

# Research on Business Model Innovation Path of High-tech Enterprises Driven by Industrial Internet

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**Abstract:** In order to address the issues that arise when developing the business models of high-tech firms, this article studies the historical context of the current industrial Internet development. The technology isn't developed enough, to start. The second issue is the scarcity of creative talent, the third is the requirement for extensive human, material, and financial assistance, and the fourth is the issue of data security and privacy protection, and related remedies are offered. This article analyzes the business model influencing factors based on the long-term development of high-tech enterprises within the current industrial Internet. The target market and customer groups are the first influencing factor, followed by production management, the formation of new partnerships, and staff training management. The first road of business model innovation is data-driven, the second is platform management, the third is to construct a sound data analysis system, and the fourth is to create an enterprise-level cloud platform. This study proposes these four paths in light of the aforementioned considerations. These avenues allow for the long-term development of businesses against the backdrop of the industrial internet.

**Key words:** industrial Internet; Business model innovation; High-tech enterprises

## 1. Introduction

Since the General Electric Company's publication of "Industrial Internet: Breaking the Boundary between Intelligence and Machines" in 2012, which introduced the idea of industrial Internet, it has advanced to some extent and gradually grown to play a significant role in advancing global economic development. China's industrial Internet industry has been expanding quickly in recent years because to the development of new technologies like 5G and big data. The size of the industrial Internet sector was 2.1 trillion yuan in 2019, and more than 5.4 billion yuan worth of logos were registered. The size of the industrial Internet market will be 3.1 trillion yuan in 2020. The size of the industrial Internet industry was 4.13 trillion yuan in 2021.

**Table 1 Scale and Growth Rate of China's Industrial Internet Market in 2018-2021**

Year	2018	2019	2020	2021
Market size (100 million yuan)	5314.73	6002.27	6592.03	5767.82
Growth rate (%)	14	13	10	17

Data source: collated by Zhiyanzhan Research Institute

High-tech businesses, which are likewise having many issues, are closely related to the industrial Internet. After a lengthy period of development, China's high-tech industry is finally starting to take shape. The first challenge is that the concept of the main product is unclear; some enterprises define the main product as the one with the highest sales revenue, while others believe that as long as the product of the enterprise can be defined as the main product, the definition of high-tech enterprises is not unfair. Second, the regulations governing intellectual property rights are irrational, and patents acquired by businesses through transfers, donations, purchases, mergers, and acquisitions do not accurately represent their true capacity for independent innovation. Thirdly, there is not enough continuity among the R&D staff. Research in science and technology is a lengthy process, and the departure of researchers can occasionally impede the progress of the entire project.

The digital economy is booming, driven by the industrial Internet, and business models that have been tried and true in practice run the risk of disappearing. As a result, creating new business models has taken precedence for the long-term growth of high-tech companies.

## 2. Literature Review and Prospect

### 2.1 Literature analysis of industrial interconnection

The current development trend of industrial Internet has piqued the interest of many academics and businesses as a novel notion. Previously, some academics investigated the current state of the industrial Internet. Xu Xiaolan (2022) emphasized the need of industrial Internet assistance in the healthy development of the digital economy. Simultaneously, she urged that China's industrial Internet maintain its strategic strength, consolidate the foundation of industrial development, and continue to increase governmental assistance from equipment and technical support to help companies' digital transformation. Zhang Bo (2022) believes that the industrial Internet, as one of the fourth industrial revolution's important pillars, not only plays an important role in the process of digitalization, networking, and intellectualization of the service manufacturing industry, but also that the continuous development of China's industrial Internet has led to the participation of leading enterprises in the industry and promoted the emergence of a number of platforms of this type. At the same time, the industrial Internet must address a number of technical issues, such as access to a wide range of industrial equipment, involving key technologies such as data integration and edge processing technology, which raises the bar for enterprise development and innovation.

### 2.2 Theoretical development of business model and its innovation

Business model research is a growing area of interest in current business study and practice. According to Yuan Lei (2007), customer value proposition is an important component of business model, however Wei Jiang (2012) posits that business model contains value proposition, value generation, and value acquisition. In terms of enterprise operation, Zott and Amit (2007) stated that business models can lower transaction costs, improve transaction efficiency, boost company creativity, and enable organizations to create value through collaboration and partnerships.

