

Research Trends on Basic Industrial Capability of Equipment Manufacturing Industry

Qinghe Wang^{a,*}, Yunting Jia^b, Miaojing Ying^c

Department of Economy and Management, Lanzhou University of Technology, Lanzhou, China

^a 1273912835@qq.com, ^b 1055844107@qq.com, ^c 1754172238@qq.com,

*corresponding author

ABSTRACT. As a major manufacturing country, China has weak basic industrial capacity of equipment manufacturing industry. Based on the summary of domestic and foreign industrial basic industrial capabilities and equipment manufacturing research, this paper analyzes the current situation of China's equipment manufacturing industry and basic industrial capabilities. It is proposed that improving the basic industrial capabilities and strengthening the construction of the basic service level of industrial technology is the only way to narrow the gap with developed countries, and become a manufacturing power, and promote high-quality economic development.

KEYWORDS: Equipment manufacturing industry, Basic industrial capacity, Research trends

1. Introduction

The manufacturing industry is the main body of the national economy, the foundation of the nation, the tool of rejuvenation, and the foundation of a strong nation. Since the reform and opening up, China's industrial economy has developed rapidly and has now become the world's largest and most comprehensive manufacturing country. The equipment manufacturing industry is a manufacturing industry that provides production technology and equipment for the national economy and national defense construction. It is a core component of the manufacturing industry and the foundation of national economic development, especially industrial development. The establishment of a strong equipment manufacturing industry is the fundamental guarantee for improving China's comprehensive national strength and achieving industrialization. The equipment manufacturing industry is the general term for providing production technology and equipment to the national economy, and it accounts for the main part of the country's manufacturing industry. Therefore, the improvement of the equipment manufacturing industry's basic capabilities is of great significance to the battle for advanced industrial foundation and industrial chain level modernization. From a horizontal perspective, focusing on improving the basic industrial capabilities of the equipment manufacturing industry can effectively solve the bottlenecks in the equipment manufacturing industry's own production, technology, and technology under the current situation; from a vertical perspective, the improvement of the basic industrial capabilities of the equipment manufacturing industry will provide a basic guarantee for promoting the construction of a manufacturing power, promoting industrial innovation and development, industrial transformation and upgrading, and promoting high-quality economic development.

2. Research on Basic Industrial Capabilities

Foreign scholars believe that the research on basic industrial capabilities can be summarized from research on key common technologies, research on core components, research on key basic materials, and related research on manufacturing development. Some foreign scholars pointed out that collaborative R&D can reduce the R&D cost of key common technologies, share R&D work, accelerate the R&D process, and reduce R&D risks, and that collaborative research and development of key common technologies can integrate superior resources. Brian (1988) clearly put forward: Generic technology is a kind of universal technology that produces a series of new processes and new product applications^[1]; Baykara et al (2015) pointed out that it is difficult for a single enterprise to complete the research and development of key common technology systems^[2]; Nina et al (2016) believe that the key common technology in the integrated circuit industry can improve the performance level and work efficiency^[3].

Domestic scholars believe that the basic industrial capabilities are embodied in four levels: basic key technology, basic technology, basic core components, and key basic materials. In 2015, "Made in China 2025" was released, listing

the industrial strong foundation project as one of the important projects supporting the upgrading of the manufacturing industry. And that the basic industrial capacity is critical to the construction of my country's industrial independent innovation capacity, the improvement of core competitiveness, the transformation of industrial development mode, and the social and economic security and national defense security, accelerating the improvement of industrial basic capabilities is an important content and key support for my country to promote industrial transformation and upgrading, and it is also a strategic cornerstone to ensure that my country will move from an industrial power to an industrial power in 2025. Qiu Lixin et al. (2018) built an evaluation index system for the development level of advanced manufacturing with 20 subdivision indicators in six aspects: quality efficiency, innovation capability, industrial structure, integration of industrialization and industrialization, green development and international competitiveness, the gray correlation method based on the entropy weight method is used to measure the development level of Qingdao's advanced manufacturing industry at multiple levels^[4]. Xu Zhaoyuan (2019) believes that the construction and improvement of the basic capabilities of the manufacturing industry must focus on a few key core areas, strengthen government guidance; give play to market mechanisms, promote industrial upgrading, and promote the integration of modern advanced technologies and traditional manufacturing technologies^[5]. It is necessary to give full play to the institutional advantages and super-large-scale market advantages of concentrating power to do major events, take the consolidation of industrial foundation capabilities as the foundation, take independence, controllability, safety and efficiency as the goal, take enterprises and entrepreneurs as the main body, and take policy coordination as the guarantee. Adhere to application traction and problem orientation, adhere to the combination of government guidance and market mechanisms, adhere to the promotion of independence and open cooperation, and fight for the advanced industrial foundation and modernization of the industrial chain.

3. Research on Equipment Manufacturing Industry

The equipment manufacturing industry refers to the general name of various manufacturing industries that provide equipment for simple production and expanded reproduction of various sectors of the national economy. It is the core part of the machinery industry and undertakes the important task of providing work machines for various sectors of the national economy and driving the development of related industries. It can be said that it is the heart of industry and the lifeline of the national economy, and an important cornerstone to support the comprehensive national strength of the country.

