Strategic Plan of "Made in China 2025" and Its Implementation

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EXECUTIVE SUMMARY:

The US has introduced a package of policies and specialized plans to reinvigorate its manufacturing industry by revolving around "reindustrialization". Besides, it has put forward "A National Strategic Plan for Advanced Manufacturing", aiming at strengthening advantages of its technology-intensive advanced manufacturing industry. German is implementing "Industry 4.0" policy. Japan has a different focus. By releasing "New Robot Strategy", Japan attempts to accelerate development of cooperative robots and unmanned plants to revolutionize the robot industry, cope with aggravation of Japanese social and economic issues, and enhance international competitiveness of Japan's manufacturing industry. As to France with "New Industrial France" promoted, layout optimization of the manufacturing industry is more important. UK, however, is invigorating its manufacturing industry through the "high-value manufacturing" strategy, and the strategy has so far entered Phase II. South Korea, a neighboring country of China, has put forward the "advanced innovators' strategy" so as to promote mutual integration between the manufacturing industry and information technology, create new industries, and scale a new high for its manufacturing competitiveness. China is no exception; thus this article provides a comprehensive analysis of "Made in China 2025" strategic plan as well as its implementation. This article provides new insights to practitioners in manufacturing industries, with guidelines to benefit the decision making processes. Moreover, we also would like to enrich the academic literature by extending the focus of advanced manufacturing topics from advanced economics to emerging market perspective. Doing so also gives both practitioners and academia an open discussion on the newly formulated national policies of advanced manufacturing in a broader scope of countries.

Keywords: Made in China, transforming, upgrading, information technology, manufacturing industry, advanced manufacturing, industry evolution, national strategy

1.“MADE IN CHINA 2025”

1.1 Development and Status of China’s Manufacturing Industry

From the start of the Industrial Revolution, the manufacturing industry has been an essential part of economy. China’s manufacturing industry embarked on the path of development after China’s adoption of the reform and opening-up policy in 1978. Its development generally includes three periods, namely period of recovery, period of emergence of private economy and foreign-invested manufacturing industry, and period of marching towards the international market (Wübbeke, Meissner, Zenglein, Ives, & Conrad, 2016).

The first period lasted from 1978 to the late 1980s. It was a period witnessing revival of China’s manufacturing industry. Before this period, China had built a relatively complete manufacturing system according to the planned economy system of the former Soviet Union, which was mainly devoted to production of industrial products, thus resulting in lack of consumables. In the coming one decade after China’s adoption of reform and opening-up policy, China’s manufacturing industry gradually made a comeback, marked by entry of domestically-made electronic products and light industrial products into the market. Televisions, washing machines and refrigerators could almost be found in every Chinese household. There were more options for dressing of Chinese. Consumables especially foods gradually enriched. During this period, state-owned enterprises (SOEs) were without doubt a pioneering force of China’s manufacturing industry. Some military industrial enterprises started producing products for civil use. However, short supply was still a striking characteristic of China’s consumption market in this period.

The second period mainly referred to the whole 1990s. It was a period when the private enterprises and foreign-invested manufacturing industry emerged. Especially benefiting from appearance of private enterprises, establishment of special economic zones and stock markets, and launch of commercial housing, China’s planned economy was transformed into market-oriented economy. Gradually, oversupply rather than short supply became a dominant characteristic of China’s consumption market. The market-oriented economy along with the increasing degree of opening of the coastal areas contributed to flourishing of private economy and gained competitive advantage for it. During the period, a large number of management and technical personnel working in SOEs quit their jobs and started their own business. In addition, many SOEs, failing to get adapted to market changes because of weak awareness of competition, suffered serious losses in the market. The glory of time-honored brands held SOEs disappeared. Moreover, different kinds of industrial parks were set up in China. The huge potential of the Chinese market attracted many foreign-invested manufacturing enterprises to base themselves in China. Thanks to foreign-invested enterprises and joint ventures, advanced design and manufacturing techniques for industrial and consumption products were introduced from foreign countries. During this period, emergence of private economy and foreign investments fueled rapid development of the manufacturing industry in China’s coastal areas. The gap between inland China and China’s coastal areas started widening in terms of the manufacturing industry and even the regional economic power.

The third period lasts from the early 21st century to present. It is a period when China’s

manufacturing industry marches into the international market. In 2001, China entered the WTO. Foreign investments flooded into China, capitalizing on opening of the Chinese market to foreign competitors (Xia, 2017). Many of these foreign investments have been developed into today's tens of thousands of manufacturing enterprises either being joint ventures or being foreign-invested. Export-oriented manufacturing enterprises located in China's coastal areas give full play to their cost advantage to handle OEM orders from the developed countries. Gradually, China becomes the production outsourcing base of the international manufacturing industry. "Made in China" starts gaining popularity in the global market as a brand of Chinese products. The cost advantage of these coastal enterprises is derived from the gathering of surplus labor and industries. Apart from the cost advantage, China's infrastructure construction and Internet development have also contributed to thriving of the manufacturing industry. Acceleration of government input in infrastructure construction, notably railways, high-speed highways and communication facilities, has led to spreading of urbanization. On the other hand, infrastructure consumption and rising of the consumption level increase the demand for raw materials, industrial products, and consumables. Thanks to burgeoning of the shipping, tool machine, automobile, engineering machinery, electronics and communications, and steel industries, the whole manufacturing industrial chain has been updated. Development of IT represented by Internet is an important driving factor of the manufacturing industry. Information systems, such as ERP, PLM, CRM and SCM, are widely used among Chinese enterprises to facilitate e-commerce. During the period, China's industrial product and consumable market has been fully transformed from the seller-oriented market into the buyer-oriented market. Internationalization of the manufacturing market, on the one hand, enriches product categories. On the other hand, it intensifies market competition. Following entry of China into the WTO, China's manufacturing industry has also quickly integrated itself into the global economy. With skyrocketing of international trade volume, China is gaining more and more trade surplus. The local excellent manufacturing enterprises, such as Lenovo, Haier and Huawei, keep expanding their business on a global scale.

1.2 "Made in China 2025"

After decades of development, Chinese manufacturing industry needs a new strategic plan to cope with the current situation. Consequently, the State Council issued "Made in China 2025" on May 8, 2015 to transform China from a manufacturing giant into a world manufacturing power. The plan, endorsed by Premier Li Keqiang, is the country's first action plan focusing on promoting manufacturing.

1.2.1 Strategic goals.

"Made in China 2025" plan proposes a "three-step" strategy of transforming China into a leading manufacturing power by the year 2049 in line with the basic guideline of "innovation-driven, quality first, green development, structurally optimizes and human-oriented" and the basic principle of "market orientation, government guidance, focus on the present, look into the future, overall promotion, key breakthroughs, independent development, opening and cooperation" (Liu, 2016; Li, 2017; Zhang, Peek, Pikas, & Lee, 2016). . The first step is to develop from a manufacturing giant into a manufacturing power by 2025. The second step is to reach the medium level of the world manufacturing powers by 2035. The third step is to further

consolidate China's position as a manufacturing power and list China's comprehensive manufacturing strengthen into the world's top list by 2049.

