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Notice of the State Council on Issuing “Made in China 2025”

Guo Fa [2015] No. 28

To the People’s Governments of all provinces, autonomous regions, and municipalities directly under the Central Government, and all ministries, commissions, and directly affiliated agencies of the State Council:

“Made in China 2025” is hereby issued to you. Please implement it conscientiously.

State Council

May 8, 2015

(This article contains deletions)

Made in China 2025

Manufacturing is the main body of the national economy, the foundation of the country, the tool for the prosperity of the country, and the basis for the strength of the country. Since the beginning of industrial civilization in the mid-eighteenth century, the rise and fall of world powers and the struggle of the Chinese nation have repeatedly proved that without a strong manufacturing industry, there will be no strong country and nation. Building an internationally competitive manufacturing industry is the only way for China to enhance its comprehensive national strength, safeguard national security, and build a world power.

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Since the founding of New China, especially since the reform and opening up, China’s manufacturing industry has continued to develop rapidly, and has built a complete and independent industrial system with a full range of categories, which has effectively promoted the process of industrialization and modernization, significantly enhanced its comprehensive national strength, and supported its status as a world power. However, compared with the world’s advanced level, China’s manufacturing industry is still large but not strong, with obvious gaps in independent innovation capabilities, resource utilization efficiency, industrial structure level, degree of informatization, quality and efficiency, and the tasks of transformation and upgrading and leapfrog development are urgent and arduous.

At present, a new round of scientific and technological revolution and industrial transformation has formed a historic intersection with China’s accelerated transformation of economic development mode, and the international industrial division of labor is being reshaped. We must seize this major historical opportunity, implement the strategy of building a strong manufacturing country in accordance with the requirements of the “four comprehensive” strategic layouts, strengthen overall planning and forward-looking deployment, and strive to build China into a manufacturing power that leads the development of the world’s manufacturing industry by the centenary of the founding of the People’s Republic of China through three decades of efforts, 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 program for the first ten years of China’s implementation of the strategy of building a strong manufacturing country.

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I. Development situation and environment

(I) The global manufacturing landscape is facing major adjustments.

The deep integration of new generation information technology and manufacturing is triggering far-reaching industrial changes, forming new production methods, industrial forms, business models and economic growth points. All countries are stepping up their efforts in scientific and technological innovation to promote new breakthroughs in three-dimensional (3D) printing, mobile Internet, cloud computing, big data, bioengineering, new energy, new materials and other fields. Smart manufacturing such as smart equipment and smart factories based on information-physical systems is leading the transformation of manufacturing methods; online crowdsourcing, collaborative design, large-scale personalized customization, precise supply chain management, full life cycle management, e-commerce, etc. are reshaping the industrial value chain system; wearable smart products, smart home appliances, smart cars and other smart terminal products are constantly expanding new areas of manufacturing. China’s manufacturing industry transformation and upgrading and innovative development have ushered in major opportunities.

The global industrial competition pattern is undergoing major adjustments, and China faces huge challenges in the new round of development. After the international financial crisis, developed countries have implemented the “re-industrialization” strategy to reshape new competitive advantages in the manufacturing industry and accelerate the promotion of a new round of global trade and investment. Some developing countries are also accelerating planning and layout, actively participating in the global industrial redivision of labor, taking over industrial and capital transfers, and expanding international market space. China’s manufacturing industry faces severe challenges of “two-way squeeze” from developed countries and other developing countries. It must focus globally, step up strategic deployment, focus on building a manufacturing power, consolidate its foundation, turn challenges into opportunities, and seize the commanding heights of the new round of competition in the manufacturing industry.

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(II) China’s economic development environment has undergone major changes.

With the simultaneous advancement of new industrialization, informatization, urbanization, and agricultural modernization, the potential of super-large-scale domestic demand is continuously released, providing broad space for the development of China’s manufacturing industry. The new equipment needs of various industries, the new consumption needs of the people, the new livelihood needs of social management and public services, and the new security needs of national defense construction all require the manufacturing industry to rapidly improve its level and capabilities in major technical equipment innovation, consumer product quality and safety, public service facilities and equipment supply, and national defense equipment support. Comprehensively deepening reform and further expanding opening up will continuously stimulate the vitality and creativity of the manufacturing industry and promote the transformation and upgrading of the manufacturing industry.

China’s economic development has entered a new normal, and the development of the manufacturing industry faces new challenges. Resource and environmental constraints are constantly strengthening, the cost of production factors such as labor is constantly rising, and the growth rate of investment and exports has slowed down significantly. The extensive development model that mainly relies on resource input and scale expansion is unsustainable, and it is urgent to adjust the structure, transform and upgrade, and improve quality and efficiency. The key to forming new driving forces for economic growth and shaping new advantages in international competition is in the manufacturing industry, the difficulty is in the manufacturing industry, and the way out is also in the manufacturing industry.

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(III) The task of building a strong manufacturing country is arduous and urgent.

After decades of rapid development, China’s manufacturing industry has leapt to the first place in the world, and has established a complete and independent manufacturing system with a full range of categories, becoming an important cornerstone to support China’s economic and social development and an important force to promote the development of the world economy. Continuous technological innovation has greatly improved the comprehensive competitiveness of China’s manufacturing industry. A number of major technical equipment such as manned space flight, manned deep diving, large aircraft, Beidou satellite navigation, supercomputers, high-speed rail equipment, million-kilowatt power generation equipment, and 10,000-meter deep-sea oil drilling equipment have made breakthroughs, forming a number of internationally competitive advantageous industries and backbone enterprises. China has the foundation and conditions to build an industrial power.

However, China is still in the process of industrialization and there is still a big gap compared with advanced countries. The manufacturing industry is large but not strong, with weak independent innovation capabilities, high external dependence on key core technologies and high-end equipment, and an imperfect manufacturing innovation system with enterprises as the main body; the product quality is not high, and there is a lack of world-renowned brands; the efficiency of resource and energy utilization is low, and environmental pollution is more prominent; the industrial structure is unreasonable, and the development of high-end equipment manufacturing and productive services lags behind; the level of informatization is not high, and the integration with industrialization is not deep enough; the degree of internationalization of the industry is not high, and the global operation capabilities of enterprises are insufficient. To promote the construction of a manufacturing power, we must focus on solving the above problems.

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To build a manufacturing power, we must seize the current rare strategic opportunities, actively respond to challenges, strengthen overall planning, highlight innovation-driven, formulate special policies, give full play to institutional advantages, mobilize the whole society to work hard, rely more on Chinese equipment and Chinese brands, realize the transformation from Chinese manufacturing to Chinese creation, from Chinese speed to Chinese quality, and from Chinese products to Chinese brands, and complete the strategic task of transforming Chinese manufacturing from big to strong.

II. Strategic policies and goals

(I) Guiding thoughts.

