# Evolving Technology in Arts, Fashion and Textile Design

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## ABSTRACT

Art an expressive medium uniquely human, involving conscious use of skill and creative imagination. Technology is reinventing how art and designs are made which is more efficient, faster and more accurate. The embracing of technologies by the textile world has accelerated the consumption of textile products in the 21st century compare to the previous centuries. It has made it simpler for different brands in the fashion industry to display their styles and vogues to a larger audience while the emergence of designing applications has made designs unique. Using the art of the 1990s as an example, there are obvious differences and improvement in the means of expression and content compared to the art of the 21st century. The increase in the use of computers and internet made it simpler for people's interactions and sharing of ideas which contributed to growth in the industry. This paper identified how information technology has enhanced the growth of arts and textile industry.



*Keywords; Technology, Arts, Textile Design, Fashion*


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## 1. INTRODUCTION

In the age of mass production, skilled workers must adapt in order to sustain their role in the textiles industry. In this context, skilled workers can be considered a crafts people who have a vast knowledge of

textile production and textiles-related objects and use the tools available at the time. As machines have become more capable, individuals have had trouble keeping up economically and temporally since these machines can produce textiles in less time, for less money. Technology has propelled the growth of human society in innumerable ways. From the basic needs of food, clothing and shelter to advanced robotics and health care, technology has rapidly assumed the status of an arguably indispensable and highly effective tool in the modern era. Clothing has always been both a necessity with regard to human civilization and a means of showcasing ones culture and interests. Social status, religious leanings, cultural diversity and professional status can all be amply reflected by ones clothes. A wide array of different styles of clothing is now possible, aided by powerful technological tools that supplement and shape the creative ideas of fabric designers [1, .[ www.fibre2fashion.com (2021), History Crunch Writers2]. "Textile Manufacturing in the Industrial Revolution (2019)]

In the last several years, design has been widely developed and improved on so that design firms and textile mills are now utilizing these for their production. Textile printing has enabled manufacturers to produce a digital sampling and strike off designs prior to old method. It is apparent that technology has influenced the style of the design that is being produced by textile artists , but digital technology has been utilized to accelerate their design processes.[History Crunch Writers [2]. "Textile Manufacturing in the Industrial Revolution (2019)]

Consequently, stylists have maintained a higher level of a design quality and aesthetics by continually refining the design in the printing process. The use of photographic imagery, the digital layering of images and the complexities of colour and tone require both knowledge and practical expertise with the requisite software.[History Crunch Writers [2]. "Textile Manufacturing in the Industrial Revolution (2019)]

## 2. DISCUSSION

### 2.1 DISCUSSIONS

**Technology iIn tThe Arts**

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From the first paintings to the production of musical instruments and contemporary cinema, art as we know it would be simply impossible without recourse to humanity's historical cache of technology development. Throughout history and modernity, technologies from ink, paper and glass to cameras, microphones and computers have enabled new forms of art. Without them, it is would be impossible to realize the paintings, ornaments, photography, cinema and contemporary digital works that fill our museums and galleries [3]. ~~Boucher (2019)~~

Technology has helped to expand the perspective and prospect of artists' inventiveness while limiting the problems encountered. It has made the production of art a lot less exhausting, and as a result, artists now have more time to contemplate and expand their creativity Jin *et al*~~.~~ [4].~~(2012)~~

According to Boucher [3]~~2019~~, Technology and the arts are generally considered as distinct sectors of contemporary society, albeit with some important links akin to those between commercial, industrial and legal sectors.