1.2.2 Priorities.

Revolving around the strategic goal of being a manufacturing power, "Made in China 2025" plan identifies nine tasks as priorities: 1) Improving manufacturing innovation; 2) Integrating information technology and industry; 3) Strengthening the industrial base; 4) Fostering Chinese brands; 5) Enforcing green manufacturing; 6) Promoting breakthroughs in 10 key sectors, including new information technology, numerical control tools and robotics, aerospace equipment, ocean engineering equipment and high-tech ships, railway equipment, energy-saving and new energy vehicles, power equipment, new materials, biological medicine and medical devices, and agricultural machinery; 7) Advancing restructuring of the manufacturing sector; 8) Promoting service-oriented manufacturing and manufacturing-related service industries; and 9) Internationalizing manufacturing.

"Made in China 2025" plan adopts intelligent manufacturing as the major area for it to make a breakthrough. To further promote intelligent manufacturing, China will set up intelligent plants and digitalized workshops as pilot projects in major fields; speed up applications of advanced manufacturing techniques and equipment, including human-machine intelligent interaction, industrial robots, intelligent logistics management and additive manufacturing, to the production process; promote simulation optimization, digital control, status information real-time monitoring and self-adaptive control of the manufacturing process. Besides, efforts will be made to fasten promotion and application of the product whole-life cycle management, customer relationship maintenance and supply chain management system; boost integration of key links, including group control and management, design and manufacturing, production-supply-marketing, business and finance; and realize intelligent control and management.

1.2.3 Guarantee systems.

"Made in China 2025" proposes achieving breakthroughs of key breakthroughs restricting development of China's manufacturing industry via government guidance, resource integration and five major projects, including construction of the National Manufacturing Industry, intelligent manufacturing, strengthening of the industrial basis, green manufacturing, and high-end equipment innovation. All these efforts made can also contribute to improvement of overall competitiveness of China's manufacturing industry. In order to realize the above objectives, "Made in China 2025" points out the necessity of deepening institutional reform, creating a market environment featuring fair play, improving financial support policies, reinforcing financial and tax policy support, building a multi-level talent training system, introducing more policies to support development of medium, small and micro-sized enterprises, further expanding opening of the manufacturing industry, and completing the organization and implementation mechanism. It is also emphasized that various central departments and local governments should realize significance of building a manufacturing superpower, strengthen their organization and leadership, improve their work mechanism, study and formulate specific implementation plans, detail policy measures, and guarantee implementation of various tasks. Under the background, local governments should launch policies to promote upgrade and

transformation of the manufacturing industry in line with regional characteristics.

1.3 Advantages and Challenges of China's Manufacturing Industry

Over the past decades, China has shaped a firm domestic market with a complete range of sectors, and an independent and complete manufacturing system. Along with rapid development of China's economy, "Made in China" has been active in the global market, forging its own advantages (Tourk & Marsh, 2016). However, there is no doubt that China's manufacturing industry still has a long way to go.

1.3.1 Advantages.

Up to 2017, the advantages of China's manufacturing industry can be summarized as follows.

1) China has a complete industrial system. There are 39 large-scale industries, 191 medium-scale industries, and 5252 small-scale industries in China. It is apt to say that China is the country with the most complete range of industrial classification in the world. The unparalleled industrial system including almost every sector enables China to compete in almost every field of industrial products, ranging from fashion and shoes to airplanes, from raw materials and minerals to machine tools. This provides an important source of competitiveness for China, and lays the foundation for China's industrial upgrade.

2) China is the world's largest consumption market. This guarantees transformation and upgrade of China's manufacturing industry. In 2015, China's retail sales accounted for nearly 20% of the global total, contributing nearly 37% to global industrial growth. As a contrast, Europe and North America together just contributed less than 5%. The sharp contrast indicated a strong vigor and growth potential of China's retail market. Benefiting from years of high-speed growth, China's online retail market scale increased to 3.8 trillion RMB, registering a year-on-year increase of 36.2% (Yang, Li , & Liu, 2015). Its percentage in the global online retail market and contribution rate were 35% and 46%, respectively. The impressive performance listed China on the top of the global online retail market. An expanding consumption market usually indicates a growing demand, and the growing demand can create a favorable condition for transformation and upgrade of the manufacturing industry.

3) China has the world's largest industrial labor resources. A large population and abundance of labor resources—these are a part of China's basic national conditions. Since popularization of the nine-year compulsory education system in 2000, the educational level of Chinese has achieved a significant improvement. The sharp increase of the popularization rate of senior high education and the strengthening of occupational education have led to popularization of higher education. Since 2011, governments at all levels have fully implemented the "National Medium-and Long-term Educational Reform and Development Programme (2011~2020)", and remarkable achievements have been achieved especially in terms of giving priority to development of education, promotion of education equality, balanced development of compulsory education and preschool education reform. The balance between education supply and demand has fostered abundant industrial labor resources.

4) China has increased its input for basic R&D to boost update of its manufacturing industry.

Competitiveness of the manufacturing industry is mainly reflected as innovation. China is a country pursuing innovation for a long time. In 2015, the national R&D input totaled at 1.4 trillion yuan, an increase of 38.1% over 2012. From 2012 to 2015, China's R&D input maintained an annual growth of 11.4%. If calculated by the exchange rate, China's R&D spending has well exceeded that of Germany and Japan to be the second largest R&D investor, just after the US. In the future, increasing R&D input of China will keep on promoting technological innovation and upgrade of the manufacturing industry.

5) China's regional development policies guarantee industrial completeness during the transformation process of the manufacturing industry. Industrial development policies vary in different parts of China. This lays the foundation for formulation of a nationwide industrial layout in China. Comparatively, development of China's manufacturing industry is the fastest in China's southeast coastal areas, followed by that of Central China, and West China is still retarding. Different industrial distributions and different development levels make it possible for industries to transfer between different regions. In this way, industrial completeness can be maintained even during the upgrade and transformation process of China's manufacturing industry.

1.3.2 Challenges.

1) A low per capita increase: Though development of China's manufacturing industry has been impressive, its total increase and per capital increase are still far behind that of the current manufacturing superpowers in the world, like the US an Germany. In other words, China's manufacturing industry is confined to the labor-intensive period with low technical content and added value. In 2008, Japan's per capita increase of the manufacturing increase was close to 9,000 USD, which was the highest in the world. However, the figure was just around 700 USD in China. From 1993 to 2008, the annual average increase of China's manufacturing increase was 26.6%, which was far overtaken by 47.2% of the US and 36.9% of Japan. This suggested that China's manufacturing industry still needed to increase its profitability, which was often reduced by the high percentage of material consumption, low degree of processing and low technical content.

