

11. International and domestic co-operations in science and technology are highly encouraged including the exchange of scholars, sharing of information, and co-research on certain subjects.

12. Some preferential policies should be made to favour the west when S&T programs are under consideration. S&T administrations and academic institutions such as Chinese Academy of Sciences should work together on the issue.¹³⁰⁷

8.6 Economic and Technological Development Zones

8.6.1 A Brief Introduction

At the beginning of 1984, to further open to the outside world, China government decided to establish economic and technological development zones (ETDZ)¹³⁰⁸ along seas by using successful experiences of special economic zones in the previous period.

From 1984 to 1988, 14 ETDZs including Dalian, Qinhuangdao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Minhang, Hongqiao, Caohejing, Ningbo, Fuzhou, Guangzhou, Zhanjiang are the first that had been established after the approval of the State Council.

In 1992 and 1993, eighteen other national ETDZs including Yingkou, Changchun, Shenyang, Harbin, Weihai, Kunshan, Hangzhou, Xiaoshan, Wenzhou, Rongqiao, Dongshan, Guangzhou Nansha, Huizhou Dayawan, Wuhu, Wuhan, Chongqing, Beijing, Urumchi are the second to be set up.

From 2000 to 2002, the State Council decided to build the third group including Hefei, Zhengzhou, Xi'an, Changsha, Chengdu, Kunming, Gunyang, Nanchang, Shihezi, Xining, Huhhot, Taiyuan, Nanning, Yinchuan, Lanzhou, Lasa, Lanzhou.

Besides, it also ratified Suzhou Industrial Park, Hainan Yangpu ETDZ, Shanghai Jinqiao Export Processing Zone, Ningbo Daxie ETDZ and Xiamen Haicang Investment Zone to enjoy the same preferential policies with these national ETDZs.

The state-level ETDZ is a relatively small piece of land carved up in the coastal cities and other open cities. It attaches great importance to improving hard and soft investment environment and adheres to the policy of "mainly developing the high-tech industry, focusing on industrial projects, absorbing foreign fund and building up export-oriented economy" to strive for a fast and sound development. Serving as "Windows and bases" in the fields of opening-up, capital attraction, export enlargement, hi-tech development and regional economy promotion, it now becomes a powerful engine in developing regional economy and plays an important role in adjusting regional economy and industry

¹³⁰⁷ Consulate General of the People's Republic of China in San Francisco, Science and Technology Programs in China issued on November 18, 2003 available online at URL: <http://www.chinaconsulatesf.org/eng/kj/kjjh/>

¹³⁰⁸ ETDZ comes under Ministry of Commerce of People's Republic of China.

structure. As a matter of fact, The ETDZs have scored great achievements and become the hot places of foreign investment and main forces of export.

The ETDZs of coastal cities have achieved remarkable success. By summarizing the experience of fast and sound development of national development zones, as a major component of a strategy to develop the western area, the State Council made a decision in 1999 that middle west provinces, autonomous regions and municipalities directly under the central government could choose one qualified and established provincial-level ETDZ from its capital city to bid for a national ETDZ.

To date, there are 54 national-level ETDZ, among which, eastern coastal regions 34, Middle West regions 21. The pattern of national ETDZs in various provinces, cities, autonomous regions and other open cities is quite reasonable especially the newly established national ETDZs, which will play an active role in implementing the strategy of developing the west strengthening the economic cooperation between eastern and middle western regions and promoting the coordinated growth of regional economy.¹³⁰⁹

The **State Council released a news** dated **May 8, 2019** titled **“New measures to boost national development zones for further opening-up”** reported that China will move faster to boost innovation in its national economic and technological development zones in terms of openness, technology and institution-building to raise the quality of economic growth and cultivate new pacesetters in the country’s reform and opening-up endeavor.

The decision was made at the State Council’s executive meeting chaired by Premier Li Keqiang on May 8.

The Chinese government puts great importance on innovation-driven development of the national economic and technological development zones. General Secretary Xi Jinping issued instructions on several occasions, stressing the need to upgrade cooperation of these development zones with the rest of the world to develop a higher-level open economy and open up new dimensions in all-around opening-up. Premier Li Keqiang required that the exemplary role of the national economic development zones be fully harnessed for better use of inward investment and related policies consistent with law be rolled out to make these zones pacesetters in attracting foreign investment.

Establishing national economic and technological development zones was a major strategic decision China made in the 1980s as part of efforts for wider opening-up. With the first zone opened in 1984, 219 such zones have been established so far, focusing on advanced manufacturing and producer services to drive China’s urbanization through global cooperation and industrialization. These economic development zones contribute around 10 percent to the national GDP and some 20 percent to the country’s foreign trade and paid-in foreign investment.

“There is still much untapped potential in these national zones. We must see that their industrial and institutional advantages formed over the years are fully leveraged to nurture new drivers of economic growth,” Premier Li said.

¹³⁰⁹ Excerpts from **National Economic and Technological Development Zones: A Brief Introduction**, available online at URL: <http://www.china.org.cn/english/SPORT-c/76751.htm>

The meeting identified several key measures to boost the development of these national zones. It called for steps to reform and innovate the operation and management model in the zones to improve the business environment. The zones will be supported to implement a simpler permitting process for investment projects and the practice of pre-commitment of compliance. Performance in attracting investment will be included as part of the assessment and incentive system in the national zones. Entrepreneurs and innovators working in the zones will enjoy convenience and support in household registration, border entry and exit, children's schooling, housing and venture investment.

“Local governments must foster a more enabling business environment in the national economic development zones. These zones should be in the forefront of government efforts in transforming its functions. The government needs to incentivize market players through regulatory streamlining and ensure fairness by effective oversight.” Premier Li said. The meeting urged the national zones to take the lead in fully implementing national policies in promoting technological innovation. The government will increase support for technological innovation in these zones, including constructing large national science infrastructure and national science and technology innovation bases. More support will be given to talent training bases jointly run by the national zones and vocational schools.

“We must embrace institutional innovation to scale up policy support for innovation in science and technology. This will help ensure that these national zones lead the way in technological innovations across the country,” Premier Li said. The opening-up of these zones will be bolstered by attracting private and foreign investors to develop and run industrial parks with distinctive features. Organizations, companies and investors from Hong Kong, Macao and foreign countries will be encouraged to participate in the running of international cooperation parks in these zones. Comprehensive bonded zones will be set up. The government will support pilot programs to facilitate foreign exchange settlement and payments of revenue under the capital accounts in these national zones where conditions permit.

The meeting also decided to promote industrial upgrading in the national zones, including favouring them when deploying key national industrial projects. Efforts will be intensified to boost businesses start-ups and innovation in the zones.¹³¹⁰

Xinhua News Item dated **May 29, 2019** titled “**China to attract more foreign investment into economic, technological development zones**” stated that **China's Ministry of Commerce (MOC)** will take various measures to attract foreign investment into the country's state-level economic and technological development zones, an official with the MOC said Wednesday.

Efforts will be made to bring in foreign-invested companies in the advanced manufacturing and modern service industries, while multinationals will be encouraged to set up headquarters or R&D centers in the development zones, said Tang Wenhong, head of the MOC's department of foreign investment administration.

¹³¹⁰ Excerpts from The State Council of PRC News article dated May 8, 2019 titled “New measures to boost national development zones for further opening-up” written by Zhang Yue, available online at URL: http://english.www.gov.cn/premier/news/2019/05/08/content_281476651099020.htm

"There is still a lot of potential for the development zones to attract more foreign capital," Tang said at a press conference. The State Council has recently made public guidelines on promoting innovation the development zones, vowing efforts to encourage technological and institutional innovation in the areas. The guidelines listed 22 tasks, including increasing the quality of foreign trade and advancing the innovation capabilities of various industries. At present, there are 219 state-level economic and technological development zones in China, contributing more than 10 percent to the national gross domestic product and fiscal revenue. In 2018, combined foreign trade volume in the zones rose by 10.8 percent year on year, accounting for 20.3 percent of China's total foreign trade.¹³¹¹

8.6.2 The State Council Guideline on development zones

The **State Council Policy Release** titled "**State Council issues guideline on development zones**" updated on **February 6, 2017** issued guideline to promote the reform and innovative development of China's development zones, aimed at improving their leading roles in opening-up and improving the investment environment.

It urged strengthening the overall arrangement of all types of development zones, speeding up their upgrades, adopting innovative mechanisms and improving the management systems and policy support. The goal is to build the development zones into leading zones for industrial development, pilot zones for high-level business operations, integrated zones for mass entrepreneurship and innovation and pilot zones for open economy and system innovation, forming new engines for the country's economic growth. Based on the principles of reform and innovation and led by related plans, the State Council asked to innovate the business models of development zones, spur their vitality and improve the distribution format. To optimize the format of development zones, they should focus on industrial development, becoming platforms for developing local manufacturing, high-end new technology and productive services, according to the guideline.

Adopting the improvement of the business environment as their top task, the development zones should strive to provide quality services, suitable support facilities and convenient resources to promote economic system reform and transfer government functions. National zones, such as economic and technical development zones, high-tech industrial development zones and special customs surveillance zones, should play their leading roles by emphasizing advanced manufacturing, strategic new emerging industries and processing trade industries, the guideline said. It also urged the development zones to actively adapt to international conventions to build themselves into industrial parks with global influences. Provincial development zones should rely on local resources, integrate industrial elements, and improve the business environment to become regional economic growth poles, driving the upgrades in regional economy.