## 2.2. Technology in Textile Industry

Today, the textile artist must adapt depending on the accessibility of machinery such as laser cutting, knitting machines, or computerized looms. A divide developed within the industry around the time that textile tools became more automated and computerized. This division has created the separated roles of the artist and the machine operator [5]. ~~[ Carp,2017 ]~~ The artist could decide to be both, rendering their practice more efficient. However, this is an advantage that not all textile artists have as these machines are expensive and oftentimes require experienced hands to operate without damage. For example, a computerized knitting machine price range is anywhere between $10,000-$190,000 according to the Los Angeles Times. On the higher end of that price range, the machines are very reliable and fast. Shima Seiki is a company that sells various kinds of high end computerized knitting machines. This is one of the most top notch manufacturers in its domain. Older used models of lower tier brands can be found on eBay for just under $1,000 [6]. ~~[ Treadaway, C (2004)]~~

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The textile and apparel industry is one of the largest industries in the global marketplace when taking into consideration the many components of the supply chain involved with transforming raw material into products and bringing products to the final consumer [7]. ~~Mary, (2009)~~

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Computer technology facilitating the communication of information, or information technology, is integrated at every stage of the textile and apparel supply chain, from design, production, and distribution to marketing, sales, and the consumer. Technology is an essential component of today's business world. "Each period has had its revolution [7]. ~~Mary,(2009)~~

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Technological change modifies manufacturing processes concerned with fabric preparation, cutting, materials handling, fusing, sewing, pressing, finishing, and garment dying by bringing new and advanced machines into the company. Technology has become a major shaping force of textile and garment sector to satisfy the requirements of customers [8]. ~~Nazrul Islam (2002)~~

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Digital technology is a computer-aided technique for developing a textile design and textile patterning mechanism which transforms visual information from an artist to the final presentation. The computer is operated by a textile designer or technician who understands the particular textile machinery for which he/she is adapting the original drawing. The designer or technician inputs the original drawing by a combination of graphical input devices; tracing on drawing free-hand printing. After the original design is in core, it is developed into the visual information to control the patterning mechanism of a specific kind of textile design. For example, a design to be woven must represent each interlacing of warp and weft; a design to be knitted must represent each stitch of the knitted mesh; and a design to be printed must represent the areas of each colour as separate images [6]. ~~[Treadaway, C (2004),]~~

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## 2.3. Use oOf Computers iIn Textile Aand Industry

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Cad is industry specific design system using computer as a tool. CAD is used to design anything from an aircraft to knitwear. Originally CAD was used in designing high precision machinery solely it found its way in other industries also. In 1970's it made an entry in the textile and apparel industry. Most companies abroad have now integrated some form of CAD into their design and production process. The level of technology related to the automation of textile machinery has changed a lot and indigenous efforts are

near about the technology of machines manufactured in industrially advanced countries. Substantial and sustained efforts to strengthen indigenous efforts and technological backup were made a today the major manufacturers supply modern machines.

Textile technology, once considered a handicraft, has become a highly sophisticated, scientific and engineering activity of new types of fibres and technologies. The field encompasses different areas of engineering such as mechanical, electrical, computer, chemical, instrumentation, electronic and structural engineering. Apparel and fashion technology, a part of textile technology has become an important activity for the designing, fashioning and marketing of garments. All this requires knowledge of latest technology and the present day textile-design students are poised to take up the challenge.S. Sudalaimuthu *et al*~~.~~ [9] ~~(2007)~~

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In last two decades, significant changes have taken place in the textile and garment manufacturing processes. These changes result from global environmental factors including technological, economic, social, demographic, political, and legal. The most important change is related to the introduction to new machines and advanced manufacturing systems. The up-gradation of technologies has changed the traditional production systems of textile and garments towards modern systems [8]. ~~Nazrul Islam (2002)~~

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## 2.4 Early Inventions ~~T~~that Transformed ~~T~~the Textile Industry

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The industrial revolution was one of the main factors in transforming the textile industry. It created new machines, which allowed for many more things to be done in a shorter time with fewer workers, so cloth production increased rapidly [10]. ~~[Collier *at al* ,.2009]~~

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During the transition period from the 18th century to the 19th, there was a rapid development of new technologies and methods that changed the textile industry. The widespread use of machines in factories made it possible for production to increase exponentially.

