The Impact of Artificial Intelligence on the Fashion Industry

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Abstract
India's fashion industry is undergoing a remarkable transformation driven by technological advancements, sustainability, and dynamic customer demands. Csanák (2020) explored the significant role of artificial intelligence in design, production, and consumption, particularly with advancements under Industry 4.0 and 5.0. The present research explores key trends shaping the future of fashion in India, including the online fashion boom, AI-driven design, and the increasing emphasis on ethical and eco-friendly practices. The amalgamation of traditional craftsmanship, weaves, designs and fabrics with recent technological advancements and modern innovations has created significant impact in both domestic and global markets. Additionally, the growing influence of Gen Z and millennial consumers, along with rapid e-commerce expansion and influence-driven marketing, is reshaping the retail landscape. This study examines consumer perception regarding AI tools in the fashion industry through a pilot study with 150 youth respondents. The theoretical constructs examined are the "Technology Acceptance Model" and "Theory of Planned Behaviour." The pilot study serves as a foundation for future research on AI adoption in India's fashion industry, which is positioned to become a global hub for innovative and sustainable fashion.
*Keywords-*Fashion industry, sustainable fashion, digital transformation, e-commerce, Indian textiles, future trends.

I. Introduction

The Indian fashion industry is undergoing rapid changes due to evolving consumer preferences, digital innovation, and sustainability concerns. As the world's fifth-largest fashion market, India is positioned to take a leading role in shaping global fashion trends. The fusion of traditional craftsmanship with modern technology and artificial intelligence is transforming how brands engage with consumers. This research examines the evolving landscape of India's fashion sector, focusing on technological advancements, sustainable initiatives, and changing consumer behaviour. The study highlights the growing acceptance of customization, personalization, and AI-driven predictive fashion models in India.

Review of Literature

2.1 Evolution of the Fashion Industry The early Georgian era, characterized by grand and formal aesthetic wear, reflected opulence and served as a symbol of status and wealth. It featured elaborate ornamentation and details reflecting elegance and sophistication. Fabrics and designs were hand-crafted, reflecting the expertise of weavers and craftsmen. The industrial revolution introduced mass production of fabric. The early twentieth century brought change through emancipation movements, resulting in practical clothing for women. The twentieth century thus witnessed

changes in both production and consumption methods. The seventies saw the boho hippy fashion designs emerge as a revolutionary concept. The fashion industry was not isolated from growing consumerism, with large production volumes and innovative designs flooding global markets. Increased purchasing power and information technology advancements gave people greater access to worldwide fashion trends. The fashion landscape experienced a vibrant era of experimentation and adaptation to growing consumer expectations.
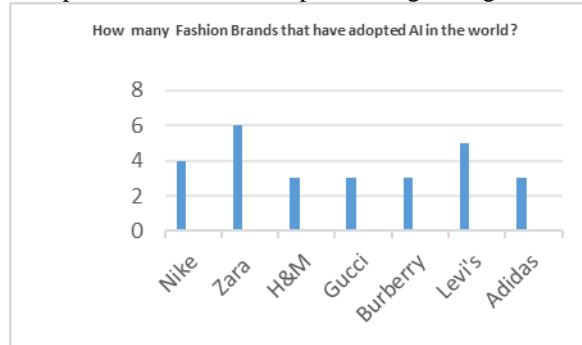
Figure 1. Adoption of AI by Fashion Brands

Technology adoption accelerated across the industry. From fabric types to patterns, designs, and accessories, all witnessed improved production methods. Advanced technologies gave significant momentum to fashion advancement. Industry leaders recognized tremendous potential and swiftly incorporated new technologies into production processes.

2.2 Evolution of the Indian Fashion Industry

The Indian fashion industry has witnessed significant transformations over recent decades. In the early 1990s, economic liberalization brought international brands such as Benetton and Levi's to the Indian market. The early 2000s saw the rise of Indian fashion designers like Sabyasachi Mukherjee and Manish Malhotra, who blended traditional craftsmanship with contemporary styles. According to a report by the Indian Brand Equity Foundation (IBEF), the Indian textile and apparel industry was valued at $108 billion in 2020 and is projected to reach $190 billion by 2025. The Indo-fusion trend has gained prominence, with designers integrating traditional fabrics like Banarasi silk and Chikankari with modern silhouettes.

