Research on Intelligent Customization and Application of Digital Clothing with Chinese Elements under the Background of National Tide Fashion

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Abstract
The "14th Five-Year Plan" for the development of the digital economy in Zhejiang Province puts forward policy support for the digital transformation and upgrading of garment enterprises. Since 2021, China has driven the cultural and creative industry with innovation, integrated creative thinking, and promoted the digitalization process of the garment industry. Taking the personalized needs of Generation Z consumers driving national tide clothing as the starting point, focusing on "Chinese elements + original core design + digitalization" as the driving force, building a pattern database to solve design homogenization, improving the digital management of body data, building a four-library virtual digital intelligent customization platform, releasing consumption potential, helping the textile industry Internet platform to open and share, and accelerating the high-end development of national tide fashion brands. Through the pattern library, pattern library, fabric library, and style library, a four-library virtual digital intelligent customization platform is built, based on oriental aesthetics, to achieve digital empowerment, cultural creativity and two-wheel drive high-quality development of the national tide garment industry.

Keywords
Guochao; Chinese Elements; Digital; Customization.

1. General Situation and Problem Analysis of Digital Transformation of Garment Industry
Since the 13th Five-Year Plan, Wenzhou garment industry has gradually expanded to design, research and development, service and retail on the basis of traditional advantages of processing and manufacturing. At the moment of the epidemic, the development of new retail business model has also made some achievements, but due to the large number of small and medium-sized processing enterprises, the lack of digital awareness, digital technology is not perfect, lack of talent, lack of funds and other reasons for the lack of digital design solutions. Therefore, it is urgent to enhance the new capability of digital design of textile and apparel industry, broaden digital marketing channels, analyze the trend of consumption value of new consumer groups, enhance consumption viscosity, and enable the digital development of national fashion clothing customization.
Based on the "14th Five-Year Plan" to build a fashion capital, promote the reform and development of the fashion industry policy support, digitally driven, industry chain and industrial ecology is being reconstructed. Under the development trend of science and technology, fashion and green, the textile and garment industry is moving towards the era of digital intelligent manufacturing. Taking the national tide fashion intelligent manufacturing as the entry point, focusing on innovation-oriented, deeply cultivating "Chinese elements + original core design + digitalization" as the driving force, and exploring high-end clothing
personalized customization has become an important path for the digital transformation and upgrading of Wenzhou’s garment industry and high-quality development.

2. Digital Empowerment of the National Tide Clothing Personalized Customization Path Construction

2.1. Chinese Elements are Integrated into the Basic Architecture of the Digital Customization Model of Clothing

In the past decade, the national tide boom has increased by 5 times, and the "post-90s" and "post-00s" have become the main consumers of the national tide fashion brands, contributing more than 74%. Since 2018, policy support documents to support the development of the national tide industry have emerged in an endless stream, encouraging "taking cultural creativity as the guide and enhancing the original ability of cultural content" to inject new vitality into the development of clothing tide brands. China's Li Ning, Peacebird and so on emerged in major fashion weeks to interpret the national fashion, Z generation Z generation refers to the population born between 1995 and 2010 pay more attention to clothing personalization, value connotation, pay attention to the sustenance of cultural pride, no longer one-sided pursuit of high prices brought by the show off and display attributes, users pay more attention to consumer culture. [1] Coupled with the promotion of social media, the traffic of the national tide topic exploded, and the minority national tide gradually developed towards the universal development of the mass national tide. In the digital virtual show in 2022, Yu Qianzi used qinghua as a cultural carrier, integrated blue and white elements into art forms, and combined digital art, allowing static national tide cultural genes to travel through dynamic historical time and space, linking virtual and real spaces. [2] Therefore, using art to convey China’s power, build a pattern library, classify the style and characteristics of Chinese elements such as classic patterns, fashion patterns, and original patterns, so that users and designers can download and edit, update and improve data, optimize creative design, accurately locate consumer demand, and form a basic framework thinking for the integration of Chinese elements digital resources into the clothing personality customization model. Using the organic integration of digital technology and pattern data assets, the cultural self-confidence is infiltrated into the virtual dress experience, and the Chinese elements and national fashion are combined with digital technology and platform resources through the original core design, so as to enhance the important cultural connotation of Chinese elements to empower the personalized, branded and high-end development of national tide clothing. Create an immersive consumer interactive experience and promote the revolutionary reshaping of the apparel industry.