These huge factory-style brick buildings were quickly becoming very popular as people shifted from handlooms at homes or businesses to these new machines, which increased production time by over seventy times faster than some artisans could do themselves. This led to many more changes, such as an increase in wages because of more jobs being available and improved living standards through

improved working conditions since workers were employed full-time with time off on Sundays and holidays [10, 11] . {Collier *at a/* ,.2009, Clarke, Simon, 1963}

Discussed below are three of the top and exciting inventions that caused a significant transformation in the textile industry [12]:

***The Cotton Gin***: The cotton gin made it easier to clean the seed from cotton fibers, which allowed cotton to become a popular source of fiber. This can only be compared to the revolution in academics where today, there are agencies like EssayMama that can help guide you in essay writing ensuring that you produce the best essays to increase your chances of succeeding in school and in the future.

***The Spinning Jenny***: The spinning jenny made it possible to produce more thread without many more workers, so cloth production increased rapidly.

***Printing Presses***: Printing presses led to an increase in printed fabrics because they could be easily reproduced quickly on machines instead of being done by hand on canvases. They were also much cheaper than any made before, which helped them be sold faster and easier. [Textile Processing. 12] .http://textilelearner.blogspot.com ]

## 2.5. The Role Oof Technology iin Fabric Design And and Fashion

Cutting-edge technological amelioration in the digital age revolutionizes industries like fashion shaping the tomorrow to re-imagine the future by transforming the realities of today. The digital technologies change the evolution trends disrupting the fashion business globally to offer the following amazing array of advantages transforming the fashion industry landscape:

Fashion is an extension of one's self identity and it talks in a downplay whisper, or wink and a smile. After all fashion is about converting self-esteem into a personal style revealing to impact contemporary society. Fashion cycle nowadays largely driven by Internet. By the time a certain style created a hysteria in the market, fashion designers start creating a new set of looks. This impacts the fashion cycle driving cut throat competition. Recent digital technological advance has significant quiver on fashion e-commerce and fashion retail business. In fact, technological innovations have unceasingly delivered profound

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advances in the smart fashion wearable industry. Thus, fashion and branding have become pervasive in the contemporary society at large.Prafulla Kumar Padhi [13](2018).

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Fashion is a system of bodily display, derived from around costume, and extends to jeweler, luggage and perfume shading into a broader definition of luxury goods. Fashion is normally characterized both as forms of everyday clothing and as luxury rather than utilitarian needs. A further defining characteristic, one which gives us the noun 'fashion', signifies a constant and shifting value system whereby items may be deemed in or out of fashion, and hence symbolic revaluing leads to their cultural and economic value being repeatedly and quickly transformed. Fashion is time-based and culturally situated in character; it is a combination of design and innovation and, as such, its qualities are context dependent and relationally, not absolutely, defined. In this sense fashion can be a constituent of any product. Some have argued that increasingly the design, or fashion component, of all products is expanding and hence this aspect is becoming an important part of explaining industrial growth and change.

Fashion and technology: innovation strategies in business models, brand communication and marketing. The field of fashion is nowadays rich of creative and innovative trends, which involve changes in business models, new communication strategies, emerging patterns of consumption and new production techniques and materials. Crucially, these new trends are mainly the result of the integration between the fashion system and current technological advances. Innovation in business models Technology and fashion have become an indissoluble combination. On one hand, the technology affects textile production and packaging, communication and distribution, transforming the entire production process, on the other technology has become an integral part of products. The recent technological and infrastructural evolution in e-commerce is leading to the development of new business online models in the fashion and luxury segment. Below, we present and describe the most innovative models, namely personal subscription, social merchandising/crowd-producing, mass customization and collaborative consumption [14].[ Pratt,*et al.*, (2012)]

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In this technological revolution where computers are replacing many of a designers manual tasks current fashion designers find a similar situation as artists did at the beginning of the industrial revolution.