Coordinating the development zones in eastern, central and western China should also be emphasized, said the guideline. It urged efforts to upgrade the industries in eastern regions, improve the business environment of the central and western regions, and those

¹³¹¹ Xinhua News Item dated May 29, 2019 titled "China to attract more foreign investment into economic, technological development zones", available online at URL: http://www.xinhuanet.com/english/2019-05/29/c_138100320.htm

in northeast regions. To speed up the transformation and upgrades of development zones, the State Council also urged setting up technology research centers, engineer labs, national key labs and innovation platforms and centers in the qualified zones. It encouraged development zones to take various measures, such as establishing maker spaces, science parks, enterprise incubators and introducing talent to create a better environment for mass entrepreneurship and innovation.

Optimizing the industrial structure is also an important task. Traditional industries in the development zones should step forward to medium- to high-end development through technological methods. More measures such as integrating information technology and manufacturing, creating more emerging industries, and developing productive services should also be utilized to build the development zones into world-class industry clusters. Moreover, development zones should also be encouraged to attract foreign investments and undertake international industrial transfers.

Green development is also one important principle of the development zones, so low-carbon, recycling and intensive development are stressed in the guideline. The State Council urged the government in all regions to set up a unified coordination mechanism for the development zones. It also asked local governments to delegate the economic management powers that can be delegated to the development zones. Private capital and Public-Private Partnership (PPP) models should be encouraged in the establishment of development zones to diversify its business models, according to the guideline.¹³¹²

8.6.3 China guideline on improving business environment for foreign investors

In a **State Council Policy Release**, earlier on **February 6 2017** State Council had issued guidelines on development zones, for better using foreign investment with a focus on safeguarding the national treatment of foreign-funded enterprises, according to the government's website.

The guideline puts forward 20 policies in four aspects to create a more "fair, transparent and predictable" business environment for foreign investors. To deepen opening-up, China will continue to reduce the negative lists for foreign investment access in both pilot free trade zones and the rest of the country, and comprehensively eliminate restrictions that are not included in the negative lists. China will accelerate the opening-up of the financial sector and optimize the foreign investment policies for automobile industry.

In promoting investment, China will optimize scientific and technological innovation services for foreign-invested enterprises and improve the construction of pilot free trade zones. More efforts will be made to improve state-level economic and technological development zones in attracting quality foreign investment and give priority to the establishment of a number of comprehensive bonded zones in the central and western regions. In deepening reform to facilitate investment, China will lower the cost of cross-border capital use, make it easier for foreigners to work in China and optimize the approval process for the use of land for foreign-funded projects. In protecting the

¹³¹² State Council Policy Release: State Council issues guideline on development zones updated on February 6 2017, available online at URL: http://english.www.gov.cn/policies/latest_releases/2017/02/06/content_281475560757252.htm

legitimate rights and interests of foreign investors, China will fully implement the foreign investment law and establish and improve institutions for accepting complaints.

The country will implement the regulatory policies more strictly and improve the transparency of the formulation of regulatory documents, according to the guideline. China will give full play to the role of judicial protection of intellectual property rights, improve the IPR protection mechanism, support both domestic and foreign enterprises in their fair participation in the standardization of products like medical equipment, food and medicine, and ensure their equal participation in government procurement, said the document.¹³¹³

8.6.4 Made in China 2025

8.6.4.1 Developments leading to “Made in China 2025”

Important details on the following topics are given in their respective references:

In “Notice of the General Office of the State Council on Printing and Distributing the Trial Measures for the National Security Review of Foreign Investment in the Pilot Free Trade Zone”, State Council has mentioned China (Shanghai) Pilot Free Trade Zone, China (Guangdong) Pilot Free Trade Zone, China (Tianjin) Pilot Free Trade Zone, China (Fujian) Pilot Free Trade Zone for Pilot Measures for National Security Review of Foreign Investment in Pilot Free Trade Zone.¹³¹⁴

Charts in Chinese Language:

- Chart: "Made in China 2025" introduced a clear road map for manufacturing power¹³¹⁵
- Graphic: Made in China 2025¹³¹⁶

Notice of the State Council on Printing and Distributing through a Press Release captioned "Made in China 2025" released on May 19, 2015 which states: ¹³¹⁷

Strategic objectives:

Based on national conditions and reality, we strive to achieve the strategic goal of making a strong country through "three steps."

The first step: Strive to enter the ranks of manufacturing powers in ten years.

¹³¹³ Source: Xinhua- “China issues guideline on improving business environment for foreign investors” dated November 7, 2019 edited by Han Jing available online at URL: <https://www.shine.cn/biz/finance/1911075563/>

¹³¹⁴ Excerpts from State Council Notice released on April 20, 2015 titled “Notice of the General Office of the State Council on Printing and Distributing the Trial Measures for the National Security Review of Foreign Investment in the Pilot Free Trade Zone” accessed on April 28, 2019, available online at URL: http://www.gov.cn/zhengce/content/2015-04/20/content_9629.htm

¹³¹⁵ Xinhua News Agency, Chart: "Made in China 2025" introduced a clear road map for manufacturing power, dated May 19, 2019, available online at URL: http://www.gov.cn/xinwen/2015-05/19/content_2864827.htm

¹³¹⁶ Excerpts from China Government Net, Graphic: Made in China 2025, dated May 20, 2019, available online at URL http://www.gov.cn/xinwen/2015-05/20/content_2865552.htm

¹³¹⁷ Excerpts from Notice of the State Council on Printing and Distributing "Made in China 2025" Guofa [2015] No. 28, released on May 19, 2015, available online at URL: http://www.gov.cn/zhengce/content/2015-05/19/content_9784.htm

By 2020, industrialization will be basically achieved, the status of a manufacturing country will be further consolidated, and the level of manufacturing informatization will be greatly improved. Master a batch of key core technologies in key areas, further enhance the competitiveness in superior areas, and greatly improve product quality. Significant progress has been made in the digitization, networking and intelligence of the manufacturing industry. The value-added energy consumption, material consumption and pollutant emission of industrial value added of key industries have decreased significantly.

By 2025, the overall quality of the manufacturing industry will be greatly improved, the innovation ability will be significantly enhanced, the labor productivity of all employees will be significantly improved, and the integration of the two industries (industrialization and informatization) will reach a new level. The value-added energy consumption, material consumption and pollutant emissions of industrial value-added units of key industries have reached world advanced levels. A group of multinational companies and industrial clusters with strong international competitiveness have been formed, and their status in the global industrial division of labor and value chain has been significantly improved.

The second step: By 2035, China's manufacturing industry as a whole will reach the middle level of the world's manufacturing power camp. The innovation capability has been greatly improved, major breakthroughs have been made in the development of key areas, the overall competitiveness has been significantly enhanced, and advantageous industries have formed global innovation leadership capabilities, fully realizing industrialization.

The third step: One hundred years after the founding of New China, the status of a major manufacturing country was further consolidated, and its comprehensive strength entered the forefront of the world's manufacturing power. The main fields of manufacturing industry have the ability to lead innovation and obvious competitive advantages, and build a world-leading technology system and industrial system.

Main indicators of manufacturing industry in 2020 and 2025

category	index	year 2013	2015	2020	2025
Innovation capacity	The proportion of R & D expenditure in the manufacturing industry above designated size as a percentage of main business income (%)	0.88	0.95	1.26	1.68
	The number of effective invention patents per ¹⁰⁰ million yuan of main business income of the manufacturing industry above designated size ¹ (piece)	0.36	0.44	0.70	1.10

Quality benefit	Manufacturing Quality Competitiveness Index ²	83.1	83.5	84.5	85.5
	Increase in manufacturing value added rate	-	-	2 percentage points higher than 2015	4 percentage points higher than 2015
	Growth rate of labor productivity of all employees in manufacturing industry (%)	-	-	Around 7.5 (the average annual growth rate during the "13th Five-Year Plan" period)	Around 6.5 (the average annual growth rate during the "Fourteenth Five-Year Plan" period)
Integration of the two	Broadband penetration rate ³ (%)	37	50	70	82
	Popularization rate of digital R & D design tools ⁴ (%)	52	58	72	84
	Key process numerical control rate ⁵ (%)	27	33	50	64
ECO development	Decrease in energy consumption of industrial added value of units above designated size	-	-	18% lower than 2015	34% lower than 2015
	Decrease in carbon dioxide emissions per unit of industrial added value	-	-	Down 22% from 2015	40% lower than 2015
	The decline in water consumption per unit of industrial value added	-	-	Down 23% from 2015	41% lower than 2015
	Comprehensive utilization rate of industrial solid waste (%)	62	65	73	79

Source: Notice of the State Council on Printing and Distributing "Made in China 2025"

URL: http://www.gov.cn/zhengce/content/2015-05/19/content_9784.htm

Xinhua News captioned "**The State Council issued Made in China 2025**", dated **May 19, 2015** to a Press Release on May 19, 2015 stating that approved by Premier Li Keqiang, and the State Council issued "Made in China 2025" to deploy and comprehensively promote the implementation of the strategy of manufacturing power. This is the program

of action for the first decade of China's implementation of the strategy of making a strong country.¹³¹⁸

Xinhua News Item titled **"Made in China 2025" is not a replica of German Industry 4.0- Chinese Academy of Engineering launched the second phase project of "Strategic Research on Manufacturing"**, Dated **April 21, 2015** mentioned that in 2013, the Chinese Academy of Engineering, together with the Ministry of Industry and Information Technology, launched a major consulting project on "Strategic Research on Manufacturing Power". Zhou Ji, President of the Chinese Academy of Engineering, and Zhu Fengfeng, Academician of the Chinese Academy of Engineering, served as team leaders, with more than 50 academicians and more than 100 experts participating.