2.3 E-commerce and Digital Transformation

The digital revolution has reshaped the Indian fashion retail sector. Myntra, one of India's largest fashion e-commerce platforms, reported a 51% increase in sales in 2021 during its annual festive sale. By 2023, the Indian online fashion retail market was valued at $22 billion, accounting for 20% of total fashion sales in the country. AI-based recommendations and virtual try-on technologies have become mainstream, with Reliance's Ajio reporting a 40% boost in consumer engagement after integrating AI-powered styling suggestions. Social commerce has also expanded, with Instagram Shopping contributing to over 30% of online fashion purchases in India in 2022.

2.4 Sustainability and Ethical Fashion

India's sustainable fashion market has expanded rapidly due to increasing consumer awareness. A 2021 survey by the Fashion Design Council of India (FDCI) revealed that 67% of Indian consumers prefer eco-friendly clothing. Major brands such as FabIndia and B Label (by Bombay Hemp Company) have introduced biodegradable and organic fabric lines. The Indian government's 'Make in India' initiative, launched in 2014, has also encouraged local textile production, reducing dependence on fast fashion imports. By 2025, the sustainable fashion market in India is expected to grow at a CAGR of 10%, with a shift towards ethical sourcing and zero-waste designs. Designs using multiple fabrics, shades and colors are particularly popular in domestic and global markets.

2.5 Influence of AI and Smart Technologies

AI and smart technologies have revolutionized fashion design and retail. By 2022, AI-powered trend forecasting reduced inventory waste by 35%, optimizing supply chains for major retailers like Tata Cliq. Blockchain-based transparency in the supply chain has gained momentum, with brands like Raymond and Aditya Birla Fashion adopting traceability solutions in 2021. The global smart textile market, including AI-integrated clothing, was valued at $2.5 billion in 2023 and is expected to grow to $6.5 billion by 2028, influencing wearable fashion innovations in India.

2.6 Role of Social Media and Influencer Marketing

Social media has become a powerful force in the Indian fashion industry. According to a 2023 report by Influencer Marketing Hub, 89% of fashion consumers in India discover brands through Instagram and TikTok. Micro-influencers (10,000--50,000 followers) generate 22% higher engagement rates compared to celebrity endorsements. Nykaa Fashion, a leading online fashion retailer, saw a 38% increase in sales through influencer-led campaigns in 2022. Live-streaming shopping, a trend that gained traction in 2021, is expected to contribute $5 billion to Indian fashion retail by 2026. Social media has profound influence on youth, a major market segment for the fashion industry.

2.7 Research Gap

Limited research exists on how new technologies, changing consumer choices, and sustainability are shaping India's fashion industry. A study by Gupta & Sharma (2020) showed that only 30% of Indian fashion brands were using artificial intelligence in design, leaving room for growth. Research by Mehta et al. (2021) found that interest in sustainable fashion grew by 60% from 2018 to 2021, but few brands had fully adopted ethical production methods. A report by the Fashion Industry Research Council (2022) stated that Gen Z consumers will make up more than 50% of fashion buyers by 2025, yet this demographic has not been fully addressed through adequate business strategies. This study aims to fill these gaps by exploring these trends and their influence on the future of fashion in India.

II. Objectives

3.1 Understanding Technological Advancements in Fashion

To analyze how artificial intelligence, machine learning, and automation are transforming the design, production, and retail aspects of the Indian fashion industry. This includes an in-depth look at digital pattern-making, AI-assisted color predictions, and automated manufacturing.

3.1.1. AI in Fashion Design
A 2024 study highlighted the integration of artificial intelligence in fashion design, emphasizing its role in trend forecasting and virtual clothing simulation (Adekunle, 2024).

3.1.2. Automated Manufacturing
Research from 2023 discussed the impact of automation in textile production, noting significant advancements in manufacturing processes.

3.2 Evaluating E-commerce and Social Media Influence
To examine the role of digital transformation, social commerce, and influencer-driven marketing in shaping consumer preferences and purchasing decisions. The study explores live-stream shopping trends, virtual trial rooms, and personalized fashion recommendations.

3.2.1 Live Commerce Trends
In 2023, 54% of Indian consumers indicated that live commerce aids in addressing queries related to product returns and warranties during online shopping.

3.2.2. Virtual Trial Rooms
A 2023 study introduced "Apparel 360°," an augmented reality-based virtual trial room, enhancing the online shopping experience.

3.2.2 Personalized Recommendations
Research from 2023 explored AI-powered fashion recommender systems that analyse user preferences to provide personalized clothing suggestions.

3.3 Assessing the Integration of Traditional Craftsmanship

To study how Indian designers are blending heritage craftsmanship with contemporary designs to appeal to both local and global markets. The research highlights case studies of brands that successfully integrate regional embroidery techniques with modern silhouettes.

3.3.1 Artisans' Adaptations
A 2024 comprehensive study examined the experiences of traditional artisans across India, focusing on their challenges and adaptations in merging traditional techniques with modern demands.