Fully implement the spirit of the 18th CPC National Congress and the Second, Third and Fourth Plenary Sessions of the 18th CPC Central Committee, adhere to the path of new industrialization with Chinese characteristics, take promoting the innovative development of manufacturing industry as the theme, take improving quality and efficiency as the center, take accelerating the deep integration of new generation information technology and manufacturing industry as the main line, take promoting smart manufacturing as the main direction, take meeting the needs of economic and social development and national defense construction for major technical equipment as the goal, strengthen industrial basic capabilities, improve the level of comprehensive integration, improve the multi-level and multi-type talent training system, promote industrial transformation and upgrading, cultivate a manufacturing culture with Chinese characteristics, and realize the historical leap from big to strong in manufacturing industry. The basic guidelines are:

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——Innovation-driven. Insist on placing innovation at the core of the overall development of the manufacturing industry, improve the institutional environment conducive to innovation, promote cross-field and cross-industry collaborative innovation, break through a number of key common technologies in key areas, promote the digitalization, network transformation and smart transformation of the manufacturing industry, and take the development path driven by innovation.

——Quality first. Insist on taking quality as the lifeline of building a strong manufacturing country, strengthen the main responsibility of enterprises for quality, strengthen quality technology research and development, and cultivate independent brands. Build a legal and standard system, a quality supervision system, and an advanced quality culture, create a market environment for honest operation, and take the development path of winning by quality.

——Green development. Insist on taking sustainable development as an important focus of building a strong manufacturing country, strengthen the promotion and application of energy-saving and environmental protection technologies, processes, and equipment, and comprehensively promote clean production. Develop a circular economy, improve the efficiency of resource recycling, build a green manufacturing system, and take the development path of ecological civilization.

——Structural optimization. Insist on taking structural adjustment as the key link in building a strong manufacturing country, vigorously develop advanced manufacturing, transform and upgrade traditional industries, and promote the transformation of production-oriented manufacturing to service-oriented manufacturing. Optimize the spatial layout of industries, cultivate a group of industrial clusters and enterprise groups with core competitiveness, and take the development path of improving quality and efficiency.

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——Talent-oriented. Adhere to the principle of taking talents as the foundation for building a strong manufacturing country, establish and improve a scientific and reasonable mechanism for selecting, employing and educating talents, and accelerate the cultivation of professional and technical talents, business management talents, and skilled talents urgently needed for the development of the manufacturing industry. Create an atmosphere of mass entrepreneurship and innovation, build a team of manufacturing talents with excellent quality and reasonable structure, and take the development path led by talents.

(II) Basic principles.

Market-led, government-guided. Comprehensively deepen reform, give full play to the decisive role of the market in resource allocation, strengthen the dominant position of enterprises, and stimulate the vitality and creativity of enterprises. Actively transform government functions, strengthen strategic research and planning guidance, improve relevant support policies, and create a good environment for enterprise development.

Do a good job on the present work and look to the future. Target the bottlenecks and weak links that restrict the development of the manufacturing industry, accelerate transformation and upgrading, improve quality and efficiency, and effectively improve the core competitiveness and sustainable development capabilities of the manufacturing industry. Accurately grasp the trends of the new round of scientific and technological revolution and industrial transformation, strengthen strategic planning and forward-looking deployment, lay a solid foundation, and occupy the commanding heights in future competition.

Overall advancement, key breakthroughs. Adhere to the combination of national layout and classified guidance for the development of manufacturing industry, make overall planning, make reasonable layout, clarify the direction of innovative development, promote the in-depth development of military-civilian integration, and accelerate the overall level of manufacturing industry. Focus on the major needs of economic and social development and national security, integrate resources, highlight key points, implement several major projects, and achieve breakthroughs first.

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Independent development, open cooperation. In the basic, strategic, and overall areas related to national economy and people’s livelihood and industrial security, focus on mastering key core technologies, improve the industrial chain, and form independent development capabilities. Continue to expand opening up, actively utilize global resources and markets, strengthen global industrial layout and international exchanges and cooperation, form new comparative advantages, and improve the level of open development of manufacturing industry.

(III) Strategic goals.

Based on national conditions and reality, strive to achieve the strategic goal of building a strong manufacturing country through the “three-step” approach.

Step 1: Strive to join the ranks of strong manufacturing countries in ten years.

By 2020, basically achieve industrialization, further consolidate status as a manufacturing power, and significantly improve the level of informatization in the manufacturing industry. Master a number of key core technologies in key areas, further enhance competitiveness in advantageous areas, and significantly improve product quality. Make significant progress in the digitalization, network transformation, and smart transformation of the manufacturing industry. The energy consumption, material consumption, and pollutant emissions per unit of industrial added value in key industries will be significantly reduced.

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By 2025, the overall quality of the manufacturing industry will be greatly improved, the innovation capacity will be significantly enhanced, the labor productivity of all employees will be significantly improved, and the integration of industrialization and informatization will reach a new level. The energy consumption, material consumption, and pollutant emissions per unit of industrial added value in key industries will reach the world’s advanced level. Form a number of multinational companies and industrial clusters with strong international competitiveness, and their status in the global industrial division of labor and value chain will be significantly improved.

Step 2: By 2035, China’s manufacturing industry will reach the middle level of the world’s manufacturing powers. Innovation capabilities will be greatly improved, major breakthroughs will be made in key areas, overall competitiveness will be significantly enhanced, advantageous industries will form global innovation leadership capabilities, and industrialization will be fully realized.

Step 3: When the People’s Republic of China celebrates its 100th anniversary, its status as a manufacturing power will be further consolidated, and its comprehensive strength will be among the world’s manufacturing powers. The main areas of manufacturing will have innovation leadership capabilities and obvious competitive advantages, and a world-leading technology system and industrial system will be built.

Main indicators of manufacturing in 2020 and 2025

Category	Metrics	2013	2015	2020	2025
Innovation capability	Ratio of internal expenditure on research and development funds in manufacturing enterprises above designated size to main business income (%)	0.88	0.95	1.26	1.68
	Number of valid invention patents	0.36	0.44	0.70	1.10

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	per 100 million yuan of main business income in manufacturing enterprises above designated size[1] (unit)				
Quality and efficiency	Manufacturing quality competitiveness index[2]	83.1	83.5	84.5	85.5
	Increase in manufacturing value-added rate	-	-	Increase by 2 percentage points compared with 2015	Increase by 4 percentage points compared with 2015
	Increase in labor productivity growth rate of manufacturing industry (%)	-	-	Around 7.5 (average annual growth rate during the 13th Five-Year Plan period)	Around 6.5 (average annual growth rate during the 14th Five-Year Plan period)
Integration of industrialization and information technology	Broadband penetration rate [3] (%)	37	50	70	82
	Popularity rate of digital research and development and design tools [4] (%)	52	58	72	84
	Numerical control rate of key processes [5] (%)	27	33	50	64
Green	Decline in energy consumption	-	-	Decrease by	Decrease by 34%

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development	per unit of industrial added value above designated size			18% compared to 2015	compared to 2015
	Decrease in carbon dioxide emissions per unit of industrial added value	-	-	Decrease by 22% compared to 2015	Decrease by 40% compared to 2015
	Decline in water consumption per unit of industrial added value	-	-	Decrease by 23% compared to 2015	Decrease by 41% compared to 2015
	Comprehensive utilization rate of industrial solid waste (%)	62	65	73	79

1 Number of valid invention patents per 100 million yuan of main business income of manufacturing enterprises above designated size = number of valid invention patents of manufacturing enterprises above designated size / main business income of manufacturing enterprises above designated size.

2 Manufacturing quality competitiveness index is an economic and technical comprehensive indicator reflecting the overall quality level of China’s manufacturing industry. It is calculated from 12 specific indicators in two aspects: quality level and development capacity.

