

# Study on the Transformation and Upgrade of E-Commerce Application in Manufacturing Industry

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**Abstract.** Under the Internet thinking, manufacturing management mode is changed, it is not depend on the scale, but in the user as the center, more dependent on the reaction rate of user requirements. As the big data, cloud computing, Internet of things technology such as the development of technology, manufacturing is from automatic to intelligent evolution, on the user's personalized customization is possible. Using Internet thinking positive development manufacturing enterprise electronic commerce application mode of transformation and upgrading of manufacturing industry plays an important role. Promoting the continued ascent of manufacturing industry informatization level, promote the transformation of the manufacturing production mode, provide greater profit space for the export of products. In industrial 4.0 mode, the user is the core of the enterprise, C2B model will be the mainstream of future manufacturing e-commerce application mode. This paper to present the sorted out the basic model of manufacturing enterprise electronic commerce application, point out the existing problems, and the computing technology, communication technology, the constant development of storage technology, such as background, puts forward the corresponding countermeasure, points out that the C2B model is the development direction of manufacturing enterprise electronic commerce application mode.

## 1 Introduction

In recent years, China's e-commerce has entered a period of rapid development. According to the China Electronic Commerce Research Center report shows that in 2014, China's e-commerce market transactions amounted to 13.4 trillion, an increase of 31.4%. Among them, B2B e-commerce market transactions amounted to 10 trillion RMB, an increase of 21.9%. Network retail market transactions amounted to 2.82 trillion RMB, an increase of 49.7%. By 2015, China's e-commerce transaction volume is expected to more than 18 trillion RMB. During the two sessions last year, with the "Internet +" action plan proposed, mobile Internet, cloud computing, big data, Internet of things and the combination of the current manufacturing industry will become the future trend, further expanding the depth and breadth of industrialization and information fusion. China's e-commerce development will usher in a new historical opportunity. In the rapid development of e-commerce, the traditional manufacturing industry is facing the plight of resources and the environment, the growth rate has slowed. How to play the role of e-commerce, promote the transformation and upgrading of China's manufacturing industry is worthy of deep thinking [1].

## 2 Theories Review

### 2.1 E-commerce

E-commerce is using electronic ways and electronic tools to carry out the entire process of business activities [2]. E-commerce in general, using a variety of electronic tools to engage in business work or activities. Narrowly, E-commerce is defined as the main use of the Internet to engage in business activities. E-commerce is in the highly developed society of computing technology, communication technology, storage technology, with computer technology and business operations knowledge, the use of the Internet to carry out business activities.

B2B, B2C, C2C, C2B, O2O is the five major e-commerce business model. B2B mainly refers to enterprises and enterprises through the Internet to carry out business activities. Traditional business model in the procurement, sales and other business processes can be done through the B2B model. B2C model usually refers to the business-to-customer transactions. At present this model is used in online retail sales. C2C model is between customer-to-customer of transactions, this model generally need to rely on a third-party service platform to carry out business activities. C2B model is the recent rise of an application model, mainly refers to the transaction between customers and manufacturers, the biggest feature is that customers can customize the production of personalized. O2O model is an extension of e-commerce online activities, online diversion, offline experience, closer to the distance between customers and goods.

## **2.2 Industrial Internet**

With the continuous development of e-commerce and enrichment of e-commerce applications, the penetration of e-commerce began to gradually extend from the consumer side, such as circulation enterprises, manufacturing enterprises, manufacturing enterprises, raw material supply enterprises and so on. Especially for manufacturing enterprises, it will take downstream market demand and upstream production more closely, forcing manufacturing transformation and upgrading that gives birth to the Chinese characteristics of the industry 4.0[3]. Industrial 4.0 was first proposed by the German Hannover Fair in 2013, whose purpose is to actively develop the next generation of manufacturing technology to promote the upgrading of modern manufacturing technology, and then to maintain Germany's leadership in the manufacturing field. With the development of artificial intelligence, big data, cloud computing, Internet of things technologies, Industry 4.0 shows up. Its core is intelligent manufacturing, to achieve the communications of material and material, people and objects, people and people. Intelligent machines can make decisions according to their own production situation. In the mode of intelligent manufacturing, production from the concentration to the decentralized, the scale effect is no longer the key factor in industrial production; products from the convergence to the personality change, the future will be fully in accordance with the wishes of individual production. Extreme cases will become automated, personalized one-piece manufacturing; users from partial participation to full participation, the users at the beginning and end of product manufacturing. They can interact with the production process, in the last part of the product can still make personalized products requirements. For customers, they can browse directly through the mobile terminal for related products, put forward personalized needs and personalized customization. Then the user's personalized requirements will be sent to manufacturing companies through the network. Manufacturing companies according to the order to purchase, to produce, to distribute arrangements, etc. All of these can be done automatically under the environment of the industry Internet. Industrial Internet for the manufacturing industry will bring a profound commercial revolution and industrial revolution [4].