Zhang Danning et al. (2014) conducted an empirical analysis on the development level and scale of the seven sub-industry of my country's equipment manufacturing industry by constructing a level evaluation index system, and the results showed that the seven sub-industries of the equipment manufacturing industry showed different development levels and models^[6]. Sun Bolin (2019) analyzed the current status of my country's equipment manufacturing industry, it is believed that the deficiencies of my country's equipment manufacturing industry are mainly reflected in the lack of core competitiveness of product technology, the need for import and export supporting capabilities such as key parts or materials, the low concentration of equipment industry and the overcapacity of low-end products in the industrial structure. Market competition is also excessive competition, with insufficient R&D capabilities and production capacity for high-end products, and many high-end areas are occupied by foreign investors^[7]. Wang Lijuan (2019) constructed an evaluation system for the high-quality development of manufacturing in Liaoning Province from the seven dimensions of innovation drive, structural optimization, speed efficiency, factor efficiency, integrated development, green development and opening up. The gray correlation model using entropy method weighting compares and analyzes the overall level of manufacturing high-quality development in Liaoning province and the scores and changing trends of seven first-level indicators from two dimensions: time series and regional comparison^[8].

4. Current Situation Analysis of the Basic Industrial Capabilities of China's Equipment Manufacturing Industry

4.1 The Growing Scale of Development

After 70 years of development in China, China's equipment manufacturing industry has successfully achieved a historical leap from small to large and from weak to strong. In 1992, China's industrial added value exceeded 1 trillion yuan, in 2007 it exceeded 10 trillion yuan, in 2012 it exceeded 20 trillion yuan, and in 2018 it exceeded 30 trillion yuan, accounting for more than 1/4.

4.2 Continuous Optimization of Industrial Structure

In the early days of the founding of New China, the development of heavy industry was given priority. The construction of "156 industrial projects" began in the 1950s, and the "three-line construction layout" began in the 1960s,

quickly establishing a complete industrial system; After the reform and opening up, we will make full use of the resources of the international and domestic markets, vigorously promote the development of light industry with consumer goods as the main body, and the rapid rise of processing and manufacturing; Since joining the World Trade Organization, the development of high-end manufacturing has accelerated. China's manufacturing industry has gradually transformed and upgraded from labor-intensive industries to capital-intensive industries and technology-intensive industries; Entering the new era, with supply-side structural reform as the main line, intensify the adjustment of industrial structure, optimize the form of industrial organization, and focus on breaking the key common technical bottlenecks that restrict the improvement of manufacturing quality, focus on complementing development shortcomings, and focus on enhancing the core competitiveness of the manufacturing industry. The real economy represented by the manufacturing industry has made considerable progress, laying a solid foundation for the sustained and rapid development of the national economy.

4.3 Significantly Improved Innovation Capabilities

In 2018, China invested a total of 1965.7 billion yuan in research and experimental development (R&D) expenditures, and research and development expenditures increased at a geometric rate. In 2019, China's top 500 manufacturing companies had a total of 917,446 patents, an increase of 18.06% over the previous year. Especially since the 18th National Congress of the Communist Party of China, the strategy of innovation-driven development has been vigorously implemented, major scientific and technological achievements have emerged, and emerging industries have flourished, the atmosphere for innovation and entrepreneurship in the whole society continues to be optimized, and technological innovation and industrial development have achieved major changes in historical, holistic, and structural patterns.

5. Conclusion

Comprehensive factors of various aspects of industrial development, the industrial foundation can be analyzed from the following aspects: the basic ability of industrial supply and demand; the foundation of innovation ability; the foundation of policy environment; the basic service ability of industrial technology; the level of industrial development. The basic ability of industry supply and demand is mainly reflected in the self-supply ability of products and technologies, including the self-satisfaction ability of core components and key basic materials. The foundation of innovation capability mainly reflects the capability of industrial product innovation and process innovation. The high-quality development of the equipment manufacturing industry is inseparable from the strong support of government policies. The improvement of basic industrial capabilities must be guaranteed by policy coordination, adhere to the combination of government guidance and market mechanisms, and do a good job of top-level design. Facing the requirements of high-quality development, improving the basic industrial capabilities and strengthening the construction of basic industrial technology services are the only way to narrow the gap with developed countries, become a manufacturing power, and promote high-quality economic development.

References

- [1] Brian L J. Economic considerations in the selection of generic technologies. *Prometheus*, Vol.6, No.1, pp.8-10, 1988.
- [2] Baykara T, Ozbek S, Ceranoglu A N. Generic transformation of advanced materials technologies: towards more integrated multi-material systems via customized R&D and innovation. *The Journal of High Technology Management Research*, Vol.26, No.1, pp.77-87, 2015.
- [3] Nina B, Tomas M. Electronics industry: R&D investments as possible factors of firms competitiveness. *Procedia-social and Behavioral Sciences*, No.220, pp.55-61, 2016.
- [4] Qiu Lixin, Zhou Jiameng. The development level measure of advanced manufacturing industry in China's advanced cities and the enlightenment to Qingdao. *Journal of Qingdao University of Science and Technology(Social Sciences)*, Vol.34, No.2, pp.18-24, 2018.
- [5] Xu Zhaoyuan. Accelerate the improvement of industrial basic capabilities. *Economic Daily*, no.12, 2019-11-13.
- [6] Zhang Danning. Chen Yang. Study on development level and mode of equipment manufacturing industry in China. *Quantitative Economics and Technical Economic Research*, Vol.31, no.7, pp.99-114, 2014.
- [7] Sun Bolin. China's equipment manufacturing industry and its high-quality development countermeasures. *Electric Times*, No.2, pp.13-17, 2019.

- [8] Wang Lijuan. Empirical Study on the high quality development level of manufacturing industry in Liaoning province--gray correlation analysis based on entropy method. Liaoning University, 2019.