

# Two Depth Fusion, from “Manufacture” to “Intellectual Creation”

—Based on Qingdao Hong Ling Group Innovative MTM Mode

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## Abstract

Promoting the deep integration of informationization and industrialization is an inevitable choice for the transformation and upgrading of traditional industries. Based on information technology and based on smart manufacturing, Hong Ling Group actively develops MTM business targeting high-end consumer groups, achieves deep integration of the two industries, and enhances the company’s core competitiveness and brand influence. This article combines the current trend of deep integration, using case studies, analyzing the MTM business model of the Hong Ling Group, and exploring its innovations in business models, technologies, production, and operations, and bringing new opportunities to the Chinese textile and apparel industry and other industries. Industrial roads, promote the integration of the two deep integration, refine the theoretical value and reference significance.

## Keywords

Two Depth Fusion, Hong Ling Group, Intelligent Manufacturing, MTM Model, Innovation

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## 1. Introduction

China is already the world’s largest producer of clothing, but there are still many problems in China’s garment industry. The most typical manifestations are: the growth mode of the Chinese garment industry is still extensive, independent innovation, lack of independent research and development design capabilities; production methods, management mechanisms and The industrial chain integration capability is not yet adapted to the new characteristics and requirements of the industry under the background of economic globalization and consump-

tion upgrade [1].

The Hong Ling Group is a textile and apparel company that has practiced “integration of the two industries” earlier and is also a classic enterprise of intelligent manufacturing in China. Through its strong supply chain integration capabilities, it took the lead in implementing the MTM model for personalized clothing customization, pioneering C2M (that is, the consumer-driven factory automating transactions), transforming the traditional textile and garment industry into a “high inventory model with pre-production and post-sales”. For the Internet information era, the “zero-stock mode of first-to-interest-production” realizes the use of large-scale industrial production to meet individualized demands and has emerged a new road of digital technology and clothing integration.

## **2. Two Deep Fusion and Related Concept Interpretation**

### **2.1. Two Depth Fusion**

“Two deep fusion” is a strategic extension of the “two fusion.” The term “two fusion” first appeared in the Party’s “16<sup>th</sup> National Congress” report, and it is based on the new forms and characteristics of China’s industrial industry, manufacturing service industry, and information technology industry, and it is an important way to take a new road to industrialization. According to the interpretation of “Informatization and Industrialization Convergence Requirements” issued by the Ministry of Industry and Information, “two fusion” refers to the combination of high-level informatization and industrialization. It refers to the use of information to drive industrialization. Industrialization promotes informatization. The two are blended at each level of technology, products, and management. Informatization has become a common method for the management of industrial enterprises. The core of the integration of the two is information support, the pursuit of sustainable development model.

The report of the 17<sup>th</sup> National Congress of the People’s Republic of China established the strategy of “two fusion” of industrialization and informatization, and China’s industrial upgrading has entered an upward breakthrough path [2].

With the intensification of informatization and the new trend of consumption upgrade, the integration of the two needs to be carried out in the breadth and depth of the next new height—“deep integration of the two.” The so-called “two deep fusion” is based on smart manufacturing, extending from manufacturing to service-based, and around the immediate need-for-manufacture model, urging the production model to change from large-scale, standardized and batch-oriented to large-scale and customized. The flexible production model promotes R&D design, supply chain, production process, logistics distribution and sales model innovation.

### **2.2. Intelligent Manufacturing**

Intelligent manufacturing is rising in the world. It is the inevitable development of manufacturing technology, especially the development of manufacturing in-

formation technology. It is the result of the deep development of automation and integration technology, and it is also the main line for implementing “Made in China 2025”. According to the “Special Action Plan for Intensive Integration of Informatization and Industrialization (2013-2018)” [3], smart manufacturing is the main direction and method for two deep fusion. It is based on a new generation of information technology such as the Internet of Things, cloud computing, and artificial intelligence to promote equipment. The intelligent application, intelligent integration of production processes and processes, and smart manufacturing production modes enable automation, intelligence, leanness, and greenness in various manufacturing processes.

### **3. Hong Ling Group Innovative MTM Model**

#### **3.1. Technological Innovation Promotes the Upgrade of Model and Strengthens Independent Brand Construction**

The traditional manual workshop tailoring cannot meet the needs of the large-scale production capacity of modern industrial production equipment, which also prompted the emergence of new tailor-made methods. In response to market demand, Hong Ling focused on implementing the “individualized and differentiated” blue ocean strategy, established the business model of high-end tailored suit suits as the main line, and launched the clothing senior tailored (MTM) business [4]. In order to support the MTM business, Hong Ling began to carry out management reform and technological transformation of the company, adjust the product structure, and actively promote the construction of “two deep fusion.”

