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Full Research Paper

# Digital Operation Management based on Value Co-creation:

## A Case study of ShangPinZhaiPei

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**Abstract:** With the prosperity of digital technologies such as cloud computing and intelligent devices, the construction and optimization of digital-driven operation management system has become the key to the success of "personalized customization+mass production" mode. Taking ShangPinZhaiPei as the research case, this paper deeply analyzes its digital operation management system from the perspective of value co-creation. It is concluded that product design and pricing, digital processing and production and supply chain management are the core modules and key links of its digital operation management system. Among them, the product design and pricing system achieves the front-end value co-creation between designers and customers, and between customers and customers by attracting customers to participate in the product design. Digital processing and production system realizes the co-creation of sales design and back-end value of production and processing through intelligent transformation of production equipment and information transferring; The supply chain management system organically combines all links of production and operation by using the integrated information integration capability, so as to realize the overall value co-creation.

Keywords: Value co-creation; Digitization; Operations management

### 1. INTRODUCTION

With the rapid development of China's socialist market economy and the improvement of people's living standards, the contradiction between "structural overcapacity" and "supply-side imbalance" in China's manufacturing industry has become increasingly serious. On the one hand, there is a serious surplus of standardized low-end products produced on a large scale, resulting in vicious competition among enterprises; On the other hand, there is a serious shortage of high-end products that can meet the individual needs of consumers. There are two main reasons for this phenomenon: First, the personalized needs of consumers vary widely, and most enterprises lack effective ways to accurately locate the personalized needs of customers, or the positioning cost is too high; Second, the mass production of personalized customized products needs flexible production lines as the support, and it is difficult to overcome the problems of high production cost and long waiting time, which greatly reduces the user experience brought by personalized customization to customers.

All kinds of digital and information technologies are used to optimize and improve the production and operation management of enterprises as a whole. The digital operation management system provides a new perspective and way to solve this problem. Based on the perspective of value co-creation, this paper takes ShangPinZhaiPei as the research case, and makes an in-depth analysis of its development process, evolution process of digital operation management system and core modules by case analysis method, with a view to expanding the theoretical boundary of value co-creation, and providing reference for personalized customization and mass production mode construction of enterprises.

### 2. LITERATURE REVIEW

#### 2.1 Value co-creation

Numerous studies have shown that it is an important characteristic of a successful enterprise to be able to

turn value creation alone into value co-creation<sup>[1]</sup>. Prahalad and Ramaswamy put forward that the interaction between enterprises and consumers can improve consumers' personalized experience, thus realizing value co-creation<sup>[2]</sup>. Vargo and Lusch put forward that consumers' input of their own knowledge, skills and experience is an important prerequisite for value co-creation<sup>[3]</sup>. Niu Zhenbang, Bai Changhong and Zhang Hui believe that the "point" interaction between customers and employees, the "intersection" interaction between customers and customers, and the "face" interaction between customers and enterprises as a whole are three main forms of value co-creation<sup>[4]</sup>. Zhou Wenhui, Wang Pengcheng and Chen Xiaohong insisted that external pressure and internal motivation jointly promoted value co-creation, and value co-creation based on interaction and experience promoted the realization of mass customization<sup>[5]</sup>. It can be seen that the internal mechanism of value co-creation is still lacking in-depth discussion, but it has become the academic consensus that interaction with customers can bring value creation.

## **2.2 Digital and operations management system**

With the rapid development of new technologies such as Internet of things, cloud computing and intelligent devices, the integration of various digital technologies and business has become a general trend, and has important potential value in tapping customer needs, market segmentation, auxiliary decision support, business model innovation and so on<sup>[6]</sup>. Henke et al. proposed that the potential value of data can be better utilized by combining data analysis capability with business mechanism and transforming it into specific business processes<sup>[7]</sup>. Porte and heppelmann pointed out that digitization and related technologies have completely changed the equipment maintenance mode in the manufacturing process, and effectively improved the reliability of the equipment while reducing the cost<sup>[8]</sup>. Chen Jian, Huang Shuo and Liu Yunhui concluded that the operation and management of digital enabled enterprises can better serve the needs of consumers from the aspects of demand creation, business design, value co creation, supply chain reconstruction and ecosystem construction, so as to create higher business value<sup>[9]</sup>. The above research shows that the application of digital technology can effectively improve the level of enterprise operation and management, but its operation mechanism is still lack of systematic and in-depth discussion.