"The project team put forward the strategic goal of" three steps "for China to enter the ranks of manufacturing powers in the future: by 2025, it will enter the ranks of manufacturing powers; by 2035, it will reach the middle level of the world's manufacturing powers; by 2045, the comprehensive strength of manufacturing Join the forefront of the world's manufacturing powerhouse, "Zhu Gaofeng said.

Based on the characteristics of a manufacturing powerhouse, the "Comprehensive Volume of Strategic Research on Manufacturing Powerhouse" released by the Academy of Engineering on the 21st builds an evaluation index system for the manufacturing powerhouse. According to the analysis of this index system, among the major industrial countries in the world, the US manufacturing industry is far ahead and is in the first phalanx; Germany and Japan are in the second phalanx. China, the United Kingdom, France, and South Korea are in third parties.

"'Made in China 2025' is not a replica of German Industry 4.0. We are not from 3.0 to 4.0, because many quality courses and basic craft courses of 2.0 and 3.0 have to be supplemented," said Liu Baicheng, academician of the Chinese Academy of Engineering.¹³¹⁹

In a **Government Press Release** captioned **"Made in China 2025, Roadmap Surfaced"**, issued on **March 26, 2015**, it was mentioned that the Premier of the State Council Li Keqiang presided over the convening of an executive meeting of the State Council on March 25, deploying and accelerating the implementation of "Made in China 2025" to achieve manufacturing upgrades. The meeting emphasized the need to conform to the development trend of "Internet +", with the deep integration of informatization and industrialization as the main line, focusing on the development of a new generation of information technology, high-end CNC machine tools and robots, aerospace equipment, marine engineering equipment and high-tech ships, advanced rail transit 10 major fields of equipment, energy saving and new energy vehicles, power equipment, new materials, biomedicine and high-performance medical equipment, agricultural machinery and equipment. The meeting also decided to launch the Green Paper Directory Guidelines for

¹³¹⁸ Excerpts from Xinhua News Agency, The State Council issued "Made in China 2025", dated May 19, 2015, available online at URL: http://www.gov.cn/xinwen/2015-05/19/content_2864538.htm

¹³¹⁹Xinhua News Item titled "Made in China 2025" is not a replica of German Industry 4.0- Chinese Academy of Engineering launched the second phase project of "Strategic Research on Manufacturing", Dated April 21, 2015, available online at URL: http://www.gov.cn/xinwen/2015-04/21/content_2850580.htm

the Upgrading of Key Manufacturing Areas in China, to dynamically adjust and roll forward.

The executive meeting also made it clear that "Made in China 2025" will focus on the development of a new generation of information technology, high-end CNC machine tools and robots, aerospace equipment, marine engineering equipment and high-tech ships, advanced rail transportation equipment, energy-saving and new energy vehicles, power Ten major fields of equipment, new materials, biomedicine and high-performance medical equipment, agricultural machinery and equipment, strengthen industrial basic capabilities, improve process level and product quality, and promote intelligent manufacturing and green manufacturing.

Miao Wei said that China is a major manufacturing country, but it is not yet a strong manufacturing country. There are not a large number of key enterprises with international competitiveness. There are still a number of major technologies and equipment for industrial development that require urgent breakthroughs. In addition, China should have some important products that have a place in the international market. According to this idea, more than 150 experts at the Chinese Academy of Engineering spent a year and a half on strategic demonstrations, and then the Ministry of Industry and Information Technology formulated the "Made in China 2025" planning outline on this basis. The Ministry of Industry and Information Technology meeting revealed that the 10 key development areas are determined according to the existing conditions and advantages of China's manufacturing industry. In addition to promoting the development of China's much-needed technology and fields, it will continue to promote the development of China's current industries with certain advantages to ensure that China's comprehensive upgrade and future competitiveness.

In the new round of global industrial chain restructuring, China's manufacturing industry is also facing competitive pressures from developed countries in Europe and America. At present, developed countries such as Europe and the United States have launched national strategies and plans to revive manufacturing. For example, the United States' "re-industrialization", "manufacturing renaissance", "advanced manufacturing partnership program", Germany's "Industry 4.0", Japan's "re-creation strategy", France's "new industrial France" and so on. Therefore, the "Made in China 2025" timely put forward the development focus of the next stage, undoubtedly to give a clear development path for China's manufacturing industry and China's economic planning.¹³²⁰

In another **Government Press Release** captioned **"The State Council deployed 10 major areas of "Made in China 2025"** dated **March 26, 2019**, mentioned ten major areas comprised of areas of rail transportation equipment, energy-saving and new energy vehicles, power equipment, new materials, biomedicine and high-performance medical equipment, agricultural machinery equipment, strengthen industrial basic capabilities, improve process level and product quality, and promote intelligent manufacturing and green manufacturing.

¹³²⁰ Excerpts from government Press release captioned "Made in China 2025, Roadmap Surfaced", issued on March 26, 2015, available online at URL: http://www.gov.cn/zhengce/2015-03/26/content_2838544.htm

It is also mentioned that: Zhang Qizi, assistant director of the Institute of Industry of the Chinese Academy of Social Sciences, believes that the development of the manufacturing industry is necessary.

The 21st Century Business Herald learned that the above 10 areas are more specific than the emerging strategic industries proposed by the state in 2010. The seven major industries involved in the "Decision of the State Council on Accelerating the Cultivation and Development of Strategic Emerging Industries" (Guo Fa [2010] No. 32) in 2010 are energy conservation and environmental protection, next-generation information technology, biological industry, high-end equipment manufacturing, and new energy , New materials industry, new energy automobile industry.

Chen Qiang, director of the Industrial Economics Research Department of the Economic Forecast Department of the State Information Center, said that the industries in the 10 major areas proposed this time are more high-end and more detailed than the last emerging strategic industries. The 21st Century Business Herald learned that, starting in 2010, China 's manufacturing output accounted for 19.8% of the world 's manufacturing, making it the world 's largest manufacturing country for the first time. However, although China is the world's largest manufacturing country, it is not a powerful country. A typical example is that many core components are difficult to produce. Guo Chongqing, an academician of the Chinese Academy of Engineering, believes that the meaning of "Internet +" for China is more suitable for China.

The 21st Century Business Herald learned that Jiangsu is formulating a "Made in China 2025" action plan, preparing to focus on the construction of 10 billion-scale B2B e-commerce trading platforms to guide steel, chemicals, ships, pharmaceuticals, non-ferrous metals, textile fabrics, and construction machinery Key leading enterprises in other industries to build characteristic trading platforms.

Prior to this, Chongqing also identified ten strategic emerging industries, including the cultivation of integrated circuits, LCD panels, robots, new materials, the Internet of Things, shale gas, biomedicine, new energy and electric vehicles, and MDI.

Wang Angeng, member of the National Advisory Committee for Informationization Experts, said that after the country proposed development strategies for emerging industries in the past, various regions have also proposed similar strategies accordingly. At present, various localities are also proposing new strategies. However, localities must make decisions based on their own situation, and develop in a differentiated way. Zhang Qizai, assistant director of the Chinese Academy of Social Sciences Industry Institute, suggested that to promote "Made in China 2025", various supporting policies need to be further introduced, otherwise many high-end products will be useless even if they are produced.¹³²¹

Further, in a **State government Press Release** Dated **April 21, 2015** captioned "**Made in China 2025**" is not a replica of German Industry 4.0- Chinese Academy of Engineering launched the second phase project of "Strategic Research on Manufacturing" 'Made in

¹³²¹ Excerpts from China Government Net , "The State Council deployed 10 major areas of "Made in China 2025" Dated March 26, 2019, available online at URL: http://www.gov.cn/zhengce/2015-03/26/content_2838613.htm

China 2025' is not a replica of German Industry 4.0. We are not from 3.0 to 4.0, because many quality courses and basic craft courses of 2.0 and 3.0 have to be supplemented," said Liu Baicheng, academician of the Chinese Academy of Engineering.¹³²²

In a South China Morning Post report Captioned "Beijing's '**Made in China 2025**' plan isn't dead, it's out of control" dated April 8, 2019, written by Tom Holland, it is pointed out: When Li Keqiang stood up in the Great Hall of the People last month to deliver his annual work report, he spoke for more than an hour and a half. Yet, the Chinese premier was notably silent about one high-profile government policy. Not once did he mention Beijing's flagship "Made in China 2025" industrial strategy, unveiled with such fanfare back in 2015.

Since then, of course, MIC2025 has attracted intense criticism internationally. Beijing's plan to pour vast state resources into seizing a dominant position in emerging high-technology industries was one of the main complaints in the US Section 301 report that last year led Washington to impose punitive tariffs on imports from China. And MIC2025 was one of the main reasons the European Union last month declared China a "systemic rival" and promised curbs on Chinese state-backed businesses in Europe.

But anyone who thinks Li's uncustomary silence on the subject means that Beijing is backing away from its signature strategy is barking up the wrong tree. Far from crumpling in the face of foreign pressure, the Chinese government is more likely to double down and pursue its policy with even greater vigour.

One of the principal aims of MIC2025 is to sever, or at least reduce, the dependence of Chinese industry on imports of sophisticated foreign-made technologies, such as advanced semiconductors. This dependence was thrown into sharp relief last year. In April, the US Department of Commerce banned American companies from selling components to state-owned Chinese telecommunications equipment company ZTE for breaches of US sanctions on Iran and North Korea. With ZTE's viability threatened, Chinese President Xi Jinping was obliged to intervene personally to get the ban lifted.