2.2. Chinese Elements are Integrated into the Key Technologies of the Digital Customization Model of Clothing

2.2.1. Form Digital Resources for Chinese Elements

In-depth investigation of consumers' consumption demand for national tide clothing characteristics, generation Z is the main force of national tide consumption, find the opportunity point of Chinese elements to integrate into the national tide clothing design, consolidate traditional culture as the foundation and integrate digital clothing design customization, and realize user personalization. Collect image and pattern classification data of Chinese elements, sort out the basic characteristics, types, bones, structure, style, connotations, etc. of the elements into the library, deeply cultivate the original design culture, build a virtual digital platform for pattern databases, form differentiated "social symbols", and protect national patterns.
At present, the pattern database is developed and constructed in large quantities such as trend flowers, traditional flower patterns, domestic elements, auspicious patterns, and Chinese cartoon elements, with a total of 4196 special pattern materials (Figure 1), realizing the development of the core originality of the digital core of national tide clothing. Develop Chinese elements through the database platform to achieve digital inheritance, innovative design, creative development, resource sharing, expand the field of Chinese element communication, to achieve efficient design of clothing, through the original design of cultural and artistic perspective to create a national tide clothing brand digital design differentiation out of the circle, enhance the national fashion model of the national tide clothing industry competitive advantage. Taking the pattern database data platform as the starting point, based on big data tracking, one-click download, reducing design risks, flat, 3D virtual clothing online display, around the online demonstration of the feasibility of design schemes, telling the story of fashion China, focusing on cultural genes to promote the digital innovation and development of national tide clothing.

![Pattern database](image1)

2.2.2. Digitization of Body Data Management

![Human body database](image2)

The project cooperates with Zhejiang Feister Garment Co., Ltd., a small and medium-sized micro and medium-sized enterprise, to record the three-dimensional scanning data of consumers in the dress state through three-dimensional scanning measuring instruments, complete the 5-second collection of human body data, the construction of three-dimensional models of the
human body, the design of the somatosensory array, the calculation of the body parameters of the dress and the digital push board, the completion of the intelligent spatial layout parameters, and the real-time matching correction. Using a three-dimensional scanner, intelligent cloud management of human body shape data is generated, reducing enterprise cost collection, quickly analyzing customer body shape data, simplifying workflow, and meeting user personalized customization needs. Establish body data assets (Figure 2) to promote the in-depth and breadth of digital development of the garment industry cluster.

2.2.3. Personalized Customization Digitalization

According to the information such as social attributes, living habits and consumption behaviors of national tide enthusiasts, the accurate positioning of Generation Z is the main force of national tide brand consumption, pursuing cultural self-confidence and personalized empathy consumption, and likes to emphasize experience, heavy appearance, immersion, and sense of participation. Generation Z consumes for experience, for the sake of appearance, for the pride of the nation, eager to find a sense of spiritual identity. Therefore, grasp the consumption upgrade, take personalized needs as the guide, strengthen the classification guidance of users through the pattern database, realize shared participation in design, and achieve the purpose of digital personality customization. Combined with the virtual sample dress program, choose different styles of Chinese elements to match the design, and realize their own exclusive and original national tide clothing personality digital intelligent customization vision, that is, the design can be produced, accelerate the supply chain to meet flexible consumer demand, and grasp the upgrading and transformation of new consumption models. The personalized customization and development of Guochao clothing, guided by target consumers, and the use of differentiated product design to influence the brand and reshape products in turn is a good way for the digital design of Guochao clothing to highlight the siege. Use digital technology to realize personalized clothing customization, accelerate enterprises to adapt to the new normal of "fragmentation" and "fragmentation" of orders, build a virtual digital platform, quickly adapt to flexible production, and enhance the competitiveness of enterprises.

2.2.4. Build a Four-Library Virtual Digital Intelligence Platform

The development of the Wenzhou regional national tide garment industry lacks high-end, the degree of branding is not enough, the original design is insufficient, and at the same time, it faces the problems of insufficient resource support of the design platform and insufficient degree of digitalization. In addition to building a database of Chinese element patterns to interpret cultural genes, enterprises need to accelerate the strategic layout of digitalization, innovate consumption scenarios, and meet the new consumption models in the post-epidemic era.

