Sociological, technical and design aspects of technologic fashion

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Abstract

The work begins with a philosophical and sociological framework to understand the currents that marked the 20th century, where the trends of globalization and the world too computerized mark the thinking of leading philosophers and researchers. Next followed, the great technological advances will be boarded, since the materials science until the incorporation of the technology in fashion, namely the electronic one. The next chapter is dedicated to design, so that our understanding and squarely facing the technologic fashion design as a facilitator of people's lives, as well as improving the quality of life for its users. Finally, in the last chapter, in light of the previous ones, the great transformations in our society are discussed. At this point it is perceived the origin of technologic fashion, born due to the launch of the Sputnik satellite, the advent of synthetic fabrics and the first human trip to the moon.

Keywords

Fashion design, Technologic fashion, Sociological behaviour, Historical summary.

I. Social and cultural frame

Due to industrial development, to the rise of capitalism and the redefinition of new values and moral codes of the urban life, overcame the "Modernity" in which the notion of progress was the basis of material and social transformations that occurred at the time, where the power of tradition fell down in face of the power of innovation and the seduction gave a new style to the urban life and the human relationships, creating new standards of femininity and of presentation of public image.

The emerging modernity in the nineteenth century, steeped in the industrial age, brought new aspects to the collective life in the big urban centres, generating changes in economic life, work, and social relations and in the private experience of people in the city, due to the birth of the modern city which preceded the current metropolitan life (Villaça and Goes, 1998). So we can affirm that the nineteenth century was a moment of
rupture, transformation and adoption of new values and references, derived from what we call "Modernity" in which the new overlaps tradition, the individual to collective, the private to public and the consumption and the technique, derived from industrial capitalism, become symbols of a new era.

The technological innovations, the trade reorganization and the industrialization which occurred in the modernity have generated deep changes in the conception and expression of fashion in the second half of the nineteenth century (Breward, 1995). The idea of modernity symbolizing the future, the progress and the new, led to the spread of the preference by fashion, in which social codes based on the traditional power hierarchy gave way to fashion consumer interest.

1.1. Sociological and philosophical considerations about modernity

At that time, society faced a new economy of cities, where new forms of consumption were present, such as cosmopolitanism, especially the nineteenth century one, which is marked by the relationship with technology. Technique is one of the instruments used by the cosmopolitan to look and conceive the world around him, in a modern way. He was fascinated by the machine, as a fetish (exactly the same as with the city), transforming it into an index of progress and maximum image of the new, in which technology reduced distances and times, defines and redefines new scenarios for the citizen at every instant.

Due to all these transformations, the discovery of the industry, the preference by the machine and the development and refinement of the technique, enabled the development of new fashion concepts and a bigger turnover of trends posing a greater appeal to consumer. Society has become consumerist and capitalist, where consumption was synonymous of status and modernity. Words such as speed and simultaneity were synonymous of this emerging era.

The new technologies are present not only in all contemporary practices activities, but they also became vehicles for aesthetic experiences, both in the sense of art, beauty, and communion of shared emotions. This is a society that approaches technique and aesthetic and community pleasure. We entered today in the cyber culture like we did in the alphabetical culture centuries ago. At each stage of language evolution, the human culture becomes more powerful, more creative and faster. Along the media progress, the spaces multiplied and enriched themselves, emerging new artistic forms, divine, techniques, industrial and political revolutions. The cyberspace represents the latest language development. The signs of culture, texts, music, images, virtual worlds, simulations, currencies, reach the last stage of digitalization (Lemos, 2004a).

The individual who has access to technology has options of choice. Being well informed and to communicate online are needs of our time, offering us the chance to be anywhere in the world, immersed in the virtual space, to watch the fashion shows, to exchange information with several people simultaneously, or only with just one person. It is the decentralization of the runway, the brands, the designers, the models, the communication and of the individual himself. Technology has the power to involve the individual in the digital and fascinating world of information (Lévy, 2000).
In the last decades we lived in an era of hyper-individualism, hyper consumerism, lost in the middle of overload information and without values. We live in a period where the great ideologies which marked modernity, like the nationalism, the socialism, the revolution and the progress, have lost their shape and stability in the contemporary world, creating confusion and complexity situations. We are not in pure emptiness but lost in the middle of so many references. Fashion is an example of this. Formerly, the things were clear in fashion: there was the fashion and the "outdated". It was a very clear opposition that changed every six months. Today the opposition between fashion and the "outdated" became vague, confuse, therefore, more than an emptiness era, we live in the era of vague, the era of confusion and disorientation (Lipovetsky, 1983).

