

## ANTICIPATING DESIGN EVOLUTION IN FUTURE TEXTILE TRENDS

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### Abstract

The field of forecasting future design directions plays a critical role in guiding innovation and shaping the creative landscape across industries. Understanding design evolution is essential for anticipating trends and navigating future challenges. Designers, by studying historical movements and techniques, gain insights into recurring themes that may resurface in modern contexts. This knowledge allows them to innovate while staying true to the spirit of the times. Sustainability has emerged as a vital focus, pushing designers to adopt eco-friendly materials and methods. Technological advancements, like smart textiles and digital fabrication, are revolutionizing design possibilities, offering new avenues for functionality and customization. As designers embrace a balance of innovation, tradition, and sustainability, they pave the way for a future that merges creativity with responsibility, enhancing both product impact and audience connection.

**Keywords:** future design trends, design evolution, sustainability, innovation, smart textiles, traditional techniques, eco-friendly materials.

### INTRODUCTION

In the area of design, the concept of "Future Design Trends" is crucial as it guides innovation and creativity across various industries. Understanding the importance of design evolution is the key, as it helps anticipate and adapt to upcoming trends. Design evolution refers to the continuous development and transformation of design principles, styles, and techniques over time. The knowledge of design history serves as a compass for designers, providing them with inspiration and insights from past design movements, styles, and innovations. Designers can identify recurring themes, motifs, and design philosophies that may resurface in contemporary design trends.

By understanding the rich history of design and its influence on modern practices, designers can navigate the constantly changing design landscape with clarity and vision. This allows them to create innovative solutions that truly capture the spirit of the times and resonate with their audience. As sustainability becomes a core focus, designers are increasingly integrating eco-friendly materials and practices into their work, paving the way for a more responsible fashion industry. Innovations such as smart textiles and digital printing are revolutionizing the way fabrics are created and utilized, offering endless possibilities for customization and functionality. Additionally, the revival of traditional techniques, combined with modern aesthetics, is expected to enrich the textile landscape. By embracing these shifts, the future of textile design promises to be a harmonious blend of creativity, sustainability, and cultural heritage, shaping a vibrant and dynamic industry.

## **TEXTILE DESIGN**

Indian textile design is highly esteemed globally, with its intricate patterns, vibrant colors, and distinctive techniques at the heart of traditional Indian craftsmanship. The history of Indian textile design is as captivating and intricate as the fabrics it has produced. Dating back to ancient times, the art of spinning, weaving, and dyeing has woven a rich tapestry of design and technique that remains a source of inspiration to this day<sup>1</sup>.

The history of textiles in India is one of the oldest globally, with cotton threads dating back to around 4000 BC and dyed fabrics from the region documented as early as 2500 BC. Indian textiles were so integral to the country's identity that the very name 'India' was synonymous with 'cotton' in ancient Greece and Babylon, reflecting the deep-rooted significance of this craft in the nation's cultural fabric<sup>2</sup>.

The history of Indian textile design is marked by influential eras - the Mughal period introduced a deep appreciation for fine art and aesthetics, while the colonial era brought mechanization and new textiles but also the decline of traditional techniques. Post-independence, there was a revival of these age-old crafts, with initiatives to preserve and promote them, leading to a fusion of traditional and modern design elements that ushered in a new era of Indian textile design<sup>1</sup>.

## **The Future of Textile Design**

Design involves problem-solving and driving change, creating innovative solutions that emphasize both aesthetics and usability. It aims to address challenges while producing functional and visually appealing outcomes. Designers draw inspiration from their surroundings, including lifestyle, climate, and cultural and political influences, which can lead to diverse interpretations and meanings in their designs. Textiles convey their values and beliefs through the choice of materials and the time invested in their creation; the more intricate and time-intensive the process, the greater the significance and quality of the finished product<sup>3</sup>.

In the dynamic world of textile design, staying ahead of evolving trends is essential for capturing audience interest and maintaining industry relevance. Today, textile trends transcend mere aesthetics, encompassing profound influences from socio-cultural dynamics, technological advancements, sustainability imperatives, and the revival of traditional techniques. These factors collectively shape the future landscape of the textile industry, guiding designers towards innovative approaches that merge creativity with ethical responsibility. As the demand for eco-friendly materials and culturally resonant designs grows, textile designers are increasingly challenged to blend tradition with innovation, forging a path that honors heritage while embracing the possibilities of modern technology and global connectivity<sup>4</sup>.

