

# The Development Strategy of Chinese Garment Industry under the Influence of World Science and Technology Garment

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**Abstract**—This paper analyzes the great changes brought by science and technology to the garment industry and human life and the application status in the garment industry from the four dimensions of garment, to explain the necessity of applying science and technology to the garment industry; it also finds out the existing disadvantage of China's garment industry from the comparison with world science and technology garment and gives strategic suggestion for this to promote the development of China's garment industry.

**Keywords**—science and technology; influence; garment industry; development strategy

## I. INTRODUCTION

Science and technology have always been inseparable relationship with garment industry, from the first industrial revolution to the application of electronic computer technology, and now to the more and more intelligent trend of garment, science and technology continue to liberate manual labor and mental work in the garment industry, and the beginning of the garment industry - the textile industry plays a significant role in the production of science and technology. In the mid-18th century, the textile industry continued developing, and the advent of "Spinning Jenny" firstly led to chain reactions such as machine invention and technological improvement in the cotton textile industry, and opened the prelude to the industrial revolution. Since then, advanced work or tool machines such as screw machine and hydraulic loom appeared in the cotton textile industry. But with the increase of machine production, the former natural power such as animal power, hydraulic power and wind power could not meet the production needs any more, which directly promoted the invention and wide used of the steam engine, as the symbol of the first industrial revolution. Since

the 20th century, the development of science and technology and the world economy has brought enormous changes to the human social economy, culture and lifestyle, the textile industry and the garment industry also presented an everlasting prosperity, and technology-supported garment Industry can be said to be experiencing a garment industry revolution.

## II. THE IMPACT OF TECHNOLOGY ON THE GARMENT INDUSTRY

Fabric, style, color and craft are the four elements of garment, it can be imagined that the embodiment of science and technology on garment design is also achieved through these four dimensions.

### A. The Beginning of Science and Technology Garment - the Advent of New Fabrics

Fabric is the basis of garment design, whose every innovation will change the garment industry and the whole social concept. The development of science and technology, the rapid progress of production of garment materials and production technology, and all kinds of technology-supported new fabrics continue to come out, which turn designers' imagination and inspiration into the actual garment. The emergence of the world's first man-made fiber - nylon brought a new look of the textile, which also changed the aesthetic tendencies, and became a popular trend. For example, silk stockings made of nylon set a record of fifty thousand pairs of sales within six hours, and became a fashionable single product after World War II. Another example is Lycra with high elasticity and resilience, which greatly improved the hand feeling, draping and crease recovery ability of fabric, which integrated the comfort and

fitting of garment, created a new era of garment fitting, and made a variety of garments show a new vitality. After entering the 21st century, people's requirements on the fabric turned from durability of wear and wrinkle resistance initially to comfort, health and functional features gradually. In order to meet the needs of the public, new fabrics and fabric processing technology kept being launched in the field of science and technology, for example, new fabrics developed in recent years such as the milk fiber fabric, bamboo fiber fabric, soybean fiber fabric and anti-ultraviolet fabric, have the comfort of natural fiber such as the traditional cotton, flax, wool and silk as well as the functionality at the same time. But what play to the extreme in functionality include Gore-tex, Polar fleece and other functional fabrics, which endow the fabric with functions such as waterproof, windproof, warm and breathable through special manufacturing method and structure. In addition, protective fabric with fungi-proofing, waterproofing, grease proofing, anti-fouling, ultraviolet-proof and radiation-proof or filtering harmful gas and material is also successfully developed. It is worth mentioning a fiber with phase change thermostat function, which coats the surface with a layer of microcapsule containing phase change material, whose solid state and liquid state coexist under normal temperature. When the ambient temperature changes, there is interconversion between the liquid state and solid state to release or absorb heat to change the material temperature, so as to alleviate the changes in the temperature of human body and maintain comfort. The continuous development of fiber expands the application resources of garment, extends the advantages of traditional natural fiber, whose processing technology has also made great progress. The technical transformation of natural fiber, the research and development of chemical fiber new varieties and synthesis technology of high-performance fiber have greatly improved the performance and quality of textiles, and also give the high-quality functionality, comfort and new look to garment fabric. The continuous advent of new materials has changed people's social life, and also brought unlimited development possibility to the garment industry.