It can be seen that the existing literature mainly focuses on the discussion of value co creation theory and the application of digital technology in operation management system, and lacks the research results of systematic analysis of digital production and operation management based on value co creation theory. Taking Shangpin home distribution as the research case, this paper deeply analyzes its digital production and operation management system from the perspective of value co creation, in order to enrich the value co creation theory and provide reference for the improvement of enterprise production and operation management level.

## **3. CASE STUDY DESIGN**

### **3.1 Research methods**

The reasons for choosing the case study method in this paper are as follows: firstly, the construction of digital operation management system with value co-creation as the core is a process of continuous evolution, and case studies based on typical samples can go deep into details, reflect the dynamic evolution process and dig deep into the reasons behind the phenomenon; Secondly, the theoretical research on promoting the change of digital operation management with value co-creation as the core lags behind the enterprise practice seriously, and the case study method helps to refine the theoretical analysis framework, eliminate the interference of non-key factors and build a new theoretical system from complex phenomena. In order to ensure the validity and consistency of the case study, this case study is carried out according to the steps of "classifying scientific problems, collecting and verifying data through multiple channels, sorting out data, analyzing scientific problems and writing case study reports".

### 3.2 Case selections

There are three main reasons for choosing ShangPinZhaiPei (hereinafter referred to as "ShangPin") as the case study object in this paper: First, with the continuous improvement of people's requirements for home environment and personalized quality of furniture, the whole house customization of furniture has gradually been accepted by consumers and become the development trend of the industry. Since its establishment in 2004, ShangPin has been a leader in personalized custom furniture industry in China. It has good industry representativeness; Secondly, ShangPin's predecessor was Guangzhou Yfang Software Company (established in 1994). It has been established for a long time, and has experienced different stages of development, each with its own characteristics. The problems and solutions it faces can dynamically reflect the process of advancing and perfecting the digital operation management system under the thought of value co-creation and development. Thirdly, the digital operation management system lays a solid foundation for the business model of "personalized customization and large-scale production" of ShangPin panel furniture, and is closely related to the rapid development of ShangPin, which can provide a paradigm for the research of digital operation management system.

### 3.3 Data sources

There are three main sources of data in this paper: First, through the field investigation of Homekoo's direct-selling headquarters and franchise stores in Beijing, it conducted field interviews with Homekoo's top managers, middle managers, grass-roots employees and customers to obtain first-hand information; Second, collect second-hand information from ShangPin official website, WeChat Official Account, announcements, internal information, external publicity, high-level speeches, media and other channels.

**Table 1 Survey and interview of ShangPin**

Access object	Duties	Interview duration	Interview content
ShangPin employees	one general manager of direct-selling headquarter	1 hour	development orientation, production process, quality control, after-sales service and differentiated competition with competitors
	one store managers	1 hour	furniture customization procedure, waiting time of each link and quality control
	manager of customer department	1 hour	the standard of customer service quality
	two sales consultants	2 hours	operation process of online and offline sales channels and benefit distribution mechanism between sales and design links
	three designers	3 hours	demonstration of home design software and split order system
	one supervisor	1 hour	after sales service process and quality monitoring
	one after sales service	1 hour	the response and quality of after sales service
two customers		1 hour	satisfaction with customized furniture design, pricing, waiting time, installation and after-sales service