1.2. Fashion in the society

Fashion life cycle is similar to all kind of products, starting with the release, after this the consensus, the consumption, the massification and the attrition. It is a cycle of novelty, ephemerality, providing a sense of suspended time and experience a succession of presents, since fashion fits in the "folly of using" which, besides being sensational, opens the doors for the fleeting realization of the imaginary (Carli, 2002). Sharing Carli’s same idea, also Lipovetsky (1989a) states that the multiplicity and the ephemerality are outlined in the fashion world where the innovation has become a source of worldly value, brand of social excellence. It is a must to follow what of new is being done and to adopt the latest changes of the moment. The present became necessary as the time axis which runs a superficial but prestigious face of elites’ life.

Fashion products are constituted as desirable objects of consumption, not for their intrinsic physical conditions (texture, colour and cuts), but by the discourses on their constitution aspects, turning them into signs of the new. These constantly manipulate desires, which allow the poetics of daily wear. As its objects, they embody the new with priority, because they are vital instruments to power strategies, providing a continuous exercise for the assessment development of the suitability of the fleeting orof the passion.

The current consumption era is the time when we are seeking for "pleasure in itself." The human needs are in use value: the intimate enjoyment, the object qualities, the sensation, the show, the body cult, the new, the autonomy and the information. A neo narcissistic tendency of giving pleasure, of growing appetite for quality and aesthetic, of pleasure for technical excellence, of absolute quality and comfort, in the hyper choice, the seduction and the fickleness outshine the fashion processes and predispose man constantly to the shedding of what was achieved. This means that the same way people buy things, mainly in the fashion world, also they come off of them very easily, with no possible affection or tenderness feeling, just a fleeting interest of comfort and maximum pleasure, which is replaced in hyper-fast way(Lipovetsky, 1989b).

II. Technology without limits

2.1. The textile importance

Until recently, the fabrics were easily recognizable. One could describe its fibres and weaves from the observation and touch. However, at present, this situation has become, in some cases, very complex due to the application of chemistry and engineering in the
textile industry, where unprecedented changes in materials by dyeing and finishing processes have been experienced, as well as the creation of microstructures and the application of technical intelligent materials.

Clearly the industrial trend in this field is the adaptation to certain natural conditions and abilities of the living organisms. In the case of the intelligent fibres, these react in turn of the living being and allow the user to adapt himself to the environment in a much more flexible and fluid way. About this question, Saulquin (1999), a sociologist specialized in fashion, argues that technological advances point out to bigger freedom in the clothing development, whose design process begins in the process of textile development and in the research of its functional and aesthetic qualities.

2.2. Technical and smart textiles

With the plethora of materials occurred at the end of the twentieth century, science and technology have achieved the molecules reestruturation, obtaining new functions. In the 1980s, this new field of study was called nanotechnology, popularized by the physicist K. Eric Drexler. According to the IEEE Foundation (Maffei, 2006), it is known that nanotechnology was foretold earlier, in 1959, by the almost forgotten Nobel Laureate Richard Feynman, who proposed the idea of building machines and mechanical devices out of individual atoms, which meant the construction molecules artificially, atom by atom. When the molecule reached the size of a nanometre (whose diameter is 100,000 times miner than a human hair) it would be possible to manipulate materials at the atomic level, constituting this idea the essence of nanotechnology.

The concept of intelligent textiles was firstly defined in Japan in 1989, due to the discovery of memory materials with shape and smart polymeric gels, in the 1970s (Langenhove, 2007). One can define as intelligent textiles the structures that can monitor their own condition and structural performance. They are sensitive to external factors, carry out operations and send information elsewhere. The incorporation of sensors in intelligent structures shows several advantages in various industry fields, which arise due to the ability of these elements to incorporate themselves with the least interference possible in a particular system under study.

The intelligent textiles are characterized as the next generation of fibres, fabrics and clothing, emerging thanks to its huge possibilities and functionalities. They are classified as materials that think for themselves, through the incorporation of electronic devices, which are nowadays used especially in protective clothing, where more and more the concepts of fashion, comfort and innovation are enhanced (Stenton, 2005). Their rapid development was due thanks to their use by the military industry, due to the design of articles that can withstand extreme temperature conditions or uniforms that change their colour enhancing the camouflage effects, in a war situation. However, the verified developments in intelligent textiles derived also from the active collaboration of other scientific areas, such as engineering, chemistry, physics, design, medicine and marketing. This way, the production of intelligent textiles is a combination of conventional textiles with high-tech materials, involving science branches such as materials science, structural mechanics, sensors and detectors technology, advanced processes technology, electronics, communication, artificial intelligence and biology.

