

**DIFFICULTIES FACED BY CHINA'S ROBOT DEVELOPMENT**

Magistrand Wenkai Shao

*Supervisor Kalesnikau L.A.*

Belarusian National Technical University, Minsk, Republic of Belarus

As the world's largest industrial robot market, China is the largest robot adopter in Asia, with a strong growth of 51% in installations in 2021 and shipments of 268,195 units. The operating inventory exceeded the 1 million mark, an increase of 27%. Such a high growth rate also indicates the rapid development of robotics in China, Figure 1.

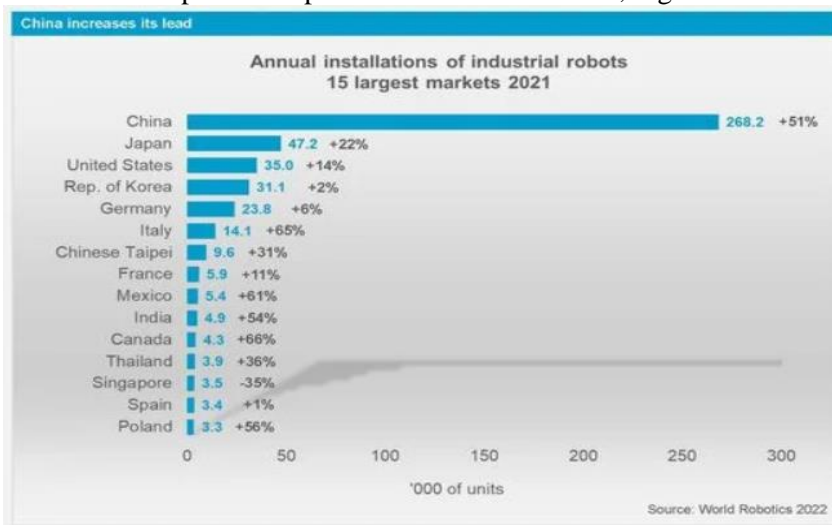


Figure 1 – 15 Largest Industrial Robot Markets in 2021

Rapid growth in market demand, but heavily dependent on foreign imports. Since 2010, the demand for industrial robots in my country has surged, but at present, more than 70% of my country's new industrial robots rely on foreign imports. Absolute share of foreign brands in the domestic market ABB of Sweden, FANUC of Japan, YASKAWA of Japan, KUKA of Germany and other well-known enterprises have a market share of nearly 90% in the Chinese market.

At present, China's industrial robot technology and its engineering application level still have a certain distance compared with foreign countries, the application scale, industrialization level and utilization rate of local products are low. As shown in Figure 2, domestic brands account for only 8.8%, almost monopolized by foreign industrial robots. At present, most well-known companies in the field of industrial robots are located in Europe, Japan and the United States. These enterprises have already played a pivotal role locally and even globally. They are representatives of advanced technologies in various countries and regions and are also pillar industries that promote economic development [1]. Consequently, key core components are controlled by others countries.

Affected by factors such as the rapid development of technology, the continuous scarcity of labor resources, and the further improvement of production efficiency requirements, global industrial robots will usher in a broader development space and a higher development speed. In terms of regional distribution, with the development of the manufacturing industry in Asia, the demand for industrial robots in various industries has increased, making the market demand for industrial robots gradually shift from Europe and the United States to Asia.

With the rapid growth of demand for industrial robots in China, companies with varying strengths have entered the industrial robot production market, which will inevitably lead to vicious competition with low quality and low price [2, 3]. The research system is too independent and closed in form, and the content is scattered, making it difficult to form a joint force, resulting in repeated research and waste of time and funds.

Although during the «19-th Five-Year Plan» and «20-th Five-Year Plan» period, the country has many projects involving the field of robotics, the industry has not yet established an effective public technology platform to strengthen the research and breakthrough of key common technologies and core functional components, and industrialization. The process is also difficult to advance, and the incentive policies for R&D of industrial robots and industrialization still need to be refined and improved.

Most companies are keen on large and comprehensive, and some companies that develop and produce key components have transferred to the complete machine production. It is difficult to form an orderly and detailed industrial chain of R&D, production, manufacturing, sales, integration, and service.

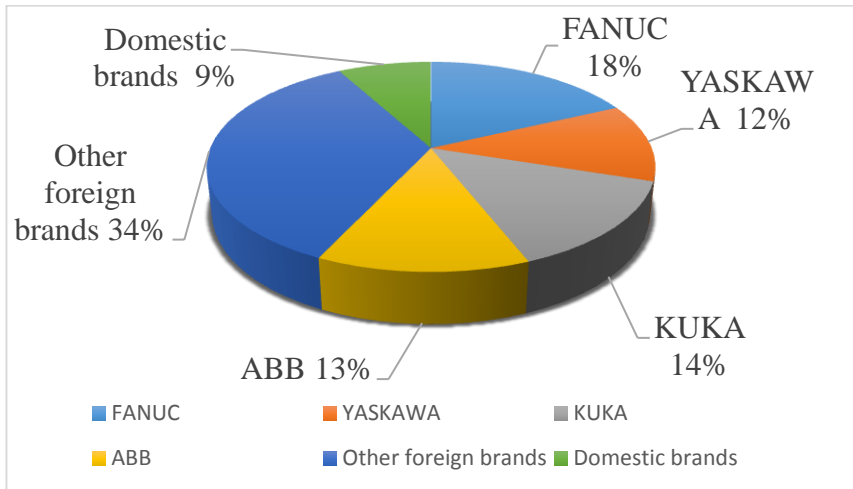


Figure 2 – The utilization rate of China industrial robots

In recent years, under the influence of the national independent innovation policy, a large number of domestic enterprises have either independently developed or cooperated with scientific research institutes to enter the ranks of industrial robot development and production, and my country's industrial robots have entered the initial industrialization stage. Some products have begun industrial production and application, but because they are not as good as imported similar products in terms of precision and speed, the degree of industrial application of these products is low, lack of brand recognition, and their market share is small.

Some advanced technologies have been mastered, but the overall technical level is still low. At present, China has basically mastered the design and manufacturing technology of robots, control system hardware and software design technology, kinematics and trajectory planning technology, produced some key components of robots, and developed

robots such as painting, arc welding, electric welding, assembly, and handling. The technical level of some products has reached the international advanced level, but there is still a big gap in the overall technology, which is only equivalent to the level of foreign countries in the mid-1990s.

Judging from the robot products launched in the world in recent years, a new generation of industrial robots is developing in the direction of intelligence, modularization and systematization. Technology is increasingly intelligent, modularized and systematic. Western industrialized developed countries have made strategic deployments one after another to this effect.

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