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3.4 Investigating Sustainability in Fashion

To explore how sustainability is influencing material selection, production processes, and consumer attitudes towards ethical fashion. The study also examines the effectiveness of circular fashion initiatives and eco-conscious packaging solutions.

3.4.1   Sustainable Fashion Perception
A 2023 analysis highlighted the evolving perceptions of sustainable fashion among Indian consumers, driven by increased awareness of environmental and social impacts.

3.4.2   Circular Fashion Challenges
Research from 2023 identified challenges hindering the adoption of circular economy practices in the Indian fashion industry.

3.4.3   Eco-conscious Packaging
A 2022 paper traced initiatives by Indian apparel manufacturers in creating sustainable packaging and managing packaging waste.

3.5   Identifying Key Drivers for Future Growth

To evaluate market trends, economic factors, and government policies that are likely to influence the future trajectory of India's fashion industry. The research also considers how digital transformation and international trade agreements shape India's fashion exports.

3.5.1.   Market Growth Potential
An October 2024 report analyzed how the Indian fashion industry can unlock its growth potential, emphasizing market trends and consumer behavior.

3.5.2.   Government Policies
A 2024 strategic overview discussed the impact of logistics and sustainable supply chain management on the Indian fashion industry, highlighting relevant government policies.

3.6 Exploring AI, Data Analytics, and Personalization

To analyze the growing role of data-driven fashion recommendations, AI-powered trend forecasting, and the increasing demand for personalized fashion solutions. This section focuses on predictive analytics in consumer behavior and AI-generated custom fashion.

3.6.1.   Generative AI in Fashion
A 2024 study explored the application of generative artificial intelligence in personalized apparel design and custom fitting, addressing challenges of fit and style.

3.6.2.   Predictive Analytics
Research from 2023 introduced a novel approach integrating machine learning algorithms to forecast consumer buying behavior in luxury fashion.

Brands like Stella McCartney have partnered with Google Cloud on a project that incorporates machine learning and cloud-based data processing to enhance supply chain transparency and make more responsible sourcing decisions.

III. Research Methodology

4.1 Research Design

This study adopts a qualitative research design, utilizing both primary data and secondary data sources such as industry reports, academic journals, and expert opinions. A comparative approach is employed to analyze evolving trends in the Indian fashion industry. For instance, a study by Saha et al. (2024) employed in-depth interviews with 36 consumers across India to understand responsible consumption in apparel.

4.2 Data Collection Methods

The research relies on published sources, including government reports, case studies, and articles from fashion industry publications. Additionally, interviews with fashion industry experts and consumer trend reports are reviewed to gain deeper insights. Google forms were distributed among 150 youth in Bhopal city. Their responses were analysed and presented through bar graphs.

4.3 Data Analysis Techniques

A comparative analysis of past and present trends is conducted to evaluate the key drivers of change in the Indian fashion industry. Predictive analytics models are also considered to understand the impact of emerging fashion technologies. For instance, a 2021 study developed a framework for artificial intelligence in fashion forecasting and validated it with a case study, highlighting the role of artificial intelligence in predicting fashion trends.

4.4 Limitations of the Study

This study uses both primary data (Google Forms) and secondary sources. However, the sample size may not fully represent diverse consumer behaviors across regions. Secondary data may have validity limitations and may not capture real-time industry trends. A broader primary survey could improve accuracy.

IV. Analysis and Discussion

5.1 Technological Disruptions in Fashion

The Indian fashion

industry is rapidly evolving with artificial intelligence, virtual fitting rooms, and blockchain. According to primary data, 78% of respondents are aware of or support the use of artificial intelligence in the fashion industry. Additionally, 72% expressed interest in virtual try-on technologies, highlighting strong consumer acceptance of tech integration in shopping.

These trends align with secondary data: AI-driven design tools boost efficiency, and the virtual fitting room market is expected to grow from $6.21 billion in 2024 to $32.29 billion in 2032 (CAGR of 22.87%). Blockchain enhances supply chain transparency, empowering consumers to trace product origins. In India, artificial intelligence adoption in 70% of companies has led to up to 25% cost reductions and 35% gains in inventory efficiency.