Then in November, the US cited national security concerns to impose controls on exports of all "commodities, software and technology" to Fujian Jinhua Integrated Circuit, a move that quickly brought the state-owned semiconductor manufacturer to its knees. Meanwhile, both the US and the EU are moving to tighten controls on inward investment from China to restrict the ability of Chinese state-backed companies to obtain strategically valuable technologies by acquisition. While these moves make it more difficult for China to acquire technologies it needs for MIC2025 from abroad, they also reinforce the determination of China's leaders to achieve the technological self-sufficiency goals outlined by the MIC2025 plan.

These are ambitious, with Beijing demanding 70 per cent self-sufficiency in critical components across a range of hi-tech industries including aerospace and telecommunications by 2025. So, although the Chinese authorities have stopped referring

¹³²² Excerpts from Xinhua News Item dated April 21, 2015, captioned "Made in China 2025" is not a replica of German Industry 4.0- Chinese Academy of Engineering launched the second phase project of "Strategic Research on Manufacturing", available online at URL: http://www.gov.cn/xinwen/2015-04/21/content_2850580.htm

in public to MIC2025, they continue to pursue the plan's objectives, talking instead about the necessity of developing "high quality manufacturing". This much is clear from the amount of money the central and local governments are pouring into the development of new industries.

As of the middle of last year, they had set up 1,940 "government guidance funds" to finance technology investment. On paper, these are modeled on the sort of private venture capital funds that financed the early development of Silicon Valley's tech giants. In reality, however, they are government-run bodies set up to direct capital to chosen sectors in accordance with government policy. The headline sums are enormous. The central government's National Integrated Circuit Industry Investment Fund has a war chest of 139 billion Yuan (US\$20.7 billion), while the National New Emerging Industries Fund has 40 billion Yuan, and the Advanced Manufacturing Industry Investment Fund has 20 billion Yuan. And that is just a handful of central government funds. Provincial and city governments have also raced to set up their own versions. In the semiconductor sector alone, at least 20 local governments have set up guidance funds with investment plans worth a combined 600 billion Yuan. Overall, government guidance funds are targeting investments totalling more than 10 trillion Yuan (US\$1.48 trillion).

Wisely invested, that would surely be sufficient to achieve many of MIC2025's goals. But not everything is as it seems. In many cases, the headline sums claimed by guidance funds are vastly inflated. The ostensible idea was for local governments to seed the funds with capital, and then attract private sector investments to make up the greater part of their equity. But investors proved cautious. As a result, the funds have taken to offering generous guaranteed returns to pull in money. In short, they are raising debt, not equity. This might sound familiar. In effect, government guidance funds have become the new equivalent of the highly leveraged "local government financing vehicles" (LGFVs) set up in the early years of this decade to fund lavish infrastructure and property developments.

Aghast at the financial risk, the central government has gone to great lengths over recent years to crack down on LGFVs. Now, with government guidance funds set up to support MIC2025, it is in danger of creating a whole new class of high-risk financial vehicles.

With some 45 new semiconductor fabrication plants set to begin production in the next two years, and 40 robotics parks in development, the headlong investment rush threatens to lead to heavy excess capacity in Beijing's chosen technology sectors. That will make it difficult for many guidance funds to service the debt they are accumulating, and challenging, if not impossible, for China's new industries to generate the returns on invested capital needed to drive the longer term technological advances the government demands. Li Keqiang may have gone quiet about MIC2025, but the policy is not dead. On the contrary, it may already be out of control.¹³²³

Excerpts from **Chapter 3: China 2025** of Monograph titled "**Rise of China History, Technology & Policies: Implications for India**" written by Maj Gen P K Mallick, VSM

¹³²³ South China Morning Post report Captioned "Beijing's 'Made in China 2025' plan isn't dead, it's out of control" dated April 8, 2019, written by Tom Holland, available online at URL: <https://www.scmp.com/week-asia/opinion/article/3004900/beijings-made-china-2025-plan-isnt-dead-its-out-control>

(Retd.) published by **Vivekananda International Foundation (VIF)** in 2019 is given below:

‘Made in China’

Made in China-2025 is a top down strategy. The leadership imposes its policy priorities and strategic vision for industrial upgrading on a manufacturing industry that has been largely hesitant about industrial modernization. This strong role of policy as the driver of smart manufacturing development stands in stark contrast to the pivotal role of enterprise initiative in the bottom up process in Germany, the United States and many other countries. MIC-2025 is part of Chinese President Xi Jinping’s ambitious plan to achieve the “great rejuvenation of the Chinese nation” and restore China to what Xi believes is the country’s rightful place as a great power by 2049 the centennial of the PRC’s founding. At the 19th Party Congress in October 2017, Xi laid out a multi stage plan with specific goals for 2020, 2035 and 2050. By 2035, he said China would be a top ranked innovative nation and by the middle of the century would be transformed into a leading global power.

MIC-2025 is the first stage of a larger three step strategy to transform China into a leading manufacturing power. The steps are:-

- China is to improve the overall quality of manufacturing, boost innovation and labor productivity, obtain an advanced level of information technology integration, reduce energy and material consumption and develop multinational enterprises and industrial clusters with strong international competitiveness.
- By 2035, China seeks to reach “an intermediate level” among world “manufacturing powers,” greatly improve innovation capability, make “breakthroughs” in major areas, boost competitiveness and become a global leader in various innovation industries.
- By 2049 and coinciding with the 100th anniversary of the founding of the People’s Republic of China (PRC), China aims to “become the leader among the world’s manufacturing powers,” have the “capability to lead innovation and possess competitive advantages in major manufacturing areas,” and “develop advanced technology and industrial systems.”

Xi Jinping has underscored the urgency to develop strategic emerging industries and make China into a leading high end manufacturing superpower as well as a centre for science and innovation. In an address to top Chinese engineers and academics in May 2018, Xi called for the “fundamental transformation of business models of the manufacturing sector and the integration of the internet, big data and artificial intelligence with the real economy so as to move China’s industries up to the middle and high end in the global value chain.”¹³²⁴

¹³²⁴ Speech by Xi Jinping to the opening of the 19th meeting of the Academicians of the Chinese Academy of Sciences and the 14th meeting of the Academicians of the Chinese Academy of Engineering, May 28, 2018. Hu Yongqi, “Xi calls for breakthrough in technology,” China Daily, May 29, 2018, available at : <http://www.chinadaily.com.cn/a/201805/29/WS5b0c5ddca31001b82571cbfe.html> (As referred from Chapter 3: China 2025 of Monograph titled “Rise of China History, Technology & Policies: Implications for India” written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi., Pg 54, available online at URL: <https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

MIC-2025 is inspired by Germany's Industry 4.0 development plan. The Chinese Academy of Engineering embraced the German concept when drafting its 'Manufacturing Superpower' report in 2013. The report served as a scientific foundation for the formulation of Made in China 2025. Following the Academy's report, the political leadership kicked off an energetic campaign in 2014. President Xi Jinping, Prime Minister Li Keqiang and Deputy Prime Minister Ma Kai made important comments on Industry 4.0 and paid and received several state visits to and from Germany revolving around cooperation on this topic.¹³²⁵ Germany's "Industry 4.0" plan, aims to establish Germany as a lead market and provider of advanced manufacturing solutions.¹³²⁶ However, there are substantial differences between MIC 2025 and Industry 4.0. Some of them are:-

- China's state subsidies are much larger and are used for many purposes, not just basic research as in Germany's plan.
- China has specific targets for replacing imports with indigenous production, which is not a feature of Industry 4.0.
- Germany's economy is far more open to foreign participation and competition than China's economy.¹³²⁷
- The difference with Germany's plan is the amount of support that the Chinese state will provide for MIC 2025 industries through state funding, tax breaks, low interest loans and other subsidies is not in public domain.¹³²⁸

Made in China 2025 -The Plan

Creating an internationally competitive manufacturing industry is the only way for China to upgrade its overall national strength, safeguard national security and build a world power. To build China into a manufacturing power that leads the development of the

¹³²⁵ "Made in China 2025: Global Ambitions Built on Local Protections," US Chamber of Commerce, 2017, p.4, Available at : https://www.uschamber.com/sites/default/files/final_made_in_china_2025_report_full.pdf (As referred from Chapter 3: China 2025 of Monograph titled "Rise of China History, Technology & Policies: Implications for India" written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi,, Pg 55, available online at URL: <https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

¹³²⁶ Industry 4.0, Available at : <https://www.gtai.de/GTAI/Navigation/EN/Invest/Industries/Industrie-4-0/Industrie-4-0/industrie-4-0-what-is-it.html> (As referred from Chapter 3: China 2025 of Monograph titled "Rise of China History, Technology & Policies: Implications for India" written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi,, Pg 55, available online at URL: <https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

¹³²⁷ . James McBride, "Is 'Made in china 2025' a Threat to Global Trade?" Backgrounder, Council on Foreign Relations, August 2, 2018, Available at : <https://www.cfr.org/backgrounder/made-china-2025-threat-global-trade> (As referred from Chapter 3: China 2025 of Monograph titled "Rise of China History, Technology & Policies: Implications for India" written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi,, Pg 55, available online at URL: <https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

¹³²⁸ "China Manufacturing 2025," European Union Chamber of Commerce in China, 2017, available at : http://docs.dpaq.de/12007-european_chamber_cm2025-en.pdf (As referred from Chapter 3: China 2025 of Monograph titled "Rise of China History, Technology & Policies: Implications for India" written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi,, Pg 55, available online at URL: <https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

world's manufacturing industry and lay a solid foundation for realizing the Chinese dream of the great rejuvenation of the Chinese nation "Made in China 2025" is the action plan for China's implementation of the first decade of the strategy of making a strong country. MIC 2025 lists out the following:

Strategic Tasks and Key Points

- To achieve the strategic goal of making a strong country, China must adhere to:-
 - The problem orientation.
 - Make overall plans.
 - Highlight key points.
 - Unite the consensus of the whole society.
 - Accelerate the transformation and upgrading of the manufacturing industry.
 - Comprehensively improve the quality of development and core competitiveness.