#### *B. Science and Technology Renovate the Color Language of Garment*

Color plays an important role in garment design, which conveys different color languages and interpreted different color emotions with its unique nature and characteristics. With the development of science and technology and the continuous improvement of human aesthetic level, the garment industry puts forward higher requirements on fabric color and pattern. Monochrome printing, bandhnu, batik and other traditional printing and dyeing technologies can not meet the design ideal of garment designers because of their long printing and dyeing cycle and complex work, more importantly, the pressure on sustainable development brought by traditional printing and dyeing technology promoted the reform of printing and dyeing technology. Especially after the computer technology became more mature, it was used in the field of textile printing and dyeing, and the dyeing and finishing technology of fabric has been significantly improved. Modern printing and dyeing process

has widely using information technology, controlled by computer program, and monitors the process and assists production with a variety of high technologies, such as color testing and color matching on computer, color separation and plate making on computer, non-forme jet printing and so on, including international anhydrous optical dyeing and finishing technology. The progress of garment technology is undoubtedly reflected in the digital technology, such as digital printing, digital etching, digital manufacturing and other technology applications. Designers print the digital images photographed by camera on the garment, and different picture books or photos usually give a special taste of fashion, while cameras and wide digital storage space also fundamentally expand the images tried by designers.

#### *C. Geometric Cut Style Prevails*

Garment style is the rational allocation among garment's outline, inner division, allocation, accessories and parts. It is a direct expression to give play to fashion designers' imagination, and also the most intuitive factor in addition to the color in garment design. The most striking change brought by technology to the garment design is the prevalence of "futurism" design theme. For example, in the 1960s, with the development of space technology, and human's first landing on the moon, the design trend of the whole society was around the space and universe, and as an important symbol of social life and trend, garment spurted sparks in its combination with technology. At that time, with geometric cutting, technological fabrics imitating astronauts garment became the main material, as well as skirts and boots decorated with plastic sheet, metal and other special materials. Garment style affected by science and technology had straight neat lines, geometric or irregular profile and hollowing, which were all typical characteristics of futurism. Designers combine technology elements and fashion trends, and express their longing and hope for the future with geometric garment style. In addition, the development of modern computer technology provides greater convenience for designers on garment design, and now many institutions have developed three-dimensional fashion design system, and some systems not only have design And management functions of garment style series, but also have the function of automatic animation display of design style, so that garment styles can be more intuitively shown.

#### *D. Intelligent Trend of Manufacturing Process*

Fabric, color, style are all separate individuals. A certain garment technology is needed to make a finished product, therefore it is not difficult to understand that garment process is the appropriate integration of the above three elements, which also plays a pivotal role in the process of garment design. With the rapid development of computer technology and network technology, human beings transfer more brain function to computer, and garment production process presents and automated and intelligent trend more and more. Especially the use of garment design and manufacturing (CAD / CAM) technology, high-speed, serialized, automated, and flexible sewing processing system (FMS) not only replaces the complex mental work, but also speeds up the design and improves the design quality. The cutting of

garment includes a number of complicated processes such as cloth inspection, cutting, sewing, keyhole, ironing, etc. Since the advent of 3D printing technology, the complicated process has become so simple. 3D printing technology is simply to establish the three-dimensional model of the required object in the computer, and then divide the model into many layers, take the raw material and put into the 3D printer, the machine will jet after melting the material, just like the inkjet printer, the first layer, second layer and third layer of the object... each layer is gradually overlaid, when all the layers are finished, the needed object appears. 3D printing technology is explored and tried on cutting clothes. The complex garment structure is drawn on the virtual human body model, which releases all the physical restrictions, and bids farewell to traditional garment production process. It makes every complex garment structure feasible, compared to the traditional garment production machines, technological ways enable garment designers to fully imagine and create more product details.

### III. DEVELOPMENT STRATEGY OF CHINA'S GARMENT INDUSTRY

At present, China's garment industry is in the transition from quality competition to cost competition, which forces enterprises to fully enhance market response speed and technological innovation ability, and also prompts the garment enterprises to spare no effort in improving innovation and keeping up with the pace of the times in the management model and information technology application, which will also determine the future success or failure of garment enterprises. In comparison with the developed countries, we still have a lot of gaps, what's the most pressing now is that we have to learn from foreign experience and technology, train professional technical personnel, and speed up the upgrading of the garment industry with high and new technology to develop development strategy in line with China's national conditions, play our own unique advantages, and improve the international competitiveness of garment industry.