### **✓ SOCIO-CULTURAL INFLUENCE**

Culture is a profound influence on the textile and fashion industry's design decisions. Designers frequently draw inspiration from a wide range of cultural sources, including traditions, historical references, and diverse global influences. This cultural inspiration is a driving force behind the creative process, shaping the aesthetic, symbolism, and craftsmanship reflected in the garments they design.

India's cultural heritage is deeply intertwined with its textile and handicrafts industry, which serves as an essential part of the nation's cultural legacy. This industry not only represents the country's diverse cultural identity but also provides a livelihood for millions of artisans, showcasing the richness and vibrancy of Indian culture. Each state in India has its own unique craft and style, reflecting the influence of historical events such as the Mughal era, the British Raj, and the Indian freedom movement. India's textile heritage has been shaped by cultural and historical interactions with regions like Persia, Greece, China, Central Asia, and Europe. Many

of India's renowned textile crafts have their roots in ancient and medieval periods, reflecting the diverse influences that have contributed to its rich textile legacy<sup>5</sup>.

Textile artisans craft local fibers into unique, functional clothing, often in limited editions due to direct control over production. This flexible, customized approach connects regional traditions with global markets. Communities of artisans use local materials and aesthetics, integrating socio-cultural traditions to create widely used, meaningful societal objects<sup>6</sup>.

Iconic Indian textile crafts include Dabu, Indigo, Kalamkari, Banarasi, Ajrak, Ikat, Bagh, Kantha, Chanderi, Chikankari, Bandhani, Phulkari, Patola, Pashmina, and Khadi. Each craft, reflects the artisans' creativity and skill through weaving, embroidering, embellishing, dyeing, printing, and painting.

India's skilled artisans have mastered distinctive weaving styles influenced by regional, environmental, and cultural factors, allowing them to create intricate textile material and home décor using handlooms. Their spectrum includes techniques like screen printing, block printing, batik, and tie-and-dye, which reflect the diversity and richness of India's textile heritage<sup>5</sup>.

The textile design process involves creating patterns and textures for fabrics through techniques like weaving, printing, and dyeing, blending creativity and technical skills to produce unique, functional, and aesthetically pleasing materials. The design process is greatly influenced by socio-cultural factors, including demographic trends, societal preferences, and cultural aesthetics.

1. **Demographic trends**, such as aging populations or increasing urbanization, can significantly influence the development of textile designs. For aging populations, designs may incorporate larger motifs, softer color palettes, and easy-to-wear materials that prioritize comfort and accessibility. On the other hand, urbanization trends might inspire more modern, sleek designs with bold colors and contemporary motifs that appeal to younger, city-dwelling consumers. By understanding these demographic trends, designers can tailor their choices in patterns, colors, and fabrics to meet the specific preferences and needs of their target markets, ensuring greater relevance and appeal.
2. **Cultural aesthetics**, which encompass the preferred tastes, styles, and artistic expressions unique to a particular culture or society, play a crucial role in guiding textile designers. By understanding and incorporating these cultural preferences, designers can create fabrics and

patterns that resonate deeply with specific communities. This approach ensures that the designs are culturally sensitive and appropriate, reflecting the heritage, traditions, and values of the society. It also fosters a sense of identity and pride among consumers, making the textiles more meaningful and relevant to their daily lives.

3. **Understanding the values and beliefs** of different societies can guide ethical decision-making in the design process. This insight helps designers select sustainable or fair-trade materials, ensuring their creations align with the cultural emphasis on environmental responsibility and social justice, ultimately fostering trust and respect within diverse communities.
4. **The rise of social media** has accelerated the global exchange and influence of design trends, creating immense pressure on designers to rapidly produce innovative and trendy designs. This fast-paced environment demands constant creativity and agility, as designers must quickly adapt to shifting preferences and maintain relevance in a highly competitive market.
5. **Fashion trends** serve as reflections of societal shifts and cultural movements. Designers must remain attuned not just to textile trends, but also to developments in fashion, interior design, and visual arts. This awareness enables them to integrate evolving influences into their work, ensuring their designs resonate with contemporary sensibilities and maintain relevance across diverse creative disciplines<sup>7</sup>.

#### ✓ **TECHNOLOGICAL INNOVATIONS**

Technological innovation has profoundly influenced textile design, revolutionizing both the creative process and the final products. Advancements such as computer-aided design (CAD) software, digital printing technologies, and smart textiles have expanded the possibilities for designers to create intricate patterns, personalized textiles, and functional fabrics with enhanced performance qualities<sup>8</sup>.

