

Research on the Pass of Manufacturing Transformation and Upgrading in Wuhan

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Abstract: Wuhan is currently in a critical period of manufacturing transformation and upgrading, and it is urgent to find the pass to overcome difficulties and promote the development of manufacturing industry in Wuhan. The influence of COVID-19 pandemic on Wuhan brought pressure and challenges to manufacturing industry. Based on the impact of the COVID-19 pandemic on the manufacturing industry, this paper analyze the development status and difficulties of manufacturing industry in Wuhan, and propose to link different sectors together to increase corporate production capacity, establish a venture capital platform to solve the problem of corporate professionals, and integrate government and enterprises.

1. Introduction

Wuhan is a famous manufacturing city with a complete range of industries and the coordinated development of three major industries. In the global ranking of Fortune, about 230 of the world's top 500 companies have invested in Wuhan. Wuhan is not only the central city in central China, but also a key link in China's manufacturing industry chain. It has large-scale industrial clusters in the fields of electronics, automobiles, medicine and so forth. It is imperative to promote the high-quality development of manufacturing industry in Wuhan with the help of networked, digital, and intelligent development technologies.

Due to the sudden outbreak of the COVID-19 pandemic in December 2019 and the strong contagion of it, many provinces and cities in China initiated a first-level response within a short period of time. Wuhan was blocked for 76 days. In the short term, although the impact of the pandemic on the manufacturing industry is transient, it will be magnified by the industrial chain. Firstly, the closure of Wuhan have some direct impacts on manufacturing, such as production suspension, reduction of corporate output, risk of default in corporate performance, and expenditure increases of rigidity cost of elements. Secondly, there are some indirect impacts on upstream and downstream enterprises in the industrial chain. Thirdly, the impact of delays in resuming work caused by the suspension has been further amplified by the industrial chain in other provinces such as Henan, Chongqing, and Hunan surrounding Hubei, and Zhejiang and Guangdong with large flowing-in populations. Therefore, how to efficiently and orderly promote the recovery and development of manufacturing industry in Wuhan is very important.

2. The development status of manufacturing industry in Wuhan

2.1 The important economic variables growing

Some important economic aggregate variables in Wuhan are growing. In the past ten years, Gross Domestic Product in Wuhan has continued to increase from 557 billion yuan to 1622 billion yuan and the number in 2014 exceeded one trillion yuan to reach 1069 billion yuan. The trend is shown in Figure 1.

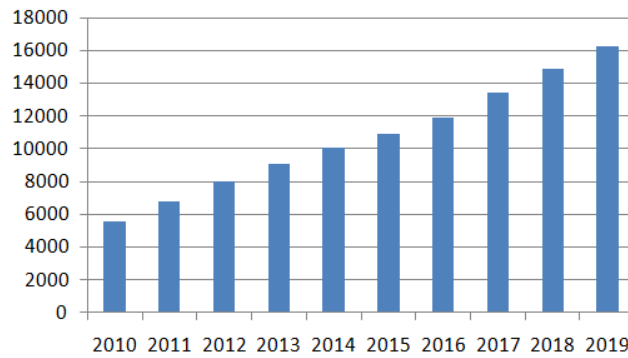


Figure 1. 2010-2019 Gross Domestic Product in Wuhan

Among these three major industries, the growing trend of the secondary industry has always been strong. From Figure 2, we can see that the GDP of the secondary industry accounts for more than 40% of the city's GDP which plays a critical role in Wuhan. The most important part of the secondary industry in Wuhan is the industrial manufacturing industry.

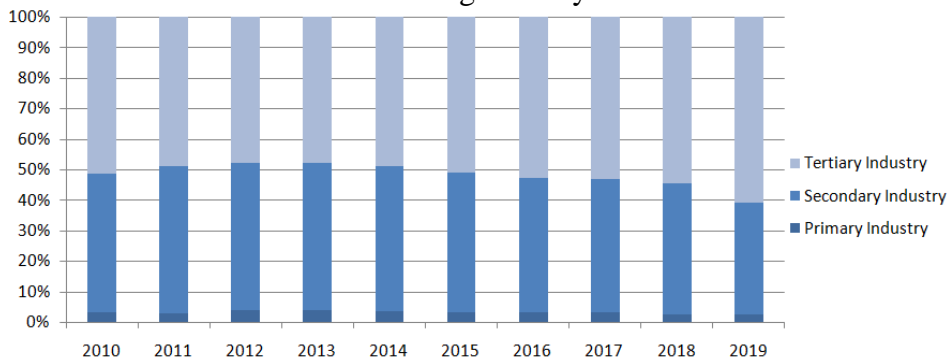


Fig. 2 2010-2019 Three Industries Structure in Wuhan

2.2 The optimized structure of secondary industry in Wuhan

The structure of secondary industry in Wuhan has been continuously optimized, which is highlighted by the following characteristics. On the one hand, the high-end manufacturing industries are increasing. The number of advanced manufacturing industries and strategic emerging industries in Wuhan are growing rapidly, such as automobile manufacturing, computer, communications and other electronic equipment manufacturing, and pharmaceutical manufacturing. On the other hand, traditional advantageous industries have also been qualitatively improved through transformation. For example, in 2019, the total output value of the textile and clothing and food manufacturing industries increased by more than 10% and 20% compared with the value in 2018.