The project, together with the R&D center of PFIST and LANXESS, jointly laid out the three-dimensional scanner to generate body shape data assets, focusing on the pattern, layout, fabric and style library as the starting point to build a high-end four-library virtual digital intelligent customization platform (Figure 3). The pattern library carries the essence of the national tide elements, classifies and stores plants, animals, cartoons, landscapes and other themes, realizes pattern, color modification and integration online, and plays with the national tide products that belong to personal customization. The layout library contains a variety of clothing basic layouts, ET special body shape data, you can easily and quickly modify the size of any part, visualize the operation process, change the traditional pattern of clothing plate making, revision of lengthy process. The fabric library integrates fabric categories, fabric properties, and fabric processes to more effectively implement fabric applications in design. The style library gathers popular dress styles, tops, bottoms, accessories, etc., while developing a graphic library of clothing style parts, providing free choice of style parts, changing clothing styles, and national tide enthusiasts can easily choose their favorite styles. [3]Siku solves the problem of low
efficiency of national tide clothing design and research and development, virtual sample clothing display technology, brings a sense of consumer immersive experience, improves service quality, builds a multi-scene immersive consumption freshness, and meets the high-value dress needs of Generation Z. Innovate and realize the digital platform to empower the national tide fashion, explore the opportunity points for the creative activation of the tide culture clothing design, and expand the popularity and influence of the national tide clothing brand through the Internet + platform.

![Four-library virtual digital intelligence platform](image)

**Figure 3.** Four-library virtual digital intelligence platform

3. **Research on Intelligent Customization and Application of Chinese Element Digital Clothing**

3.1. **Digital Technology Enables the Coordinated Development of Industrial Clusters**

Build a pattern database, realize resource sharing and dissemination, and solve the pain points of Inheritance, Protection, Activation and Application of Chinese elements for China’s excellent traditional culture that is non-renewable and facing disappearance through digital technology. Cooperate with the development of the four-library virtual digital intelligent customization platform to avoid the substantial waste of surface accessories in the development process of enterprises, and improve environmental problems such as global warming. Relying on the pattern database and joint enterprises, we will jointly develop a digital intelligent customization platform for clothing, and use artificial intelligence and digital technology to achieve personalized matching of patterns, colors, styles and patterns.

Based on the cloud fashion method, it interprets the cultural genes of Chinese elements and injects new energy and diversified values into the original design of the Oriental Country Series Story Brand (Figure 4). Through CLO 3D, digital national fashion clothing quickly displays the design effect, simulates the virtual clothing effect in different scenes in the state of body movement, and has a more realistic sense of try-on experience. Focus on digital technology as the starting point, relying on the pattern database, drive cultural creativity to empower the high-quality development of the national tide garment industry. Realize the digital platform through the upstream and downstream communities of garment enterprises, optimize the development of the whole process of digital intelligent customization flow for clothing.
designers, plate makers, garment processing plants, supply chains, sales chains, etc., and promote the collaborative service of the supply chain at the clothing manufacturing end. Promote the coordinated development of the national tide garment industry cluster, enhance the requirements of the industry's scientific and technological fashion green development, and realize the consumer's vision of "a better life".

Figure 4. Oriental Nation Series Virtual Dressup 1
Figure 5. Oriental Nation Series Virtual Dressup 2
Figure 6. 3D virtual sample dress display

3.2. Digital Platforms Enable Iterative Upgrading of New Consumption Scenarios

With the transformation and upgrading of the garment industry, the digitization of consumption scenarios such as physical sales, e-commerce platforms, and smart stores, and the digitization of marketing strategies are major reforms in the national tide garment industry. The apparel retail end continues to create a panoramic digital consumption scene conversion marketing core strategy. [4] The four-library virtual digital intelligent customization platform developed by the project has built an immersive interactive experience of virtual fitting scenes, consumption breaks through the limitations of time and space, personalizes and rapidly matches virtual dressing through Chinese elements, combines tangible national fashion, transmits intangible aesthetic values, traditional culture and spiritual values, protects the excellent cultural resources of the Chinese nation, strengthens the patriotic tide of consumers, and plays with the cultural self-confidence of New Oriental Beauty. Focus on the development of the four-library virtual digital intelligent customization platform, consume leading fashion, improve the synergistic advantages of pattern database, fabric database, layout database and style database, realize fast selection, and meet the new needs of consumers for "socialization", experience, enjoyment and immersion. For example, the joint name of the TV series "Dream Hualu" and Xicha makes Xicha not only have a fashion model, but also infiltrates the traditional Hanfu cultural beauty into fashion life, and for the film and television drama clothing IP, the national tide fit point needs Chinese elements to arouse consumers' empathy. The new consumption scenario model generated by the digital platform makes the audience of the national tide garment industry younger, more low-carbon and environmentally friendly, improves the added value of products, and makes garment companies have more say in homogeneous competition.