To achieve these tasks China should:-¹³²⁹

- Improve the innovation capability of the national manufacturing industry.
- Promote the deep integration of informationization and industrialization.
- Strengthening industrial infrastructure capabilities.
- Strengthening the construction of quality brands.
- Full implementation of green manufacturing.
- Deepen the adjustment of manufacturing structure.
- Actively develop service oriented manufacturing and production service industries.
- Improve the level of international development of manufacturing industry.
- Vigorously promote breakthrough development in key areas of:
 - A new generation of information technology industry.
 - High end CNC machine tools and robots.
 - Aerospace equipment.
 - Marine engineering equipment and high tech ships.
 - Advanced rail transit equipment.
 - Energy saving and new energy vehicles.
 - Power equipment.
 - Agricultural machinery and equipment.
 - New materials.
 - Biomedical and high performance medical devices

Concern of US Policymakers and Stakeholders

Western Critics of MIC 2025 contend that:-

- MIC 2025 will advance China's goal of integrating its defense and commercial economies, which is aimed at strengthening the country's innovation capability

¹³²⁹ Notice of the State Council on Printing and Distributing "Made in China 2025", available at :

http://www.gov.cn/zhengce/content/2015-05/19/content_9784.htm

(As referred from Chapter 3: China 2025 of Monograph titled "Rise of China History, Technology & Policies: Implications for India" written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi,, Pg 56, available online at URL:

<https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

for dual use technologies in key strategic industries, including aviation, robotics and information technology.¹³³⁰ The Pentagon warned in 2017 that state led Chinese investment in US firms working on facial recognition software, 3D printing, virtual reality systems and autonomous vehicles is a threat because such products have “blurred the lines” between civilian and military technologies.¹³³¹

- China’s ambition to control entire supply chains, some of which have potential application to military manufacturing, poses a risk that entire industries could come under Chinese control. Today only four companies are comprehensive providers of Telecommunications equipment infrastructure: Huawei, ZTE, Ericsson and Nokia. Two of those four are Chinese companies. Many other US and European companies that were producing telecom equipment folded in the last few decades.¹³³²
- Chinese government subsidies distort markets, undercut western manufacturers and result in overcapacity and the dumping of cheap products in the global market. In the case of solar panels, where government support in the form of fiscal subsidies and tax incentives to the production of Chinese solar cells and panels combined with government backed theft of intellectual property drove nearly 30 US manufacturing firms out of the business.
- The plan suggests that China’s intention is not just limited to joining the ranks of high tech economies, but rather envisages displacing them. The plan foresees the targeted industries developing in three phases to capture both domestic and international market share in many industries and technologies. They are:-
 - Localize and indigenize R&D and control segments of global supply chains.
 - After dependence on foreign technology has been reduced, proceed with substitution.
 - After Chinese technology and brands are developed, capture global market share.

¹³³⁰ Lorand Laskai, “Civil-Military Fusion and the PLA’s Pursuit of Dominance in Emerging Technologies,” China Brief, volume 18, issue 6, April 9, 2018, Available at : <https://jamestown.org/program/civil-military-fusion-and-the-plas-pursuit-of-dominance-inemerging-technologies/>
(As referred from Chapter 3: China 2025 of Monograph titled “Rise of China History, Technology & Policies: Implications for India” written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi,, Pg 58, available online at URL: <https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

¹³³¹ Paul Mozur and Jane Perlez, “China Tech Investment Flying Under the Radar, Pentagon Warns,” New York Times, April 7, 2017, available at : <https://www.nytimes.com/2017/04/07/business/chinadefense-start-ups-pentagon-technology.html>
(As referred from Chapter 3: China 2025 of Monograph titled “Rise of China History, Technology & Policies: Implications for India” written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi,, Pg 58, available online at URL: <https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

¹³³² Made in China 2025 and the Future of American Industry, Project for Strong Labor Markets and National Development, US Senate Committee on Small Business & Entrepreneurship, p. 20, Available at : https://www.rubio.senate.gov/public/_cache/files/d1c6db46-1a68-481a-b96e-356c8100f1b7/3EDECA923DB439A8E884C6229A4C6003.02.12.19-final-sbc-project-mic2025-report.pdf (As referred from Chapter 3: China 2025 of Monograph titled “Rise of China History, Technology & Policies: Implications for India” written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi,, Pg 58, available online at URL: <https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

- Establishing quotas violates WTO rules against technology substitution.
- MIC-2025 emphasises on the acquisition of advanced technology. China will buy out foreign companies as well as forced technology transfer agreements and use cyber espionage to procure cutting edge technologies.
- Together with the Plan to Enhance Standardization and Quality of Equipment Manufacturing, MIC 2025 will help China to spread Chinese standards abroad and undermine Western standards.

Chinese firms such as Huawei and ZTE are building upon their success as global leaders in key telecommunications technologies and racing to become leaders in 5G patents and network deployment.

Huawei is the world’s second-largest firm in Ethernet switches and routers based on 2017 revenue, after US telecommunications firm Cisco.¹³³³

World’s Largest Firms in Select Telecommunications Technologies, 2017

Key Technologies	Leading Firms (global market share based on revenue)
Mobile infrastructure hardware	Huawei (28 percent), Ericsson (27 percent), Nokia (23 percent), and ZTE (13 percent)
Enterprise wireless local area network (WLAN)	Cisco (43.6 percent), Aruba Networks * (14.9 percent), ARRIS/Ruckus † (5.9 percent), Ubiquiti ‡ (5.6 percent), and Huawei (5 percent)
Ethernet switches	Cisco (54.9 percent), Huawei (8.3 percent)
Routers	Cisco (36.7 percent), Huawei (23.8 percent), Juniper (18 percent)
Smartphone semiconductors	Qualcomm (42 percent); Apple (22 percent); MediaTek § (15 percent)
Note: Mobile infrastructure hardware comprises radio access network, switching and core equipment.	

Source: Rise of China History, Technology & Policies: Implications for India, Pg 60

URL: <https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>

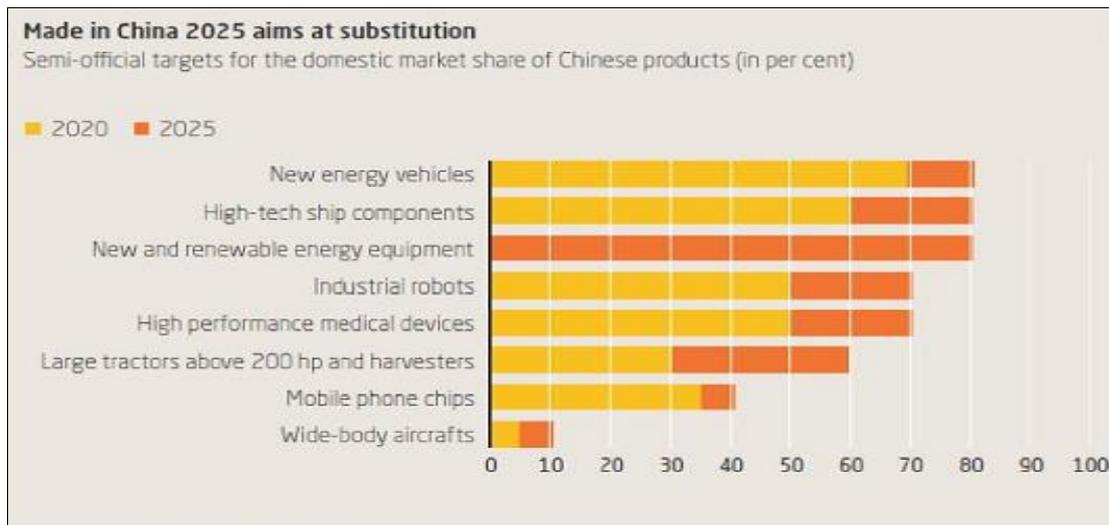
Some critics contend that such targets constitute an import substitution plan that will likely hurt foreign high technology suppliers and appears to violate World Trade Organization rules. Government support through MIC-2025 has delivered visible results.

¹³³³ 2018 Report to Congress of the US-China Economic and Security Review Commission, November 2018, available at : <http://www.uscc.gov>

(As referred from Chapter 3: China 2025 of Monograph titled “Rise of China History, Technology & Policies: Implications for India” written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi,, Pg 60, available online at URL:

<https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

Mercator Institute for China Studies has done a remarkable analysis of MIC-2025:-
1334



Source: Rise of China History, Technology & Policies: Implications for India, Pg 61

URL: <https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>

The number of Chinese patents for Industry 4.0 related technologies has grown very rapidly since 2006. Industry 4.0 is characterized by the combination of advanced internet and communication technologies, embedded systems and intelligent machines. In Cyber Physical Systems (CPS), connected machines collect massive amounts of data through smart sensors, communicate with each other and independently make decisions. These systems create and analyse big data to optimise production processes and logistics. Whereas the German term Industry 4.0 emphasises engineering, the American Industrial Internet focuses more on the software related elements of smart manufacturing.