## **3 Analysis on the Current Situation of E-commerce Service Platform for Manufacturing Industry**

### **3.1 Manufacturing B2C Model Status**

The current e-commerce model of the manufacturing industry is mainly B2C. Enterprises establish an official website to introduce products in detail, supplemented by the company's news, activities, recruitment and other information. Such as "Shanghai Volkswagen" of car manufacturing industry, "Changan Ford", "Yutong Bus" of passenger car industry and "Gree Mall" of home appliance industry. Gree Mall, for example, its website provides five modules: product display, solutions, shopping processes, after-sales service, the strength of Gree. The products can be introduced to the user through the enterprise-related products, for customers encounter different problems, they can solve specific issues through specific solutions. Shopping process can be showed detailed. After-sales service eliminate the worries about after shopping. When users have problem, they can communicate with the online customer service in time.

### **3.2 Manufacturing B2B Model Status**

At present, Alibaba, World Factory Network and Chinese Machinery Manufacturing Network are the better manufacturing e-commerce sites in China[5]. Their main function is to provide a platform for communication between sellers and buyers. The sellers through the platform to publish product information and the buyers through the platform to browse the corresponding products. When the two sides reached a transaction intention, they can pay through the platform with the payment tool.

World Factory Network, one of the best manufacturing B2B websites, its biggest feature is to take into account other manufacturing industries, while it is free to the enterprises to provide the initial page and only for value-added services to charge the appropriate fees. Since the site has been on the line, there are already more than 500,000 manufacturers joined the site, which becomes a well-known, low-cost direct-to-business B2B website. What's more, it has a huge enterprise information database, such as the Global Enterprise Database, China Purchasing Information Database, the World's Factory Network Procurement Channels. In which you can easily find the information for the enterprise. At the same time the site also provides business schools and other resources for business owners, to change the traditional mode of thinking, re-use the Internet to rethink the business processes and how to use the Internet to maximize sales of enterprise products.

### **3.3 Manufacturing O2O Model Status**

In 2013, the Dianping mobile side view more than 70%, the mobile end of the cumulative number of independent users more than 80 million; Meitua mobile side sales accounted for nearly 70%, exceeding the 50% target set at the beginning of the year[6]. Since 2013, all kinds of taxi software, car rental services for people to provide convenience, and integration will have far-reaching impact on the industry; all kinds of food services such as Yi Tao food, Taodiandian have a huge development and growth. Life services O2O field of public disclosure of investment and financing nearly

40. Into 2014, the mobile Internet era officially opened, O2O online and offline perfect integration of the most effective means. In such a combination, e-commerce will be a large number of integrated into the mainstream economy, "from there to nothing", and ultimately change people's lifestyles.

O2O model is one of the current well-established business models. In the home sector, Meilele is the most typical representative. It not only build its own official website platform, also build nearly 300 offline experience museum, provide goods and after-sales service [7]. Through the combination of online and offline, Meilele also has a traditional physical store and online virtual store double advantage. Erection of offline physical store, they can show the goods to customers, allowing users to personally experience the purchase of goods, while the store is also charged with the task of logistics and after-sales service, allowing users to purchase goods with greater confidence. Online sites play a role in the drainage, the use of the Internet low-cost marketing tools to expand the scope of the impact of the brand to attract more customers to browse the site.

### **3.4 Manufacturing C2B Model Status**

The core idea of the C2B model is that customers drive the entire business [8]. Compared with traditional industrial high-volume, pipeline production, C2B model to the customers as the core, can accept the users' personalized needs, and then organize production and procurement. Through the first order of production, they can greatly reduce the production of blindness, reduce inventory and marketing costs, provide users with more intimate services, increase the viscosity of users.