2) Weak technological innovation and lack of core techniques: That techniques and brands lack proprietary intellectual property rights is common to see in China's manufacturing industry (Siu & Contreras, 2016). About 60% of key techniques and core techniques come abroad. In 2012, the R&D input of China's top 500 manufacturing enterprises just accounted for around 1.87% of their operating income. In 2013, the R&D input of manufacturing enterprises above the designated scale accounted for just 0.85% of their operating income. Many Chinese manufacturing enterprises have not yet realized the importance of innovation, and their ability to digest the innovational techniques is wanting. These shortages have been hurdles of Chinese manufacturing enterprises to effectively absorb international innovation resources. Though human resource costs keep on increasing, top-notch technical personnel and technological innovation teams are still lacking. As China 's manufacturing industry keeps on improving its technological level, making technological import increasingly difficult, its late-mover advantage is losing. Most Chinese manufacturing enterprises are resource-intensive or labor-

intensive. In international labor distribution, they are often at the bottom of the global industrial value chain. In the field of foreign trade, 80% of Chinese competitors with a competitive advantage are from the labor-intensive sector. The competitiveness index of China's manufacturing enterprises in the high-tech field represented by computer integration and manufacturing technology, material technology, aerospace technology and electronic technology is extremely low. For example, most electronic and communication devices exported from China to other countries include compute peripheral devices, electronic elements and audio devices for home use. All these are low-end products in the new-and high-tech industry. To sum up, China is still the "world's manufacturing plant", serving as a supplier of cheap, low-end products and parts for the rest of the world. It is full of challenges for China's manufacturing industry, being at the bottom of the value chain, to take the lead in the international manufacturing market. Worse still, the profit margin of China's manufacturing industry has been increasingly squeezed.

3) Extensive development mode and serious environmental pollution: China is a major energy consumer in the world. Its energy supply structure is unreasonable (Hao, Qiao, Liu, & Zhao, 2017). The terminal energy consumption and total power generation of China rank No. 1 in the world. However, in terms of the energy generation mode, China's electricity is mainly generated by coals. The electricity generation mode is outdated and less environmentally-friendly. To support the rapid economic development, China has consumed large amounts of energies with a low energy utilization efficiency. For example, in 2011, China's GDP took up 10.48% of the world's total, but its energy consumption was around 18.33% of the global total. The GDP unit energy consumption of China was nearly 1.75 times higher than the world's average, 2.25 times higher than that of the US, 3.63 times higher than that of Germany and 4.18 times higher than that of Japan. There is a huge gap between China and the current manufacturing superpowers in terms of energy efficiency. In 2011, China's GDP unit carbon dioxide emission was 2.42 times higher than the world's average, 3.12 times higher than that of the US, 5.21 times higher than that of Germany and 5.39 times higher than that of Japan. All this proved an extensive development mode of China's economy. Though the energy consumption and the unit output pollutant emission of the manufacturing industry are declining on an annual basis, the rapid economic growth still leads to a sharp increase of pollutant emissions, seriously damaging the ecological environment (Binz, Gosens, Hansen, & Hansen, 2017).

At present, China's economic development has been ushered into a period of medium-rate growth. Resource and environmental constraint is strengthening; cost of production elements, such as labor resources, is increasing; and the investment and export increase rate is obviously slowing down. From the perspective of external environment, trade protectionism is prevailing in the international community and the trade environment is worsening. Meanwhile, foreign investments are withdrawing from the Chinese market to have their manufacturing bases located in Southeast Asia or other places with cheaper labor resources. After years of rapid development, China's manufacturing industry is embracing a hard time. The previously extensive development mode relying on input of resource elements and scale expansion could no longer bring sustainable benefits for China's manufacturing industry. It has become an imperative for China to adjust the structure of its manufacturing industry, upgrade and

transform it, and increase its development level and efficacy. Under such a background, the Chinese government put forward “Made in China 2025” plan, at an attempt to achieve an all-around transformation and upgrade of its manufacturing industry, form new driving force for its economic development, and shape new advantages for it to compete in the international market.

2. ANALYSIS OF POLICIES FOR DEVELOPMENT OF THE MANUFACTURING INDUSTRY IN TYPICAL REGIONS OF CHINA

2.1 Regional Economic Layout of China

2.1.1 Overall evaluation of China’s regional manufacturing industry.

China has a vast territory. This leads to striking differences of the manufacturing industry in different regions. According to development characteristics of the manufacturing industry, this chapter divides 22 provinces, five autonomous areas, four municipalities directly under administration of the central government in China, excluding Hong Kong SAR, Macau SAR and Taiwan, into the east region, central region, western region, and northeast region. Most manufacturing enterprises concentrate in the east region. In the central region and the western region, the resource-intensive manufacturing industry concentrates. In the east region, communication devices, electric appliances and machinery devices form a major part of the manufacturing industry. In the northeast region, the traditional manufacturing industry dominates. It can be seen that regional distribution of China’s manufacturing industry is not balanced. However, in recent years, under regulation of national policies, China’s regional industrial economy has been increasingly coordinated (Li, Yang, & Liu, 2014).

1) East region

The east region includes six provinces (Hebei, Jiangsu, Zhejiang, Guangdong, Fujian, Henan, etc.) and three municipalities (Beijing, Shanghai and Tianjin) directly under administration of the central government. For a long time, the east region, particularly, the Yangtze Delta Area and the Pearl River Delta Area, has been celebrated as the region with the most developed manufacturing industry in China.

a. The Yangtze River Delta Region

The Yangtze River Delta Region mainly refers to two provinces (Jiangsu and Zhejiang) and one municipal (Shanghai) directly under administration of the central government. Here is the area with the largest manufacturing industrial scale in China. Revolving around Shanghai, the manufacturing industry in this region radiates along major traffic axes, and has absolute advantage in terms of new-generation IT, marine engineering equipment, high-tech ships and new materials. After 2000, the Yangtze River Delta Region has been expanding obviously. The higher the degree of technological concentration is, the smaller the industrial expansion radius is. In the current Yangtze River Region, development of Jiangsu’s manufacturing industry has been impressive; while Shanghai is shifting its focus from the manufacturing industry to the service industry, so the percentage of its manufacturing industry is declining.

b. The Pearl River Delta Region

The Pearl River Delta Region mainly covers nine cities of Guangdong Province, including Guangzhou, Shenzhen, Zhuhai, Dongguan, Foshan, Zhongshan, Huizhou, Jiangmen, and Zhaoqing. It is a major manufacturing base of China. Guangzhou is the central city of the Pearl River Delta Region. Though the Pearl River Delta Region exceeds the Yangtze River Delta Region in terms of economic aggregate, the former is still inferior to the latter in terms of the manufacturing industrial scale. Technological innovation is a highlight of the manufacturing industry in the Pearl River Delta Region. The new and high-tech industry is the largest contributor to Guangdong's manufacturing industry. At the same time, the low-tech industry is also taking up a high percentage in Guangdong's manufacturing industrial structure.

c. Beijing-Tianjin-Hebei Region

As the region name implies, the region includes one province, Hebei, and two cities, namely Beijing and Tianjin. The manufacturing industrial scale of the Beijing-Tianjin-Hebei Region is relatively small. Currently, the Beijing-Tianjin-Hebei Region is implementing the in-depth integration strategy, which combines growth of the manufacturing industry, technological research and talent advantage of Beijing and Tianjin to boost an overall promotion of Hebei's manufacturing industry. However, air pollution has hindered in-depth integration among Beijing, Tianjin and Hebei.

d. Other regions

Shandong Province is a giant manufacturing province, because it is included in the top 5 of most segments of the manufacturing industry. The advantage of Shandong's manufacturing industry is mainly reflected in the sector of food manufacturing and textile. Fujian Province is advantageous in the field of new-generation IT, marine engineering devices, high-tech ships and new materials.