#### A. Reasonable Introduction of Garment Integrated Manufacturing System

From its research and development to being put into production, garment integrated manufacturing system has brought the garment industry of developed countries into a new era. Computer integrated manufacturing system of garment (CLMS) specifically includes computer-aided design system of garment (CAD), computer-aided manufacturing system of garment (CAM), computer-aided process plan of garment (CAPP), automatic ironing and three-dimensional packaging warehouse of garment, electronic trading system of garment, computer online detection system, garment enterprise computer management system (MIS), etc., in order to achieve the control and management of garment design, manufacturing, mall sales and so on. Using CLMS in the garment industry can greatly enhance the quality and efficiency of garment production, which will be the core technology of the third industrial revolution, and a powerful weapon to change the traditional

garment industry. Many of our advanced garment enterprises have also seen the importance of CLMS in the garment industry, and try to introduce the garment CLMS, but unfortunately, because there is no suitable technical personnel or supporting production process, the garment system can not really play its role, and such blind import of advanced digital equipment puts a lot of manpower and material resources, which ultimately leads to losses or even collapse of the enterprise. Therefore, when enterprises introduce high and new technologies, they shall fully understand the development trend and dynamic of the garment industry, clarify the strategic objective of the enterprise to obtain a clear technical needs, and then carry out technological reform planning with purpose.

#### B. Speed Up the Development and Application of Garment Integrated Management System

Garment integrated management system such as: garment ERP (enterprise resource planning) system, which is a one-stop enterprise solution, comprehensively controlling production progress, material inventory and cost. The use of ERP system can integrate decentralized departmental functions into a unified process, so as to make the company operation more standardized and efficient. It only takes a week from getting order to supply with ERP system, which accelerates the enterprise's response to the garment market, shortens the garment cycle from production, processing to entering the market, and brings garment enterprises advantages of speed. Especially for the exporting garment enterprises, due to logistics and access procedures, the cycle of garment entering the market is extended, and the garment integrated management system transcends the time and space, achieves the modernization of production management, and changes the mode of economic competition. Synchronous enhancement of speed and quality becomes a key factor in the competitive advantage of garment enterprises. Construction of high information feedback channel to adjust the knowledge structure and marketing management model of productivity is a necessary way for the rapid development of China's garment industry.

#### C. Strive to Build Independent Intellectual Property Right

The level of independent intellectual property right of garment can reflect the status of the development of garment science and technology. China's garment industry is faced with problems such as few garment patents and ever fewer high-tech garment patents, and low level of independent intellectual property right of garment, which means that China's development level of garment technology is still very low, and can not support the development of the garment industry. Therefore, we shall develop independent garment brand with support of science and technology, and increase the added value of products. Enterprises shall pay more attention to the reference and development of patent technology from the strategic height, and actively devote themselves to the market to transfer into effective productivity. Patent management part shall give full support and assistance to garment-related patent applications to encourage the application of garment patents.

#### *D. Develop Garment Education to Meet the Requirements of Garment Industry*

In recent years, China's garment education has developed a lot, but compared with the development need of garment industry, it is still not enough. As far as school is concerned, outstanding garment faculty is obviously insufficient, and the contradiction that teaching content falls behind the scientific and technological achievements becomes more obvious, the most importantly, the garment education that should target at enterprise needs is out of line with the garment market. And practical talents both skilled in theory and practice are lacked in the talent market. Nowadays, the garment industry puts forward higher requirements on garment education in the promotion of high technology. So first of all, the garment industry associations, based on investigation and study of talent demand of the garment market, puts forward reform program such as the structural layer, scale of education and training programs of garment education for reference of education administrative departments to coordinate the decision-making of educational resources. We shall vigorously develop various levels and systems of garment education to meet the garment enterprises' demand of management staff, technical staff and front-line workers, and comprehensively enhance the overall quality of garment practitioners.

#### IV. CONCLUSION

The development of modern science and technology greatly changes the garment industry from garment design to production and processing and then to garment marketing model, and provides endless vitality to the prosperity and development of garment industry. China's garment industry is faced with the transition stage from "manufacturing" to "creation", and technology is undoubtedly the catalyst for this transition. China's garment enterprises must realize that science and technology are effective means to enhance the added value of garment products, actively introduce foreign advanced technology, cultivate comprehensive talents, and strengthen the research, development and application of enterprise technology, which is the necessary way to develop the garment industry.

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