

**CHINA'S INNOVATION CLUSTERS AS A FACTOR
IN THE DEVELOPMENT OF INTERNATIONAL
TECHNOLOGICAL EXCHANGE**

Qin Yu, Master's Student, Polessky State University, uqdayu@qq.com

Abstract. The article examines the place of Chinese clusters in the innovative development of China, as well as their position in the global innovation ranking 2022.

Keywords: innovation, innovation policy, cluster, regional development, international technology exchange

In the 14th Five-Year Plan (2021-2025), China intends to focus on developing advanced industrial clusters and stimulating key industries, which include aerospace, integrated circuits, marine engineering equipment, robots, advanced rail transport equipment, as well as energy, medicine.

An advanced manufacturing cluster refers to an industrial grouping formed by a large number of companies and institutions in proximity that carry out mutual cooperation and exchanges. It is considered to be an advanced form of industrial division of labor and agglomeration development, and is part of China's push to pursue high-quality development of manufacturing.

China's decisive turn toward clusters stems from the fact that since 2015, the share of manufacturing in China's GDP has gradually declined and now does not exceed 27 percent. Such a noticeable weakening of the manufacturing business could lead to a slowdown in economic growth and affect urban employment. It would also threaten industrial security and weaken the country's global competitiveness. It will take at least three decades to remedy the situation and achieve its goal of becoming a powerful center of advanced manufacturing.

In declaring its determination to stabilize the share of manufacturing in GDP, China has stimulated activity to develop advanced industrial clusters, evaluate them, and engage cities and regions in improving their manufacturing competitiveness, prompting cities across China to join the race to achieve meaningful results in doing so.

So back in 2019, Changsha, the capital of Hunan province, established a special working group to promote the development of the construction machinery cluster, in which leading companies in the industry worked together to achieve breakthroughs in 22 key technologies related to high-performance engines. Their total investment in research and development rose to 8.25 billion yuan (\$1.27 billion) in 2019.

Some provinces, such as Jiangsu and Guangdong, known for their manufacturing potential, already have six industrial clusters each, and Zhejiang province has three clusters.

During the competition, experts selected leaders in various industries according to uniform evaluation standards so that they could fulfill the national mission of creating advanced industrial clusters and then participate in global competition and international cooperation on behalf of China to become "world champions" in their industries. The comprehensive evaluation took into account both qualitative and quantitative factors. In

particular, the clusters had to not only reflect the advanced nature of the industry, but also have a strong market impact.

After fierce competition among cities across the country, the Ministry of Industry and Information Technology, China's leading industry regulator, has prepared and published a list of 25 winners, which have been named clusters of advanced manufacturing. A total of 21 cities from nine provinces and municipalities made the list. These are the ones included in the "national manufacturing cluster."

The competition showed that not a single industrial cluster from the Beijing-Tianjin-Hebei region and northeast China made the list. It turned out that more efforts are needed in North China to create a favorable environment for innovation. Beijing itself ranks third in the ranking of innovative cities.

The Ministry of Industry and Information Technology said that additional support measures are planned for key advanced industrial clusters to accelerate the strengthening of production chains, optimize the layout of production innovation centers and develop cooperation of global competitive large enterprises and specialized small and medium enterprises.

Based on market-oriented mechanisms, measures will be taken to enable these clusters to implement innovative management models, play the role of public investment funds, plan major projects and promote the modernization of industrial bases and production chains.

Local governments will also benefit from participating in the state's 14th Five-Year Plan cluster program, which has the goal of creating industrial clusters with annual revenues exceeding 1 trillion yuan (\$150 billion). For example, Nanjing, capital of Jiangsu province, said it aims to increase the output of its new cluster (smart grid equipment) to \$60 billion by 2025.

Zhuzhou, a city in Hunan province, aims to build a world-class industrial cluster of advanced railroad equipment with an annual output of more than \$30 billion by 2025.

These clusters are also expected to draw an influx of talent, capital and other resources. Over the coming five-year period, the integrated circuits cluster in Shanghai will invest 300 billion yuan (\$46 billion) and implement a targeted talent assistance program to locate in Shanghai, offer customized tax incentives, help small and medium-sized enterprises develop and support industrial funds to ensure industrial development.

Shenzhen Municipal Government also said it will support key projects of high-tech medical equipment cluster, attract industrial investment funds and venture capital, and form a complete capital participation chain.

The Global Innovation Index-2022 showed the place of Chinese clusters, strengthening their positions.

The largest increases in the ranking came from three Chinese clusters - Zhengzhou (+15 positions), Qingdao (+12) and Xiamen (+12).

Chinese clusters experienced the largest increases in S&T output too, with the median increase equating to +13.9 percent and with China hosting the fastest growing clusters - Qingdao (+25.2 percent) and Wuhan (+21.9 percent).

China is now on a par with the United States in terms of the number of top 100 S&T clusters in 2022 (Table).

Table – Economies with three or more top 100 S&T clusters, 2022

Economy	Economy name	Number of top 100 clusters
US	United States	21
CN	China	21
DE	Germany	10
JP	Japan	5
FR	France	4
CA	Canada	4
IN	India	4
KR	Republic of Korea	4
GB	United Kingdom	3
AU	Australia	3
CH	Switzerland	3
SE	Sweden	3

Source: WIPO Statistics Database, April 2022

China is now consistently introducing new "rules of the game," forcing foreign corporations operating in the country to share their technology with Chinese state enterprises. In addition, it is important for China today (from both economic and image points of view) to actively project its scientific and technological power outward and change stereotypes in favor of the idea that "Chinese means quality. In this regard, Chinese high-tech companies are now more open to various forms of cooperation, as they need to promote their image and strengthen their position in new markets.

By maintaining high rates of innovative development for several decades, China was able to reform its own economy and turn from a manufacturing center into one of the largest innovation centers in the world.

The rapid global development has given rise to all kinds of innovations, which are not only technical, but also organizational. One of the organizational innovations has been the creation of innovation clusters, which are a synergy of companies and institutions with the common goal of creating, developing and presenting innovations at all levels, from the interstate, state, regional to the local level.

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