2) Central region

The central region includes six provinces, namely Shanxi Province, Henan Province, Anhui Province, Jiangxi Province, Hunan Province and Hubei Province. Most of these provinces show a huge potential in many manufacturing sectors. For example, Henan Province has formed development advantages in the field of new-generation IT, power equipment, energy-saving and new energy vehicle, agriculture machines and new materials; Hubei, Hubei and Anhui have made remarkable achievements in the field of new-generation IT; Jiangxi has advantages in developing biomedicine and high-performance medical instruments, marine engineering devices, high-tech ships and new materials; and Shanxi is rising in the field of advanced rail transit devices and new materials.

3) Western region

The west region includes 12 provinces, municipalities and autonomous areas, chiefly Shaanxi, Gansu, Ningxia, Qinghai, Xinjiang, Sichuan, Guizhou, Yunnan, Tibet, Inner Mongolia, Guangxi and Chongqing. Sichuan and Chongqing are two representative areas with an advanced manufacturing industry in the west region. Sichuan is a giant manufacturing province in the west region. More importantly, it is a major national equipment manufacturing base. Chongqing, relying on the Yangtze River Economic Belt Strategy, has maintained a rapid

development momentum (Hou, 2016).

4) Northeast region

The northeast region includes three provinces, namely Heilongjiang, Jilin and Liaoning. It is known as the traditional industrial basis of China. The manufacturing industry is a pillar industry of this region. However, since 2013, the growth rate of the manufacturing industry in this region has been sharply declining. The manufacturing industry in the region mainly concentrates in the medium-and low-end sector with a low R&D input and lacking technological innovation. The manufacturing industry distribution in the northeast region has a close bearing on its development history. The competitive sectors of the region include high-end numerically controlled machine tools and robots, aerospace devices, marine engineering devices and high-tech shipping, advanced rail transit traffic devices, energy-saving and new energy vehicles, power equipment and agricultural machinery, etc.

2.1.2 Introduction of manufacturing superpowers in China.

1) Introduction of manufacturing superpowers in China

Data analysis of China's industrial statistical yearbook shows that different sectors of China's manufacturing industry are low in concentration. Concentration of the top five provinces in every sector is around 50% (China State Statistics Bureau, 2017). Key sectors of "Made in China 2015" are found in the following provinces and municipalities with a high concentration, principally Jiangsu, Guangdong, Shanghai and Shandong (Hu & Sun, 2014). According to requirements of "Made in China 2025", the indexes are analyzed from four dimensions, namely innovation capability, quality effectiveness, integration between industrialization and informatization, and green development (See Table 2-1). Jiangsu and Guangdong are worthy of the top two in the list of China's manufacturing industry comprehensive strength, with their measuring indexes far exceeding those of others.

Table 2-1. China's manufacturing superpower evaluation index system

Dimensions	Indexes
Innovation ability	Percentage of the internal R&D spending in the total operating income of a manufacturing enterprise above the designated scale (%)
	Number of effective patterns and inventions in per 100 billion yuan of the operating income of a manufacturing enterprise above the designated scale (piece)
Quality effectiveness	Quality competition index of the manufacturing industry
	Increase of the added value of the manufacturing industry
	Increase rate of the overall labor productivity in the manufacturing industry (%)
Integration between industrialization and informatization	Broadband popularization rate (%)
	Digital R&D design tool popularization rate (%)
	Key process numerical control rate (%)
Green development	Decrease of energy consumption of unit industrial added value of an enterprise above the designated scale
	Decrease of carbon dioxide emission of unit industrial added value
	Decrease of water consumption of unit industrial added value
	Comprehensive utilization rate of industrial solid wastes (%)

Sources: summarized by authors based on the national and provincial government reports.

After analyzing more than 600 cities, either large-scale or medium-scale or small-scale, in China according to the above evaluation indexes, it can be observed that Shenzhen and Guangzhou, both located in Guangdong Province; Suzhou, Wuxi and Nantong in Jiangsu Province; Ningbo in Zhejiang Province; and Qingdao in Shandong Province show outstanding performance.

2) Analysis of distribution of ten key sectors of the manufacturing industry

Based on the data from "China Manufacturing Big Data Platform", the distribution of ten key sectors listed in "Made in China 2025" is analyzed. See Table 2-2. below:

Table 2-2. Provincial distribution chart of ten key sectors

Ten key sectors	Distribution	Competitive provinces and cities
New information technology	The east region is the major competitive region, and the central region shows a strong development potential.	Beijing, Guangdong, Shanghai, Jiangsu, Zhejiang, etc.
Numerical control tools and robotics	Distribute in eastern central, west, and northeast region, and concentrate in areas with a maturely developed manufacturing industry.	Beijing, Shanghai, Jiangsu, Zhejiang, Shandong, Liaoning, Hubei, Hunan, Shaanxi, etc.
Aerospace equipment	With the Yangtze River Delta and Shaanxi in the central region at the core; the Pearl River Delta and northeast region on two wings; with Beijing, Tianjin and Sichuan as R&D support.	Aeronautic equipment: Shanghai, Tianjin, Shaanxi, etc.; Spaceflight equipment: Beijing, Shanghai, Shaanxi, etc.
Ocean engineering equipment and high-tech ships	Distribute mainly around ship and ocean engineering production bases and research institutes.	Guangdong, Shanghai, Jiangsu, Shandong, Tianjin, Fujian, Liaoning, Hubei, Anhui, Chongqing, Guangxi, etc.
Railway equipment	Mainly concentrate in the east region, northeast region and central region.	Jiangsu, Shandong, Hebei, Jilin, Liaoning, Hunan, etc.
Energy-saving and new energy vehicles	Consistent with the distribution of the traditional automobile industry, including the Yangtze River Delta cluster represented by Shanghai, the northeast industrial cluster represented by Changchun, central region cluster represented by Wuhan, Beijing-Tianjin-Circum-Bohai Sea Region cluster, Pearl River Delta area represented by Guangzhou, and southwest cluster represented by Chongqing.	Beijing, Guangdong, Shanghai, Zhejiang, Jilin, Hunan, Chongqing, etc.
Power equipment	Concentrate in the east region, and some provinces of the northeast region and west region show development advantages in the segments.	Shanghai, Jiangsu, Zhejiang, Tianjin, Liaoning, Henan, Shaanxi, Xinjiang, etc.
Agricultural machinery	Mainly concentrate in the eastern central region.	Jiangsu, Shandong, Heilongjiang, Henan, Hubei, Anhui, etc.
New materials	The Yangtze River Delta, Pearl River Delta, Beijing-Tianjin-Hebei-Shandong Region,	Beijing, Guangdong, Shanghai, Jiangsu, Zhejiang,

	central region, northeast region and west region.	Shandong, Tianjin, Anhui, Jiangxi, etc.
Biological medicine and medical devices	The biological medicine industry revolves around the Yangtze River Delta and the Circum-Bohai Sea Region. The high-performance medical equipment industry concentrates in eastern coast areas, and Sichuan and Chongqing in the west region.	Biological medicine: Guangdong, Jiangsu, Henan, Sichuan, etc.; High-performance medical equipment: Guangdong, Shanghai, Jiangsu, Zhejiang, Shandong, Tianjin, Chongqing, Sichuan, etc.

Sources: summarized by authors based on the national and provincial government reports.