Fashion has always been at the forefront of innovation from the invention of the sewing machine to the rise of e-commerce. Like tech, fashion is forward-looking and cyclical [15].[ C Binsights ,2022 ]. One of the most significant outcomes of the famed Industrial Revolution was the mechanization of textile manufacture. The power loom and the mechanized cotton mill resulted in a huge increase in the quantum of production by shortening the time required for production manifold. In the more recent times, there has been a proliferation of novel materials designed, and this has enhanced both the quality and adaptability of fabrics [16]. [ Bowles, Melanie,(2012)] The so-called smart materials enable the production of clever fabrics, with high-end technology like atomic force microscopy and polymeric nanofibres going into the design, manufacturing and testing of these fabrics. Ranging from special applications like the design of suits for space travel, swimsuits and suits for military purposes to the usage of more durable and adaptable garments for daily use, these methods have proved to be extremely effective. Several research centres have sprung up to investigate these exciting possibilities. The role of computers is unarguably prominent in fashion technology [17] [http://textilelearner.blogspot.com (2010) ]. The visualization of the final design right at the conceptualization stage, down to the finest detail, making suitable modifications if so desired, automating several stages in the manufacturing process and, finally, executing quality control procedures - all of them involve computing at various levels of complexity. Be it creating an eye-catching design using CAD or running the computerized knitting and weaving machinery, automation is fast becoming the buzzword. Fashion courses nowadays invariably include a major technological thrust in the curriculum to enable prospective designers to be abreast with the latest trends [18].[Blum *et al*, 1986]

How about having a single garment that one can use both in the summer and winter one that would change texture, colour and even shape in response to external environments? All these are gradually transcending from being mere fantasies to reality. Digital clothing that incorporates sensors in the very clothing that one wears and other fascinating possibilities lie in store - courtesy the largely interdisciplinary explorations into the field of fabric and fashion technology. At a more mundane level, one could most definitely be pleased by the thoughts of having clothes made to precise specifications at a much faster rate and with several times more durability [17].[http://textilelearner.blogspot.com(2010)].

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## 2.6. Current Trends

According to Kochar 2022, Social media is changing how fashion is consumed and has trained customers to want instant access to the latest trends, as soon as they hit the catwalks and at the same time. The prevailing inclination or drift in art, fashion and textile design has made products to be tailored to the needs and taste of younger generation who wants to emerge different which brought about different innovations. These innovations are biotechnology, nano technology, genetic engineering and artificial intelligence (AI) [25].~~[Kochar, 2022 ]~~

## 2.7. Biotechnology Techniques

Biotechnology is based on DNA technology heading to Enzymes synthesis to save resources like, energy, time, and most importantly water. This advanced technology has directed the manufacturing industry towards the new horizon, where the possibilities of success and productivity are endless. In current times, Biotechnology is playing a key role to save this planet and creating it more sustainable and safe for the future generations [9, 17].~~[~~ ~~https://www.fibre2fashion.com ,~~ http://textilelearner.blogspot.com].

Biotechnology in textiles deals in innovative and advance technologies, where it applies on composed structure of textile fibers, which are designed to use in specific design industry. This is an updated and performance based technology, in result of it many high tech novel fabrics have been developed, which contains the high performance properties, such as water and dirt repellant, shock proof, lightweight, temperature regulating etc [9, 17]~~[https://www.fibre2fashion.com ,~~ http://textilelearner.blogspot.com].

Biotechnology is currently a driving force in design industry, although it has been used in multiple domains such as, textiles, medicine, agriculture, fashion and design. In textiles it is mainly integrates of natural and synthetic materials. It has developed the enormous development of multiple properties in one material, which is somehow beneficial for the designers in many ways like, apparel, home fashion, luxury automobiles and climate based materials, which are normally used in outdoor areas.

Biotechnology is playing a vital role in terms of innovations like.

### 2.7.1 Self-cleansing Surface

Self-cleansing fabric has huge impact upon fashion and design industry for the outer looks; these fabrics repel the dirt and can be cleaned easily. They are not soiled whatsoever.