Chinese innovation activities are particularly strong in technology fields with high political support: traditional industrial robots, wireless sensor networks and smart sensors. In contrast, Chinese innovation activities are weaker in cloud computing and big data, advanced robots and information security. China’s industrial planning is in the same line with the development strategy of other great manufacturing countries. Japan’s rise to dominance in industries from automobiles to home electronics had the backing of the Ministry of International Trade and Industry. Governments in the US and Europe funded immensely for science and technology for advancing competitiveness. Chinese officials contend that the MIC2025 plan is transparent, open and non-discriminatory. The domestic content numbers are goals, not mandates. A 2017 study by the US Chamber of Commerce concluded that “MIC 2025 aims to leverage the power of the state to alter competitive dynamics in global markets in industries core to economic competitiveness.

¹³³⁴ Jost Wübbeke et al, Made in China 2025, The making of a hightech superpower and consequences for industrial countries, December 2016 available at :

https://www.merics.org/sites/default/files/2017-09/MPOC_No.2_MadeinChina2025.pdf

(As referred from Chapter 3: China 2025 of Monograph titled “Rise of China History, Technology & Policies: Implications for India” written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi,, Pg 61, available online at URL:

<https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

By targeting and channelling capital to specific technologies and industries, MIC 2025 risks precipitating market inefficiencies and overcapacity, globally.”¹³³⁵

What stands out in the case of China’s 2025 plan are three factors:-

- Scale of government support. With investments from central and local government, state banks and state enterprises, funding for China 2025 is considerable.
- Testing the limits of fair competition. A report released in March 2018, by the US Trade Representative accused that China isn’t playing fair. The 215 page document concludes that China is deploying a well-financed strategy to “displace” foreign companies and “undermine the global trading system.”
- China’s size and politics. Taiwan, South Korea and even Japan could transform themselves into industrial powerhouses without testing the global balance of power. China, with its population of 1.4 billion, has the ability to overtake the US as the world’s biggest economy. China will challenge the global order as it becomes the economic leader.¹³³⁶

Strengths and limitations of Made in China - 2025

Key Findings:

- Major strengths of MIC 2025 are its mobilization capacity, long term planning, generous funding, local experimentation and strong local initiatives.
- Mismatch between political priorities and industry needs, the fixation on quantitative targets, inefficient allocation of funding and overspending by local governments are some of the major weaknesses.
- The overall downward pressure on China’s economy, the possible effects of upgrading on the labour market and the shortage of skilled labour, is likely to diminish the effectiveness of the policy.
- MIC-2025 will not lead to wide ranging industrial upgrading nor will it create a broad based industry of tech suppliers within the next decade.
- However, the initiative will succeed in building a small, highly competitive group of manufacturers and tech suppliers of smart manufacturing, significantly enhancing China’s economic competitiveness in domestic and global high technology markets.

¹³³⁵ Made in China 2025 : Global Ambitions Built on Local Protections, A study by the US Chamber of Commerce, Available at :

https://www.uschamber.com/sites/default/files/final_made_in_china_2025_report_full.pdf

(As referred from Chapter 3: China 2025 of Monograph titled “Rise of China History, Technology & Policies: Implications for India” written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi,, Pg 62, available online at URL:

<https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

¹³³⁶ Made in China 2025 Explanation 6: The Manufacturing Power ‘Three-Step’ Strategy, Ministry of Industry and Information Technology, May 19, 2015, available at :

<http://www.miit.gov.cn/%20n1146295/n1146562/n1146655/c3780688/content.html>

(As referred from Chapter 3: China 2025 of Monograph titled “Rise of China History, Technology & Policies: Implications for India” written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi,, Pg 63, available online at URL:

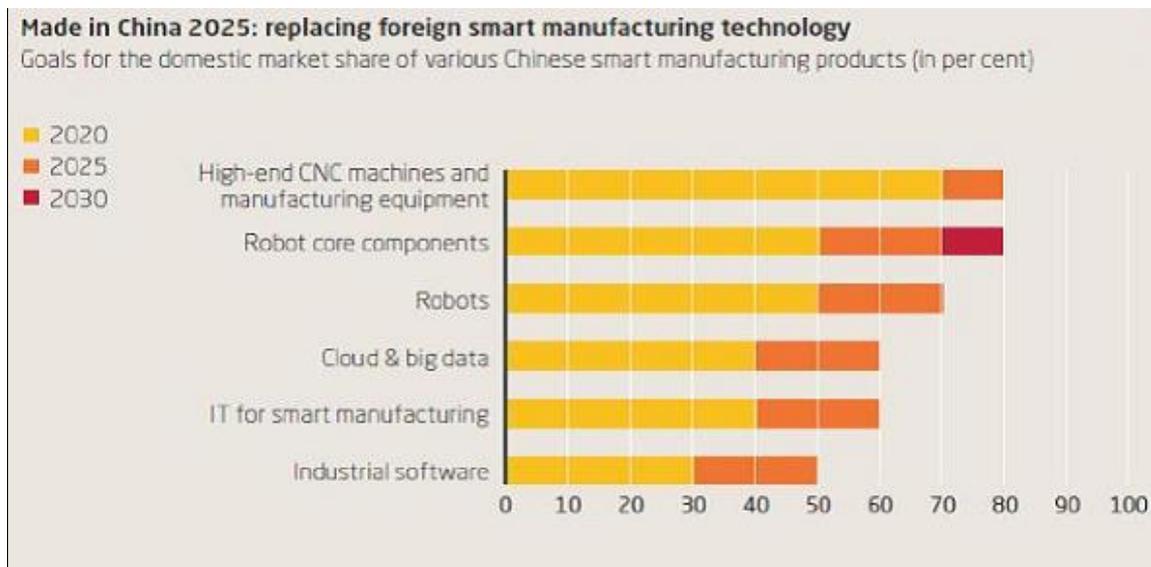
<https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

Manufacturers - A small but growing group of front runners will challenge the industrial countries:

- Made in China 2025 will have different effects on different enterprises: China will have frontrunners, hopefuls and latecomers in the use of smart manufacturing.
- A small number of frontrunners will become highly competitive on the world market. The frontrunners upgrade their processes out of their interest, but policy is important in accelerating their efforts.
- The policy will have the biggest impact on the hopefuls. This group of enterprises operates at a less advanced level but will move to upgrade production to the next level if provided with the right incentives.
- The hopefuls' success or failure will depend on effective policy implementation.
- The development of the group of hopefuls will determine China's competitiveness in smart manufacturing in the medium term.

Chinese tech suppliers: lagging behind but rising:

- Several Chinese tech suppliers will be propelled forward by China's smart manufacturing initiative. They will bridge the technology gap and become serious domestic and international competitors in fields such as robotics, industrial software and 3D printing.
- The pace and degree to which Chinese tech suppliers will become competitive depends largely on the effectiveness of the initiated policy activities.

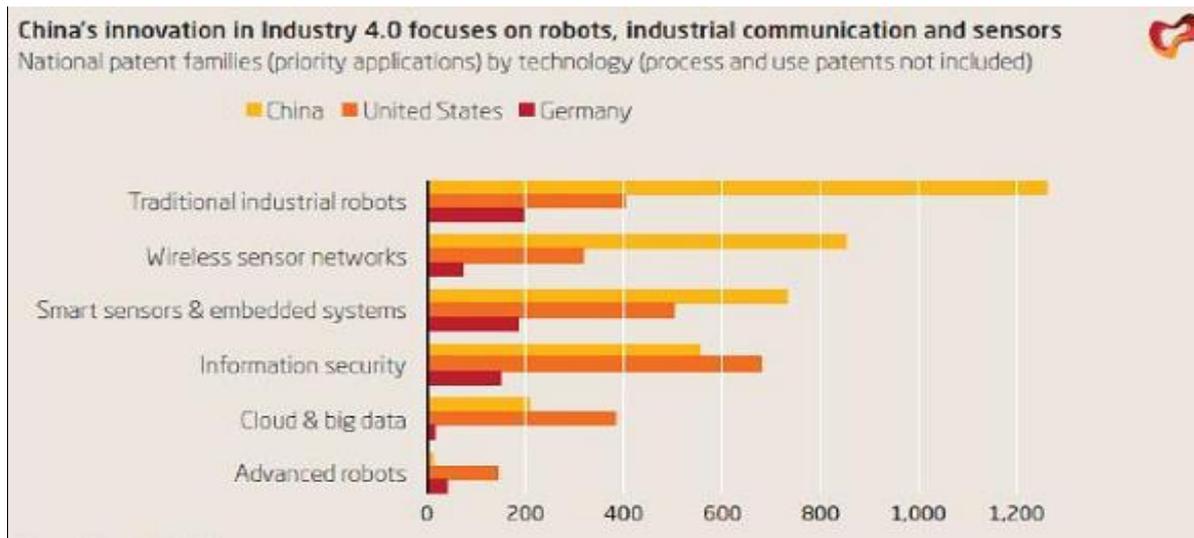


Source: Rise of China History, Technology & Policies: Implications for India, Pg 65

URL: <https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>

- A significant technology gap still exists. Foreign suppliers currently benefit from China's smart manufacturing boom. However, they need to be prepared to see their market opportunities and shares dwindle swiftly within the next ten years.
- The pace of technological catch up and intensifying competition varies markedly by technology. The competitiveness of Chinese companies will develop more rapidly in some areas than in others.