2.2 Government Action Schemes for Typical Regions

Since issuance of "Made in China 2025", there have been 29 provinces, autonomous areas and municipalities, including Jiangsu, Guangdong, Shandong, Fujian, Sichuan, Hubei and Beijing, gradually issuing local implementation strategies and action schemes for "Made in China 2025". Besides, more than 30 cities, including Dongguan, Wuxi, Wuhan, Dalian, Harbin, Nanjing and Suzhou have introduced measures to more effectively implement "Made in China 2025". In terms of content, various places in China have formed a development strategy oriented towards high-end equipment manufacturing and industrial upgrade. On the whole, their strategies revolve around ten key sectors proposed by "Made in China 2025", but each of them gets different focuses.

In order to analyze "Made in China 2025" implemented on a local level, this chapter chooses Guangdong, Jiangsu and Hubei as well as representative cities of these provinces, namely Dongguan, Wuxi and Wuhan, for a contrastive analysis.

2.2.1 "Made in China 2025" action scheme in Guangdong, Jiangsu and Hubei.

1) "Made in China 2025" action scheme of Guangdong Province

The Guangdong Provincial Government, Economic & Information Commission of Guangdong Province, Guangdong Provincial Development and Reform Commission, Guangdong Provincial Science & Technology Bureau and Guangdong Provincial Finance Bureau have issued a series of supporting documents based on practical situations of Guangdong and requirements of "Made in China 2025". The "Notice of the Guangdong Provincial People's Government on Issuing 'Guangdong Provincial Intelligent Manufacturing Development Plane (2015-2025)'" (No. 70 [2015]) released in 2015 was the first of its kind, closely followed by "Suggestions of the Guangdong Provincial People's Government on Implementing 'Made in China 2025'" (No. 89 [2015]). Later, around 20 documents related to task distribution, integration of the manufacturing industry and Internet, and so on have been launched. These documents show that *Guangdong is quick in responding to the national government's call for implementation of "Made in China 2025"*, *and its action scheme is highly referential to the rest of provinces in China*.

Major development sectors pinned down by the Guangdong Provincial People's Government include new information technology, advanced equipment manufacturing, new materials, and biological medicine. Under the four major sectors, there are 18 subsidiary categories. Four

projects are clarified, including the *industrial infrastructure strengthening project, manufacturing internationalization project, green engineering project and manufacturing innovation engineering project*. Nine major tasks, including building a national intelligent manufacturing development demonstration area; promoting deep integration between informatization and industrialization; accelerating transformation, upgrade and structural adjustment of the manufacturing industry; implementation of the industrial infrastructure strengthening project; fully promoting green manufacturing; enhancing protection and utilization of quality, brand and intellectual property; boosting coordinated development of large-scale, medium-scale and small-scale enterprises; actively developing the service-oriented manufacturing industry and the production-oriented service industry; and raising the international development level of the manufacturing industry.

2) “Made in China 2025” action scheme of Jiangsu Province

Since 2015 after the CPC Jiangsu Provincial Committee and the Jiangsu Provincial People’s Government issued “Notice on ‘Made in China 2025 Jiangsu Action Scheme’” (No. 16 [2015]), the local government and various departments have subsequently introduced nine comprehensive documents. Meanwhile, *more documents haven issued in order to guide the development of dedicated industries, such as new energy vehicles, ships, chemical and metallurgical building materials*, etc.

There are 15 key sectors involving in Jiangsu’s action scheme for “Made in China 2025”. Among them, eight are major sectors, including high-end equipment innovation; integration between military and civil manufacturing, manufacturing industry innovation center construction, intelligent manufacturing, industrial infrastructure foundation strengthening; quality and brand construction; manufacturing industry internationalization; and green manufacturing. The major tasks are clear, including eight categories, including strengthening of independent innovation and promotion of Jiangsu’s core manufacturing competitiveness; acceleration of in-depth integration between industrialization and informatization and improvement of the corporate intelligent development level; continuous promotion of technical transformation and gathering of new driving force for industrial optimization and upgrade; strengthening of quality and brand construction and expansion of the international influence of products in Jiangsu Province; promotion of innovation of industrial models and speeding up of production-oriented service industry; increasing foreign exchange and cooperation to promote internationalization of the manufacturing industry; acceleration of the industrial structural adjustment and optimization of the productivity space layout; promotion of green production and manufacturing to support sustainable development of the manufacturing industry.

3) “Made in China 2025” action scheme of Hubei Province

The Hubei Provincial People’s Government, Hubei Provincial Economic and Information Committee, Hubei Provincial Development and Reform Committee, Hubei Provincial Science and Technology Bureau and Hubei Provincial Finance Department have issued many documents concerning “Made in China 2025”. *In order to coordinate different documents*

issued by different departments, the provincial government has specially set up the provincial manufacturing superpower construction leadership group. In February 2017, the leadership group issued "Notice on '1+X Action Scheme or Implementation Plan of Hubei Province for 'Made in China 2025'" (No. 1 [2017]). Later, eight plans revolving around the Action Scheme have been subsequently launched, including "Hubei Provincial Intelligent Manufacturing Demonstration Project Implementation Plan", "Hubei Provincial Manufacturing Industry Innovation Center Construction Engineering Implementation Plan", Hubei Provincial Industrial Infrastructure Strengthening Implementation Plan", "Implementation Plan for Hubei's Development of the Service-oriented Manufacturing Industry", "Hubei Provincial New-Generation Technology and Industry Development Action Plan (2016-2020)", "Hubei Provincial Biological Medicine and High-end Medical Instrument Industrial Development Action Plan" (2016-2020), "Hubei Provincial New Materials Industry Development Implementation Plan" (2016-2020), And "Hubei Provincial Ocean Engineering Equipment and High-Tech Ship Industry Development Action Plan" (2016-2020) (Li, 2016). The eight implementation plans cover multiple key development sectors of Hubei's manufacturing industry.

The key sectors in Hubei's "Made in China 2025" action plan includes ten categories and 42 items. To achieve development of the nine key sectors, nine projects have been launched, namely the intelligent manufacturing demonstration project, manufacturing entrepreneur development new center construction, industrial foundation strengthening project, enterprise fine management promotion project, intelligent technological transformation project, service-oriented manufacturing industry demonstration project, clean production demonstration project, manufacturing internalization project, and entrepreneur development project. Correspondingly, nine major tasks are pinpointed, including acceleration of intelligent manufacturing development and promotion of in-depth integration between informatization and industrialization; improvement of the manufacturing industry innovation system and promotion of the independent innovation ability; strengthening of "four fundamentals" development and improving the foundation of the manufacturing industry; improvement of the industrial standards and systems, and enhancement of quality and brand construction; boosting of the industrial structural adjustment and speeding up of the manufacturing industry transformation progress; development of the production-oriented service industry and promotion of service orientation of the manufacturing industry; promotion of green manufacturing and sustainable development capability; sticking to promoting development through increase of the opening degree to the outside world, and deepening of international industrial cooperation; acceleration of multi-layer talent development and full release of talent dividends.

2.2.2 "Made in China 2025" action scheme in Dongguan, Wuxi and Wuhan.
1) "Made in China 2025" action scheme of Dongguan

Dongguan is the city of Guangdong responding the fastest to "Made in China 2025", from the issued time of city level policy and documents as responses to the central government policy change(s). Right after Guangdong Province issued the action plan for "Made in China 2025", Dongguan spearheaded to put forward "Made in Dongguan 2025", and issued "Suggestions on

Implementing ‘Made in Dongguan 2025’” (No. 1 [2015]). Later, more than 10 documents related to implementation measures and key development sectors have been introduced. Seen from the content of the documents, measures to implement “Made in Dongguan 2025” are relatively comprehensive.