In the household appliance industry, Haier Group and Tmall held household appliances customization activities. Customers can choose their own air-conditioning panels, refrigerator refrigeration ways. After the customers pay the deposit Haier will organize to produce, and delivery after 37 days. There are 65,000 orders in a month by this measure and 120 million RMB of sales. Customers, Haier and Tmall pre-sale platform tripartite win-win situation. Through the C2B, Haier dare to produce the products only a dozen users like. Customers' demand for long tail has been fully released. Nearly 10% of this activity comes from long tail demand, such as one of the seven-kilogram multi-drum washing machines, only from Xinjiang, Guangdong, Shanghai, Yunnan and other provinces of the 13 custom users. Without the Internet, Haier can not gather more than a dozen consumers prefer a product, can not predict the product sales, similar niche products often can not appear in the traditional sales channels. Haier through the C2B mode to receive customers' orders before the organization of production. Profit margins than the industry average increased by 0.5 percentage points [9]. By C2B mode, Haier can provide customers with only one order of the product, break the traditional model of regional sales forecast by the restrictions. Do not have to bear the bullwhip effect caused by the stock, achieve a supply chain without scale [10].

## **4 The Problems in the Development of Electronic Commerce in Manufacturing Industry**

After rapid growth period in China, more and more companies recognize the use of Internet thinking to the enterprise competitive advantage. In particular, manufacturing industry in China is facing an important opportunity for transformation and upgrading. Many manufacturing enterprises have to strengthen the investment in e-commerce. However, due to the e-commerce develop not long in China, there are some outstanding problems in the process of rapid development.

### **4.1 The level of internal information to be improved**

Manufacturing industry includes a very wide range, China's manufacturing e-commerce applications carry out mainly for the production of consumer-oriented products, such as clothing, household appliances and other industries. However, some traditional manufacturing industries also take the traditional sales methods, and the popularity of e-commerce to be further in-depth [11]. China's manufacturing industry is not strong, weak foundation of the low level of information technology. Such as customer relationship management system, supply chain management system, ERP system, the popularity and application level is still low. Developed countries in the manufacturing industry in the 1980s has been widely used within the enterprise computer network technology to improve the internal information exchange and operational efficiency. While China's current stage of the manufacturing industry is still not high degree of information [12]. But in China, most of the manufacturing industry with a serious shortage of investment on construction of information system, is still familiar with the application of information management model of the problem. In China, automobile industry is one of the high degree of automation production enterprises, but the car's sales model is still using the traditional methods. Because of the high price of the car, the customers for security reasons generally just browse commodity on the website and its functions, the low proportion of online payment of the customers. It needs innovation in the auto industry of electronic commerce application model, such as the use of O2O mode to achieve online and offline combination, the user's personalized customization and production systems connected to increase the user's desire to use the network to achieve online diversion and offline sales combined.

## **4.2 Manufacturing technology level behind**

China's industry is still in the end of industry 2.0 and industrial 3.0 universal stage, the degree of automation of manufacturing processes to further significantly improved. In China, CAD technology coverage of machinery manufacturing industry only 5%[13]. With the manufacturing industry to become a new round of national competitiveness of the new high ground, Germany put forward the "Industrial 4.0 Development Strategic Plan", the United States developed the "Advanced Manufacturing Development Plan", through the development of big data, cloud computing and Internet of things to seize the manufacturing sector a new round of change opportunities. Through the adoption of new technologies to achieve material and material, people and objects, people and people connecting, to achieve from the automated manufacturing to intelligent manufacturing changes. Compared with foreign manufacturing technology, there is still a considerable gap. The integration of industrialization and informationization is the key to the development of e-commerce in manufacturing enterprises. However, the integration of the two needs a lot of manpower, material resources, financial resources and risks, so the manufacturing enterprises are seriously inadequate in investment in information technology and backward in manufacturing equipment. For most enterprises are still in the stand-alone automation, rigid automation stage. The majority of enterprise automation production level is still very low[14].

## **4.3 E-commerce development model to be improved**

As enterprises develop e-commerce can eliminate the space and time barriers with customers, while users can grasp the huge amount of information. It is the enterprises through big data analysis that can grasp the changes in customers demand and make corresponding changes. B2B and B2C are the two main e-commerce application models of manufacturing enterprises. So many companies regardless of their own characteristics of the industry, blindly launched e-commerce projects, the results often counterproductive. With the development of technology, O2O model and C2B model are emerging, different companies should be based on their specific characteristics of the industry in which to choose the appropriate e-commerce model.