The results of the primary survey conducted are summarized in Figures 2 to 6. The responses reflect the views of 150 youth in the age group of twenty to twenty-five years. These respondents were pursuing either their graduation or post-graduation in different institutes situated in the city of Bhopal.
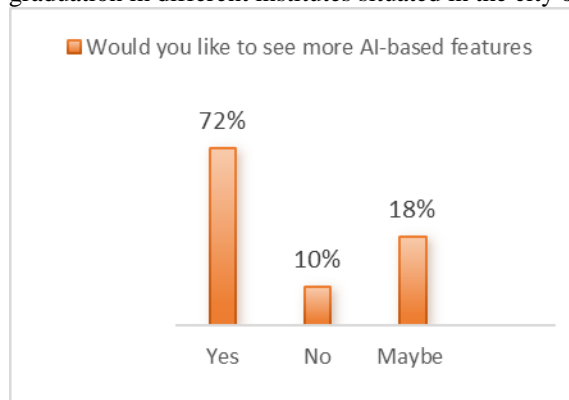
Figure 2. Preference for AI-Based Fashion Trends

Figure 3. Use of AI in Fashion

5.2 Consumer Behaviour Shifts

5.2.1. Social media and digital

platforms significantly influence fashion preferences. According to primary data, 84% of respondents favor sustainable and eco-friendly fashion, reflecting increased consciousness among Indian consumers. This aligns with a 2021 survey (secondary data) where 89% of Indian consumers preferred sustainable options.

India's e-retail market reached $60 billion in 2024, and over 270 million Indians now shop online. Influencers also impact behavior: 65% of respondents from our survey said they follow influencer recommendations for fashion purchases.

Figure 4. Source of New Fashion Trends

5.3 The Role of E-commerce and Digital Marketing

E-commerce offers unmatched convenience. 91% of our respondents stated they prefer shopping for fashion items online, supporting the growth of digital platforms in India. This trend is transforming consumer-brand interaction through AI-powered recommendations, influencer marketing, and live-stream shopping.
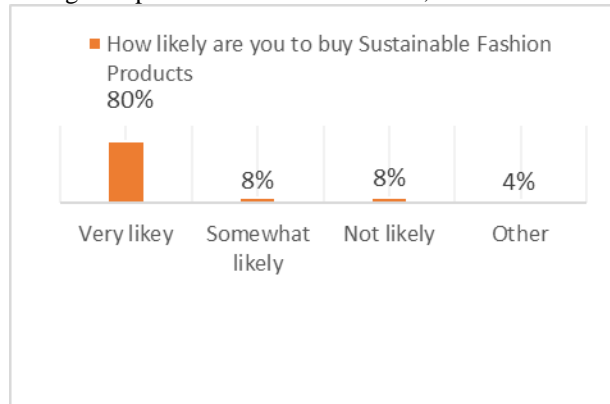
Figure 5. Likelihood of Buying Sustainable

5.3.1 Fashion

The inputs of the youth indicated that the majority preferred AI-Based Fashion Trends (Figure 2). About 78% were keen on using artificial intelligence in fashion (Figure 3). From Figure 4 it was evident that about 43% relied on social media for queries regarding trending fashions. The majority of respondents preferred to purchase clothing from online shopping platforms (Figure 6). An interesting feature observed was that about 80% were very likely to buy products that were sustainable (Figure 5).

According to secondary data, the online fashion market is projected to grow by USD 51.79 billion between 2024 and 2028, with artificial-intelligence-driven personalization being a core growth driver.

Figure 6. Preferred Clothing Purchase Platforms
Sustainability Challenges and Opportunities

Despite growing
awareness, primary data indicates that 37% of consumers are still unaware of sustainable fashion, highlighting the need for awareness campaigns. High production costs and the popularity of fast fashion also pose challenges.

However, brands like Suta are innovating by making eco-fashion more affordable and relatable. The opportunity lies in combining affordability with sustainability and targeted education.

5.5 Global Positioning of Indian Fashion
India is gaining
global recognition through a blend of traditional and modern designs. As of 2022, the apparel market was valued at $59.3 billion (sixth-largest globally). International fashion weeks now feature Indian designers, validating the country's design influence.

Primary responses indicate pride in Indian fashion globally: 88% of survey participants believe Indian styles should be promoted internationally, especially handlooms and regional textiles.

V. Conclusion

The future of India's fashion industry is shaped by technology, sustainability, and evolving consumer preferences. Artificial intelligence adoption in fashion is growing rapidly, with the AI-driven fashion market expected to rise from USD 2.19 billion in 2024 to USD 170.62 billion by 2037, growing at a CAGR of 39.8%. E-commerce and digital retailing have also seen massive growth, with India's online fashion market projected to expand by USD 36.01 billion between 2024 and 2029, growing at a CAGR of 22.2%.

The rise of social media and influencer marketing is driving consumer engagement, with platforms like Instagram and TikTok shaping fashion trends. Reports indicate that 74% of Indian consumers now rely on influencer recommendations for fashion purchases.