#### **3.2. Collaborative and Innovative Intelligent Manufacturing System**

##### **3.2.1. Build Cotte Smart C2M Custom Platform, Carefully Layout Online and Offline**

The Hong Ling Group adopts the Cotte Smart Customization Platform, which is based on big data-driven assembly line production, and has established a version library that includes millions of versions. Cotte Smart C2M platform generates a 3D model by collecting data from customers’ appointments. Customers can carefully observe the style color, detail design, and fabric material through this three-dimensional model. Cotte smart platform introduces RFID (Radio Frequency Identification) technology, which converts personalized information submitted by customers into standardized data, which is directly passed to the factory order platform for ordering. As shown in **Table 1**.

The RFID card maker records the entire data into an electronic tag, and the code is translated into corresponding operation instructions. The worker in each processing step reads the card and completes specific operations such as cutting, buttoning, and embroidery according to the corresponding instructions. Through the integration of industrial assembly lines and personalized manufacturing, it not only satisfies the customer’s individual needs better, but also Get rid of the dependence on the plate maker. The cost is also greatly reduced. **Table 1** shows

Cotte smart C2M custom platform’s specific operation flow.

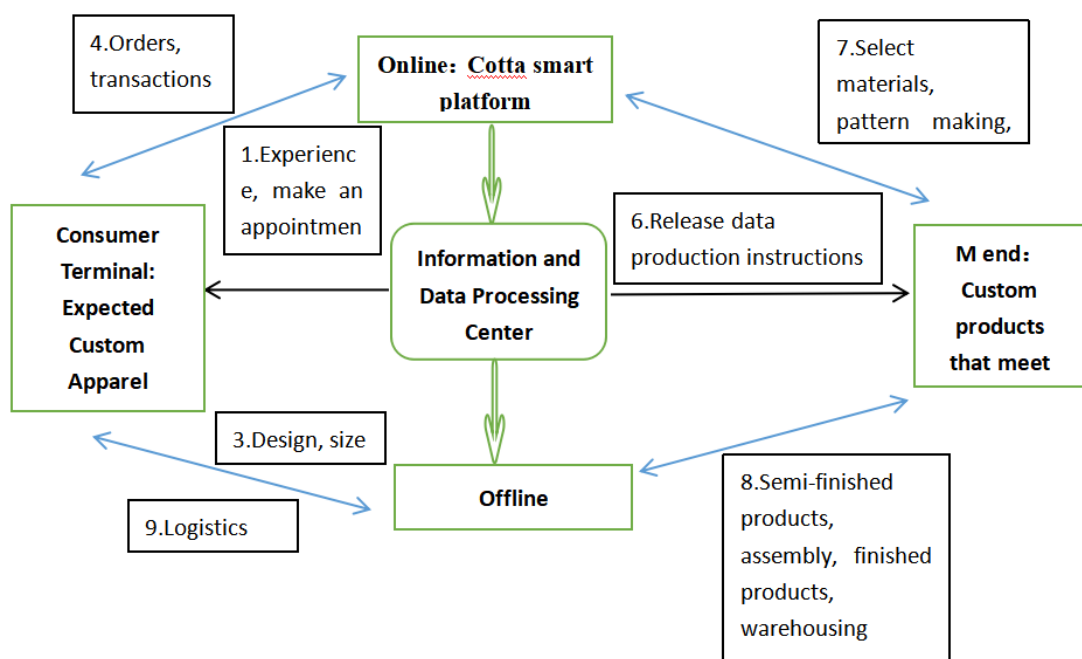
At present, 70% of overseas orders come from this platform. **Figure 1** shows the specific custom operation process of the Cotte Smart C2M platform.

In addition, Cotte Smart platform also launched the online C2M brand APP—Magic Factory. Magic Factory APP is the world’s first mobile online shopping platform with independent high-quality apparel customized by buyers, covering men’s wear, women’s wear, children’s wear and designer brands. The Red Ridge Magic Factory APP has 3 million people’s version data and 1000 trillion kinds of design portfolios, satisfying 99.9% of consumers’ individual needs.

These two modes of operation reflect the Cotte Smart C2M business model, that is, the consumer’s personalized demand drives the factory production, the manufacturing side directly to the consumer’s production and consumption mode.

