving produces a variety of fabric types, each characterized by its texture, strength, and appearance. The process of weaving includes:
 - Warp Preparation: The warp yarns are aligned and stretched on a loom to form the base of the fabric. This requires precision to ensure uniform tension and alignment.
 - Weft Insertion: The weft yarns are inserted across the warp using various techniques, depending on the type of loom or weaving method.
 - Interlacing: The interlacing pattern of warp and weft determines the weave type, which affects the fabric's strength, texture, and aesthetics.

Weaving is used to create a wide range of fabrics, including cotton, silk, polyester, viscose, and blends and is customisable with different weave patterns, such as plain, twill, satin, or jacquard. It

offers unique textures, drape, and durability, making them suitable for specific uses and catering to market such as fashion industry.

- **Jacquard:** Jacquard technology represents a significant advancement in textile manufacturing, enabling the creation of intricate patterns and designs directly into the fabric during the weaving process. It is widely used for fabrics, offering unmatched design capabilities and versatility. It involves the use of a specialized loom equipped with a jacquard attachment that controls individual warp threads. This allows for the production of complex, multi-coloured patterns and designs that are woven into the fabric, rather than printed or embroidered. Named after Joseph Marie Jacquard, who invented the loom in the early 19th century, this technology has evolved significantly with modern advancements, including computerized jacquard looms. Jacquard weaving is used to create fabrics for upholstery, drapery, and home décor, such as brocades, damasks, and tapestries. It is integral to high-end fashion, producing fabrics with intricate textures, patterns, and vibrant designs and can be applied to various materials, including silk, cotton, polyester, viscose, and blends, ensuring diverse fabric options.
- **Computerised Embroidery:** Computerised Embroidery has revolutionized textile manufacturing by enabling the addition of detailed and decorative designs to fabrics with exceptional precision and efficiency. It combines traditional artistry with modern advancements, creating visually stunning and high-quality embellishments that cater to diverse market needs. It involves the use of computerized or automated embroidery machines to create patterns, motifs, and textures on fabrics or garments. Unlike manual embroidery, modern machines are equipped with CAD (“**Computer-Aided Design**”) systems, allowing for the precise replication of designs in a fraction of time. Embroidery technology has expanded creative possibilities in both couture and ready-to-wear segments, making embellished fabrics more accessible. It has allowed personalized designs at scale, meeting the growing demand for unique and tailored products.
- **Dyeing and Processing:** Dyeing and processing are fundamental steps in textile manufacturing, transforming raw textiles into finished products that meet desired aesthetic, functional, and performance standards. These stages enhance the appearance, texture, and usability of fabrics while preparing them for further applications in fashion textiles. Dyeing is the process of applying colour to textiles using dyes that chemically or physically bond with the fibres. We use it at various stages of production, such as yarn and fabric stage. Whereas processing involves finishing techniques that improve the appearance, feel, and functionality of fabrics. It includes chemical and mechanical treatments applied after dyeing. Dyeing and processing are critical for the textile supply chain, ensuring that fabrics meet consumer expectations for colour, texture, and performance. These steps add significant value, from creating vibrant hues

to imparting functional properties that cater to diverse market demands, such as fashion, sportswear, or technical applications.

Kaytex Fabrics also has its in-house design team which is the creative driving force behind the trend-driven fabric solutions. This team comprises of designers and textile experts who stay at the forefront of global fashion trends, ensuring the products are always aligned with market demands. By leveraging advanced design tools, such as CAD software, and drawing inspiration from global fashion forecasts, the company's designers create unique patterns, textures, and designs that cater to a wide variety of customer preferences. The in-house design team plays a pivotal role in developing seasonal collections, ensuring that the company remains relevant in the fast-paced textile and fashion industries. From ideation to execution, the team collaborates with the production units to translate creative concepts into quality fabrics and garments. Their expertise extends across various styles and applications, including digital prints, jacquard weaves, and embroidered designs, allowing Kaytex Fabrics to offer a diverse portfolio of products. This team also works closely with its clients, including apparel brands and wholesalers, to develop customized designs that meet their specific requirements. Whether it's creating exclusive prints for a premium collection or producing culturally inspired patterns for regional markets, the design team continues to deliver tailored solutions that enhance the uniqueness of our customers' products. Additionally, the in-house team ensures that every design is optimized for production efficiency, balancing aesthetics with practical manufacturing considerations. Their ability to integrate creativity with technical know-how sets Kaytex Fabrics apart, enabling to offer fabrics and garments that are not only visually stunning but also commercially viable. Through their efforts, the company continues to deliver exceptional value, combining innovation, quality, and style to meet the evolving needs of its customers.