The key sectors involving in Dongguan’s action scheme fall into 23 categories. There are four major tasks, including strengthening the electronic information manufacturing industry; developing the intelligent manufacturing equipment and intelligent power distribution equipment; promoting the consumable manufacturing industry transformation; cultivating the emergence industry of strategic importance. There are six projects launched to realize development of the key sectors, including the innovation manufacturing project; quality manufacturing project; intelligent manufacturing project; green manufacturing project; service-oriented manufacturing project; cluster manufacturing project.

2) “Made in China 2025” action scheme of Wuxi

The Wuxi Municipal People’s Government, Wuxi Municipal Economic and Information Committee and Wuxi Municipal Development and Reform Committee, Wuxi Municipal Science and Technology Bureau, and Wuxi Municipal Finance Bureau have nearly introduced ten documents and guidelines to ensure smooth progress of “Made in China 2015” in China. In particular, Wuxi has launched a guiding document specially for development of the local integrated circuit industry.

The key sectors involved in “Made in China 2025” action scheme of Wuxi falls into eight categories and 32 subsidiary categories. 16 major tasks have proposed, including promoting the intelligent workshop (plant) construction; accelerating intelligent manufacturing of key sectors; promoting Internet applications to industry; developing intelligent equipment and products; developing intelligent equipment and key parts; strengthening cooperation in the intelligent equipment industry; promoting the intelligent manufacturing coordination and innovation scheme; participating in the intelligent manufacturing standard formation; propelling intelligent manufacturing patent, brand and quality construction; developing software and information technology; developing the Internet-based manufacturing industry; cultivating intelligent manufacturing service suppliers; building the intelligent manufacturing service system; building a multilevel talent team; improving the talent development mechanism; and implementing the “Taihu Talents” plan. In response to the 16 major tasks, there are 11 projects, including the opening and cooperation project; service-oriented manufacturing project; talent support project; enterprise cultivation project; intensification and cluster project; green low-carbon project; intelligent manufacturing project; innovation-driven project; project leadership; and quality and brand project.

3) “Made in China 2025” action scheme of Wuhan

The Wuhan Provincial People’s Government, Wuhan Provincial Economic and Information Committee and Wuhan Provincial Development and Reform Committee, Wuhan Provincial

Science and Technology Bureau, and Wuhan Provincial Finance Bureau have nearly introduced ten guiding documents for implementation of "Made in China 2025". These documents cover a wide range of sectors and issues.

The key development sectors in "Made in China 2025" action scheme of Wuhan falls into four categories and 11 types. The major tasks fall into four categories and include 15 items. The four categories of tasks include promotion of the manufacturing industry independent innovation capability; acceleration of integration between the Internet and the advanced manufacturing industry; building of a new industrial development system; and acceleration of the traditional industrial transformation and upgrade. There are four major projects launched to realize the four tasks, including intelligent manufacturing project; green manufacturing project; green manufacturing project; service-oriented manufacturing project; and industrial foundation strengthening project.

2.3 Comparison of Government Implementation Policies in Typical Regions

2.3.1 Comparative analysis of government implementation policies in Guangdong, Jiangsu and Hubei.

Comparison of key development sectors and supporting service systems of Guangdong, Jiangsu and Hubei are shown in Table 2-3:

Table 2-3. Key development sectors and supporting service systems of Guangdong, Jiangsu and Hubei

Provinces		Guangdong	Jiangsu	Hubei
Key development sectors	Similarities	Biological medicine and high-end medical equipment; new materials (high-performance compound materials); ocean engineering equipment and high-tech ships, aerospace equipment, railway equipment, energy-saving equipment and resource recycling, new energy vehicles, intelligent equipment (industrial robots and high-end numerically controlled machine tools); new information and technology (integrated circuit and specialized devices, cloud computing, big data and Internet of Things, network communication devices, operation systems and industries, software new energies); intelligent manufacturing (Internet Plus manufacturing, integration between industrialization and informatization, robots, industrial cloud platforms, industrial big data application, and industrial e-commerce).		
	Differences	New information and technology (new-type panel display); satellite application; intelligent manufacturing devices (sensors, automatic control systems, machine tools, and other major equipment, R&D and industrialization of intelligent devices, including intelligent production line, intelligent plant, servo	Intelligent equipment (additive material manufacturing, such as 3D printing, and new-type intelligent textile machinery); engineering and agricultural machinery; new-type power equipment (large-sale efficient power generation devices	Beidou Navigation Satellite System: New information and technology (intelligent terminal and new panel display); intelligent manufacturing equipment (laser); biological medicine and high-end medical instruments (chemical pharmacy and

		and implementation components); new materials (materials with special functions, rare earth and nanometer materials); biological medicine and high-end medical equipment (southern medicine plants); new energies	and heavy-type gas turbines); new materials (new-type antiseptic coatings, green new materials using renewable resources, high-temperature superconducting materials, new-type electronic materials, high-performance, strong and light-weighted metal alloy materials, nanometer materials, etc.); new energies.	Chinese patent medicines); new materials (high-performance metal materials, high-end chemical and industrial new materials, electronic information functional materials, new-type inorganic nonmetal materials, and leading new materials); specialized cars; energy-saving and environmentally-friendly devices (resource recycling).
Supporting service systems	Similarities	Promoting the institutional and system reform; changing the government functions (simplifying administration and delegating powers to lower levels); accelerating financial and tax support (for the first set of technical equipment); improving the financial support policies (introducing social capitals, financing leasing, property mortgage or pledge); fostering medium-and large-scale enterprises, development small-and micro-scale enterprises, and promoting coordinated development of enterprises of all sizes; creating a market environment featuring fair play; talent construction and intelligence support (entrepreneur development project and industry-research-university combination); playing a leading role; and promoting network security and information guarantee.		
	Differences	① Encouraging enterprises under administration of the central government and Guangdong provincial SOEs to set up "entrepreneurship and innovation" innovation funds, equity investment funds, and industrial investment funds; ② Providing land, housing and ocean use preferential policies; ③ Giving full play to the role of industrial associations; ④ Promoting technology innovation cooperation of	① Encouraging the government to purchase cloud computing and other specialized third-party services; Launching industrial integration cooperation demonstration sites; ③ Encouraging the financial institutions to make use of the "entrepreneurship and innovation" platform to provide one-stop systematic financial services, equity investment funds, and industrial investment funds; ④ Implementing the policy of maintaining the land use type and property type within five years of the transition period; ⑤	① Expanding all-around technology cooperation with the US, Germany, France, Britain and other developed countries; ② Strengthening exchange and communication of Wuhan city circle with the circum-Fanyang Lake city circle and the circum-Changsha-Zhuzhou-Xiangtan city circle; deepen cooperation and interaction of Wuhan with Changsha, Nanchang, and other central cities; ③ Assessing technology innovation, and launching "technology finance innovation project", "technology poverty relief project"

		Guangdong with Hong Kong and Macau.	Giving full play to the role of industrial associations.	and "carbon finance"; ④ Launching industrial integration demonstration sites, BOT model, industrial park investment and financing demonstration sites, financing and investment companies in industrial parks, loan and lease asset securitization demonstrates sites; attracting insurance funds into major development projects, and starting Internet equity fund-raising.