3 Broadband penetration rate is represented by fixed broadband household penetration rate, fixed broadband household penetration rate = number of fixed broadband household users / number of households.

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4 Digital research and development and design tool penetration rate = number of enterprises above designated size that apply digital research and development and design tools / total number of enterprises above designated size (relevant data comes from 30,000 sample enterprises, the same below).

5 Numerical contract rate of key processes is the average numerical control rate of key processes of industrial enterprises above designated size.

III. Strategic tasks and priorities

To achieve the strategic goal of becoming a manufacturing power, we must adhere to problem orientation, make overall plans, and highlight key points; we must build consensus across society, accelerate the transformation and upgrading of the manufacturing industry, and comprehensively improve the quality of development and core competitiveness.

(I) Improve the innovation capacity of the national manufacturing industry.

Improve the manufacturing innovation system with enterprises as the main body, market-oriented, and combining government, industry, academia, research and application. Deploy the innovation chain around the industrial chain, allocate the resource chain around the innovation chain, strengthen the key core technology research, accelerate the industrialization of scientific and technological achievements, and improve the innovation capabilities of key links and key areas.

Strengthen the research and development of key core technologies. Strengthen the leading role of enterprises in technological innovation, support enterprises to improve their innovation capabilities, promote the construction of national technological innovation demonstration enterprises and enterprise technology centers, and fully absorb enterprises to participate in the decision-making and implementation of national science and technology plans. Focus on the major strategic needs of the country and the commanding heights of future industrial development, regularly study, formulate and publish technological innovation roadmaps in key areas of manufacturing. Continue to implement major national science and technology projects, and support the research and development of key core technologies through national science and technology plans (special projects, funds, etc.). Give full play to the leading role of key industry enterprises and the basic role of colleges and universities and research institutes, establish a number of industrial innovation alliances, carry out collaborative innovation among

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government, industry, academia, research and application, overcome a number of key common technologies that have a global impact and strong driving force on the overall improvement of industrial competitiveness, and accelerate the transformation of results.

Improve innovative design capabilities. Carry out innovative design demonstrations in key areas such as traditional manufacturing, strategic emerging industries, and modern service industries, and comprehensively promote the application of advanced design technologies characterized by green, smart, and collaborative. Strengthen the research and development of common key technologies in the design field, overcome common technologies such as information design, process integration design, complex process and system design, develop a number of key design tool software with independent intellectual property rights, and build and improve the innovative design ecosystem. Build a number of innovative design clusters with global influence, cultivate a number of professional and open industrial design companies, encourage OEM companies to establish research and design centers, and transform to OEM design and export of independent brand products. Develop various types of innovative design education, establish a national industrial design award, and stimulate the enthusiasm and initiative of innovative design in the whole society.

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Promote the industrialization of scientific and technological achievements. Improve the operation mechanism of scientific and technological achievements transformation, study and formulate guiding opinions on promoting the transformation and industrialization of scientific and technological achievements, establish and improve the information release and sharing platform of scientific and technological achievements, and improve the technology transfer and industrialization service system with the technology trading market as the core. Improve the incentive mechanism for the transformation of scientific and technological achievements, promote the reform of the use, disposal and income management of scientific and technological achievements of public institutions, and improve the scientific evaluation and market pricing mechanism of scientific and technological achievements. Improve the mechanism for the coordinated promotion of the transformation of scientific and technological achievements, guide the government, industry, academia, research and application to strengthen cooperation in accordance with market laws and innovation laws, and encourage enterprises and social capital to establish a number of pilot bases engaged in technology integration, maturation and engineering. Accelerate the transformation and industrialization process of national defense scientific and technological achievements, and promote the two-way transfer and transformation of military and civilian technologies.

Improve the national manufacturing innovation system. Strengthen top-level design, accelerate the establishment of a manufacturing innovation network with innovation centers as the core carrier and public service platforms and engineering data centers as important supports, and establish a market-oriented innovation direction selection mechanism and a risk-sharing and benefit-sharing mechanism that encourages innovation. Make full use of existing scientific and technological resources, focus on the major common needs of the manufacturing industry, adopt new mechanisms and models such as government-society cooperation, government-industry-university-research-application industry innovation strategic alliances, form a number of manufacturing innovation centers (industrial technology research bases), and carry out key common major technology research and industrial application demonstrations. Build a number of public service platforms to promote collaborative innovation in the manufacturing industry, standardize service standards, carry out professional services such as technology

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research and development, inspection and testing, technology evaluation, technology trading, quality certification, and talent training, and promote the transformation and promotion of scientific and technological achievements. Build a manufacturing engineering data center in key areas to provide enterprises with open sharing services for innovative knowledge and engineering data. Focus on key common technologies in the manufacturing industry, build a number of major scientific research and experimental facilities to improve the system integration capabilities of core enterprises and promote the extension to the high end of the value chain.

Column 1 Manufacturing innovation center (industrial technology research base) construction project
Focus on the major common needs of transformation and upgrading of key industries and innovative development in the fields of new generation information technology, smart manufacturing, additive manufacturing, new materials, biomedicine, etc., form a number of manufacturing innovation centers (industrial technology research bases), focus on the research and development of industry foundation and common key technologies, industrialization of achievements, talent training, etc. Formulate and improve the standards and procedures for the selection, assessment and management of manufacturing innovation centers. By 2020, focus on forming about 15 manufacturing innovation centers (industrial technology research bases), and strive to form about 40 manufacturing innovation centers (industrial technology research bases) by 2025.

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Strengthen the construction of the standard system. Reform the standard system and standardization management system, organize and implement the manufacturing standardization improvement plan, and carry out comprehensive standardization work in key areas such as smart manufacturing. Give full play to the important role of enterprises in standard formulation, support the establishment of key field standard promotion alliances, build standard innovation research bases, and jointly promote product research and development and standard formulation. Formulate group standards that meet market and innovation needs, and establish a self-declaration disclosure and supervision system for enterprise product and service standards. Encourage and support enterprises, research institutes, industry organizations, etc. to participate in the formulation of international standards and accelerate the internationalization process of China’s standards. Vigorously promote the adoption of advanced civilian standards for national defense equipment and promote the transformation and application of military technical standards to the civilian field. Do a good job in the publicity and implementation of standards and vigorously promote the implementation of standards.

Strengthen the use of intellectual property rights. Strengthen the intellectual property rights reserve of key core technologies in key areas of manufacturing and build an industrialization-oriented patent portfolio and strategic layout. Encourage and support enterprises to use intellectual property rights to participate in market competition, cultivate a group of advantageous enterprises with comprehensive intellectual property rights strength, support the establishment of intellectual property rights alliances, and promote market players to carry out the coordinated use of intellectual property rights. Steady progress in the decryption and market-oriented application of national defense intellectual property rights. Establish and improve the intellectual property rights review mechanism, encourage and support industry backbone enterprises and professional institutions to cooperate in patent evaluation, acquisition, operation, risk warning and response in key areas. Build a public service platform for the comprehensive use of intellectual property rights. Encourage cross-border intellectual property rights licensing. Study and formulate policies and measures to reduce the cost of intellectual property application, protection and rights protection for small and medium-sized enterprises.

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(II) Promote the deep integration of informatization and industrialization.