Business model innovation is the driving factor behind enterprise value creation. With the rise of the industrial Internet, business model innovation has emerged as a tool for businesses to boost their competitiveness. The old business model has been impacted and must be transformed as a result of the industrial Internet. Business model innovation, whether in form or content, can expand the business model's development space. According to Tu Shuangfeng (2017), as the Internet has grown in popularity, so has the business model's meaning, which has expanded from the sphere of attentive management to the field of enterprise management. At the same time, he stated that the business model is a set of operations whose primary goal is to convert technical value into customer value. Tu Shuangfeng (2017), on the other hand, emphasized that in the Internet environment, the three fundamental factors in the process of business model building are community, cross-border, and platform. The community exists at the network intersection on the Internet, and its primary aim is to meet the demands of customers and provide services to them. Cross-border cooperation refers to collaboration across industries and fields in order to create more value. The platform, as the core of the company model, provides a good environment for corporate. The platform guarantees the transmission and reception of information, and reduces the cost of information collection for users.

For the construction of business models under the Industrial Internet, research on the impact of the Industrial Internet on enterprise business model innovation has mainly focused on the impact of the Industrial Internet on business model composition factors. Metallo (2018) and others explored how to apply the Internet of Things to the construction or innovation of enterprise business model. Shang Yanying (2021) and others believe that business model innovation is influenced by internal and external factors, external policy factors and innovation learning factors under the influence of education have an important impact on the innovation path of business model under the industrial Internet. At the same time, Shang Yanying (2021) also pointed out in detail that external policy factors include market demand, policy support and technological innovation; innovative learning factors include open learning and Internet ecological creation; and enterprise cognitive factors include entrepreneurship, TMT cognition and entrepreneurial orientation. Zhang Qiliang (2021) believes that the industrial Internet can play a role in business model transformation, and the value of the future industrial Internet platform is to use connected devices to obtain data, solve customer problems, and ultimately achieve the effect of business model transformation.

### 2.3 Comprehensive review

Generally speaking, the business model, as a concept that has attracted much attention since its inception, has no fixed model, but is constantly innovating with the changing background of the times. With the development of science and technology, industrial Internet has become the mainstream. As an important pillar of the Fourth Industrial Revolution and an important driving force for the healthy

development of China's digital economy, the industrial internet can help high-tech enterprises use key technologies such as data integration to achieve intelligent production, thus promoting business model innovation. At the same time, under the background of industrial Internet, business model innovation needs to pay attention to business model construction factors, including internal and external factors. The vigorous development of the Industrial Internet under the digital economy has created opportunities for many enterprises to develop. The emergence and vigorous development of industrial Internet has promoted the business model innovation of high-tech enterprises.

### **3. Influencing Factors of Business Model Innovation of High-tech Enterprises**

Nowadays, with the rapid development of the Industrial Internet, high-tech enterprises can make flexible use of their own technological advantages. High-tech enterprises can adopt a business model that combines data-driven and platform management. The combination of platform management and industrial Internet can be understood as the construction of an open platform to promote cooperation and innovation among enterprises. Driven by the Industrial Internet, the business model construction of high-tech enterprises has the following four factors:

First, the target market and customer groups. The construction of the business model of high-tech enterprises driven by the industrial Internet must first define the target market, define the target market and customer segmentation, understand the market size, demand and current competition pattern. Zhang Kai (2017) stated that business model innovation should adjust market positioning, redefine customers and customer needs, and expand the radius of value space. This is conducive to the accurate positioning of target customers, and the provision of tailor-made products or services for target customers. Under the application of industrial Internet technology, it focuses on perfecting user portraits based on the multiple labels of users' digital information, constantly analyses the information obtained, and forms a virtual customer representative close to the real image of users. Wang Genming (2022) said that the diversified characteristics of big data can be used to accurately screen customers, accurately analyse customer needs, rationally plan products, and accurately locate customer groups. For the accumulation of data volume, high-tech enterprises can collect available information through the industrial internet to improve customer portraits. At the same time, the analysis of user data can make the target audience of goods clearer. Through a series of digital technologies, goods can meet the personalised needs of users.

Second, production management use data to guide production. Li Fei (2019) mentioned that the first role of digital technology is to improve the power of local efficiency of service work. The second is the formation of an integrated platform, which changes the situation of scattered service business, small scale and high dependence on personnel, and supports the operation of the business model stage. The third is the input of key resources and capabilities, which has changed the functional orientation and transaction mode of service providers, and directly promoted the development and transformation of the business model. In the past, the surface quality defects of some high-precision and high-performance structural parts and functional parts, which need to be detected by the naked eye, are not stable enough, and the labour cost of enterprises is also high, which is optimised according to the information obtained from the industrial Internet platform. At the same time, it can also improve the efficiency of production through the Internet of Things (IoT), using the interconnection between sensors, devices and physical systems to achieve real-time data collection, monitoring and control, to improve production efficiency and reliability of production lines.