**Table 1.** Cotta smart platform.

Demand	Cotta smart platform Supply and demand common market, Data conversion, Demand customization and homogenization display, Data accumulation				supply
	1	2	3	4...	
Deconstructing dimensions or levels					Producer
Consumer demand for personalized or homogenized display	<b>Clothing category</b> Casual Dress Formal wear .....	<b>Feature dimension</b> Fabrics Style Lining .....	<b>Parameter space</b> Cotton Hemp Polyester .....	<b>Segmentation parameter space</b> Dark blue Enthusiasm Gentle and elegant .....	<ul style="list-style-type: none"> <li>• Clothing personalized needs homogenization and deconstruction</li> <li>• Mass production of homogenized demand</li> <li>• Interaction between quantity inventory and incremental</li> </ul>



**Figure 2.** Cotta smart platform customization process.

### **3.2.2. Innovation Uses a Modular Design Program to Achieve Coordinated Development**

The Hong Ling Group adopts a modular design process, and the process decomposition method is more effective: the process is decomposed by the process that the traditional factory is completed by an employee, so that the entire assembly line is disassembled into multiple processes (such as picking up and dropping each. The actions become a process). Each employee is only responsible for one process. The time required for each process is the standard working hour. The standard working time for a process is the sum of the standard working hours required for the process, and the entire process of the garment product is processed. It is composed of a small number of operating modules. The required working hours, workload, materials, and process requirements of all operating modules are standard. They are arranged in advance according to certain rules, so that each operation module can realize assembly line operations. Both production efficiency and production capacity have been greatly improved.

In addition, the Hong Ling Group collaborative development and cloud manufacturing platform aims to achieve interconnection between people, between people and factories, between factories and factories, and between services and services. Through the vertical integration, the internal information island of the red collar is opened, all the internal links of the enterprise are seamlessly connected, and the horizontal integration enables the enterprises to integrate the resources of the value chain and the information network to realize seamless cooperation among various enterprises and provide products and services. Realize the entire lifecycle management and service of product design, manufacturing, logistics distribution, use and maintenance.

### **3.3. Using Modern Measuring Techniques to Accurately Meet Consumer Needs**

Due to the large demand for customization of customers, it is in a fit, so it is very important to customize the body data collection in the early stage of clothing customization. The Hong Ling Group has its own innovative and modern measuring system and has invested in the development of a 3D scanner. The instrument is a non-contact, digital body measurement system that can accurately acquire three-dimensional data and curve characteristics of the human body and complete the human body in 5 seconds. Scan to get a 1:1 human body three-digit model. Then combined with self-developed shoulder, back, waist circumference database, through the special measurement rules and quantitative data set, the customer to carry out multi-site data measurement, accurate collection, precise customization.

The Hong Ling Group has also successfully developed a highly programmed and personalized 3D customization system. The system uses 3D design renderings and selects rich and personalized instant research and development technologies. This process is completely different from the traditional long-period manual customization. Instead, it decomposes the entire customized production

process, and the customer selects and reassembles according to his preferences. , The details of the clothes can be changed locally [5].

### **3.4. Comprehensively Optimize Business and Management Processes and Establish an MTM Business Rapid Response System**

The Hong Ling Group have invested heavily in the company's advantageous resources, tailored the operating model around the high-end, and promoted industrialization through the use of information technology. Through the cooperation with domestic software vendors such as Beijing Weifuyou to introduce apparel ERP systems, and establish cooperation with high-end institutions such as Qingdao University to establish the MTM Institute, etc., to make full use of the advantages of the other party's information technology management, comprehensively transform the business processes and management processes, and establish flexibility. And rapid response mechanism, to achieve "product diversification and customization" of large-scale custom production, on the one hand to meet the market's individual needs and rapid response, rapid exchange requirements; on the other hand to ensure that not only meet the individual needs of customers, but also Without sacrificing the benefits of mass-customized production methods, the strategic transformation of personalized manual production and large-scale co-production of modern industry has been realized, thus achieving a blue ocean strategy of "individualization and differentiation" [6].

### **4. Scientific and Technological Innovation, Supporting the Construction of MTM Strategic Informatization Infrastructure**

In order to support the MTM business strategy, the Hong Ling Group investment has built an integrated industrial park LAN cabling. Relying on scientific and technological innovation and technological transformation, the Hong Ling Group has independently developed more than 30 systems covering all aspects of the company's operations, accumulatively invested over 50 million, and built a clothing MTM e-commerce platform and a cross-border e-commerce customized direct marketing platform (C2M). Automatic designing plate system (CAD), production planning management system (APS), material management system (WMS), manufacturing enterprise production process execution management system (MES) as the core integrated information system support platform, all information systems fully open, Data and information are shared in real time, avoiding information silos. Based on the introduction of more than 2000 smart manufacturing equipment and inspection instruments from Germany, Japan and China, the Hong Ling Group has realized the industrialized intelligent manufacturing mode of customized products, realized the mass production of personalized customized products, and built customers directly facing the manufacturers. Personalized custom platform.