Accelerate the integration and development of new-generation information technology and manufacturing technology, and take smart manufacturing as the main direction of the deep integration of the two industries; focus on the development of smart equipment and smart products, promote the smart transformation of production processes, cultivate new production methods, and comprehensively improve the smart level of enterprise research and development, production, management and services.

Research and formulate smart manufacturing development strategies. Formulate smart manufacturing development plans, clarify development goals, key tasks and major layouts. Accelerate the formulation of smart manufacturing technology standards, and establish and improve the management standard system of smart manufacturing and the integration of the two industries. Strengthen application traction, establish an smart manufacturing industry alliance, and jointly promote the research and development of smart equipment and products, system integration innovation and industrialization. Promote the comprehensive integrated application of industrial Internet, cloud computing, and big data in the entire process and the entire industrial chain of enterprise research and development design, production and manufacturing, business management, sales and services. Strengthen the construction of network security protection capabilities of smart manufacturing industrial control systems, and improve the comprehensive protection system.

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Accelerate the development of smart manufacturing equipment and products. Organize the research and development of smart manufacturing equipment and smart production lines such as high-end numerical control machine tools, industrial robots, additive manufacturing equipment with deep perception, smart decision-making, and automatic execution functions, break through new sensors, smart measuring instruments, industrial control systems, servo motors and drivers, reducers and other smart core devices, and promote engineering and industrialization. Accelerate the smart transformation of production equipment in industries such as machinery, aviation, shipbuilding, automobiles, light industry, textiles, food, and electronics, and improve precision manufacturing and agile manufacturing capabilities. Coordinate the layout and promote the research and development and industrialization of products such as smart transportation tools, smart engineering machinery, service robots, smart home appliances, smart lighting appliances, and wearable devices.

Promote the smart transformation of the manufacturing process. Pilot the construction of smart factories/digital workshops in key areas, accelerate the application of technologies and equipment such as human-machine smart interaction, industrial robots, smart logistics management, and additive manufacturing in the production process, and promote the simulation optimization, digital control, real-time monitoring of status information, and adaptive control of manufacturing processes. Accelerate the promotion and application of product life cycle management, customer relationship management, and supply chain management systems, promote the integration of key links such as group management, design and manufacturing, production, supply and marketing integration, and business and financial connection, and realize smart management and control. Accelerate the construction of smart detection and supervision systems for key industries such as civilian explosives, hazardous chemicals, food, printing and dyeing, rare earths, and pesticides, and improve the level of smart transformation.

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Deepen the application of the Internet in the manufacturing field. Formulate a roadmap for the integrated development of the Internet and manufacturing industry, and clarify the development direction, goals and paths. Develop new manufacturing models such as personalized customization, crowdsourcing design, and cloud manufacturing based on the Internet, and promote the formation of research and development, manufacturing, and industrial organization methods based on dynamic perception of consumer demand. Establish an open industrial ecosystem with complementary advantages and win-win cooperation. Accelerate the development and application demonstration of Internet of Things technologies, and cultivate new industrial Internet applications such as smart monitoring, remote diagnosis management, and full industrial chain traceability. Implement pilot projects for innovative applications of industrial cloud and industrial big data, build a number of high-quality industrial cloud services and industrial big data platforms, and promote the open sharing of software and services, design and manufacturing resources, key technologies and standards.

Strengthen the construction of Internet infrastructure. Strengthen the planning and layout of industrial Internet infrastructure construction, and build an industrial Internet with low latency, high reliability, and wide coverage. Accelerate the deployment and construction of optical fiber networks, mobile communication networks and wireless local area networks in manufacturing clusters, realize broadband upgrades of information networks, and improve the broadband access capabilities of enterprises. Focus on the research and development and application needs of information-physical system networks, organize the development of smart control systems, industrial application software, fault diagnosis software and related tools, sensor and communication system protocols, and realize real-time connection, accurate identification, effective interaction and smart control of people, equipment and products.

Column 2 Smart manufacturing project
Focus on the key links in key manufacturing fields, carry out integrated innovation and engineering applications of the integration of new generation information technology and manufacturing

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equipment. Support joint research by government, industry, academia, research and application, develop smart products and autonomous and controllable smart devices and realize industrialization. Rely on advantageous enterprises, focus on the smart transformation of key processes, robot replacement of key positions, smart optimization and control of production processes, and supply chain optimization, and build smart factories/digital workshops in key areas. In key areas, industries and enterprises with good basic conditions and urgent needs, implement pilot demonstrations and application promotion of process manufacturing, discrete manufacturing, smart equipment and products, new formats and models, smart management, and smart services in a classified manner. Establish a smart manufacturing standard system and information security assurance system, and build a smart manufacturing network system platform.

By 2020, the level of smart transformation in key manufacturing areas will be significantly improved, the operating costs of pilot demonstration projects will be reduced by 30%, the product production cycle will be shortened by 30%, and the product defect rate will be reduced by 30%. By 2025, key manufacturing areas will be fully smart transformed, the operating costs of pilot demonstration projects will be reduced by 50%, the product production cycle will be shortened by 50%, and the product defect rate will be reduced by 50%.

(III) Strengthen industrial basic capabilities.

The weak industrial base capabilities such as core basic parts (components), advanced basic processes, key basic materials and industrial technology bases (hereinafter collectively referred to as the “four bases”) are the crux of restricting the innovative development and quality improvement of China’s manufacturing industry. Adhere to the principles of problem orientation, integration of production and demand, collaborative innovation, and key breakthroughs, and strive to break the bottlenecks that restrict the development of key industries.

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Coordinate the development of the “four bases”. Formulate an implementation plan for industrial strengthening, clarify key directions, main goals and implementation paths. Formulate a guidance catalog for the development of the “four bases” of industry, publish an industrial strengthening development report, and organize and implement the industrial strengthening project. Coordinate military and civilian resources, carry out joint research on military and civilian dual-use technologies, support the effective mutual use of military and civilian technologies, and promote the integrated development of basic fields. Strengthen the construction of standards and measurement systems in basic fields, accelerate the implementation of benchmarking and compliance, and improve the quality, reliability and life of basic products. Establish a multi-department coordination and promotion mechanism to guide various factors to gather in basic fields.

Strengthen the construction of innovation capabilities of the “four bases”. Strengthen forward-looking basic research and focus on solving key common technologies that affect the performance and stability of core basic parts (components). Establish a basic process innovation system, use existing resources to establish key common basic process research institutions, and carry out joint research on key manufacturing processes such as advanced molding and processing; support enterprises to carry out process innovation and cultivate process professionals. Increase the research and development of basic special materials, improve the self-sufficiency guarantee capability and preparation technology level of special materials. Establish a national industrial basic database, and strengthen the collection, management, application and accumulation of enterprise test and measurement data. Increase support for technology research and development in the “four bases” field, and guide industrial investment funds and venture capital funds to invest in key projects in the “four bases” field.

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Promote the coordinated development of complete machine enterprises and “four bases” enterprises. Focus on demand-side incentives, combine production and use, and jointly tackle key problems. Rely on national science and technology plans (special projects, funds, etc.) and related projects, in key areas such as numerical control machine tools, rail transit equipment, aerospace, and power generation equipment, guide complete machine enterprises and “four bases” enterprises, universities, and research institutes to match production and demand, establish industrial alliances, form a new model of collaborative innovation, production and use integration, and market-driven development of basic industries, and improve the level of independent control of major equipment. Carry out industrial base strengthening demonstration applications, improve the first unit (set) and first batch policies, and support the promotion and application of core basic parts (components), advanced basic processes, and key basic materials.