## 4. CASE ANALYSIS

### 4.1 Analysis of the Development Process of ShangPin

Established in 2004, ShangPin was a company that mainly produces and sold whole house customized panel furniture, and provided design software and overall information solutions. The predecessor of the company was Guangzhou YuanFang Software Company, which was established in 1994. After 27 years of development, the company now has five core capabilities, such as "whole house furniture, personalized

customization, digital cloud design, mass production and integration of stores and networks". In 2009, the company became the top ten most influential home brands. In 2012, it was rated as "the Chinese sample of C2B model" by the Chinese edition of Harvard Business Review. In 2013, it won the "Best Business Model of the Year Award"; In 2020, it was rated as the "Customization Capital" model enterprise in Guangzhou, and was newly listed as "Innovative Brand of the Year". According to the results of investigation and interview, data collection and analysis, the development of ShangPin can be divided into three stages.

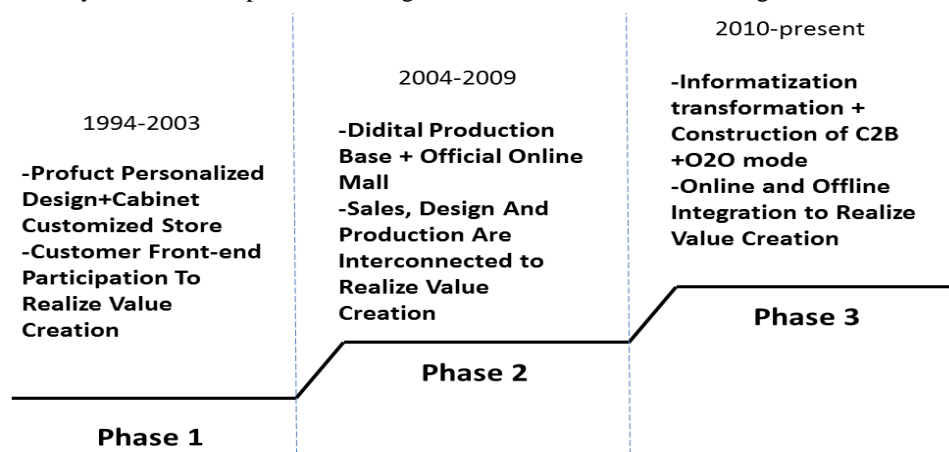


Figure 1. Analysis of the development process of ShangPin

### Phase 1: Product personalized design + Cabinet customized store (1994-2003)

In 1994, Guangzhou Yfang Software Company was established (predecessor of ShangPin, hereinafter referred to as Yfang Company). The company was jointly funded by Li Lianzhu and Zhou Shuyi of South China University of Technology. Its main business is home design software, which can conveniently and quickly tailor personalized home solutions for consumers. In order to improve consumer acceptance and quickly open up the market, Yfang actively promotes its own software to furniture manufacturers on the one hand; On the other hand, a custom cabinet store was opened to provide consumers with design drawings and design schemes free of charge. Consumers can communicate with designers, participate in the design and revision of home plans, and get the design renderings for free.

### Phase 2: Digital production base + Official online mall (2004-2009)

At the early stage of its development, Yfang's orders were mainly outsourced to downstream furniture manufacturers for processing. With the increasing orders, this outsourcing method brought a series of problems, such as uneven quality of OEM products, high OEM cost, long delivery period and no guarantee, and poor experience of product maintenance and after-sales service [10]. In order to solve this series of problems, Li Lianzhu established ShangPin in 2004, officially transforming from a home design software service provider to a furniture manufacturer, and making great efforts to build a digital production base with the advantage of home design software. On the one hand, the order splitting system is developed based on the existing software, which splits customer orders into parts and then generates production instructions. On the other hand, the software part of the furniture production equipment is reformed, so that the machine can automatically identify and execute the production instructions. In September, 2006, the scheduling software independently developed by ShangPin was successfully developed and officially launched.

At the same time, ShangPin set up Xinju in 2007, and began to lay out the official online direct selling platform, moving the design service process to the Internet. Consumers can search and browse the housing design cases, put forward the requirements of measuring scale, communicate the design scheme with designers, submit orders and track the order production and installation process on Xinju.