## **4.4 Macro environment to be optimized**

Due to the e-commerce started late in China, it has been in a rough-style development. The relevant e-commerce laws and regulations are not perfect. What's more, enterprises and customers credit system has yet to be strengthened. Selling fake and shoddy products online have occurred. At the same time, the government departments of the e-commerce site monitoring capacity is not strong. In economic activities on the Internet is a lack of regulation means, such as a tax on online business activities[15].

# **5 Transformation and upgrading of manufacturing industry**

## **5.1 Improve the informatization level of manufacturing enterprise**

It is information economy era for 21 Century. The key to enhance the core competitiveness of enterprises is the realization of enterprise informatization. The enterprise informatization is the application of communication technology and computer technology in procurement, production, inventory, sales, customer service and other services sectors, to achieve the electronic operation process. But the information does not mean to buy equipment or use system. It is not the electronically instead of manual labor, but the transformation of business process and the production process, such as to realize the automation of production process, electronic financial management, accelerate the flow of information within the enterprise and between enterprises and enterprises. On one hand, it can grasp the latest information and to make a quick response to change. On the other hand, it can realize the sharing of information between various departments and enterprises break information barriers, which is conducive to the decision-making level of decision optimization. It can be said that the opening information construction is the extension of the enterprise management and organization management. At present the enterprise information systems of relatively simple common features include transaction process system, knowledge system experts, the office automation system, expert information system, management information system, advanced management information system, and information system with strong comprehensive such as ERP, SCM, CRM. Different information systems have different functions, and the enterprise level in it is not the same. Therefore, enterprise making the right choice should be based on their situation. The enterprise informatization is the foundation to develop the electronic commerce. Only if this, it is possible for external changes timely deliver to the enterprise decision-making, and make a change to enterprise production process.

The enterprise should increase their informatization construction investment to adapt to the needs of the development of electronic commerce. the enterprise is able to quickly respond to changes, strengthen the ability of enterprises to deal with the internal and external risks. Actively using big data, cloud computing, networking, wireless RF technology to remould technology, the production process, the transformation management flow. At the same time, it can strengthen the enterprise information construction level, the introduction of supply chain management,

management of customer relationship, enterprise resource planning, set up their own websites or the application of the third party service platform, achieving interoperability of Intranet and extranet, further applying collaborative commerce to manufacturing enterprises as soon as possible to join the torrent of e-commerce[16].

## **5.2 implementation of intelligent manufacturing**

Our society has now entered the era from IT to DT, and will enter the IM era in the near future [17]. The technology of the enterprise should keep pace with the times. In the last century 80, 90 enterprises began to use the IT technology; the manufacturing enterprises should make DT technology; the enterprise must do IM technology well after 10 years. With the development of artificial intelligence, networking, wireless RF technology, it can interoperability between objects and objects, and the production equipment can make the corresponding judgment according to the real-time, achieving intelligent production.

There is no doubt that the future direction of development of manufacturing enterprises is intelligent manufacturing. Artificial intelligence technology will be widely used in all aspects of the manufacturing process. Expert system can be used to project design, process design, production scheduling, fault diagnosis and other aspects and neural network calculation method of intelligent fuzzy control technology can also be used for product formulations, production scheduling and other aspects, so as to realize the intelligent manufacturing. For the complicated and uncertain problems in production process, it is especially suitable to use artificial intelligence technology. But it also needs a period of time for us to clearly realize the whole intelligentize process of realizing the manufacturing enterprises in the production process. At present stage the intelligent production manufacturing enterprises realize is only partial intelligence, and it still has a long way to go for manufacturing enterprises intelligent production, and this trend is irreversible.

With the development of intelligent manufacturing technology, interoperability among things and things, people and objects, objects and objects into reality. Interconnection between people produces service internet, and interoperability between objects and objects forms industry internet. Through the links of service internet and industry internet, it will form a comprehensive coverage of the network, to achieve full connectivity. The big data, cloud computing, networking technology were actively used in the process of upgrading of manufacturing enterprises, which forms the new value chain - knowledge of original research - development of new products - intelligent manufacturing - smart services on the Internet platform.