Third, establish a new type of collaborative partnership. Building a business model that combines data-driven and platform management also requires the use of data to establish new partnerships, which mainly refers to the construction of new transaction content between core enterprises and partners. Chen Jianxin (2021) mentioned in the article that the value network is an important factor in business model innovation, including suppliers, partners and so on. At the same time, through the industrial Internet platform, we can understand and communicate in many ways, and strengthen the links between the two sides. It is beneficial for enterprises to expand their business scope and reduce risks, while improving market penetration.

Fourth, personnel training management. Through the use of industrial Internet virtual reality and augmented reality technology, to provide interactive training, visualisation and collaborative environment, to improve employee productivity and reduce unnecessary work mistakes. Wang Genming (2022) shows that it has become a trend for enterprises to use big data. With the help of big data, they can manage

human resources and daily logistics, and improve the scientific nature of talent recruitment. As a world-renowned high-tech company, Sony uses VR technology to simulate actual scenes in employee training, allowing employees to learn and familiarise themselves with various operating processes and equipment in a safe environment. Microsoft uses VR technology in all kinds of training and exercises. Microsoft uses VR to train pilots, surgeons and engineers, and has developed a VR headset called “Microsoft HoloLens” for training.

#### **4. Business Model Innovation Path of High-tech Enterprises**

Under the environment of industrial Internet, the business model innovation of high-tech enterprises needs to analyse the market, target users and production management, which can use data-driven innovation to establish a sound data analysis system to promote innovation and development. At the same time, in view of the two influencing factors of establishing new partnerships and staff training, we can choose to create enterprise-level cloud platform to guide the business model innovation of enterprises.

Therefore, the business model construction of high-tech enterprises driven by the industrial Internet can be divided into the following four paths:

First, data-driven business model innovation. The Industrial Internet connects a large number of devices and stores a large amount of production data. Through in-depth analysis and mining of this data, enterprises can summarise and discover new business opportunities, accurately grasp customer needs, and enable data-driven business model innovation. Enterprises offer customised products, refined production management, and personalised services through data analysis to gain greater competitive advantage. Data-driven business model innovation is conducive to improving the management process of enterprises, at present, enterprises mainly refer to the needs of their own development in the process of setting up management process, and rarely change in the process of its operation, but this is not conducive to the long-term development of enterprises, in the context of the rapid development of Industrial Internet. With the help of the interactive characteristics of data, it can help enterprises quickly understand the changes in the external environment, and at the same time, it can examine the internal management system, analyse the existing problems in the management of enterprises, and constantly optimise the enterprise management process through rational thinking, so as to achieve the result of improving management efficiency.

Second, the platform promotes business model innovation. The Industrial Internet provides a platform for enterprises to connect various industries and large enterprises. Enterprises can integrate resources, collaborative innovation and value sharing on the platform. Platform-driven business model innovation can provide more perfect solutions for enterprises, break the original boundaries between traditional industries and enterprises, and form a new industrial ecosystem.

Third, determine the relevant data needs of the enterprise. With the help of Industrial Internet technology, we can build a perfect data analysis system, and then use data to drive innovation. Effective Integration of Collected Data. Ensure that there is an effective data collection and storage mechanism within the enterprise, and integrate various data sources, including but not limited to internal systems, external data suppliers and third-party data platforms, to collect data information in a comprehensive way. Select appropriate data analysis tools. Select the appropriate data analysis tools according to the needs of the organisation and the skills of the data analysis team. Commonly used tools include data visualisation tools, statistical analysis software and machine learning platforms. For example, Quick BI data visualisation analysis platform, Knime Knime data analysis platform. Due to the rapid iteration of technology updates, enterprises should pay attention to the latest data analysis technologies and algorithms to improve the ability and effectiveness of data analysis. Data analysis and modelling, data visualisation. Apply appropriate statistical analysis and machine learning techniques to analyse data and discover potential associations and trends. Build data models and related algorithms for prediction, classification, clustering and optimisation, and present analysis results in a visual way that makes data analysis more intuitive and helps decision-makers make decisions.

Fourth, we should use Industrial Internet technology to create an enterprise-level cloud platform to provide infrastructure and services to customers or other partners, supporting data sharing and win-win cooperation. Facing the new risks and challenges of the Industrial Internet, enterprises should establish an Internet security management system. First, conduct a risk assessment of the current industrial Internet system and related equipment. Eliminate potential threats and vulnerabilities, and reduce the risk of data interconnection. It also regularly evaluates and improves the industrial Internet system to promote the improvement of the security management system. Second,

according to the risk assessment, appropriate security measures and emergency response measures should be formulated. This ensures that companies can deal with unexpected security problems in a timely manner and reduce losses caused by risks. Finally, a professional security team will be established to manage the risks posed by the Industrial Internet and to oversee and implement the normal operation of the security management system.