These innovations not only accelerate the design process but also enable more sustainable practices through reduced waste and energy consumption. Moreover, developments in nanotechnology have introduced fabrics with properties like moisture-wicking, UV protection, and antimicrobial features, catering to modern consumer demands for both style and functionality<sup>9</sup>.

From the creation of breathable and lightweight fabrics to the embrace of eco-friendly, non-toxic dyes, the Indian textile sector are undergoing a transformative shift. These technological breakthroughs not only enhance the performance and sustainability of textile products but also pave the way for a future where fashion and function coexist in perfect harmony. By blending traditional artistry with the power of modern innovation, the textile industry in India is weaving a tapestry of progress that captivates both consumers and industry professionals alike. This topic promises to shed light on the exciting advancements that are shaping the future of textiles, inspiring designers, manufacturers, and enthusiasts to explore smart fabrics, the use of non-toxic dyes, use of ARVR, virtual try on technology and other transformative weaving and knitting technologies<sup>10</sup>.

## **INNOVATIVE BREAKTHROUGHS IN TEXTILE DESIGN**

### **Breathable Fabrics**

Breathable fabrics have revolutionized the pursuit of comfort and functionality. These materials offer exceptional comfort and a variety of benefits. The key to their breathability is in their composition, often utilizing natural fibers like cotton or bamboo, or advanced synthetic materials<sup>11</sup>.

Plant-based fabrics, such as cotton, linen, and bamboo, along with animal-based fabrics like silk and wool, are highly breathable. This makes them ideal for clothing and bedding as they allow easy air circulation, wick away perspiration, and help keep the body cool. In contrast, synthetic fabrics are produced using chemical treatments and construction methods aimed at mimicking breathability by pulling moisture away from the body<sup>12</sup>.

The secret to Breathable Fabric's outstanding breathability is its microstructure. The fabric is designed with tiny micropores that are strategically placed to allow air molecules to pass through. These micropores act like small channels, letting fresh air in and pushing warm, moist air out. This continuous air exchange helps control temperature and prevents overheating, making it perfect for hot and humid environments<sup>11</sup>.

The fabric industry has advanced its technology to produce lightweight, breathable fabrics that are also waterproof, allowing individuals to engage in physical activities comfortably for longer durations without needing to change clothes. Currently, there are three main methods to create breathable waterproof fabrics: high-density woven fabrics, coated fabrics, and laminated fabrics.

Waterproof and breathable fabrics are widely used in various applications, including but not limited to Outdoor Gear, Construction materials, Medical and Sportswear<sup>13</sup>.

### **Non-Toxic Dyes**

Non-toxic dyes, made from natural ingredients like plants, fruits, and minerals, are free from harmful substances, making them safe for humans and the environment. These dyes offer vibrant, long-lasting colors that resist fading. They minimize pollution during production, support sustainable farming, promote biodegradability, and reduce the fashion industry's carbon footprint. Additionally, they are gentle on the skin, reducing the risk of allergies and adverse reactions<sup>14</sup>.

Non-toxic dyes are classified based on their sources: vegetable, animal, and mineral<sup>15</sup>.

### **Smart Fabrics**

Smart textiles, or smart fabrics, are woven materials embedded with digital components like batteries, sensors, or electronic chips. These fabrics can regulate body temperature based on weather conditions or protect users from environmental hazards like radiation. The digital components are integrated during the garment's manufacturing process<sup>16</sup>.

These innovations, including temperature-regulating clothing and wearable health monitors, revolutionize our interaction with garments. In India, they are paving the way for comfortable, high-performance clothing that adapts to wearer needs. Smart textiles, also referred to as electronic textiles or e-textiles, integrate advanced technologies to offer functionalities beyond traditional fabrics. Examples include thermochromic fabrics that change color with temperature, conductive fabrics transmitting electrical signals, and self-healing materials repairing punctures. Other innovations include photochromic textiles reacting to light, pressure-sensitive fabrics with medical and interactive uses, shape memory textiles in aerospace and fashion, and water-resistant, breathable fabrics for outdoor wear. Illuminated fabrics with LEDs, temperature-regulating materials in activewear, and antimicrobial treatments in medical and active wear further highlight their diverse applications<sup>17</sup>.

### **Sustainable Manufacturing**

Sustainable manufacturing involves producing goods using economically viable processes that reduce environmental harm, conserve energy, and preserve natural resources. It entails creating products with full life-cycle considerations and using processes that minimize environmental

impacts, consume minimal materials, energy, and resources, ensure safety for all stakeholders, and are economically viable and socially beneficial<sup>18</sup>.