## **5.3 Actively explore the new model of the development of manufacturing electricity suppliers**

In large quantities, scale, production process is fixed under traditional industrial production mode, which is based on the sales data in the past to predict the current enterprise product sales volume, and then determine the production scale. The manufacturing enterprise production decision as such exists blindness, which can't response timely to changes of consumers, leading to out of stock of some products, while the unsalable of some products, and out of stock of the market demand. It causes great waste of resources by manpower, material, and financial, and it is difficult to achieve maximum profit for the enterprise. But the demand pull type production is based on the electronic commerce mode of production. Enterprise organize production according to the user's orders, so that turn the production process from large quantities, assembly line production to small quantities, personalized customized production mode, and finally realize flexible production management[18].

In recent years, with the increase impact of Electronic Commerce on the garment industry, the competition between garment enterprises is increasing, leading to the positive thinking methods of change. Enterprises in the garment industry as an example, with the use of digital printing, CNC cutting, 3D body measurement instrument, enterprises can be customized according to the needs of individual users. Compared with the large-scale pipeline of the original mode of production, the production of the enterprise is more targeted after using C2B enterprise organization model of the production process, avoiding the blindness of production, saving a lot of manpower, material, and financial resources, improving the level of corporate earnings. It forms multi products species, small batch production mode.

With the continuous development of e-commerce, the dispersion of network users, personalized needs are constantly strengthened. The transformation from product sales end reverse promoting enterprise production mode, requires enterprise possesses stronger flexible production capability, and thus make changes of enterprise business processes and business model changes. In the continuous development of big data and cloud computing technology, the C2B model will be the future development direction of manufacturing enterprise e-commerce application mode.

## **5.4 Improve the external environment for the development of manufacturing industry**

The development of the enterprise electronic commerce requires not only their own efforts, but also the government's actively creating a policy environment for the development of electronic commerce. Firstly, the government should further decentralization, reduce administrative examination and approval, issue support policy doing well to the development of electronic commerce, promoting the development of e-commerce in the manufacturing enterprises. Secondly, perfect the legislation of electronic commerce, and strength the supervision and actively guide of electronic transactions, security authentication, privacy protection, problems of tax laws and so on. Actively guide the electronic commerce enterprise innovation service pattern of electronic commerce, and realize the diversification of

manufacturing enterprises in the development of electronic commerce. Put private capital into the range, and then into the field of electronic commerce, to increase the motive force of the development of electronic commerce. At the same time, the government should standardize the competition between enterprises, reduce the administrative intervention, and create a good market environment for the development of Chinese manufacturing enterprises of electronic commerce.

The government should strengthen the pilot work of electronic commerce, and play a leading role model. The successful experience of manufacturing enterprises is to carry out through a typical demonstration, expanding the scope of application of e-commerce in manufacturing enterprises. It should also need to strengthen the e-commerce development level of infrastructure construction such as speeding up the construction of "broadband Chinese", promote the popularization and application of the 4G network, and the pilot project of e-commerce integrated innovation. As to the key technologies of e-commerce development such as smart card, chip, independent research and development of safety management technology, realize the independent research and development and master the core technology. Through the leading role of the pilot to relevant technical standards. Encourage enterprises increase investment in enterprise informatization construction, promote the construction of manufacturing enterprise informatization and development of e-commerce applications, and then realize the transformation and upgrading of the application of electronic commerce in manufacturing enterprises[19].

## 6 Conclusion

Under the influence of e-commerce, from clothing, retail industry to the financial sector, from the agricultural industry to the manufacturing sector and even to the service industry are undergoing changes. In the use of Internet thinking to reshape business processes, and even change the business model to become a trend. Under the Internet thinking, the manufacturing business model is changing, not relying on economies of scale, but user-centric. It's more dependent on its response to user demand for speed. With the development of big data, cloud computing and Internet of Things technology, the manufacturing industry is evolving from automation to intelligence, and it is possible to customize the production of the users. The use of the Internet to actively develop the manufacturing enterprises of the e-commerce application model will be the manufacturing transformation and upgrading play an important role. In the industrial 4.0, users are the core of the enterprises, C2B model will be the mainstream of future manufacturing e-commerce application model.

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