



## On Assortment and Implementation of Modern Mass Customization of Apparel

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### Abstract

In this paper, the author mainly discusses assortment and implementation methods of mass customization nowadays. Through investigation of market requirements of mass customization, the author proposes the major assortment of mass customization of apparel: personal customization aimed at high-level customers, group customization aimed at group customers, marketplace customization aimed at tradesman ordering, original brand customization aimed at foreign trade ordering, and alteration customization on standard ready-to-wear clothes. And also features and implementation methods of these kinds of customization, including fast design method, production management method, customer relationship management method and resource reuse method of mass customization and mass production.

**Keywords:** Mass customization of apparel, Assortment, Methods

### 1. Introduction

Today when technology is highly developed, previous rag trade is now going through an unprecedented revolution, and modern apparel has also entered a brand-new development phase. With fast development of the economy, continual advancement of science and technology and continual improvement of people's standards of living, apparel consumers' requirements for dressing are, without exception, becoming higher. Therefore, the increasing personal demands can not be satisfied by the general large-scale ready-to-wear costume. They need to participate in the design in person according to their own taste, which only customization can satisfy. In recent years, quite lots of enterprises abroad have gained tremendous competition advantages by implementing large-scale customization. Some experts predicted that large-scale customization would gradually replace traditional mass production to become the mainstream production mode in the 21st century.

### 2. Technological system and basic thought of mass customization

Technological system of mass customization includes basic principles of mass customization, development and design technology, as well as managing and manufacturing technology of mass customization. The basic principles of mass customization include comparability, reuse and overall consideration.

External diversification of products refers to that in product appearance, performance and functions, etc, experienced by customers in the process of purchasing and using; while internal diversification of products refers to that in product design, manufacturing, sale and service, etc, experienced by an enterprise in the process of producing. Market demands of mass customization include those of customers and enterprises. Customers call for increasing external diversification, while enterprises call for internal diversification. Increasing of the former usually increase customization value accordingly, but that will lead to an increase of internal diversification. In order to decrease customization costs, it is necessary to reduce the latter and eliminate contradiction of the two.

Under the guidance of comparability, reuse and overall consideration, what an enterprise should do is: to adopt the development and design technology, managing and manufacturing technology aimed at mass customization, to improve customization value, to provide customers with satisfactory customized products and service with a fast speed, to cut down on customization cost, and to realize benefits of mass production, which will make an enterprise gain profits therein.

### 3. Major assortment of mass customization of apparel

Through further market classification, mass assortment of apparel can be classified into personal customization, group customization, marketplace customization, original brand customization and alteration customization.

#### 3.1 Personal customization

Personal customization is aimed at high-level customers by manufacturing enterprises. With the development of economy, a high-level and large-scale consumer group has formed that pursues fashions and outstanding individuality. Considering these market demands, some manufacturing enterprises have already begun their customized production of single measuring and single customization, namely, personal customization. Whether in the aspect of managing or technology, there have definite difficulties with personal customization, since it has relative higher demands on information-based levels of the design, manufacturing and management of an enterprise. Besides, it requires an enterprise to have a perfect sale network. Therefore, at present, this type of customization is especially propitious to those manufacturing enterprises that have advanced manufacturing technologies, relatively mature information, and sound sale network. Furthermore, some modern tailor's shops also begin to focus on establishing their own brands: they adopt modernized producing facilities and are equipped with special producing plants. Even there are some that hire pattern designers and professional designers to specially tailor and design for customers, so it also belongs to personal customization.

#### 3.2 Group customization

Apparel customization targeting at group customers is called group customization. Different from personal customization, body measuring of group customization is aimed at group customers, usually conducted by measuring personnel on the site. In addition, apparel customized is mainly product series, because its technology and management are relatively simple. Market scope of group customization is extensive, including school uniforms, team uniforms and fatigue clothes, etc.. Because of its large-scale customization, and high overall profits, it has gained favor by more and more costume manufacturing enterprises, even becoming primary production business of certain enterprises and primary profit source of enterprises.