### Phase 3: Informatization transformation + Construction of "C2B + O2O" mode (2010-present)

Since 2010, ShangPin has started many information process transformations. On the one hand, online and offline will be opened up, and the online network and offline physical stores will be deeply integrated through the benefit distribution mechanism to build a online to offline with customer experience as the core; On the other hand, the whole information transformation of furniture manufacturing back-end is implemented, and the integrated information integration of purchasing, placing orders, splitting orders, scheduling, logistics and distribution, installation and after-sales service is carried out, which lays a solid digital and information foundation for the company's personalized customization and large-scale flexible production.

#### 4.2 Analysis of digital operation management system from perspective of value co-creation

The establishment of ShangPin digital operation management system is a process of continuous evolution and advancement. It started from the initial personalized home design software, and promoted to order splitting, processing scheduling, flexible manufacturing and information integration, integration and upgrading. Digital information management of the whole process of ordering, production, logistics, assembly and after-sales has been realized, as shown in Figure 2. ShangPin's digital operation management system provides powerful digital information support for personalized home customization with low cost and short production cycle, and becomes the cornerstone of high-quality and rapid development of ShangPin. ShangPin connects the system of product design and pricing, digital processing and production and supply chain management through digital operation management system closely, and realizes value creation through information sharing, the following will be analyzed from these three aspects:

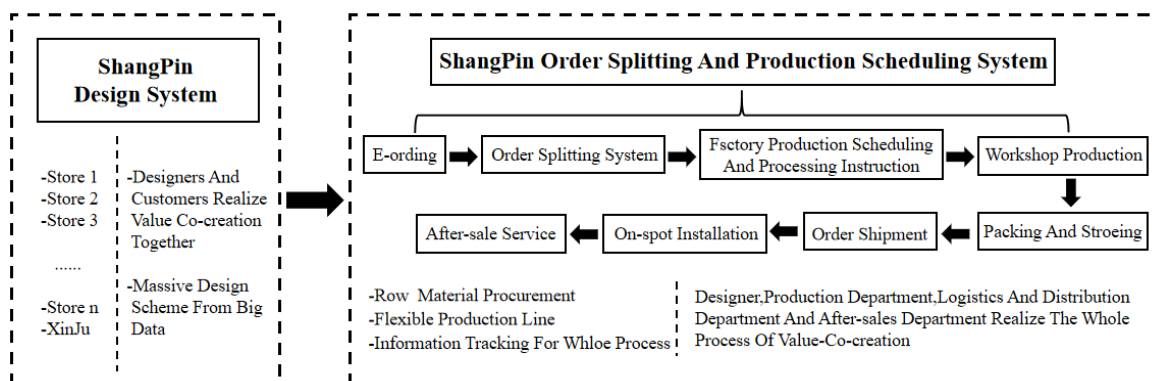


Figure 2. Analysis of ShangPin digital management and operation system

##### (1) Product design and pricing

Product design and pricing is the starting point and one of the core modules of ShangPin digital operation management system. ShangPin, as an advocate of the whole furniture customization industry, deeply explores the personalized needs of customers, and provides customers with a good user experience as its core value and core competitiveness. For this reason, ShangPin has trained a large-scale designer team, and provided all-round support to the designer team from the aspects of information acquisition of intended customers, design software, sales consultants, raw material information, online real-time pricing of products, production and processing, door-to-door installation and after-sales service, etc. First of all, the intended customers obtained from the online network and offline stores will be quickly transferred to the corresponding designers, and timely arrangements will be made for early communication between designers and intended customers, door-to-door measurement, and free issuance of preliminary plans, which are generally completed within 1 to 3 days; Secondly, the designer and the sales consultant will make an appointment with the customer to go to the store to discuss the design scheme in detail, lead the customer to visit the model rooms and samples arranged in the store, show the previous design scheme to the customer, communicate with the customer deeply, learn more about the details of

the customer's demand (including furniture functional requirements, styles, materials, colors, sizes, etc.), and modify the design scheme on the spot according to the customer's demand; Furthermore, once the design scheme is determined, the order splitting system in the design software can automatically split the design scheme into parts, and give the pricing of the whole design scheme through the parts price set in the system.