### **3D Knitting and Printing**

3D printing is rapidly expanding across diverse industries from medicine, aerospace, to design, and construction, driving constant advancements and innovations. 3D printing empowers fashion designers to create unique, customized pieces for customers with faster turnaround. Designer Rosanne van der Meer, also founder of New Industrial Order defines “3D printing as the machine-driven production of *a three-dimensional shape* from filament material. 3DFashion's 3D printing technology enables direct-to-textile printing of vibrant, illusionary designs for innovative garments, footwear, and luxury accessories<sup>19</sup>.

3D printed textiles are created by layering material onto fabric from digital designs, allowing precise control and reducing waste. A European Commission study found 3D printing could save up to 90% of natural resources, often using recycled plastics. This method also eliminates excess inventory by producing items on demand, minimizing waste from unsold garments<sup>20</sup>.

There are many applications of 3D Printing in Fashion like 3D printed fabric and cloths, 3D printed shoes, 3d printed jewelry and accessories.

However, the primary materials used in 3D printing, such as plastic and metal, lack flexibility. To address this issue, fashion and 3D enthusiasts have explored alternatives and found a promising solution: 3D knitwear<sup>19</sup>.

3D knitting utilizes computer-controlled machines to create entire garments with a seamless, three-dimensional structure. Also called whole garment knitting, this method involves directly knitting yarn into a single, seamless piece, eliminating manual cutting and sewing processes.

The digital textile printing system is predicted to grow at a CAGR of 12.2% from 2023 to 2033, reaching a global market worth of about \$8,545.1 million by that time. This indicates a major change, despite the increased prices<sup>21</sup>.

### **Nanotechnology In Textiles**

Nanotechnology is introducing a microscopic revolution in textiles. Increasing demand for sustainable, durable apparel has created an opportunity to integrate nanomaterials into textiles<sup>22</sup>.



Nanotechnology deals with materials on the nanometer scale, where properties drastically change at small dimensions<sup>23</sup>.

Nanofibers are produced by electrospinning and split spinning, while nanoparticles are coated using techniques like sol-gel and plasma polymerization. Nanocomposites with nanometer-scale components enhance textile properties, enabling smart textiles with improved electrical, mechanical, optical, and biological capabilities<sup>24</sup>.

Nanomaterials also offer a wider application potential to create connected garments that can sense and respond to external stimuli via electrical, color, or physiological signals. Incorporating nanoparticles or nanofibers into clothing and fabrics enhances properties without significantly increasing weight, thickness, or stiffness. Nanoparticles can impart static elimination, stain resistance, electrical conductivity to fibers and wrinkle resistance, without compromising their comfort and flexibility<sup>22</sup>.

Nano-fibers exhibit remarkable properties, including efficient filtration, high surface area, high permeability, and thin layers. These fabrics can effectively filter out toxic gases, pathogens (bacteria, viruses), and other harmful airborne substances, making them highly versatile and functional<sup>24</sup>.

Nanotechnology enables new functionalities like energy storage and communications in textiles. Examples include stain/wrinkle-resistant threads, temperature-responsive warmers, and odor-resistant socks. Nano-enhanced textiles gain properties like water/soil repellence, anti-bacterial, UV-protection, and self-cleaning abilities<sup>23</sup>.

### **Artificial Intelligence in Design**

Artificial Intelligence (AI) has found its place in textile design, optimizing patterns, and predicting trends. Artificial Intelligence (AI) and Machine Learning (ML) play pivotal roles in the landscape of production and quality control. Their integration enhances supply chain management, anticipates market trends, and improves manufacturing efficiency. Artificial intelligence (AI) enhances designers' creativity by managing routine tasks, allowing designers to focus on generating ideas. AI acts like a virtual assistant, taking care of the small details so designers can concentrate on their creative work<sup>21</sup>.

### **Biodegradable Textiles<sup>25</sup>**

In response to increasing concerns over textile waste, biodegradable fabrics are becoming more prominent. Advances in material science have enabled the creation of textiles that naturally decompose, significantly reducing environmental impact. This shift includes the use of organic cotton and plant-based fabrics, aligning with circular fashion principles. The industry is moving towards sustainable materials that not only minimize waste but also promote a more eco-friendly lifecycle for garments, emphasizing the importance of reducing, reusing, and recycling in fashion. Biodegradable fabrics are those that naturally decompose. Various plant-based options include hemp, cotton, abaca, bamboo, lyocell (TENCEL), ramie, and jute.