#### 3.3 Marketplace customization

Marketplace customization is aimed at marketplace ordering. In the dynamic market nowadays, an enterprise not only predicts on bestselling styles of costume and demanded quantity of each style, but predicts on styles in different selling places and seasons and their quantities. All these result in more and more complexity of market prediction, and involve more and more factors. Incorrect prediction might lead to such problems as blind production, overstock and management confusion of supply chain, etc., which would directly affect profits of an enterprise. Such sale ends as marketplace and franchised stores are close to the market, able to grasp changes in the market in time. Therefore, the task of prediction is gradually transferring from manufacturing enterprises to sale ends. Marketplaces and franchised stores can make more precise demand prediction, send out purchasing orders to manufacturing enterprises according to prediction results; and then manufacturing enterprises will arrange production and supply products according to the overall results of orders. This kind of customization has been adopted by some apparel manufacturing enterprises, and its production and development is actually a specific phenomenon of switch from mass production to mass customization.

#### 3.4 Original brand customization

Original brand customization is a kind of customization in which a costume manufacturing enterprise makes use of remaining manufacturing power to customize for other top-brand costume enterprises. It is mainly embodied by material processing, sample processing and original brand production, etc, which are targeted at foreign trade orders. When we advocate independent brand, innovative design and attention on sale aspects, we should also notice that China is a costume manufacturing country, in which quite a large quantity of costume manufacturing enterprises have their own remaining manufacturing power. Especially some medium and small-size enterprises have not had an internationally well-known brand by now, and have not had competitive research, development and sale capacity. In order for them to enter global costume manufacturing network, the largest advantage lies in low-cost manufacturing power, which will not be changed within a short period of time. Therefore, these enterprises mostly play a role of manufacturers, and original brand customization becomes an important component of their business.

#### 3.5 Alteration customization

In addition to the previous several types of customization by manufacturing enterprises, another type of customization is alteration customization, that is, a marketplace alters on standard ready-to-wear clothes according to customers' body size, and, therefore, provides appropriate costume. Although there are large quantities of models of costume to choose from, still discrepancy, big or small, exists between these clothes and size of customers. Due to a high expectation of customers in fitness of top brand costume, an enterprise can adopt this type of customization to realize that.

#### 4. Implementation methods of mass customization of apparel

Different forms of apparel mass customization determine its different features. For different markets, we should adopt totally different implementation methods. Considering such key factors as customer requirements, customization choice, price, and delivery date, primary methods to implement mass customization include fast design method, production management method, customer relationship management method and resource reuse method. By means of reasonable application of these methods, an enterprise can reduce internal product diversification, increase external product diversification, cut down on costs of products, and shorten delivery date of customized products.

##### 4.1 Fast design method

For personal customization, group customization, marketplace customization, to realize apparel mass customization, satisfy customers' requirements for materials, patterns, and sizes, the first thing is to develop and present apparel patterns having potentials in customization market. For original brand customization, there is no need for costume manufacturing enterprises to develop products. Alteration customization adopts mode of mass production, while different from general mass production, appropriate adjustment will be made to products in view of subsequent modification. Development and design technology is a key technology of mass customization. The process of this technology can be regrouped into development process of costume product groups and fast design process of customized apparel. By means of development of product groups, we establish pattern mode, templet mode and technics mode with CAD system as a basis of fast design of customized apparel.

Fast design of customized apparel and relative development and tailoring is completed under the support of compositive CRM/CAD/CAM/PDM system. On the basis pattern mode, templet mode and technics mode, fast design of pattern, templet, material arrangement and technics, working out of documents about pattern diagram, templet diagram, material arrangement diagram and technics list, tailoring, sewing and ironing, which will together bring about production of individualized customized apparel.

##### 4.2 Production management method

For personal customization, group customization, marketplace customization, and original brand customization, we need to adopt rational producing management method in accordance with features of customized production. Production management is mainly composed of material arrangement management, tailoring management and sewing management. For alteration customization, what an manufacturing enterprise tends to adopt is mass production of standardized products, and its customization mainly occurs in the subsequent sale phase. In the process of mass customization, customers' orders are quite distinctive, so it requires to work out rational tailoring and collocating programs on the basis of templet, to achieve the double aims of reducing material waste and improve production efficiency. While there is strict requirements for color distinction, clothing pieces of one dress should be cut from the same piece of material. And sometimes, adjacent clothing pieces should match each other in panes and strips, which also requires adjustment to material cutting programs. The application of computers in material arrangement can realize convenient and shortcut copy and re-composition according to customer orders and requirements in the production, which effectively supports mass customization.

Tailoring fundamentally confirms patterns and specifications of customized apparel, which also has direct effect on the subsequent processing. Therefore, it means quite a lot in ensuring product quality and satisfying customers' demands.