Column 3 Industrial base strengthening project
Carry out demonstration applications, establish reward and risk compensation mechanisms, and support the first batch or cross-field application of core basic parts (components), advanced basic processes, and key basic materials. Organize key breakthroughs, and support leading enterprises to carry out joint research and development of government, industry, academia, and research for the urgent needs of key technologies and products of major projects and key equipment, and break through the bottlenecks of engineering and industrialization of key basic materials and core basic parts. Strengthen platform support, layout and establish a number of “four bases” research centers, create a number of public service platforms, and improve the key industrial technology foundation system. By 2020, 40% of core basic parts and key basic materials will be independently guaranteed, and the situation of being restricted by people will be gradually alleviated. The advanced manufacturing

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processes of core basic parts (components) and key basic materials urgently needed by industries such as aerospace equipment, communication equipment, power generation and transmission and transformation equipment, engineering machinery, rail transportation equipment, and household appliances will be promoted and applied. By 2025, 70% of core basic parts and key basic materials will be independently guaranteed, 80 iconic advanced processes will be promoted and applied, some of which will reach the international leading level, and a relatively complete industrial technology foundation service system will be established, gradually forming an industrial innovation and development pattern with coordinated interaction between whole machine traction and basic support.

(IV) Strengthen quality brand building.

Improve quality control technology, improve quality management mechanism, consolidate the foundation for quality development, optimize the quality development environment, and strive to achieve a significant improvement in the quality of manufacturing. Encourage enterprises to pursue excellent quality, form famous brand products with independent intellectual property rights, and continuously enhance corporate brand value and the overall image of Made in China.

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Promote advanced quality management technologies and methods. Build a platform for the certification of key product standards compliance, and promote key product technologies and safety standards to reach international advanced levels. Carry out quality benchmarks and leading enterprise demonstration activities, and popularize advanced production management models and methods such as performance excellence, Six Sigma, lean production, quality diagnosis, and continuous quality improvement. Support enterprises to improve online quality monitoring, online control, and product quality traceability throughout the life cycle. Organize and carry out process optimization actions in key industries to improve the control level of key process processes. Carry out demonstration and promotion of mass quality management activities such as quality management teams and on-site improvements. Strengthen quality management of small and medium-sized enterprises, and carry out quality and safety training, diagnosis and counseling activities.

Accelerate the improvement of product quality. Implement the action plan for improving the quality of industrial products. For key industries such as automobiles, high-end numerical control machine tools, rail transit equipment, large-scale complete sets of technical equipment, engineering machinery, special equipment, key raw materials, basic parts, and electronic components, organize to overcome a number of key common quality technologies that have long plagued product quality improvement, strengthen the development and application of reliability design, testing and verification technologies, and promote the use of advanced molding and processing methods, online detection devices, smart production and logistics systems and testing equipment, so that the performance stability, quality reliability, environmental adaptability, and service life of key physical products can reach the advanced level of similar products internationally. Implement quality management, quality self-declaration, and quality traceability systems covering the entire life cycle of products in the fields of food, medicine, baby products, and home appliances to ensure the quality and safety of key consumer products. Vigorously improve the quality reliability of national defense equipment and enhance the actual combat capability of national defense equipment.

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Improve the quality supervision system. Improve the product quality standard system, policy planning system, and quality management laws and regulations. Strengthen industry access and market exit management in key areas such as people’s livelihood and security. Establish a mandatory product accident reporting system for consumer product production and operation enterprises, improve the quality credit information collection and release system, and strengthen the main responsibility of enterprises for quality. Make quality violation records an important part of enterprise integrity rating, establish a quality blacklist system, and increase the crackdown and punishment of quality violations and counterfeit brand behaviors. Establish regional and industry quality and safety early warning systems to prevent and resolve product quality and safety risks. Strictly implement the product “three guarantees” and product recall systems. Strengthen supervision and inspection and accountability to effectively protect consumer rights.

Lay a solid foundation for quality development. Formulate and implement manufacturing quality, safety, hygiene, environmental protection and energy-saving standards that are in line with international advanced levels. Strengthen the research on metrology science and technology foundations and cutting-edge technologies, establish a number of high-accuracy and high-stability metrology base standards urgently needed for the development of the manufacturing industry, and enhance the national traceability capabilities related to the manufacturing industry. Strengthen the construction of national industrial metrology and testing centers, and build a national metrology science and technology innovation system. Improve the inspection and testing technology guarantee system, build a number of high-level industrial product quality control and technical evaluation laboratories, product quality supervision and inspection centers, and encourage the establishment of professional testing technology alliances. Improve the certification and accreditation management model, improve the effectiveness of mandatory product certification, promote the healthy development of voluntary product certification, improve the level of management system certification, and steadily promote international mutual recognition. Support industry organizations to issue self-discipline norms or conventions and carry out quality reputation commitment activities.

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Promote the construction of manufacturing brands. Guide enterprises to formulate brand management systems, focus on the entire process of research and development innovation, production and manufacturing, quality management and marketing services, improve internal qualities, and consolidate the foundation for brand development. Support a number of professional service agencies for brand cultivation and operation, and carry out brand management consulting, market promotion and other services. Improve the registration and management system for collective trademarks and certification trademarks. Create a number of industrial cluster regional brands with distinctive characteristics, strong competitiveness and good market reputation. Build brand culture, guide enterprises to enhance brand awareness with quality and reputation as the core, establish brand consumption concepts, and enhance brand added value and soft power. Accelerate the internationalization process of brand value evaluation in China, give full play to the role of various media, increase the publicity and promotion of Chinese brands, and establish a good image of Made in China brands.

(V) Comprehensively promote green manufacturing.

Increase the research and development of advanced energy-saving and environmentally friendly technologies, processes and equipment, and accelerate the green transformation and upgrading of the manufacturing industry; actively promote low-carbonization, recycling and intensification, and improve the resource utilization efficiency of the manufacturing industry; strengthen the green management of the entire life cycle of products, and strive to build an efficient, clean, low-carbon and circular green manufacturing system.

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Accelerate the green transformation and upgrading of the manufacturing industry. Comprehensively promote the green transformation of traditional manufacturing industries such as steel, nonferrous metals, chemicals, building materials, light industry, printing and dyeing, vigorously develop and promote green process technology equipment such as waste heat and pressure recovery, water recycling, heavy metal pollution reduction, toxic and harmful raw material substitution, waste slag resource utilization, desulfurization, denitrification and dust removal, and accelerate the application of clean and efficient casting, forging, welding, surface treatment, cutting and other processing technologies to achieve green production. Strengthen the research and development and application of green products, promote lightweight, low power consumption, easy recycling and other technical processes, continuously improve the energy efficiency level of terminal energy-consuming products such as motors, boilers, internal combustion engines and electrical appliances, and accelerate the elimination of backward electromechanical products and technologies. Actively lead the green development of emerging industries from a high starting point, significantly reduce the energy consumption and restricted substance content of electronic information products in production and use, build green data centers and green base stations, and vigorously promote the green and low-carbon development of new materials, new energy, high-end equipment, and bio-industries.