Through the deep integration of informatization and industrialization, the

Hong Ling Group has developed proprietary copyrighted software and established a 99% suit-oriented version of the human database, covering five major categories and more than 500 million versions. In terms of the matching design of the 500 million version, the function and idea of CAD have been brought into play. Through the joint research and development of laser and body instruments, the red collar can achieve accurate data, timely production, and improve efficiency.

#### **4.1. Overturn the Tradition and Take the Lead in Implementing the New Marketing Model of “F2C”**

The innovative thinking of seeking survival, change, and development will enable the Hong Ling Group to pioneer and advocate the “F2C” marketing model in the industry (ie, the process of product customization from the factory directly to the consumer). The core of the F2C marketing model is network sales. Since the customization services cannot rely entirely on the Internet, the innovative test of the Hong Ling Group is based on the “mice + cement” model, which is based on the online mall and the offline experience shop. The Hong Ling Group to the wedding photo studio as a platform, laying a brand counter and the wedding industry signed an alliance cooperation agreement; in the office building a personalized custom experience hall and the opening of an online flagship store and other marketing methods to promote and enhance brand marketing force. This low-cost, high-return, inventory-free marketing initiative is a sign of innovation in the red-collar marketing channel.

Through the unique and brand-new MTM e-commerce platform for Hong Ling, customers can submit orders in a timely manner regardless of their location or location, enabling CTP and resource pre-occupancy management. The information system comprehensively analyzes the various information (fabric, lining, delivery, transportation methods, etc.) of the customer’s order submission, and schedules according to the current inventory and production capacity of the system, timely feedbacks the commitment information to the customer, and confirms the order. At the time of pre-occupation of resources such as materials and production capacity. Through deep integration of the two companies, the number of business orders received has increased by more than 100% annually; customer-customized information delivery has been reduced to less than 5 minutes; customer order processing time has been reduced to less than two days; product production cycle time has been reduced to three days; The goods deadline is within 50% of the original; the order processing error rate is reduced to less than 3%; the production cost is reduced by 30%; the liquidity use is reduced by more than 50%; and the profit rate is increased by more than 100%.

#### **4.2. Independent Innovation, Constructing a Resource-Saving and Environment-Friendly Enterprise**

The Hong Ling Group adheres to the business philosophy of “health, green, and environmental protection” as the theme, and continues to carry out the me-

chanism construction and system construction activities with the main contents of resource conservation and comprehensive utilization and the development of recycling economy. It was introduced as early as in 2000. A flue gas desulphurization and dust removal project was researched and developed. The annual economic benefit was 250,000 yuan. The emissions of smoke, exhaust gas and carbon dioxide reached the national emission standards. The purpose of solving energy, reducing consumption, and protecting the environment was achieved, and the quality of the city was improved. Corporate image. In 2003, it passed the National Cleaner Production Audit. It was identified as the first batch of “Qingdao Cleaner Production Enterprises” by Qingdao City, and was named “Green Enterprise” in the same year. In 2004, it passed the ISO14000 Environmental Management System Certification once; The steam boiler return water utilization project recycles the steam during the production process. Over the past three years, a total of more than 15 million yuan has been invested in transforming the greening plant area and the surrounding environment. Enterprises have made contributions to the promotion of resource conservation, environmental friendliness, and the development of a recycling economy. They have been highly recognized by the Ministry of Science and Technology and the International Environmental Protection Agency and other departments, thus enhancing the Brand building social image.

### 4.3. Conclusion

Currently, the sales revenue of the Hong Ling Group MTM business has already accounted for 90% of the company’s total sales revenue. Hong Ling have tailored MTM apparel and become influential brands in the clothing market in the United States, Canada, and the United Kingdom, becoming the world’s advanced MTM field. Top brand. The outstanding achievements of the Hong Ling Group in management innovation are mainly due to its exploration of a characteristic development path of a Chinese clothing company through two deep fusion, focusing on intelligent manufacturing, and building its own brand.

### Fund Project

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The “2018 Light of Textiles” China Textile Industry Federation Higher Education Teaching Reform—innovation and entrepreneurship education into professional personnel training reform and practice of one of the results.

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