Computer clippers adopts CAD/CAM integration system, which conduct tailoring according to output results of CAD, and have relatively high tailoring precision and efficiency. They are able to adapt to order requirements of multi-specifications, short period of delivery date, and high quality, especially appropriate for producing and manufacturing of customized apparel. Owing to the individualization of customized apparel and their components, it requires reasonable numbering on pieces cutting to ensure correct tailoring and combination of all clothing pieces. Diversification of orders determines the method of piece packing to guarantee correct producing of each piece of customized apparel.

Sewing is a relatively complex aspect of the whole processing, and it has obvious effects on quality and delivery date of customized apparel. With the scientific advancement, sewing machines have developed from mechanization to automatization and informationization, among which hanging and transmitting production system is relatively typical. This system is totally controlled by computers, able to fit costume processing of different varieties and batches. Module-mode sewing and processing system, composed of by several sewing and ironing facilities, can be re-structured conveniently on the basis of production requirements, and respond to changes of orders with a fast speed. In the process of sewing, methods of working procedure classification and flow process are adopted, modularization and specialization of working procedure are realized, and re-design and combination of working procedure modules, which all together make successful customization of apparel.

#### 4.3 Customer relationship management method

Mass customization transfers from product as the center to customer as the center, because customer relationship management is an important element of mass customization. Whichever one, effective customer relationship management is indispensable. The key of customer relationship management is to establish mutual learning relationship between costume manufacturing enterprises and customers, and to upgrade satisfaction and loyalty of customers. And personal customization is single measuring and single customization, with different customer orders, and highly dispersed customer spots, so it has higher requirements for customer relationship management.

For personal customization, an apparel manufacturing enterprise can make full use of sale ends to establish and improve relationships with customers. Customers can know more about an enterprise, its products and services by means of the sale ends, so that they can make appropriate customization choices. An enterprise may communicate with its customers through sale ends, knowing that different customers may have different demands on materials, patterns, price, delivery date and service, so that they can improve development and design, production management and customer service of customized apparel. A customer may be measured at one sale end. Measuring technologies mainly include traditional measuring, size-measure fixture measuring and non-touching three dimensional human measuring. In the first kind, a ruler is used, which is simple and convenient, with wide-range randomness; in the second kind, size-measure fixtures are used for measuring, which avoids windage caused by artificial factors. Since training is a must for measuring personnel, and size-measure fixtures are indispensable, this kind of measuring is mainly used in franchised stores. Customers can register their intentions and favors in the page layouts afforded by an enterprise, and subsequent measuring in terminal stores can also implement customization; in the third kind measuring, computers are used to assist human measuring technology — with support of human scanning technique, three-dimensional human virtual models are produced to conduct try-on imitation of customized apparel, even apparel templet being able directly brought into form. However, at present, facility cost of this kind of measuring is too high.

#### 4.4 Resource reuse method

Mass production and mass customization respectively aims at standardized market and individualized market. Usually, requirements of one customer for standardized products and customized products coexist. Therefore, market information of mass production might reflect potential customization demands of a customer in a way. Likewise, a customer's customization demands can also provide reference for the market of mass production. Furthermore, these two production modes can share obtaining channels of information.

Mass production and mass customization can adopt unified templet design system and material arrangement system in the development and design, and share the data base. Different specifications of series of templates developed in mass production can be used as the basic model base of customized apparel. Templates of customized apparel are obtained on the basis of customers' size measuring and of basic model templates in the basic model base.

If products produced in the mass production and mass customization belong to the same category, we can apply a unified sewing production line because of the comparability of the product structures and manufacturing process.

It is also through a supply chain that apparel of mass customization can arrive at the customers, so a share of mature supply chain in the mass production can partly resolve allocation problems of customized apparel.

### 5. Conclusions

1. Producing according to customer orders, mass customization belongs to a production mode of demand promoting. It has specific market space, not only for future development, but also has gradually evolved into one of the realistic production way. It includes several different forms, mainly personal customization, group customization, marketplace customization, original brand customization and alteration customization, etc.

2. An apparel manufacturing enterprise can take an effective measure to implement mass customization, including fast design method based on product models, effective management method in the process of tailoring and sewing, customer relationship management method of mutually learning, and reuse method of mass production resources. To realize alteration customization, it requires an apparel manufacturing enterprise to conduct reasonable design and equip with corresponding manpower and facilities.

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