2.3. The evolution of technologic fashion
Fashion with integrated technology was born due to the convergence of several different types of technologies, such as computers, memory, wireless networks, mobile phones, among others. All these elements lead to a position for technology to be reconsidered, optimized and, this way, miniaturized, rising a practically autonomous technologic fashion.

The emergence of wireless communication enabled data transmission without using wires, where the ability to distribute data through wireless networks using a system attached to the body was an important turning point in the development of wearable technology. It functioned as a conduit for other innovations, as well as other navigation systems, such as GPRS, WIFI, BLUETHOOT, GPS. All of them appear later also integrated in technologic clothing. The concept of ubiquitous computer, developed by Mark Weiser (Seymour, 2008a), which means this is present everywhere and, in the case of wearable technology, it appears integrated in clothing or in the accessories, was also one of the key aspects that formed the basis of the technologic fashion.

Today, the wearable technology use conventional sensors to capture data. These sensors are integrated in clothing and their proper placement in the garments is essential to be able to capture the required data. The integration of sensors allows to measure a wide variety of data, being able to gather information not only from the human body (bio signals), but also from several environments that involve light, humidity, temperature, sound or smoke, which are captured and analyzed using a microprocessor.

III. Design for Man

3.1. Design as problem solver

Design has the power to construct and reconstruct itself in a continuing process of expanding its limits, taking in account nowadays requirements. Due of its evolutionary trend and its interdisciplinary it does not close itself in concepts, theories and exclusive authors, having a nature that requires interaction, dialogue and partnership.

Designer looks for the intelligent solution for a problem whose contours are not completely visible. At its best he should generate new ideas and concepts. The innovation is essential in a competitive market. He must be active in his information searches, as well as to use the most appropriate method to solve the problem in hands. His creations should emerge from a logic that results from the interrelationship of several factors, being them technical, economic, aesthetic, environmental or human.

The project methodology is a series of necessary operations, arranged in a logical order, dictated by experience. Its aim is to achieve the best results with minimal effort (Munari, 1984). The advantages of the project methodology are: to rationalize the development of the project; to optimize the choice of materials; to allow the establishment of a common language throughout the project development; to dominate the work progress; to reduce the design conception time; to facilitate costs reduction; to perform final tests which allow to minimize errors, to improve the product, as well as to anticipate its acceptance in the market.
The designer’s mission is to find objects and services which may be useful to people and provide them better quality of life. The aim of the designer is to create methods, techniques and strategies that lead to quick and functional solutions, in order to solve the problems closed to the Man. To be a designer is to be attentive to every detail; is to create or recreate solutions which may satisfy consumers’ needs.

3.2. Fashion Design

The fashion product is designed for a particular market according to its lifestyle, inspired by fashion trends of every season. With design applied to fashion products it is intended to achieve a perfect modeling allied to an innovative design and aesthetically appealing, consistent colors with current trends, a good drape allied to a high quality material, a high level of comfort and durability after numerous washings (Rech, 2003). These are the main characteristics that are possible to observe in an objective way and which allow to make the distinction, enabling a product success in a competitive market, as Lipovetsky’s hyper modern times.

Design creates solutions, hopes and opportunities. According to Bonsiepe (1992), one of the designer's responsibilities is to tailor the product to the user, being responsible for the relationship between product and user, i.e., designer’s fundamental task is to understand the type of object and the function that it will play. It is certain the visual image and the aesthetic aspect should also be part of the project, but if the garment is uncomfortable is not usable. The comfort is reflected in the proper materials selection, in the proper proportion of the measures and in the use of appropriate technologies, providing user the best possible enjoyment of the piece.

3.3. Technologic fashion design

Technologic fashion design is defined as the intersection between fashion, design and science (Seymour, 2008b). In effect, in the technologic fashion design there is a large interdisciplinarity of scientific fields that are allied to the design principles, such as engineering, ergonomics, anthropometry, which are linked to fashion trends, taking into account the functionalities that meet the consumers’ needs.