2.3 The obvious industrial agglomeration effect

The regional development characteristics of Wuhan are obvious, and the industrial agglomeration effect is particularly obvious. Among the manufacturing industries in Wuhan, the automobile, communications and electronics manufacturing industries have the highest concentration. Wuhan has gathered five major vehicle companies: Dongfeng Passenger Car, Dongfeng Honda, Shenlong Automobile, Dongfeng Renault, and SAIC GM. These OEMs have attracted a large number of parts and components companies, including chassis, transmission, body, electronics, interior, glass and other major parts and components manufacturers. The development of these enterprises to a certain scale will form an industrial park. Wuhan currently has four national industrial bases: storage, network security talents and innovation, new energy and intelligent networked vehicles, and aerospace industry.

2.4 The improving innovation ability of industries

The number of enterprise R&D patent applications and granted patents can explain the innovation

ability of enterprises within a region. The more the number of authorized patents, the greater the scientific research investment in this region, and the greater the importance the region attaches to technological innovation. From 2010 to 2019, the number of patent applications and granted patents in Wuhan continued to increase. The increasing of patent applications and granted patents indicates that Wuhan has strong innovation capabilities.

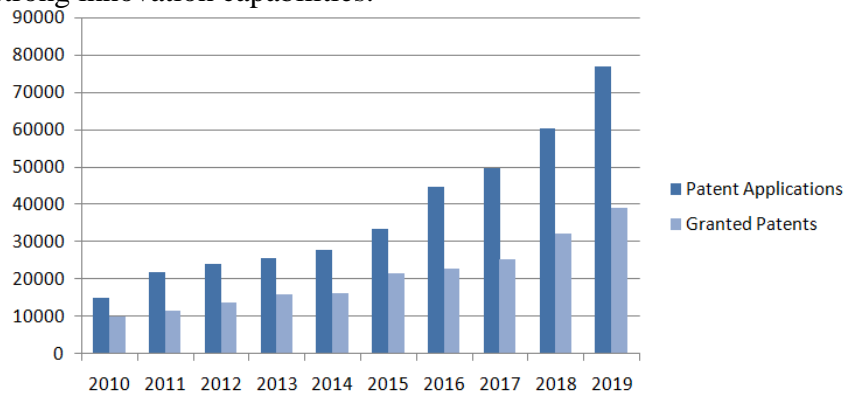


Fig. 3 2010-2019 Patent Applications and Granted Patents in Wuhan

3. Problems

3.1 The scale and competitiveness of manufacturing industry

The scale of manufacturing industry in Wuhan is not large enough, and the competitiveness is not strong. As to the automobile industry, the automobile and parts manufacturing industry is Wuhan's largest industry, but its output still lags behind Shanghai and Guangzhou. In terms of product structure, Wuhan's automakers still focus on basic passenger vehicles, with their outdated models, weak market competitiveness, and low added value. As to the electronic manufacturing industry, the competitiveness is not strong. In 2017, the output of Wuhan was only 62% of Chengdu, 37% of Shanghai, and 13% of Shenzhen. Furthermore, in addition to competitive advantages in subdivisions of optical communications and high-power lasers, Wuhan's optoelectronic information industry is currently at the middle and low end of the international division of labor and the global industrial chain.

3.2 The innovation ability of key manufacturing industries

The innovation ability of key manufacturing industries needs to be enhanced. Although the automobile industry in Wuhan has been developed for many years and has a large scale, its industrial innovation capability is not strong. Now there is no top automotive industry technology research center located in Wuhan. In particular, the technology and standard research of emerging industries such as smart cars are not advanced enough, leading to difficulties in transformation. The core technologies need to be further explored. In the optoelectronic information industry, there is a big gap in technology level with foreign countries. For example, the production cost of optical fiber is higher than that of other countries, and high-end core devices and high-speed optoelectronic chips are less competitive. As to high-end equipment manufacturing, core components such as high-precision reducers and servo motors for intelligent equipment rely on imports.

3.3 The amount and quality of technical employees

The amount and quality of technical employees can not satisfy the need of development of manufacturing industry in Wuhan. It is important for manufacturing enterprises to have enough professional employees when entering the industrial Internet era. Enterprise requires professionals to operate new machines and equipment, and a specific computer department needs to be established to solve related technical problems. However, the employees in enterprises now need to be trained for a long time.

4. Conclusions

To realize the transformation and upgrading of manufacturing industries, the enterprises and governments in Wuhan should focus on the following activities.

Firstly, increase enterprise production capacity with the help of the Industrial Internet. The Industrial Internet connects people, data, and machines through the network to analyze the operation of the manufacturing industry and promote the operation of intelligent machines. During the COVID-19 pandemic, Industrial Internet in Wuhan took the advantages of big data to improve the efficiency of emergency response to the pandemic, helped manufacturing enterprises go from offline to online, accurately connected with customers, improved procurement efficiency, and made enterprises conduct market research and judgment and make reasonable decisions. Enterprises can use big data to establish a specialized production scheduling platform, which is equipped with a team of engineers to analyze and match the needs of the enterprises, integrate the production capacity of small and medium-sized enterprises, improve the production and marketing efficiency, and make full use of idle resources. With the help of the location advantage of the traditional commerce and trade market, the manufacturing industry open up their supply chains to promote the integrated development of enterprises.

Secondly, combine government and enterprise to lower the entry barriers. The government should issue incentives and subsidies policies for enterprises, and provide financial and policy support for enterprises to enter the platform. It lead enterprises to coordinate and match the supply and demand in the market, promote strategic cooperation with various platform providers and telecom operators, reduce network fees and investment costs.

Thirdly, establish a venture capital platform to attract professionals. The venture capital platform solves the temporary shortage of professional talents. In the initial stage, enterprises are unable to establish a comprehensive support system due to capital and technology limits. They can use the venture capital platform to solve the problems of technology, equipment installation, maintenance and policy support. With the integration of online and offline, the platform operates a professional employee support system to push the start-up of enterprises.

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