Sustainability remains a crucial challenge and opportunity. While consumer demand for eco-friendly fashion is rising, fast fashion brands still account for over 60% of sales in India. However, initiatives like zero-waste design, ethical sourcing, and government-backed sustainability programs are helping brands shift towards more responsible fashion practices.

The results of the pilot study considering responses from a tier 2 city of the country indicated the youth's inclination towards artificial intelligence adoption and sustainable fashion.

Hence, by blending AI-driven innovation, digital expansion, and sustainable practices while preserving traditional craftsmanship, India is positioned to emerge as a global leader in the fashion industry. A collaborative approach between government policies, brands, and consumers will be key to ensuring a thriving, ethical, and technologically advanced fashion ecosystem in India.

VI. Recommendations

7.1 Investment in AI-Driven Fashion Solutions Fashion brands and retailers should integrate artificial intelligence for trend forecasting, supply chain optimization, and customer personalization. AI-powered design tools can enhance creativity and operational efficiency. For instance, Myntra's "Style Mynt" feature utilizes machine learning algorithms to analyze customer data and suggest outfits based on their style and body type. Additionally, artificial intelligence applications in supply chain management have been shown to enhance efficiency, reduce costs, and promote sustainability.

7.2 Strengthening Government Policies on Sustainability
Advocating for robust environmental regulations and incentives can promote sustainable and ethical fashion practices. The Indian textile industry has called for tax rebates and financial incentives to support innovation and sustainability. Implementing subsidies for eco-friendly fabrics and providing tax benefits for sustainable brands can significantly impact the industry's environmental footprint.

7.3 Promoting Collaborations Between Startups and Artisans
Encouraging partnerships between tech-driven fashion startups and traditional artisans can preserve heritage crafts while embracing innovation. Collaborations that blend traditional artistry with modern fashion trends can enhance global competitiveness. Studies have highlighted the importance of such collaborations in preserving cultural heritage and promoting social innovation.

7.4 Enhancing Consumer Awareness About Ethical Fashion
Conducting campaigns and educational initiatives can inform consumers about sustainable choices and ethical production practices. Organizations like Fashion Revolution India are dedicated to promoting a sustainable fashion

industry and educating consumers about ethical fashion. Fashion weeks, sustainability workshops, and collaborations with environmental organizations can further boost awareness and drive responsible consumption.

7.5 Expanding Indian Fashion Brands Internationally

Developing strategies to position Indian fashion brands as global players by leveraging digital platforms and participating in international fashion weeks is crucial. Indian designers like Sabyasachi Mukherjee have gained international recognition through collaborations with global brands and establishing flagship stores in key markets. Export-friendly policies and global collaborations can further enhance international presence.

7.6 Leveraging Social-Media for Brand Growth

Optimizing social media marketing through influencer collaborations, interactive content, and live-stream shopping experiences can drive consumer engagement. The rise of micro and nano influencers has proven effective in creating authentic connections with niche markets. Brands should focus on viral marketing campaigns and user-generated content to maximize online reach.

7.7 Supporting Emerging Designers

Creating funding and mentorship programs to nurture new talent and innovative fashion entrepreneurs is essential. Initiatives like the CFDA/Vogue Fashion Fund provide grants and mentorship to emerging designers, fostering the next generation of fashion talent. Similar programs can be established to support Indian designers.

7.8 Strengthening Digital Fashion Platforms:

Investing in digital showrooms, AI-powered styling apps, and virtual reality fashion experiences can enhance online retailing. The AI-powered fashion app "Alle," recognized as Google's Best App of 2024 in India, allows users to virtually try on items and receive style advice. Brands should explore immersive shopping experiences using augmented reality to engage tech-savvy consumers. Implementing these recommendations can drive innovation, sustainability, and global competitiveness in the Indian fashion industry.

Acknowledgments

Competing Interests

The author declares that there are no financial, personal, or professional conflicts of interest related to this research. This study has been conducted independently, with no affiliations to any commercial fashion brands or industry stakeholders. The findings and recommendations presented are purely based on academic research and industry insights to contribute to the ongoing discourse on the future of Indian fashion.

Authors' Contributions

This research paper was planned, researched, and written by Pratiksha Dongre under the guidance of Dr Suchitra Srivastava and Dr Yogendra Sigh Thakur. The author collected primary data through surveys and secondary data from various sources to analyze industry trends and key insights. Responsibilities included structuring the research, analyzing data, and preparing the report. The content was reviewed and refined for clarity, consistency, and precision. This study aims to provide valuable insights into the future of India's fashion industry for researchers and professionals.

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