The technologic clothing acts as an interface for the exterior. The technologic fashion has a great potential and it can also be expanded with the increased use of technology, where the potential for immediate and dynamic customization of clothing is fascinating. Fashion combined with technology mediats information, amplifying our fantasy (McLuhan, 1995).

The context of use is extremely important when creating fashion with embedded technology. Design is fundamental to the success of wearable technology; however, the context determines the function and the significant definition of the technologic fashion. At the beginning, technologic fashion became functional, but impossible to use and to look to. Currently, the technologic fashion is already within the comfort parameters and with a style integrated in the fashion universe. Its customization allowed generating new ways of self expression, consisting of a key factor to make it appealing to the general public.
Through technology clothing functions can be reinforced and new ones can be defined: physical or material functions, such as protection or attractiveness. Cultural functions (including psychological and social functions), which are the communication, the self expression, the economic or social status and also the political or religious affiliation. For example, with technologic fashion it is possible to conceive a type of military uniform which allows monitoring the health of soldiers, at the level of heart rate, breathing and presence of gas in the environment. It also allows integrating a GPS system to monitorize the location. This monitorization allows controlling the physical state and location of the soldier in times of war and conflict. It is an example of how clothing may have multiple functions, allowing controlling the military health, finding it and send alerts if he is in life danger.

3.4. The construction of wearable technology

Technologies integrated in clothing and the functionalities integrated in the electronic textiles influence the wearable capacity, comfort and aesthetics of the wearable technology, hence the need to consider these factors in an essential part of the design process, when developing clothes of this type, directed to an determined application (Gemperle et al, 1998). Designers must have a comprehensive view of the purpose, of the user, of the interaction, of the commercial applications and of the right price. An appealing design combined with an intuitive interface turns a wearable technology in a success case.

The different considerations for the construction of wearable technology (Table 1) are based on ergonomics, perception, functionality, technology, materials, energy and environmental impact. In what concerns the limitations of technologic fashion, we must consider that technology and fashion have different life cycles. It is an important task for the designer to reconcile the lifetime of a garment with the lifetime of technological components to be integrated into clothing.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ergonomics</td>
<td>Language of the form, human movement, size, weight, height, accessibility, comfort, body shape, garment fit</td>
</tr>
<tr>
<td>Perception</td>
<td>Aesthetics, to look and feel, design, cultural and psychological functions</td>
</tr>
<tr>
<td>Functionality</td>
<td>Functionality is essential in the creative process, because without it the articles become not very practical and useless</td>
</tr>
<tr>
<td>Materials</td>
<td>The right choice of materials should be made taking into account the functions for the article</td>
</tr>
<tr>
<td>Recycling</td>
<td>Ecology, biodegradability</td>
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</tbody>
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IV. Technologic fashion

4.1. Socio-cultural context

The period preceding Second World War, called the Cold War, allowed the appearance of two contexts which emerged in parallel, the weapons generation and the space generation, promoting a culture of suspicion, mistrust and atonement, which exerted a strong impact on art, design, cinema and literature of that time (Wright, 2007).
The tension and turmoil experienced dominated many aspects of everyday life, surprisingly influencing a diverse number of cultural products, where stood out the design products, architectural constructions and movie productions, in which designers have turned fear and dread in artistic possibilities, finding a conductive line of militarized world products, assimilating it in a vision of modernity. Despite these interests, the 1950's and 1960's can be characterized as the age of "technological utopia" due to a large faith in the possibility that science could transform the future into something better.

Lipovetsky (2004) characterizes this age of "technological utopia" in post-modernity, being seen as a transitional phase, which has triggered an unprecedented figure: the autonomous individual, free of institutional checks, political ideologies and tradition principles, characteristics of the modernity. According to Lipovetsky, post-modern individualism would be marked by hedonism, by the taste for the new, the promotion of futile and frivolous and by the willingness to express a unique identity, creating a revolution in the people's presentation and in the sense of the self, disrupting the mentalities and the traditional values of the technological history. The birth of sensorial technology has its origins in the psychedelic music and in the nightclubs environment, i.e., the incorporation of electronic components such as lights and screens to convey emotions and feelings arose precisely in 1960's (Figure 1).