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Promote efficient recycling of resources. Support enterprises to strengthen technological innovation and management, enhance green lean manufacturing capabilities, and significantly reduce energy consumption, material consumption, and water consumption. Continue to increase the use ratio of green and low-carbon energy, carry out the construction of distributed green smart microgrids in industrial parks and enterprises, and control and reduce fossil energy consumption. Fully implement circular production methods to promote linkage and symbiosis, mutual supply of raw materials, and resource sharing among enterprises, parks, and industries. Promote the standardized and large-scale development of resource recycling and utilization industries, strengthen technical equipment support, and improve the comprehensive utilization level of bulk industrial solid waste, scrap metals, and discarded electrical and electronic products. Vigorously develop the remanufacturing industry, implement high-end remanufacturing, smart remanufacturing, and in-service remanufacturing, promote product certification, and promote the sustainable and healthy development of the remanufacturing industry.

Actively build a green manufacturing system. Support enterprises to develop green products, promote ecological design, significantly improve the energy-saving, environmental protection and low-carbon level of products, and guide green production and green consumption. Build green factories to achieve intensive plant construction, harmless raw materials, clean production, waste resource utilization, and low-carbon energy. Develop green parks, promote industrial park industrial coupling, and achieve near-zero emissions. Create a green supply chain, accelerate the establishment of a procurement, production, marketing, recycling and logistics system oriented towards resource conservation and environmental friendliness, and implement the extended producer responsibility system. Strengthen green enterprises and support enterprises to implement green strategies, green standards, green management and green production. Strengthen green supervision, improve energy-saving and environmental protection laws and regulations and standards system, strengthen energy-saving and environmental protection supervision, promote corporate social responsibility reporting system, and carry out green evaluation.

Column 4 Green manufacturing project

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Organize and implement special technical transformations such as energy efficiency improvement, clean production, water conservation and pollution control, and recycling in traditional manufacturing industries. Carry out major energy-saving and environmental protection, comprehensive resource utilization, remanufacturing, and low-carbon technology industrialization demonstrations. Implement plans to improve the level of clean production in key areas, river basins and industries, and steadily promote special projects for the prevention and control of air, water and soil pollution sources. Formulate a standard system for green products, green factories, green parks and green enterprises, and carry out green evaluation.

By 2020, 1,000 green demonstration factories and 100 green demonstration parks will be built, the energy and resource consumption of some heavy chemical industries will reach a turning point, and the emission intensity of major pollutants in key industries will drop by 20%. By 2025, the green development of the manufacturing industry and the unit consumption of major products will reach the world’s advanced level, and the green manufacturing system will be basically established.

(VI) Vigorously promote breakthrough development in key areas.

Aiming at strategic priorities such as new generation information technology, high-end equipment, new materials, and biomedicine, guide the gathering of various social resources, and promote the rapid development of advantageous and strategic industries.

1. New generation of information technology industry.

Integrated circuits and special equipment. Focus on improving the level of integrated circuit design, continuously enrich intellectual property (IP) cores and design tools, break through the core general-purpose chips related to the development of national information and network security and the electronic complete machine industry, and improve the application adaptation capabilities of domestic chips. Master high-density packaging and three-dimensional (3D) micro-assembly technology, and enhance the independent development capabilities of the packaging industry and testing. Form the supply capacity of key manufacturing equipment.

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Information and communication equipment. Master core technologies such as new computing, high-speed interconnection, advanced storage, and systematic security assurance, comprehensively break through the fifth-generation mobile communication (5G) technology, core routing and switching technology, ultra-high-speed and large-capacity smart optical transmission technology, and the core technology and system architecture of the “future network”, and actively promote the development of quantum computing, neural networks, etc. Research and develop high-end servers, large-capacity storage, new routing and switching, new smart terminals, new generation base stations, network security and other equipment to promote the systematic development and large-scale application of core information and communication equipment.

Operating systems and industrial software. Develop industrial basic software such as operating systems in the security field. Break through the core technologies of high-end industrial software such as smart design and simulation and its tools, manufacturing Internet of Things and services, and industrial big data processing, develop independent and controllable high-end industrial platform software and key application software, and establish and improve industrial software integration standards and security evaluation systems. Promote the systematic development and industrial application of independent industrial software.

2. High-end numerical control machine tools and robots.

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High-end numerical control machine tools. Develop a batch of precision, high-speed, high-efficiency, flexible numerical control machine tools and basic manufacturing equipment and integrated manufacturing systems. Accelerate the research and development of cutting-edge technologies and equipment such as high-end numerical control machine tools and additive manufacturing. Focus on improving reliability and precision retention, develop high-end numerical control systems, servo motors, bearings, gratings and other major functional components and key application software to accelerate industrialization. Strengthen the construction of user process verification capabilities.

Robots. Focus on the application needs of industrial robots, special robots such as automobiles, machinery, electronics, dangerous goods manufacturing, national defense and military industry, chemicals, light industry, and service robots such as medical health, family services, education and entertainment, actively develop new products, promote the standardization and modularization of robots, and expand market applications. Break through the technical bottlenecks of key parts such as robot bodies, reducers, servo motors, controllers, sensors and drivers, and system integration design and manufacturing.

3. Aerospace and astronavigation equipment.

Aerospace equipment. Accelerate the development of large aircraft, start the development of wide-body passenger aircraft in due course, and encourage international cooperation in the development of heavy helicopters; promote the industrialization of trunk and branch aircraft, helicopters, drones and general aircraft. Breakthrough the technology of high thrust-to-weight ratio, advanced turboprop (shaft) engines and high bypass ratio turbofan engines, and establish an independent engine development industrial system. Develop advanced airborne equipment and systems to form an independent and complete aviation industry chain.

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Astronavigation equipment. Develop a new generation of launch vehicles and heavy-duty carriers to enhance the ability to enter space. Accelerate the construction of national civil space infrastructure, develop new satellites and other space platforms and payloads, and broadband Internet systems in the air, space and land, and form long-term, continuous and stable satellite remote sensing, communication, navigation and other space information service capabilities. Promote manned space flight and lunar exploration projects, and moderately develop deep space exploration. Promote the transformation of aerospace technology and the application of space technology.

4. Marine engineering equipment and high-tech ships. Vigorously develop deep-sea exploration, resource development and utilization, offshore operation support equipment and their key systems and special equipment. Promote the development and engineering of deep-sea space stations and large floating structures. Form comprehensive testing, detection and identification capabilities for marine engineering equipment and improve the level of marine development and utilization. Break through the design and construction technology of luxury cruise ships, comprehensively enhance the international competitiveness of high-tech ships such as liquefied natural gas ships, and master the core technologies of integrated, smart and modular design and manufacturing of key supporting equipment.

5. Advanced rail transit equipment. Accelerate the application of new materials, new technologies and new processes, focus on breakthroughs in systematic safety assurance, energy conservation and environmental protection, digital transformation and network transformation technologies, and develop advanced, reliable and applicable products and lightweight, modular and systematic products. Develop a new generation of green, smart, high-speed and heavy-duty rail transit equipment systems, provide users with overall solutions around the entire life cycle of the system, and establish a world-leading modern rail transit industry system.