Sources: summarized by authors based on the national and provincial government reports.

The east region represented by Jiangsu and Guangdong is quick in responding to "Made in China 2025", proposing a new development mentality for local development. Benefiting from their favorable development basis of the manufacturing industry, their supporting service systems put forward are highly elaborate and feasible. The action scheme of Jiangsu resolves around major problems facing its manufacturing industry and aims at strengthening its performance in the medium-and high-end manufacturing sector. Based on in-depth integration between new information and technology, and the advanced manufacturing industry, Jiangsu attempts to make a breakthrough in the field of intelligent manufacturing. Key industrial sectors and core technologies are its major focuses. In the future, it will march into the world market more vigorously. As a provincial manufacturing giant in China and a major global manufacturing base, Guangdong has deeply realized its shortages after years of development. A series of supporting policies introduced by it fully show its determination to transform from "manufacturing" to "intelligent manufacturing". Hubei Province is a critical province of the central region. In one year and a half after the provincial government issued 'Made in China 2025 Action Scheme of Hubei", concerted efforts have been made among more than 20 departments to form a "1+16" planning policy framework covering nine major tasks and ten key sectors. However, concerning the content of various policies, some measures are too complex; policies issued by different departments are sometimes inconsistent. Seen from their implementation effects, these policies still need to improve their feasibility. In fact, these problems are not facing Hubei Province, but are shared problems of areas with an underdeveloped manufacturing industry in the central region and west region of China.

All in all, provinces, cities and municipalities in different regions of China are still dominated by an enclosed, independent and "small but complete" development mentality. The homogenization of the regional industrial structure is becoming increasingly prominent, making structural complementation even an impossibility. Meanwhile, due to lack of regional balance and overall planning, some unnecessary repeated constructions have been found between different sectors and regions. This impairs the cost effectiveness and might easily

trigger unjust competition.

2.3.2 Comparative analysis of implementation policies in Dongguan, Wuxi and Wuhan.
Comparison results of key development sectors and supporting service systems of Dongguan, Wuxi and Wuhan are shown in Table 2-4:

Table 2-4. Comparison of key development sectors and supporting service systems of Dongguan, Wuxi and Wuhan

		Dongguan	**Wuxi**	**Wuhan**
Key development sectors	Similarities	Intelligent manufacturing equipment (numerically-controlled machine tool, industrial robots and 3D printing); new information and technology (integrated circuit, cloud computing, big data and Internet of Things, software and new display); new materials (metallic materials, compound materials, and special function materials); new energy vehicles; biological medicine sector (biological medicine and high-performance medical instruments).		
	Differences	Textile, clothing, shoes and hats; foods and drinks; toys, stationery and sporting goods (specialized electronic devices and intelligent production lines, modules and intelligent plastic molding equipment, and intelligent power distribution equipment); new information and technology (intelligent mobile phones, intelligent wearable devices, Internet of vehicles, intelligent home furnishing, fifth-generation mobile communications, new electronic devices, basic materials, Internet of Vehicles, etc.)	High-end equipment manufacturing; intelligent manufacturing devices (R&D and industrialization of intelligent sensing, intelligent test and installation, intelligent warehousing and logistics); power equipment; energy-saving and environmentally-friendly industry; new energies (photovoltaic and wind power); high-end textile and garment sector; production-oriented service sector; high-end ships and maritime work equipment.	New information and technology (intelligent terminal and optical communications); intelligent equipment manufacturing (laser); future industry (all optical network, quantum communication network, virtual reality technology, gene diagnosis and target treatment, stem cell, tissue and organ regeneration, artificial intelligence, human-computer manufacturing and equipment, key technology of driverless vehicles); applications of BeiDou Navigation Satellite System; high-tech ships and ocean engineering equipment; railway equipment.
Key supporting service systems	Similarities	Deepening the institutional reform, and optimizing industrial policies; strengthening financial policy support, and promoting integration between the financial industry and the manufacturing industry; enhancing the financial and tax policy support; increasing the degree of opening and international cooperation; optimizing the internal and external opening layout; improving the organizational leadership mechanism; doing a good job in talent introduction and development, and shoring up the talent team construction; improving the market monitoring system; reinforcing the land use guarantee; and improving the performance assessment mechanism.		

	Differences	Promoting the industrial spirit and manufacturing civilization; enhancing the fundamental guarantee for plan implementation (in terms of traffic, water electricity, communications, etc.); giving full play to the role of commercial associations; and promoting development of the Internet finance.	Giving full play to the role of industrial organizations; strengthening overall planning and top-level design; building a major problem negotiation mechanism; and reinforcing the organic connection between special plans.	Optimizing the industrial development environment (improving the connection mechanism between the upstream and downstream industries, and constructing the corporate credit system); adjusting and optimizing the spatial layout (increasing the scale and efficiency of four major sectors).

Sources: summarized by authors based on the national and provincial government reports.

Dongguan has long been the manufacturing base of Guangdong Province. Its strategic significance to development of Guangdong's manufacturing industry is self-evident. This city includes "Made in Dongguan 2025" into the national strategy of "Made in China 2025", and clarifies the objective of "developing a model city of Made in China". Meanwhile, the strategic objective system of "Made in Dongguan 2025" is implemented through "six major projects". The series of measures adopted by Dongguan is in line with its industrial characteristics and almost covers every aspect of the manufacturing industrial development in Dongguan.

Comparatively, the action scheme of Wuxi to implement "Made in China 2025" is less systematic. Though many key development sectors and objectives are proposed, documents supporting overall development of the manufacturing industry and development of specific sectors are lacking. This is related to position of Wuxi in Jiangsu's manufacturing industry development plan. In Jiangsu, Suzhou is the manufacturing superpower. Thus, Wuxi becomes less important to Jiangsu in realizing its provincial manufacturing industry development. The policies issued are not closely integrated with industrial characteristics of Dongguan, and are highly homogenous to those for other parts of Jiangsu Province.

As a major industrial town of the central region, Wuhan, the provincial capital of Hubei, is contributing around one third to the industrial output of Hubei. In order to realize development of future industries, Wuhan has built a manufacturing innovation system. By 2020, the optoelectronics information industrial, new energy vehicle and intelligent vehicle national manufacturing and innovation centers will be set up. meanwhile, innovation intensity of Hubei's competitive industries, including biological health, intelligent manufacturing and high-end equipment, will be strengthened. Wuhan also clearly states its goal to build two to four national manufacturing and innovation centers by the year 2025.

On the whole, the supporting documents issued by various cities in the typical regions of China have a close bearing on the position of these cities in the manufacturing industry development of their respective province (China Academy of Information and Communications Technology,

2016). For example, major cities, including Dongguan and Wuhan, have their action scheme serve implementation of “Made in China 2025” in their respective province. Meanwhile, they integrate sectors with their own development characteristics in their action scheme. On the contrary, in terms of cities such as Wuxi which is less important to the province it is located in, the development planning is relatively generous, which cannot fully show their development characteristics.

2.3.3 “Made in China 2025” regional development planning.