In 1945, after the Second World War, the U.S. bombing at Hiroshima and Nagasaki cities in Japan with nuclear weapons took place, driving a new era: the nuclear era, considered the novelty of the atomic science. In parallel, there was the mission of making "the man walking on the moon", announced by President JF Kennedy in his speech in the Congress in 1961. These technological developments were the starter for the progressive improvement of technologies which have created the spatial suit, providing a new and popular vocabulary of the future. The act of putting the man in space (cosmonaut Yuri Gagarin in 1961 by the Soviet Union) and, eventually, the act of walking on the moon (U.S. Apollo 11 landed in 1969) created an unparalleled image of accomplishment.

FIG. 1: Diana Dew. Electroluminescent dress. 1966 (Pavitt, 2008a)
The space era not only promoted a steady stream of technological innovations, but also enabled the development of materials that could be adapted to everyday use, creating a range of possibilities for new products, clothing and environments, also thinking in the re-design of the human body in the near future (Figure 2).

The analogy between the post period of the Second World War and the industrial development and the importance of the machinery in the nineteenth century, demonstrates how the conditions and the necessary infrastructures have been previously created for the technologic period that was subsequently lived: the discovery of new materials with innovative properties, the voyage to the moon and the development of nuclear weapons. These events happened due to the industrial development and the technique advancement of the previous period.

Paradoxically, in the age lived on the brink of nuclear destruction, the idea of a happy and bright future offered by science was enthusiastically embraced. The advances of the spatial age and of the computer-savvy generation has enabled designers to imagine a utopic future due to the fast advance of science which changed the relationship between body and technology, also promoting new materials with high functionalities, which even today are familiar to us, such as the kevlar and the teflon (both resistant to heat and breakage), and the gore-tex (waterproof and breathable fabric). They also promoted the acceleration of the development of personal electronic technologies that we use today in our daily lives, such as Mp3 and iPod (Lindiger, cited by Pavitt, 2008b).

![Figure 2: Snyder Production Company - A piece of air-ventilated protective against radiation, noxious vapours and caustic chemicals. Material used: Vinyl and Neoprene closure. 1960 (Pavitt, 2008c).](image)

This progression of science is also reported by Neves (2000), who characterizes the second half of the twentieth century by the scientific development of micro and nanotechnology, computing and biotechnology, which exerted a significant influence on the development of production and testing of textile materials. This revolution has had a social, economic and industrial unprecedented effectiveness, allowing society to take a step forward. The application of fibres in all industrial sectors, has allowed substantial
progress in all ways of life, providing a continuous development and improvement of production techniques, material properties and application of multidisciplinary technologies, producing technical, industrial and economic unparalleled benefits due to its implementation and the impact they had on our society.

4.2. Science and the body space age

According to Ndiaye's point of view (in Pavitt, 2008d) many of the new synthetic fabrics were part of the accelerated technological development of that period, emerging from what was called the "complex military industry". Many of the new fabrics from the 1950's and 1960's emerged as a result of the chemical research, developed for military applications, aeronautical and space, soon becoming synonymous of affordable clothing, associated with terms such as modernity and youth, where its qualities were embraced by designers interested in exploring their different aesthetics and structure. Due to this development, producers began looking for a more cost-effective alternative to cotton and wool, through the use of synthetic fibres in order to broaden the range of clothing and daily goods.

In 1957 the Sputnik satellite was successfully launched into space and acted with such bravery and skill that led to both fears and hopes for the future, as having significance for some people a threat of a new kind of war, while for others it meant the birth of a technological age that has spawned new forms of communication and new meanings of transportation and, even, the ideal of human colonies in space. Shocked by the early leadership of the Soviet Union in space, the USA announced, in a program of space research, a man on the moon in 1970 (Neil Armstrong and Buzz Aldrin did it on Apollo 11).

In parallel with was lived in society, also in fashion there was this trend, through a look inspired by the space age, consisting of clothes that provided a clean silhouette, with geometric cut, high boots, wide belts and helmets, which contained some military uniform connotation. According to Colomina (in Pavitt, 2008e) both electronics and synthetic fibres are seen as prerequisites for a future existence, as the guidelines of the futuristic fashion are the display of clothing as a uniform, highlighting the practical and orderly nature of the military clothing (Figure 3).
4.3. The space costume and the cybernetic body

This simple piece of wrapped clothing changed the relationship between body and technology. Developed from experiences with flight altitude, these costumes, designed for pilots during the Second World War, had evolved in 1960's to a technologic micro-habitat, that possessed the necessary conditions for human survival: temperature, pressure, oxygen, waste removal and communication devices, being these variables grouped in a, hitherto unparalleled, fusion of technology with clothing. Space costume provided inspiration for various artistic fields, including fashion, where was patent the fascination by human transcendence (Quinn, cited by Pavitt, 2008g).