Product Profiling

Kaytex Fabrics operates primarily in the following segments:

- **Fabric Manufacturing**

The company produces a diverse range of fabrics, including:

- Cotton fabrics.
- Polyester fabrics.
- Viscose fabrics.
- Blended fabrics for various applications such as suiting, shirting, and uniforms.

- **Textile Processing**

- Kaytex Fabrics offers comprehensive textile processing services, including dyeing and printing. The company utilizes modern techniques to ensure high-quality finishes and vibrant colours.

Kaytex Fabrics produces a wide variety of fabrics, depending on capabilities, technology, and customer demands. The product range can include hundreds of variations depending on the combination of fibre, weave, texture, finish, and application. Following are the few types of fabrics the company currently produces at its manufacturing units:

- **Digital Printed Fabrics:** Kaytex Fabrics specializes in digitally printed fabrics, offering a wide range of products designed to meet the diverse needs of its customers. Digitally printed fabrics are available in vibrant colours, different patterns, and high-resolution designs, catering to industries such as fashion apparel, home textiles (curtains, upholstery, and bed linens), etc. Using advanced digital printing technology, the company ensures precision, customization, and eco-friendly production, delivering fabrics with quality, sharp details, and durability.
- **Jacquard Fabrics:** Kaytex Fabrics specialize in manufacturing high-quality jacquard fabrics, including detail designed shawls and stoles, tailored to meet the diverse needs of customers. These jacquard fabrics are known for their patterns, textures, and durability, making them ideal for industries such as fashion apparel, home textiles, and accessories. Advanced jacquard weaving technology can create intricate and multi-coloured designs directly into the fabric, offering a blend of tradition and modernity.
- **Corduroy Fabrics:** The corduroy fabrics are manufactured to meet the diverse needs of customers across various industries. Known for their distinctive ribbed texture, durability, and versatility, these corduroy fabrics are ideal for applications in fashion apparel, including jackets, trousers, as well as home textiles like upholstery and cushion covers. Using advanced manufacturing techniques, these corduroy fabrics are produced in a variety of weights and patterns.
- **Dobby Fabrics:** Known for its unique geometric patterns, rich textures, and durability, dobby fabrics are ideal for a wide range of applications, including fashion apparel such as shirts, dresses, and ethnic wear, as well as home textiles like upholstery, curtains, and table linens. Produced using dobby weaving technology, these fabrics feature intricate, raised designs that add depth and sophistication to the material. Available in various fibres, colours, and finishes, the dobby fabrics crafted offer a balance of style, functionality, and quality.
- **Garments:** Garment section offers ready-to-stitch suits and accessories such as shawls and stoles. Ready-to-stitch suits are made from quality fabrics with modern designs, patterns, and a wide range of colours. They are perfect for traditional wear, casual occasions, and formal events, giving customers the flexibility to tailor garments to their personal style. By combining current fashion trends with craftsmanship, the ready-to-stitch suits offer style, comfort, and great value, in semi-urban and rural markets of North India.

Financial Snapshot

Kaytex Fabrics Limited	FY 2022	FY 2023	FY 2024
(INR Million)			
Operating Revenue	822.58	991.88	1,249.41
Finance Cost	23.0	28.2	39.3
EBITDA	87.2	127.9	224.3
PAT	39.2	55.9	113.1
Net Worth	155.5	211.4	335.5
Long Term Borrowing	118.2	155.6	184.7
Debt Equity Ratio	1.39	1.28	1.06
Return on Assets	6.4%	7.8%	11.8%