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6. Energy-saving and new energy vehicles. Continue to support the development of electric vehicles and fuel cell vehicles, master the core technologies of low-carbonization, informatization and smart transformation of automobiles, improve the engineering and industrialization capabilities of core technologies such as power batteries, drive motors, high-efficiency internal combustion engines, advanced transmissions, lightweight materials, and smart control, form a complete industrial system and innovation system from key parts to complete vehicles, and promote the integration of independent brand energy-saving and new energy vehicles with international advanced levels.

7. Power equipment. Promote the industrialization and demonstration application of large-scale, high-efficiency and ultra-clean emission coal-fired power units, and further improve the manufacturing level of ultra-large capacity hydropower units, nuclear power units, and heavy-duty gas turbines. Promote the development of new energy and renewable energy equipment, advanced energy storage devices, and power transmission and transformation and user-end equipment for smart grids. Break through the manufacturing and application technologies of key components and materials such as high-power power electronic devices and high-temperature superconducting materials, and form industrialization capabilities.

8. Agricultural machinery equipment. Focus on the development of advanced agricultural machinery and equipment used in the main production processes of grain, cotton, oil, sugar and other major grains and strategic cash crops such as breeding, tillage, planting, management, harvesting, transportation and storage, and accelerate the development of high-end agricultural equipment and key core parts such as large tractors and their complex operating tools, large and efficient combine harvesters. Improve the information collection, smart decision-making and precision operation capabilities of agricultural machinery and equipment, and promote the formation of an overall information-based solution for agricultural production.

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9. New materials. Focus on the development of special metal functional materials, high-performance structural materials, functional polymer materials, special inorganic non-metallic materials and advanced composite materials, accelerate the research and development of key technologies and equipment for the preparation of new materials such as advanced smelting, solidification molding, vapor deposition, profile processing, and efficient synthesis, strengthen basic research and system construction, and break through the bottleneck of industrial preparation. Actively develop special new materials for military and civilian use, accelerate the two-way transfer and transformation of technology, and promote the development of military-civilian integration of the new materials industry. Pay close attention to the impact of disruptive new materials on traditional materials, and make early layout and research and development of strategic frontier materials such as superconducting materials, nanomaterials, graphene, and bio-based materials. Accelerate the upgrading of basic materials.

10. Biomedicine and high-performance medical devices. Develop new products of chemical drugs, traditional Chinese medicine, and biotechnology drugs for major diseases, focusing on new mechanism and new target chemical drugs, antibody drugs, antibody-drug conjugates, new structural proteins and peptide drugs, new vaccines, innovative traditional Chinese medicines with outstanding clinical advantages, and personalized therapeutic drugs. Improve the innovation ability and industrialization level of medical devices, focus on the development of high-performance diagnostic and treatment equipment such as imaging equipment and medical robots, high-value medical consumables such as fully degradable vascular stents, and mobile medical products such as wearables and remote diagnosis and treatment. Achieve breakthroughs and applications of new technologies such as biological 3D printing and induced pluripotent stem cells.

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Column 5 High-end equipment innovation project
Organize and implement a number of innovation and industrialization special projects and major projects such as large aircraft, aircraft engines and gas turbines, civil aerospace, smart green trains, energy-saving and new energy vehicles, marine engineering equipment and high-tech ships, smart grid complete sets of equipment, high-end numerical control machine tools, nuclear power equipment, and high-end diagnostic and treatment equipment. Develop a number of key products and major equipment with strong symbolic and driving force, improve the level of independent design and system integration capabilities, break through the bottlenecks of common key technologies and engineering and industrialization, organize application pilots and demonstrations, improve innovation and development capabilities and international competitiveness, and seize the commanding heights of competition. By 2020, the above mentioned fields will achieve independent research and development and application. By 2025, the market share of high-end equipment with independent intellectual property rights will be greatly increased, the external dependence of core technologies will be significantly reduced, the basic supporting capabilities will be significantly enhanced, and the equipment in important fields will reach the international leading level.

(VII) Deepen the structural adjustment of the manufacturing industry.

Promote traditional industries to move towards medium and high-end, gradually resolve overcapacity, promote the coordinated development of large enterprises and small and medium-sized enterprises, and further optimize the layout of the manufacturing industry.

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Continue to promote enterprise technological transformation. Clarify the policy direction of supporting the implementation of technological transformation of strategic major projects and high-end equipment, stabilize the scale of central technological transformation guidance funds, and establish a long-term mechanism to support enterprise technological transformation through interest subsidies and other means. Promote legislation related to technological transformation, strengthen incentive and constraint mechanisms, and improve the policy system to promote enterprise technological transformation. Support key industries, high-end products, and key links to carry out technological transformation, guide enterprises to adopt advanced and applicable technologies, optimize product structure, comprehensively improve the level of design, manufacturing, technology, and management, and promote the development of industries such as steel, petrochemicals, engineering machinery, light industry, and textiles to the high end of the value chain. Research and formulate investment guidelines for technological transformation of key industries and key project guidance plans, attract social capital participation, and optimize the industrial investment structure. Focus on the transformation of traditional fields such as the integration of industrialization and information technology, energy conservation and consumption reduction, quality improvement, and safe production, promote the application of new technologies, new processes, new equipment, and new materials to improve the production technology level and efficiency of enterprises.

Steadily resolve the contradiction of overcapacity. Strengthen and improve macroeconomic regulation, follow the principle of “digesting a batch, transferring a batch, integrating a batch, and eliminating a batch”, implement policies by industry and classification, and effectively resolve the contradiction of overcapacity. Strengthen industry norms and access management, promote enterprises to improve the level of technical equipment, and optimize existing production capacity. Strengthen dynamic monitoring and analysis of industries with serious overcapacity, establish and improve early warning mechanisms, and guide enterprises to actively withdraw from overcapacity industries. Give full play to the role of market mechanisms, comprehensively use legal, economic, technical and necessary administrative means to accelerate the elimination of backward production capacity.

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Promote the coordinated development of large, medium and small enterprises. Strengthen the market status of enterprises, support strategic cooperation between enterprises and cross-industry and cross-regional mergers and reorganizations, improve the level of scale and intensive operation, and cultivate a group of enterprise groups with strong core competitiveness. Stimulate the entrepreneurial and innovative vitality of small and medium-sized enterprises, and develop a group of specialized “little giant” enterprises with outstanding main business, strong competitiveness, good growth and focus on market segments. Give full play to the demonstration role of Sino-foreign small and medium-sized enterprise cooperation parks, and use bilateral and multilateral small and medium-sized enterprise cooperation mechanisms to support small and medium-sized enterprises to go out and bring in. Guide large enterprises and small and medium-sized enterprises to establish collaborative innovation and win-win cooperation through various means such as professional division of labor, service outsourcing, and order production. Promote the construction of a number of high-level small and medium-sized enterprise clusters.

Optimize the development layout of the manufacturing industry. Implement the national regional development overall strategy and the main functional area planning, comprehensively consider factors such as resources and energy, environmental capacity, and market space, formulate and implement key industry layout plans, and adjust and optimize the layout of major productive forces. Improve the guidance catalogue of industrial transfer, build a national industrial transfer information service platform, create a number of demonstration parks for industrial transfer, guide the rational and orderly transfer of industries, and promote the coordinated development of manufacturing industries in the east, middle and west. Actively promote the coordinated development of industries in the Beijing-Tianjin-Hebei region and the Yangtze River Economic Belt. In accordance with the requirements of new industrialization, transform and upgrade existing manufacturing agglomeration areas, and promote the transformation and upgrading of industrial agglomeration to industrial clusters. Build a number of new industrialization demonstration bases with outstanding characteristics and advantages, efficient industrial chain coordination, strong core competitiveness, and a sound public service system.