3.3. Digitalization Empowers the Cultural Core of the National Tide Garment Industry

The "Z generation" is the new generation of consumer innovation demand driven by the national tide of clothing industry development is the intensifier, through digital technology +
culture to drive the dual-wheel empowerment to promote the diversification of consumer goods in the clothing industry. The design revolves around the "Chinese elements embracing the digital national tide" to carry out revolutionary reshaping of the products of Pfister and LANXESS, relying on the pattern database, based on oriental aesthetics, making full use of digital technology to carry out the customization of digital national tide silk scarves, so as to improve the quality and seek dividends for the enterprise. Through the four-library virtual digital intelligent customization platform, optimize the user pattern selection scheme, make the silk scarf customization more in line with the design aesthetics, help create high-quality products, realize one-to-one personalized services and large-scale flexible production, etc., grasp the data to grasp the accurate needs of users, and help brands differentiate out of the circle.

Digital clothing without rich cultural connotation genes is miserable and tasteless, and design products without scientific and technological content are monotonous. Using typical cultural symbols such as pandas and cranes (Figure 7), digital collections, digital badges, Chaoguan IP cultural creations, blind boxes, etc., to tell the "creativity" and "connotation" of digital national tide products, with the help of digital technology and platforms to tell the story of fashion China, to create a high-end brand of national tide, digital scenes to help immersive collocation experience, strengthen user stickiness. Realize the quality and efficiency of enterprises, and promote the innovative development of traditional Chinese culture.

![Figure 7. Creative design of crane and panda element silk scarf](image)

3.4. Opportunities and Challenges Faced by Digital Clothing Intelligent Customization

The vision of digital China, digital intangible cultural heritage and carbon neutral global sustainable development accelerates the development of textile and apparel industry in the city and Guochao in the future. China fashion industry is facing digital upgrading and transformation, which is both an opportunity and a challenge. First of all, the project cooperated with Fister and Lanxess to develop the resources of pattern database, pattern library, style library and fabric library, deeply cultivated Oriental aesthetics and cultural confidence to construct the virtual digital intelligent customization platform of four libraries, shorten the time of product development, reduce the energy consumption and carbon emission of traditional production. Secondly, the development of digital technology has spawned the fashion meta-universe space and expanded new virtual space scenes, so that users can immerse themselves in the cross-space link of national fashion aesthetics. Relying on the pattern database, and collaborating with the four-database intelligent platform and the network social platform, we can appreciate the Chinese culture traversing history and space and shuttling between the real and virtual world. Chinese aesthetic elements and the charm of intangible cultural heritage take root in the virtual fashion platform, subvert the traditional promotion and experience mode, and help the design of new digital fashion products and the output of connotation value. Let Guo Chao fashion design in the virtual world coruscate new vitality. Moreover, Chinese elements use digital technology combined with national fashion carrier to quickly realize the inheritance, activation, conversion and application of different scenes, green energy saving, what you see is what you
get, in line with the new consumer needs of generation Z, improve the strength of enterprise clothing brand, and promote a new pattern of future clothing industry development. Deepen the digital leadership of the national tide clothing industry, in addition to integrating the new digital business philosophy, how to better establish pattern database resources, improve the data ecosystem of platform data collection, use, sharing, protection and dissemination, and standardize digital resources to form a future virtual space National tide fashion needs to specify legal norms and reduce digital privacy crises.

4. Conclusion and Outlook

The development of the four-library virtual digital intelligent customization platform provides convenience for enterprises to automatically and quickly obtain user body shape data, quickly provide intelligent optimization and collocation solutions, and form a set of style design, intelligent sample generation and modification, digital virtual sample display, personalized pattern matching display and 3D virtual clothing dynamic simulation production advantages, providing consumers with diversified consumption scenarios and enhancing the stickiness of users and brands. By building Chinese elements into the design of national tide clothing, deeply focusing on the cultural innovation of digital + oriental aesthetics, and always focusing on the vision of the content of the four library platform, digital scenes, and digital national tide culture, we have deeply cultivated the digital track of the national tide clothing industry. Will linkage education industry circle, strengthen the education system to build digital talent team, the perfect digital collaborative platform, facilitate the tide garment design between government, industry, enterprise, further fu can design industry digitization process, comprehensive ability in creative thinking, the original design, finally realizes the fashion of global sustainable development.

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