### **Virtual Try-On Technologies**

Virtual try-on is a revolutionary technology that empowers consumers to visualize and experience products, particularly in the fashion industry, without the need for physical interaction. Powered by augmented reality (AR) and specialized visors, this immersive solution enables a 360-degree experiential journey, allowing users to make informed purchasing decisions conveniently, even from the comfort of their own homes. This cutting-edge technology streamlines the decision-making process and enhances the overall shopping experience, revolutionizing the way we approach product exploration and acquisition<sup>26</sup>.

Virtual Try-On (VTO) technology has revolutionized the way we shop, allowing us to experience fashion like never before. With just a few taps on an app or website, you can virtually slip into a pair of stylish sneakers, don a sleek pair of sunglasses, adorn yourself with chic jewelry, apply captivating makeup, or even drape yourself in a stunning formal gown – all from the comfort of your own home. This virtual shopping experience has truly flourished during the pandemic, as physical retail stores were forced to keep their dressing rooms closed. As online shopping habits skyrocketed, VTO technology emerged as a game-changer, enabling consumers to explore and experiment with fashion in a seamless, immersive manner, without the hassle of in-person visits<sup>27</sup>.

### **✓ SUSTAINABLE AND ECO-FRIENDLY DESIGN<sup>28</sup>**

In today's rapidly evolving world, the pursuit of sustainability has become an imperative, shaping the way we approach product and service design. At the heart of sustainable design lies

the consideration of a product's entire lifecycle, from its manufacturing to its eventual disposal or reuse.

Sustainability is delivering things required by humans without causing disturbance to natural balance and future generation and also to reproduce in beneficial ways. Similarly sustainable textile design is redefining the industry, paving the way for a more responsible and regenerative era of fashion and home furnishings. The textile industry, long recognized for its environmental impact, has undergone a profound transformation with the integration of sustainability principles. Designers are now embracing eco-friendly materials, innovative production methods, and circular design approaches to create textiles that minimize waste, conserve resources, and promote a greener future. Sustainability in textile designing considers environmental issues. It identifies the environmental concerns and also the responsibility of a designer in showing the required modifications in designing.

In her book, Kate Fletcher emphasizes that designers must always consider environmental and ethical impacts when creating collections. They need to understand how their choices affect people, animals, and nature. By opting for sustainable fabrics, designers can create durable, eco-friendly clothing that protects rainforests and reduces pollution. Sustainable fashion involves making mindful decisions to positively impact people and the planet, both now and in the future.

### **REVIVAL OF LOST TECHNIQUES<sup>1</sup>**

Textile designing plays a crucial role in the revival of lost techniques, bridging the gap between traditional craftsmanship and modern aesthetics. Many ancient textile methods, such as hand weaving, natural dyeing, and intricate embroidery, have been overshadowed by industrial production. However, contemporary designers are rediscovering these techniques, infusing them with innovative approaches that celebrate cultural heritage.

Many traditional Indian textile techniques have unfortunately been lost to time, fading into obscurity as modern manufacturing processes took precedence. However, with a growing interest in preserving cultural heritage, these forgotten techniques are experiencing a remarkable resurgence. As designers and consumers alike seek authenticity and uniqueness in their fashion choices, we can expect to see more traditional crafts like phulkari and kalamkari making a significant impact in mainstream fashion. These vibrant, handcrafted textiles not only showcase

the rich history of Indian artistry but also resonate with contemporary values of individuality and craftsmanship.

### **Conclusion**

The future of traditional Indian textile design looks both promising and exciting. The harmonious blend of age-old traditions with modern sensibilities, coupled with a strong move towards sustainability, signals a new era for Indian textiles. This revival of lost techniques, along with the emphasis on eco-friendly practices, indicates a vibrant future where heritage and innovation coexist beautifully. So, keep an eye out—you might just spot the next big trend emerging from this dynamic world of textiles.

In essence, textile designing serves as a vital conduit for revitalizing lost techniques, ensuring that cultural narratives and artisanal skills are preserved for future generations. This revival not only enriches the fashion landscape but also fosters a deeper appreciation for craftsmanship, sustainability, and the stories woven into every fabric. By embracing these traditional methods, the industry can create a more ethical and culturally aware future, where the past informs the present and inspires the next generation of designers and consumers alike.

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