Now, the Chinese government is organizing revision of “Guide to Provinces and Cities in Implementing ‘Made in China 2025’” (hereinafter abbreviated as the “Guide”), and the revised version will hopefully be realized before the end of 2017. The Guide aims at combining key tasks of “Made in China 2025” with resource endowments and current industrial development in various places, avoiding repeated constructions, highlighting specialties of every region, giving full play to competitive industries in different places, and promoting transformation and upgrade of China’s manufacturing industry and reasonable layout of the industrial structure. All these efforts will form a “new map” of “Made in China”.

According to the Guide, provinces in the central region, such as Anhui, Henan and Shanxi, are required to explore development possibilities of their new energy, new materials, biological medicine, information and technology sectors, apart from further tapping development potential of their original competitive industries, including energy mining equipment, coal and chemical equipment, agricultural machinery and basic processing equipment. Besides, the Guide requires central provinces to further optimize the industrial structure of the manufacturing industry, increase the percentage of the technological industry in the whole manufacturing industry, and gradually eliminate the high-energy-consumption and high-pollution industries.

In terms of the west region and partial old industrial areas, the Guide is urging the focus to be put on cultivation of emerging competitive industries, while gradually weeding out backward production capacity. For example, Shaanxi, Sichuan and Chongqing are positioned to further develop their competitive industries, including information and technology, and aerospace. On the other hand, they are expected to seek development in emerging industries, including cloud computing, big data and Internet of Things.

The Guide also gives policy support to industrial upgrade of some old industrial bases in the northeast region and the northwest region. Places with the old industrial bases are required to seek their comparative advantages and support transformation and upgrade of the key sectors with comparative advantages. Meanwhile, the list of competitive industries for foreign investments is issued to attract more foreign investments, and guide the coastal industries to gradually shift to the inland. The northeast region and the southwest region are supported to take the lead to introduce key projects with favorable basic development conditions and which can hopefully make breakthroughs of “Made in China 2025”. Meanwhile, a batch of competitive industrial bases with outstanding economies of scale and competitive industries highly competitive in various segments and with their own development characteristics will be developed.

Revision and implementation of the Guide is to guarantee continuous implementation of "Made in China 2025", and promote steady progress of industrial upgrade in different places. Meanwhile, the ten key development sectors raised by "Made in China" will get the priority of development. Additionally, emerging industries, such as robots, additive material manufacturing, industrial Internet and intelligent manufacturing, in recent years will be further cultivated.

After issuance of the Guide, various provinces, districts and municipalities can better implement "Made in China 2025" in the local level by giving full play to their comparative advantages and adopting the differentiated industrial development strategy; formulate more reasonable industrial transfer policies and promote coordinated development of the regional manufacturing industry; and fully improve the comprehensive development capability of China's manufacturing industry through overall planning.

CONCLUSION

Over the past several decades, China's manufacturing industry has experienced three stages of development, namely revival, emergence of private and foreign-invested manufacturing enterprises, and marching of products made in China to the international market. Now, China's manufacturing industry is facing with both development opportunities and challenges. On one hand, it has the most complete industrial system and the largest consumption market. The potential knowledge spillover of different sectors within the scope of national border will bring the manufacturing industries and other supporting sectors a valuable opportunity to enhance its competence. Due to its huge domestic market, the discrepancy between the rural regions and the east coast provinces can provide possibilities to the domestic leading sectors to restructure the manufacturing processes and distribution systems. These two factors will benefit both the regional government in the short run and the central government in the long term. On the other hand, its per capita growth rate is low; its innovation capability is lacking; and its environmental pollution is worsening. One of the common challenges Chinese manufacturing companies encountering is how to develop or build competitive advantages through innovation capabilities. In the development of Chinese manufacturing industry, a small group of leading domestic firms accumulated knowledge and built capabilities when expanding internationally. It is widely considered that the majority manufacturing companies do not have the similar competence. Therefore, China's manufacturing industry is calling for a new development strategy. "Made in China 2025" is a national strategy proposed for China's manufacturing industry. It attempts to develop China from a global manufacturing giant into a global manufacturing superpower.

China has a vast territory. In different regions, the economic development level is different, so it is with the development level of the manufacturing industry. Therefore, how to fully realize the strategic goals laid down by "Made in China 2025" should be considered carefully. This chapter attempts to provide references for transformation strategies, paths and policy support for different regions in implementing "Made in China 2025". For continental countries and other emerging countries such as India and Brazil, the experience of development and implementation of "Made in China 2025" strategy also offers a template model to refer.

Particularly, the policy and policy modification of Chinese authority at national and regional level provides the other countries valuable lessons. However, due to the difference of economic characteristics of the manufacturing sectors from China to other nations, replication becomes difficult. This brings another possibility to these countries to cooperate in responding to the demands of advanced manufacturing. We would like to highlight the main findings of this article:

1) According to the national statistical yearbook, the industry in different regions of China is classified into different levels. Based on the indexes of the national statistical yearbook, a measurement model is built to measure the manufacturing industry of different regions in terms of informatization and intelligentization. Then, the manufacturing industry of different regions is classified into different levels according to the concept of informatization and intelligentization. In other words, the starting point of the regional manufacturing industry is clarified. Next, the author visits dozens of enterprises and plants to learn their demands, expectations and future action schemes.

2) The transformation and upgrade goals in different economic belts of China are examined through in-depth interview and observation in July to August, 2017. First, Guangdong Province, Jiangsu Province, Hubei Province and the surrounding regions are chosen for study. Then we chose representative industries and manufacturing companies to conduct interviews.

3) Based on industrial theories and interview materials, transformation and upgrade strategies and paths for different key sectors are outlined. Based on existing statistical data and in-depth interview, the foundation of key sectors, as well as their demands and expectations of transformation and upgrade, and characteristics of their manufacturing industry is investigated. According to the industry theories, different transformation and upgrade strategies and paths are put forward for different key sectors.

4) According to strategies and paths of different sectors, the role of the government played in the transformation and upgrade of China's and regional manufacturing industry is summarized. Furthermore, whether policies of the central government and the local government can effectively support upgrade of the manufacturing industry is examined. Hence, our description and analysis of "Made in China 2025" puts forward policy implications for the other countries.

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KEY TERMS AND DEFINITIONS

Beijing-Tianjin-Hebei Region: The national capital region of China, which includes an economic region surrounding Beijing, Tianjin, and Hebei, along the coast of the Bohai Sea.

Green Manufacturing: The renewal of production processes and the establishment of environmentally-friendly operations in the manufacturing field.

Intelligent Manufacturing: The use of production process technology that can automatically adapt to changing environments and varying production process requirements, with the capability of manufacturing various products with minimal supervision or assistance from operators.

Made in China 2025: An initiative, drafted by the Ministry of Industry and Information Technology over two and a half years, to comprehensively upgrade Chinese industry.

Planned Economy System: An economic system in which the government controls and regulates the economy system, including production, distribution, prices, etc.

Pearl River Delta Metropolitan Region: A low-lying area surrounding THE Pearl River estuary that mainly covers nine cities of Guangdong Province, including Guangzhou, Shenzhen, Zhuhai, Dongguan, Foshan, Zhongshan, Huizhou, Jiangmen, and Zhaoqing.

Yangtze River Delta Region: A triangle-shaped metropolitan region where Yangtze River drains into the East China Sea that comprises Shanghai, southern Jiangsu province and northern Zhejiang province of China.