In the face of talent shortage, enterprises should establish detailed training plans and innovative incentive mechanisms, encourage employees to actively participate in innovative projects, and encourage them to propose new ideas and practice courageously. First, companies should cultivate innovative teams. Conduct targeted training for employees to improve their independent innovation ability. Partnerships with other high-tech companies, universities or research institutions can share resources, knowledge and experience and promote innovation. Partnerships can provide new perspectives and innovative ways of thinking and broaden the thinking of the team. Allow time for team members to focus on exploring new ideas and techniques. This can be done through dedicated project or research time, freeing people from their day jobs to focus on innovation and experimentation. Through internal or external training, we can help employees improve their ability to innovate and help companies innovate and evolve. Second, set up a performance evaluation team. Through segment training costs and hours, different job training, salary and performance management indicators, the performance of employees is reasonably evaluated.

## 5. Conclusions and recommendations

### 5.1 Conclusion

This article focuses on the construction of the business model of high-tech enterprises driven by the industrial Internet, analyses the current situation of the industrial Internet and the business model of high-tech enterprises in China, and provides the corresponding construction strategies. High-tech enterprises have a lot of room for development under the premise of the continuous development of the industrial Internet, but they also face many challenges. At present, the original business model of high-tech enterprises has many problems to solve in various aspects in the face of the emerging Industrial Internet. The conclusions of this paper are as follows:

First, from the perspective of this study, influenced by the development of industrial Internet, most high-tech enterprises have embarked on the road of transformation, and the construction of business model of high-tech enterprises has become the top priority of enterprise development.

Second, this paper summarises and finds that in the process of using industrial Internet, the technical problems in the process of equipment interconnection is a major problem that enterprises need to solve. In the process of interconnection, different equipment manufacturing standards or different technical requirements may lead to interconnection failure. Different data standards and requirements make the application of Industrial Internet technology a difficult problem.

Third, with the rapid development of the digital economy, customer needs are constantly changing. In order to gain competitive advantage in the fierce market competition, the construction of the business model must focus on customer value. At present, customer demand is changing rapidly, and the trend of diversification is obvious, and the demand for customised products and services is getting higher and higher. At the same time, the use of Industrial Internet technology to create customer value has become an indispensable part of development.

In addition, with the development of the Industrial Internet, data interconnection has become a trend, the Industrial Internet has changed the production and manufacturing environment of enterprises from closed to open, the production process from automation to intelligence, and some production information has been mapped to cyberspace through digital technology, and the security of information systems and industrial systems has become a big problem. The security of enterprise production data has also become one of the key issues to be considered in the development of enterprises.

### 5.2 Recommendations

First, get the value of the Industrial Internet right. The Industrial Internet is a concept that applies sensors, devices, networks and analytical technologies to traditional industries. By using data collection and analysis technology, it can monitor key data in the production

process in real time, helping to reduce production downtime, reduce resource waste and improve production efficiency. It can realise real-time supply chain monitoring, enabling enterprises to better manage the flow of raw materials and improve the reliability and accuracy of the supply chain through real-time data sharing. At the same time, the Industrial Internet can also help improve product quality, enhance safety and reliability, and promote enterprise innovation. Therefore, this paper argues that, driven by the Industrial Internet, high-tech enterprises should attach importance to the construction of business models.

Second, increase R&D investment. High-tech enterprises take science and technology as the core, increase investment in the industrial Internet and shorten the production cycle. Reasonable use of industrial Internet technology, the establishment of enterprise-level platform, the use of advanced technology to manage data, reduce the barriers between enterprises because of data management technology, is conducive to communication between enterprises.

Third, pay attention to customer value. Customers are the core of value creation for enterprises, and the main purpose of business model construction is to further enhance the competitiveness of enterprises and create more value for enterprises. Deeply understand customer needs, accurately locate target customers, improve resource utilization efficiency and avoid wasting resources. On the other hand, paying attention to customer value can also help enterprises to build a good corporate image, increase customer loyalty, and indirectly help enterprises to make profits.

Fourth, proper risk management. Risks are inevitable in the Industrial Internet. It is very important to formulate effective security efficiency and measures. According to the instructions of the national security standard system, we should strengthen the training of network security awareness to further ensure the security of data. Establish a professional data security management team, employ professional security management experts, establish risk management barriers for enterprises, and ensure enterprise data security.

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