- The Chinese ambitions will lead to an increase of technology seeking FDI and knowledge acquisitions. Chinese enterprises, spurred by political targets, support and incentives, will seek to accelerate their technological catch up through strategic technology investments abroad.
- The Chinese government aims to close the technology gap between Chinese and foreign suppliers and to substitute foreign with Chinese technology by 2025. The envisioned market shares for Chinese products and brands in the MIC-2025 'Key Area Technology Roadmap' demonstrate the ambitious political goal of reducing the market share of international technology suppliers.



Source: Rise of China History, Technology & Policies: Implications for India, Pg 66

URL: <https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>

An updated version of the plan released in January 2018 said China aimed to become the world's leading manufacturer of telecommunication, railway and electrical power equipment by 2025 and that China's robotics, high end automation and new energy vehicles industries would globally rank second or third by 2025. In an interview on November 3, 2017, US Trade Representative Robert Lighthizer stated that China's MIC-2025 initiative was "a very, very serious challenge, not just to us, but to Europe, Japan and the global trading system." The United States Trade Representative's (USTR) 2017 annual report on China's WTO compliance stated that MIC2025 differed from industry support by other WTO members in the level of ambition and scale of resources dedicated to obtaining its goals. The USTR report warned that "even if the Chinese government fails to achieve the industrial policy goals set forth in Made in China 2025, it is still likely to create or exacerbate market distortions and create severe excess capacity in many of the targeted industries."

Is MIC-2025 Under Review?

After the United States imposed tariffs on China, Beijing dropped references to MIC-2025 in official documents and media. Chinese officials are saying that they are drafting a replacement for MIC-2025 that would play down the goal of making China the dominant global manufacturer and attempt to assuage US concerns by opening up the Chinese plan

to participation by foreign companies. Though no new policy has been announced media reports suggested that the new policy would be rolled out in 2019.¹³³⁷

Given the close linkages between MIC-2025 and Xi Jinping's staged plan for national rejuvenation, it is unlikely that substantial changes will be made. Explicit parts of MIC 2025, such as the numerical targets for market share by Chinese companies, are likely to be removed from the public version of the program.

The State Council updated a piece of **information** on **Apr 29,2020** titled **"Solid progress made in China's three pilot FTZs"** mentioned that China's pilot free trade zones (FTZ) in provincial-level regions of Guangdong, Tianjin and Fujian have made various innovative achievements since their establishment in 2015, according to the Ministry of Commerce. A total of 398 reform pilot tasks in the overall plan have been basically implemented, Tang Wenhong, an official with the ministry, told a news conference on April 28.

During the past five years, the three FTZs have carried out trail-blazing reforms, including the implementation of the pre-establishment national treatment with a negative list, "single-window" in international trade, as well as the reforms of the business registration, investment management and electricity systems. "Institutional innovations have greatly optimized business environment and stimulated market vitality," Tang said, "Since their establishment, actual utilization of foreign capital in the three pilot free trade zones has grown by an average of about 15 percent annually."

In the meantime, The pilot FTZs have further opened up the financial sector to facilitate enterprises in financing, which effectively boosted the real economic development, the official said. A highly-effective system for risk prevention and control was also formed between the FTZs. With cross-sectoral collaborative monitoring in key areas, no regional or systemic risks occurred in the three pilot zones since 2015, according to Tang. Amid the COVID-19 outbreak, the country has taken multiple measures to help the enterprises resume work. By now, enterprises each with an annual output value of at least 20 million yuan (\$2.83 million) in pilot free trade zones have fully restored operation, said Tang. Tang also noted that China will be more open and transparent for market access and will create a business-friendly environment with more preferential policies to provide more support to foreign companies for their development in the country's 18 pilot FTZs.¹³³⁸

China Daily news item titled **"Nation to step up building of free trade zones"**, updated on **Apr 04,2020** mentioned that China will continue to accelerate development of free

¹³³⁷ Lingling Wei and Bob Davis, "China Prepares Policy to Increase Access for foreign Companies," The Wall Street Journal, December 12, 2018, Available at : <https://www.wsj.com/articles/china-ispreparing-to-increase-access-for-foreign-companies-11544622331>

(As referred from Chapter 3: China 2025 of Monograph titled "Rise of China History, Technology & Policies: Implications for India" written by Maj Gen P K Mallick, VSM (Retd.) published by Vivekananda International Foundation (VIF) in 2019, New Delhi,, Pg 67, available online at URL: <https://www.vifindia.org/sites/default/files/rise-of-china-history-technology-policies-and-implications-for-india.pdf>)

¹³³⁸ Excerpts from The State Council updated a piece of information on Apr 29,2020 titled "Solid progress made in China's three pilot FTZs", available online at URL: http://english.www.gov.cn/statecouncil/ministries/202004/29/content_WS5ea8b472c6d0b3f0e94969d2.html

trade zones with more incentive policies to encourage foreign investment this year, in a bid to promote high-level opening-up, according to the Ministry of Commerce.

The ministry released a notice on April 3, reiterating the resolution to stabilize foreign trade and investment as the COVID-19 pandemic has posed severe challenges to the global economy. It said market access for foreign capital will be continuously widened by shortening negative lists that identify sectors where foreign capital is restricted, and expanding the catalogue of industries where foreign investment is encouraged. Manufacturing, high-tech, energy conservation and environmental protection, as well as service industries are some of the fields expecting to attract more foreign investors. Pilot free trade zones should play a bigger role in pioneering opening-up backed by more policies benefiting foreign trade. Development of the Hainan Free Trade Port will be boosted, it said. Dong Debiao, general manager of global auditing and consulting firm Deloitte China's Hainan office, said the Hainan Pilot Free Trade Zone boasts a vast market that will facilitate the company's innovative projects. Encouraged by favorable government policies, in January the firm established its Hainan regional headquarters in Sanya, a coastal city in Hainan. In addition to Deloitte, a number of multinationals such as Coca-Cola, GLP Group and Temasek Holdings have invested in the Hainan FTZ.

Dong said Deloitte would provide professional services to support the development of the Hainan FTZ and free trade port in fields including creating a world-class business environment, carrying out global investment cooperation and improving government service capabilities. Wei Jianguo, vice-president of the Beijing-based China Center for International Economic Exchanges, said in order to adapt to the changes brought by the COVID-19 pandemic, it is significant for China to take a lead in constructing the free trade zones that play a key role in attracting foreign investment, especially big-ticket projects. "Many foreign investors will pay more attention to China's overall institutional advantages, as the country has done well in virus control," Wei said, adding that China's effective measures proved that the market is the best place to protect foreign investment.

Zhang Yansheng, a senior researcher with the China Center for International Economic Exchanges, said since the introduction of reform and opening-up, China has been ramping up efforts to liberalize market access for foreign companies, and significantly improve the country's investment environment. Opening the economy wider is conducive to protecting the legitimate interest of foreign companies and to stabilizing foreign investment, Zhang said. According to the notice, the ministry urged efforts to facilitate resumption of work at foreign companies with targeted measures to address their difficulties, and further advance major foreign-invested projects. It also stressed innovative methods to attract foreign capital such as through major fairs and exhibitions and online channels, optimizing the business environment and government services.¹³³⁹

Xinhua Net updated news on **Jan 17, 2020** titled “**China's Jiangsu pilot free trade zone aims for high-quality opening-up**”, which reported that the Suzhou area of the Jiangsu Pilot Free Trade Zone in eastern China will establish a financial fund totaling 12 billion Yuan (around \$1.7 billion) to push forward high-level opening-up.

¹³³⁹ Excerpts from China Daily news item titled “Nation to step up building of free trade zones”, updated on Apr 04, 2020, available online at URL: http://english.www.gov.cn/statecouncil/ministries/202004/04/content_WS5e87c36cc6d0c201c2cc01f7.html

The fund will provide up to 66 million Yuan for newly introduced financial institution headquarters for the use of start-up capital, office construction and talent introduction, according to statistics released at a news conference held in the Suzhou Industrial Park on Jan 16. The move aims to bring in three corporate financial institutions and 30 functional headquarters of financial institutions, promoting the landing of 300 high-quality scientific and technological innovation projects, said Liu Xiaomei, deputy director of the Suzhou Industrial Park Administrative Committee. The Suzhou free trade zone will also invest more than 3 billion Yuan to bolster the high-quality development of the service sector. The newly settled high-quality service enterprises will be granted up to 22 million Yuan start-up capital. Since its founding in September 2019, the Suzhou free trade zone has seen the registered capital of newly invested domestic enterprises exceed 16.8 billion Yuan and contract foreign investment reach \$646 million. In August, China announced a master plan for six new pilot free trade zones in a strategic move to press ahead with reform and opening-up in the new era. Propelling innovation and development of the manufacturing industry marks one of the goals for the pilot FTZ in Jiangsu, a vibrant manufacturing hub in the east.¹³⁴⁰

China Daily News updated on **Jan 14, 2020** titled “**Guangdong FTZ pushes ahead with greater opening-up, foreign investment**” mentioned that China (Guangdong) Pilot Free Trade Zone has proved itself a top destination for foreign investment with its ever-improving business environment and deepening reform and opening-up efforts creating more opportunities for businesses. The FTZ in Guangdong province was officially launched in April 2015. Covering a total area of 116.2 square kilometers, it is composed of three major parts: Nansha in Guangzhou, Qianhai and Shekou in Shenzhen, and Hengqin in Zhuhai.