### 2.7.2 Naturally Colored Cotton

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Who can visualize the naturally colored cotton better than designers? One of the marvelous innovations of Biotechnology is the production of naturally colored cotton through genetic engineering, though color range is limited. However, in future, it can be so interesting to see fields of cotton with primary, secondary and tertiary colors, and world would be far better place, without dyes and pigments, which are so injurious to human health, as well as devastating the environment.

## 2.8. Animal Fiber

To get the valuable wool for the outerwear, Biotechnology vaccines are there which when injected into sheep, after specific time breaks appear and wool fiber can be pulled off. This procedure will take half the time of labor for shearing the sheep. Another important breakthrough is the scorpion goat, which produces wool fit to endure extremely high temperature, and used in making astronauts space suits [9]. ~~[https://www.fibre2fashion.com]~~

## 2.9. Nanotechnology Techniques

Nanotechnology is an industrial revolution, in which the properties of materials will drastically change when they are reduced to NANO scale. To treat textiles with the coating of NANO materials is the NANO technology, which improves the properties of the material and making it more durable. It is great news for the designers that when you see the NANO particles through proper equipment, it changes its color at this NANO level. Innovations in NANO technology have changed the commercial aspect of all, related to design, textile and Fashion business [20]. ~~[ www.azonano.com ]~~

By NANO technology techniques textile sector functionalities, have changed as the innovative fabrics with high performance properties came to exist. Stain repellant, Water repellant, UV protected, Anti static, Wrinkle free, Anti bacterial, Fire retardant, Bio degradable, Bulletproof and defense clothing to name a few [17]. [http://textilelearner.blogspot.com ].

## 2.10. Genetic Engineering Techniques

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In Genetic Engineering techniques, the major development is the Colored Florescent Silk category of material, which is somehow look very fashionable, and design oriented. As the material, it is so much attractive and appealing to design. The technique which researchers have used, that they have inserted glowing proteins which are the taken from Corals and Jellyfish, into the silk worm Genome. In result of this genetic engineering innovation is the properties of the material is more or like same as silk but it become slightly weaker after processing . In the area of Fashion and design this whole process of genetically engineered silk is very fascinating and it will open up new directions of taking and using these materials in a more creative and sustainable way. Another latest and more sustainable genetic engineering material is “SYNTHETIC SPIDER SILK”. Though it is synthetic but it is more Biodegradable [21].~~[ www.smithsonianmag.com]~~

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## 2.11. Artificial Intelligence

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In this advanced technology world, Artificial intelligence, (AI) is playing very important role in the area of Fashion and Design industry. In the presence of Artificial intelligence the role of designers have become more critical, as they will have to equip themselves with the next generation’s tools and technology [22].~~[ www.businessinsider.com]~~

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AI tools in terms of Fashion and Design are so important in this technological world. As it is difficult for the designers to look up multiple season collections and figure out the data about what was hot selling what was not. AI has come up with this solution, as there is a complete database for all the previous collections and incredible amount of information is available with the click of the button.

In this case traditional process to design is still the same as to do research, collecting fabrics, making prototypes etc. but to catch the latest technology development, designers will be able to learn about new tools, which are definitely improving the design process day by day [23].~~[ https://wtvox.com/]~~

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Kochar ~~2022~~[25] opines that AI is being used by brands to boost customers' shopping experience, analyze data, boost sales, forecast trends and offer inventory-related guidance. These technologies have accentuated AI as the future of development in the fashion industry.

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## 3. CONCLUSION

Technology in arts, fashion and textile design have a deep and exceptional relationship that passes through all the stages of human development. It has also created an advanced environment for social and business synergy which has assisted designers and manufacturers to meet up with the current challenges. Technology is scaling tremendous heights and with it, so are all its applications. Textile and Arts design have in store lots of promises and continue to be a standing example of the prowess of technology.

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