ShangPin's product design and pricing system fully embodies the concept of value co-creation between designers and customers, and between customers and customers. First, as a furniture manufacturing industry with outstanding personalized features, attracting customers and designers to communicate and participate in front-end design together can not only obtain information of customers' consumption preferences, accurately locate customers' needs, but also enhance customers' sense of participation in creating their own home environment, provide customers with home products that fully meet their personalized needs, improve customer satisfaction, and realize the value creation between designers and customers; Secondly, product design software, order splitting system and quotation system can provide real-time online quotation for customers, and customers can adjust the design scheme locally according to their own budget, so as to obtain furniture products that meet their price requirements, and further improve customer satisfaction through cost-performance matching; Thirdly, ShangPin has accumulated a large number of design cases of different types and styles, and the customer service staff will encourage customers to publish the renderings after installation by giving small gifts, and put the big data formed by these design cases on the network for other customers' reference, so as to realize the value creation between customers and customers. Therefore, ShangPin product design and pricing system always takes customer experience as the core, and attracts customers to deeply participate in the early product design process through the interaction between designers and customers, so as to improve customer experience and realize the value co-creation between designers and customers and customers.

## **(2) Digital processing and production**

Digital processing and production system is an important link and way for ShangPin to create back-end value. Customized furniture must overcome the problem of flexible production. Only by reducing production cost and improving production efficiency can mass customization be realized. ShangPin R&D team invested a lot of manpower and material resources, and finally successfully developed the scheduling system through unremitting efforts, and finally built a digital production base through intelligent transformation of production equipment and information docking. First of all, once the customer plan is determined to generate an electronic order online, the order splitting system will automatically split the electronic order into parts, and get the quotation of the design plan through the price set by the parts; Secondly, once the customer pays the order payment (generally full payment), the designer will execute the ordering instruction, and the scheduling system will convert the parts information produced by the order splitting system into production documents and production instructions; Furthermore, production documents and production instructions are important information of digital production and operation management of ShangPin. On the one hand, the purchasing department will be required to purchase and distribute raw materials from raw material suppliers according to the production documents and production instructions; on the other hand, the production documents will split different pieces of furniture into pieces, analyze the production process of each piece on the assembly line, and arrange the equipment for customized production. After the pieces are distributed to the places designated by customers, the installers will assemble the pieces into pieces of customized furniture.

ShangPin's digital processing and production mainly solves two core problems: first, the integration between personalized customization and mass production. Because personalized customized furniture varies widely, the traditional mode has high production cost, long production cycle and high rejection rate, which makes it difficult to form large-scale flexible production capacity (for example, supporting the same production capacity requires more production equipment, longer conversion and waiting time, more production workers,

etc.). ShangPin digital production base converts different products into homogeneous plates with the help of computer control and intelligent production equipment, so as to realize low-cost, short-cycle and large-scale production, which plays an important role in supporting the rapid development of the company. Second, information integration. Digital processing and production system is an important foundation for ShangPin to realize information integration. Designers, sales consultants, installers, quality supervisors and after-sales service personnel can inquire about the order status in real time according to their respective authority, find and deal with various existing problems timely and accurately, and provide better user experience for customers. Therefore, the digital processing and production system is the core part of ShangPin's operation management system. It can closely link the sales department, design department and production and processing department, provide better service for customers and realize the creation of back-end value.