It was precisely from the construction of the space costume that was born the term of wearable technology, referring particularly to electrical engineering and electronics, computing and wireless communication, which make technology fashion works. This means, technology begins to be seen as a body extension, as if it was a part of it, giving rise to the concept that technologic clothing acts as an interface for the outside, in which fashion combined with technology is an information mediator and provides a potential increase in both clothing and individual.

Inspite of the weight and restricted movements experienced by astronauts, the space costume inspired a number of experimentalists designers and architects, having described it as "the ideal minimum housing", being seen as an embodiment of a controlled environment, integrating itself the necessary elements for survival, including oxygen, temperature control and waste removal. The electronics incorporated in it were used to provide communication and to monitorize the condition of the body. This new trend has marked the birth of a new era: the cybernetic body (Clynes, cited by Pavitt, 2008h).

The term "cybernetic body" gave rise to the cyberculture defended by Lemos (2004b), who characterizes it as a step in the evolution of language, in which human culture has
become more powerful, creative and fast (result of the emergence of the technologic industry). Due to the media progress, the spaces multiplied and enriched themselves with new forms of art, technique, industrial and policies, generating new ideas to designers, who had as primary aim the breaking of the boundaries between body and technology, enabling large advances in this area (Figure 4).

FIG. 4: Research prototype. USSR space costume. 1960's (Pavitt, 2008i)

4.4. Man extensions – wearable technologies

Still following Clynes’ thought line (in Pavitt 2008h) cybernetics has established itself as the first science of understanding the systems, technologic and biologic, and the interaction of human and mechanical action, having progressed from the military research in 1940’s due to the relationship between men and machines, being an influence on a great number of issues: the development of computers and weapons, organizational and theoretical systems of business, as well as studies of sociological and psychological human behaviour. This fusion between man and machine, built through military conduct, was a powerful analogy of man’s extendable capacity through technology, having influenced related projects with the interaction of human operators in a confined space.

4.5 Fashion futurologists

In Paris, the unconventional collections of a group of designers, where excelled André Courrèges, boasted in 1964 a modern palette of bright colours mixed with white, black and silver through a lean and angular silhouette for men and women, achieved through patterns and rigid synthetic fabrics that held its own form. This kind of clothing marked the emergence of a new type of functionality: the use of a closing system by velcro and zips, which until then was not in use. Having a special interest in modern materials, construction techniques and sculptural forms, the practice of these designers was often aligned with the tenets of the modern architecture, in yhe way they all had some basic notions and practices of architecture and engineering.
According to Courrèges (cited by Pavitt, 2008), women are equal to men, work, having a thousand things to do. So, it is necessary to make their life easier, taking advantage of the technological advances. The civil engineer and fashion designer André Courrèges was not only innovative in his art of creating clothing; he was also considered a visionary in anticipating many ideas, such as functionality and comfort for fashion's future. His collections (signed by him and co-designed by his wife Coqueline) summarize how the Parisian fashion served as a channel for optimism and technological modernity of 1960's, by applying the pinnacle of technological advancement and of social development of its time. The precision and simplicity of the clothing he designed are the result of applying a kind of mathematical method to the design, using basic geometric shapes that were directly related to the principles of the Bauhaus School of Design and the Russian Constructivism (Figure 5).

![Image](image_url)

**FIG. 5: Courrèges. Spring Collection in Paris, 1965 (Pavitt, 2008)**

Courrèges was the first designer to think in functional and comfortable clothing combined with innovative and technologic materials, thus creating a fashion that became immortalized in history. His collections have established the space age look: short dresses with geometric cuts, tunics and pants made of double or triple gabardine that held its own structure, mixed with tops and shorts that combine with white boots and a palette of silver and flourishing in a purest style of space travel. Note here again the concern about the future, particularly in the choice of unusual colours, such as silver and fluorescent that typified the spirit of the age and the desire for change. His emphasis in the structure and clean look and the use of modern forms came from a particular interest in architecture, especially by the work of Le Corbusier and Eero Saarinen, so he considered that to design a building and to make a dress had much in common.