All the three parts demonstrated strong growth in foreign investment last year. In August 2019, French nutrition giant Danone opened its first cross-border e-commerce warehouse in the Chinese mainland in Nansha, allowing its products ordered online to be shipped directly from its overseas factories to China. It was an important development in Nansha becoming an international distribution center. The warehouse will save logistics and storage costs for Danone, more efficiently connect with e-commerce channels in China and better serve Chinese consumers, according to the company. It took just five months for the warehouse to go from project preparation and construction to completion and opening, according to the management of the FTZ. In October, it was decided the Guangzhou Futures Exchange would be located in Nansha with an expected registered capital of 3 billion yuan (\$432.8 million). It will be the fifth futures exchange in the Chinese mainland and the first approved by the China Securities Regulatory Commission in 26 years. In November, Nansha International Cruise Home Port began operating. It is the largest cruise terminal in China and can berth the largest cruise liner in the world. In the Qianhai-Shekou area, official figures indicate a total of 12,611 foreign-funded companies have been approved since April 2015. The area attracted some \$3.76 billion in foreign investment from January to November 2019, accounting for 18 percent of the province's total, according to official statistics. Hengqin, which mainly serves the development of Macao, attracted 745 newly registered companies from the special administrative region last year. The total number of Macao-funded companies in Hengqin reached 2,157 by Dec 16, 2019, with an accumulative investment of \$18.8 billion.

¹³⁴⁰ Xinhua Net updated news on Jan 17, 2020 titled “China's Jiangsu pilot free trade zone aims for high-quality opening-up”, available online at URL: http://www.xinhuanet.com/english/2020-01/17/c_138713629.htm

As a whole, about 42,600 companies were added to the Guangdong FTZ from January to November in 2019. About \$6.84 billion in foreign investment had been utilized during the period, up 22 percent from a year ago. The sum of utilized foreign investment accounted for more than 30 percent of the province's total. As a domestic leader in attracting foreign investment in the modern services and advanced manufacturing industries, the Guangdong FTZ has welcomed many quality projects. They include the country's first fund and securities company controlled by foreign capital, the first wholly-foreign-funded ship management company, the first foreign-funded mutual insurance company and the first foreign-funded bulk commodity trading platform. The FTZ has been one of the areas in China with the best performance in terms of opening-up. It has attracted a large number of foreign industrial leaders, including JP Morgan Futures, HSBC, Siemens and Maersk. Many large domestic companies have also located their international, regional or functional headquarters in the FTZ, including China COSCO Shipping, China Communications Construction and China Railway Construction. After more than four years' development, the Nansha area of the Guangdong FTZ mainly focuses on the five industries of shipping and logistics, high-end manufacturing, finance, technological innovation, and health and life sciences. The Qianhai-Shekou area has an emphasis on finance, modern logistics, information services and technological services, and Hengqin focuses on tourism, financial services, culture, science and high technology.

Business environment

A report released by global auditor KPMG in April 2019 said that the business environment in the Guangdong FTZ is excellent, especially when it comes to starting a business, power acquisition and contract enforcement, and ranks among the top 15 globally. The report looked at the World Bank's ease of doing business indexes, a system it used to assess business environment across 190 economies and selected cities. The Guangdong FTZ has also performed well in terms of cross-border trade, taxation and access to loans, according to KPMG's report. To further improve the business environment, the management of the FTZ said optimization will continue in terms of making it easier for companies to attain business registrations and construction permits, carry out cross-border trading and pay taxes more efficiently.

For example, customs will further cut import and export clearance time to improve the efficiency of cross-border trading, according to the FTZ's management. The FTZ also plans to set up express services for companies from Hong Kong and Macao to pay taxes and register real estate. "The Guangdong FTZ has a special and irreplaceable position," said Wei Jianguo, former vice-minister of commerce. "I am optimistic that Guangdong will play a leading role in quality development in the next five years as its FTZ can make more breakthroughs." He said Guangdong has a unique advantage in its manufacturing industry, forming the most sophisticated industrial chain in China. This will provide a strong base for its FTZ to achieve a deep integration of high-end manufacturing with modern services.¹³⁴¹

¹³⁴¹ Excerpts from China Daily News updated on Jan 14, 2020 titled "Guangdong FTZ pushes ahead with greater opening-up, foreign investment"

http://english.www.gov.cn/news/topnews/202001/14/content_WS5e1d21bbc6d0891feec022c0.html

Xinhua Agency News item updated on **Aug 30, 2019** titled **“China's new FTZs inaugurated to push forward opening-up”** mentioned that China's new pilot free trade zones (FTZs) were inaugurated on Aug 30, in a bid to press ahead with reform and opening-up. South China's Guangxi Zhuang autonomous region held a pilot FTZ unveiling ceremony in Nanning, the regional capital, on the morning of Aug 30. The Guangxi pilot FTZ aims to step up cooperation with the ASEAN region. The total area of Guangxi's pilot FTZ is nearly 120 sq km, covering areas of Nanning, Qinzhou Port and Chongzuo. According to the regional government, Guangxi's pilot FTZ will focus on modern financial services, smart logistics, digital economy, emerging manufacturing industries, port shipping logistics, international trade, components of new energy vehicles and cross-border tourism.

According to a master plan released by the State Council on Aug 26, the six new pilot FTZs are located in Shandong, Jiangsu, Guangxi, Hebei, Yunnan and Heilongjiang, bringing the total number of the country's pilot FTZs to 18. Neighboring Yunnan province also announced the inauguration of its pilot FTZ on Aug 30. Yunnan's pilot FTZ covers parts of Kunming, the provincial capital, Honghe Hani and Yi autonomous prefecture and Dehong Dai and Jingpo autonomous prefecture.

Wang Guangfu started his business in Dehong, which borders Myanmar, in 2000. Wang's company launched an online wholesale platform in 2017, providing services to more than 6,600 Myanmar retailers and developed a mobile phone shopping application for individual customers. "I look forward to seeing the implementation of policies related to the pilot FTZ, which will promote the development of export-oriented industries," said Wang, who attended the inauguration. A total of 28 enterprises announced at the ceremony their intention to settle in the Kunming FTZ area. With a total investment of 5.46 billion yuan (\$763.6 million), the enterprises cover industries including warehousing and logistics, biology, information, new energy technologies and import and export.

According to the plan, the pilot FTZ of Shandong province in East China will feature new measures to nurture new businesses, develop the marine economy and explore China-Japan-Republic of Korea economic cooperation at the sub-national level. The Shandong pilot FTZ covers three areas as well, including Jinan, the provincial capital, and coastal cities of Qingdao and Yantai. Zhang Deping, director of the Department of Commerce of Shandong province, said the core of the pilot FTZ will be institutional innovation. Innovative exploration will be carried out in fields such as business environment, investment and trade facilitation, the opening-up of the financial sector, science and technology, marine economic development, as well as the cooperation model of China-Japan-Republic of Korea. Qingdao's World Jaguar Logistics Inc was established in 2000. The company focuses on multi-modal transportation, warehouse and logistics, cross-border e-commerce and customs declaration. "The establishment of the pilot FTZ will bring more supervision and convenience of operation to our company, effectively reduce costs and enhance the international competitiveness of import and export enterprises in the zone," said Wu Shaoyong, president of the company. Situated in the northernmost province of China, the Heilongjiang pilot FTZ will feature the all-around revitalization of the north-eastern regions, Sino-Russian exchange and cooperation, and the opening up and cooperation in Northeast Asia.

The Hebei pilot FTZ covers parts of Xiongan, Zhengding, Caofeidian and the area where the Beijing Daxing International Airport is located. The Xiongan section will focus on industries including new generation information technology, modern life science and biotechnology, and high-end modern service. It will build a leading area for high-tech industries, digital commerce and financial innovation.

The Jiangsu pilot FTZ is composed of three sections. Among them, the Nanjing section will focus on building an independent innovation pilot area; the Suzhou section will promote opening up and innovation; and the Lianyungang section will work to build a Eurasian international transportation hub and a platform for exchanges and cooperation among Belt and Road countries.

China started piloting FTZs in Shanghai in 2013. The country had established 11 more in its coastal regions including Guangdong and Fujian and inland provinces such as Shaanxi and Sichuan. With the new zones, China's pilot FTZs now covers all the country's coastal provincial-level regions. It is also the first time that the country has set up pilot FTZs in border regions.¹³⁴²

8.7 Specific Areas of R&D

8.7.1 Agriculture

Chapter 20 “Improve Technology and Equipment and Increase Information Technology Application in Agriculture” under Part IV “Agriculture Modernization” of the 13th Five-Year Plan for Economic and Social Development of The People’s Republic of China (2016–2020):

With the aim of raising agricultural productivity, we will improve systems for promoting innovation in and the application of modern agricultural science and technology, accelerate agricultural mechanization, strengthen the integration of information technology into agriculture, and develop intelligent agriculture.

8.7.1.1 Section 1 Agricultural Technology and Equipment

We will strengthen innovation in agricultural science and technology and accelerate work on developing bio-breeding, agricultural machinery and equipment, and eco-friendly methods for increasing production. We will promote the use of high yield, high-quality crop breeds suited to mechanized agriculture as well as standardized and localized models of high-yield and high-performance cultivation, and we will improve the conditions for making innovations in major agricultural laboratories. We will develop the modern seed industry, tackle key scientific and technological issues to make progress in the development of superior seed varieties, implement a new action plan for upgrading crop varieties, develop national seed breeding and production centers, and help the growth of leading seed enterprises using integrated cultivation breeding-promotion operations. We will promote complete mechanization of the production process of major crops as well as the integration of agricultural machinery and methods. We will improve

¹³⁴² Xinhua Agency News item updated on Aug 30, 2019 titled “China's new FTZs inaugurated to push forward opening-up” available online at URL:

http://english.www.gov.cn/news/topnews/201908/30/content_WS5d68e0c2c6d0c6695ff7f88f.html