**(3) Supply chain management**

Digital information technology plays an important role in ShangPin supply chain management. It provides strong support for its efficient and convenient supply chain management. On the one hand, ShangPin has accumulated a large number of customers and related data since its employment, which can accurately predict the demand scale of products. In addition, the personalized customized furniture products adopt the mode of "pay first and then produce", so that ShangPin can accurately predict the demand of raw materials and production, arrange the purchasing plan reasonably and effectively, and control the risk of shortage while reducing the waiting time, storage cost and capital occupation of raw materials. At the same time, arrange the production plan reasonably and effectively, make full use of intelligent production equipment, and reduce the waiting time and conversion cost in the production process of different plates; On the other hand, ShangPin adopts the "O2O" mode to integrate online and offline information, and provides inquiry channels for customers through WeChat Official Account and official website. Customers can check the order status at any time, arrange the delivery and installation time reasonably, and feed back the problems in the production and installation process at any time. After-sales service personnel and quality supervisors will deal with customer feedback in a timely manner. In addition, ShangPin uses the digital operation management system to monitor, analyze and optimize the whole production and operation process, regularly report the operation management analysis, and continuously improve the production and operation management level.

After many information process transformations, ShangPin's supply chain management ability has been greatly improved, the storage cost of raw materials has been reduced by more than 30%, the customer order cycle (referring to the time required from the customer to the door-to-door installation) has been controlled within 30 days, and the customer satisfaction has been improved to more than 90%. Therefore, ShangPin uses the digital operation management system to continuously consolidate and improve its supply chain management ability, and organically combines the raw material purchasing end, sales design end, production and processing end, logistics distribution end, installation and after-sales end, so as to realize the overall value co-creation.

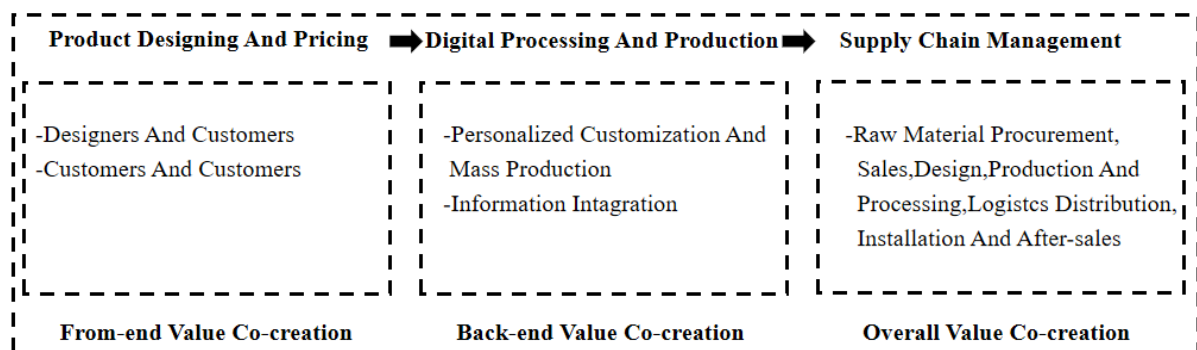


Figure 3. Value co-creation analysis of ShangPin digital management and operation system



## 5.CONCLUSIONS

Based on the theory of value co-creation, this paper makes an in-depth study of ShangPin digital operation management system. It concludes that the construction and continuous optimization of digital operation management system is the key to the success of ShangPin's "personalized customization+mass production" and "C2B+O2O" modes, and product design and pricing, digital processing and production and supply chain management are the core modules and key links of its digital operation management system. Product design and pricing system can attract customers to deeply participate in front-end product design, and realize the value creation between designers and customers, customers and customers. Digital processing and production system can divide personalized customized furniture into homogeneous plates, and realize the co-creation of sales design and back-end production and processing value through intelligent transformation of production equipment and information docking. The supply chain management system makes full use of the integrated information integration capability of ShangPin digital operation management system, and organically combines raw material purchasing end, sales design end, production and processing end, logistics distribution end, installation and after-sales end, so as to realize the overall value creation.

There are the following shortcomings in this paper: First, there is a certain degree of particularity in the furniture whole house customization industry (for example, customers are willing to participate in front-end design, and splitting orders into panels can be realized, etc.). For other industries, its universality may be lacking; Second, this paper only makes a single case analysis of ShangPin. In the future, to enhance the stability of the research conclusion multi-case comparative study can be considered.

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