### 4.6. Fashion and technology

Each time more often, the human body situates itself between nature and technology, i.e., in this beginning of this century the human body, the greatest exponent of nature, is contaminated by technology. The personal phone is not only a communicational electronic device that has become indispensable, it works almost like an extension of the body, integrating the garment in specific bags, or, as an accessory, saved in bags or backpacks. The wearable computer is already in interaction with the user and in a
determined context, resembling an accessory, since it is integrated in the garment and this way, in our image, acting as an intelligent assistant whose virtues are the portability, the accessibility and the integration in the user look, seeing, hearing and experiencing their own life.

The future of fashion is following the technological advances of the intelligent textiles and the capacity dimension of the textile materials being indeed as our second skin. In the context of intelligent fabrics many of the advances have occurred thanks to nanotechnology, which operates at the molecular level, combining some of the principles of molecular chemistry and physics with engineering and materials science. The clothing which generates solar energy, the fabrics that prompt the person in case of damage, the bed sheets that monitorize heartbeats and physiological health open up a whole new scene for a promising future.

Most of the research and the projects with embedded technology are used in military industry, both in the field of protection and in order to control and monitorize the military life. Other important fields of application are, firstly, the industry of sportive equipment and materials, in order to help the improvement of the athletic performance and, secondly, in the health through clothing for bio signals monitorization.

The wearable technology allows an intuitive utilization of the garment, where the user can control and manipulate the garment through an acoustic or tactile feedback system. In Figure 6, the user wears a jacket with built-in iPod, managing to control the sound level and to change the music through the technology of Fibretronic, Ltd., which permits the design of a wide range of electronic products designed specifically for clothing applications and various fashion accessories. These products include switches, joysticks, lighting systems, signal cables, via of communication systems and via radio, as well as a variety of sensor technologies that enables the user to interact with technology, controlling it.


Another technology application of the Fibretronic, Ltd. is the collection of the human body bio signals and its automatic transmission via wireless. The example of Figure 7 shows a top that monitors heart rate, to be used during sport activity.
In recent years, technology by itself has become fashion and the emerging technologies have become fashion accessories that determine the lifestyle. By the consuming public there is a great interest in electronic textiles and wearable technology, although the widespread in daily life has not happened yet, maybe because the price does not justify, either the level, either the kind of needs they propose to meet.

V. Conclusions

The period preceding the Second World War, called the Cold War gave rise to the weapons generation and the space generation, promoting a culture of suspicion, distrust and espionage. In 1945, after the Second World War, the U.S. bombing at Hiroshima and Nagasaki in Japan with nuclear weapons took place, triggering a new era: the nuclear age, considering the novelty of atomic science. It was a period marked by the tension between the blocs led by the two world superpowers, the United States and Russia, which exerted a strong impact on contemporary art, design and literature.

This agitation has surprisingly influenced a diverse number of cultural products, where design products, architectural constructions and film productions stood out, in which designers have turned fear and dread in artistic productions. The 1950’s and 1960’s can be characterized as the "age of technological utopia" because of the existence of a great faith that science could make the world a better future.

The mission of conquering the moon by man was a starter for the progressive improvement of technologies, giving rise to the space costume as a new vocabulary of the future. The space age, not only promoted a stream of technologic innovations, but also enabled the development of materials that allow designers to a range of possibilities for creating new products, functionalities and techniques, such as the kevlar, gore-tex and teflon, that provided a major breakthrough in personal protection with comfort, that even today we use in our daily lives.
The second half of the twentieth century is characterized as a period of great scientific development. The micro and nanotechnology, the computing and the biotechnology, exerted together a significant influence on the production development of textile materials. In this period, the electronic and synthetic fibers are seen as a prerequisite for a future existence.

The space costume, besides having resulted in the birth of the wearable technology, has created a technological trend that marked the emergence of a new era: the cybernetic body and the cybertulture, characterized as a step in the evolution of language, in which human culture has become more powerful, faster and more creatively. This technological culture has led new ideas to the designers who had the primary aim of breaking the boundaries between body and technology, bringing great improvements.

Fashion associated with technology has allowed the emergence of a new world, with new settings, in which the topics of web and technology have become a trend, patent in standards and references used by young fashion designers and by brands for commercial distribution. However the market has not yet identified as an asset for a daily use the wearable technology. So, it remains the applications on military, sports and health projects, which have resulted in successful cases. One of the great curiosities for next years lies in the understanding if the science evolution of materials, electronics, design and consumer behaviour may enable the existence of a future scenario of mass technologic fashion.

Bibliographic References


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