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(VIII) Actively develop service-oriented manufacturing and productive services.

Accelerate the coordinated development of manufacturing and services, promote business model innovation and format innovation, and promote the transformation of production-oriented manufacturing to service-oriented manufacturing. Vigorously develop productive services closely related to manufacturing, and promote the construction of service functional areas and service platforms.

Promote the development of service-oriented manufacturing. Study and formulate guiding opinions on promoting the development of service-oriented manufacturing, and implement the action plan for service-oriented manufacturing. Carry out pilot demonstrations, guide and support manufacturing enterprises to extend the service chain, and transform from mainly providing product manufacturing to providing products and services. Encourage manufacturing enterprises to increase investment in service links, develop personalized customization services, full life cycle management, network precision marketing and online support services, etc. Support qualified enterprises to transform from providing equipment to providing system integration general contracting services, and from providing products to providing overall solutions. Encourage advantageous manufacturing enterprises to “split” their professional advantages and provide socialized and professional services to the industry through business process reengineering. Support qualified manufacturing enterprises to establish financial institutions such as corporate finance companies and financial leasing companies, and promote financing leasing services such as large-scale manufacturing equipment and production lines.

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Accelerate the development of productive services. Vigorously develop information technology services for the manufacturing industry, and improve the solution design, development, and comprehensive integration capabilities of information application systems in key industries. Encourage Internet and other enterprises to develop innovative models such as mobile e-commerce, online customization, and online to offline, actively develop dynamic monitoring and forecasting and early warning of products and markets, achieve seamless connection with manufacturing enterprises, and innovate business collaboration processes and value creation models. Accelerate the development of scientific and technological services such as research and development design, technology transfer, entrepreneurship incubation, intellectual property, and scientific and technological consulting, develop and expand third-party logistics, energy conservation and environmental protection, inspection and testing certification, e-commerce, service outsourcing, financial leasing, human resources services, after-sales services, and brand building, and improve the support capacity for the transformation and upgrading of the manufacturing industry.

Strengthen the construction of service functional areas and public service platforms. Build and upgrade the functional areas of productive services, focus on developing modern services such as research and development design, information, logistics, business, and finance, and enhance radiation capacity. Relying on manufacturing clusters, build a number of public service platforms for productive services. Encourage enterprises in the eastern region to accelerate the transformation of manufacturing services and establish production service bases. Support the development of distinctive and competitive productive services in the central and western regions, accelerate the construction of supporting service facilities and capabilities in industrial transfer areas, and achieve coordinated development of manufacturing and service industries.

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(IX) Improve the level of international development of manufacturing.

Coordinate the use of two resources and two markets, implement a more active opening-up strategy, better combine bringing in and going out, expand new areas and spaces for opening up, improve the level and level of international cooperation, promote the international layout of key industries, and guide enterprises to improve their international competitiveness.

Improve the level of foreign investment and international cooperation. Further liberalize general manufacturing, optimize the opening-up structure, and improve the level of opening up. Guide foreign investment to high-end manufacturing fields such as new generation information technology, high-end equipment, new materials, and biomedicine, and encourage overseas enterprises and scientific research institutions to establish global research and development institutions in China. Support qualified enterprises to issue stocks and bonds overseas, and encourage various forms of technical cooperation with overseas enterprises.

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Improve transnational business capabilities and international competitiveness. Support the development of a number of multinational companies, and accelerate the improvement of core competitiveness through global resource utilization, business process reengineering, industrial chain integration, and capital market operations. Support enterprises to carry out mergers and acquisitions, equity investment, and venture capital overseas, establish research and development centers, experimental bases, and global marketing and service systems; rely on the Internet to carry out network collaborative design, precision marketing, value-added service innovation, media brand promotion, etc., establish a global industrial chain system, and improve international business capabilities and service levels. Encourage advantageous enterprises to accelerate the development of international general contracting and general integration. Guide enterprises to integrate into local culture, enhance social responsibility awareness, strengthen investment and business risk management, and improve enterprises’ overseas localization capabilities.

Deepen international industrial cooperation and accelerate enterprises to go global. Strengthen top-level design, formulate an overall strategy for the development of manufacturing going global, and establish and improve a comprehensive coordination mechanism. Actively participate in and promote international industrial cooperation, implement major strategic deployments such as the Silk Road Economic Belt and the 21st Century Maritime Silk Road, accelerate the construction of interconnection infrastructure with neighboring countries, and deepen industrial cooperation. Give full play to the advantages of opening up along the border, and build a number of overseas manufacturing cooperation parks in countries and regions with conditions. Adhere to government promotion and enterprise-led, innovate business models, and encourage high-end equipment, advanced technology, and superior production capacity to transfer overseas. Strengthen policy guidance, promote industrial cooperation from processing and manufacturing links to cooperative research and development, joint design, marketing, brand cultivation and other high-end links, and improve the level of international cooperation. Innovate processing trade models, extend the domestic value-added chain of processing trade, and promote the transformation and upgrading of processing trade.

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IV. Strategic support and guarantee

Build a strong manufacturing country, we must give full play to the institutional advantages, mobilize all forces, further deepen reforms, improve policies and measures, establish a flexible and efficient implementation mechanism, and create a good environment; we must cultivate an innovative culture and a manufacturing culture with Chinese characteristics, and promote the transformation of the manufacturing industry from large to strong.

(I) Deepen institutional and mechanism reform.

Fully promote administration according to law, accelerate the transformation of government functions, innovate government management methods, strengthen the formulation and implementation of manufacturing development strategies, plans, policies, standards, etc., strengthen industry self-discipline and public service capacity building, and improve the level of industrial governance. Streamline administration and delegate power, deepen the reform of the administrative approval system, standardize approval matters, simplify procedures, and clarify time limits; revise the government-approved investment project catalogue in a timely manner, and implement the main investment status of enterprises. Improve the collaborative innovation mechanism of government, industry, academia, research and application, reform the technical innovation management system and mechanism and the project funding allocation, achievement evaluation and transformation mechanism, promote the capitalization and industrialization of scientific and technological achievements, and stimulate the innovation vitality of the manufacturing industry. Accelerate the market-oriented reform of production factor prices, improve the mechanism in which prices are mainly determined by the market, and rationally allocate public resources; promote the reform of energy conservation, carbon emission rights, pollution discharge rights, and water rights trading systems, accelerate the levy of resource taxes based on price, and promote the reform of environmental protection fees into taxes. Deepen the reform of state-owned enterprises, improve the corporate governance structure, orderly develop the mixed-ownership economy, further break down various forms of industry monopolies, and cancel unreasonable restrictions on the non-public economy. Steadily advance the reform of the national defense science and technology industry and promote the in-depth development of military-civilian integration. Improve the industrial security review mechanism and

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regulatory system, and strengthen security reviews in investment and financing, mergers and acquisitions, and bidding and procurement in important manufacturing fields that are related to the lifeline of the national economy and national security.

(II) Create a fair and competitive market environment.

Deepen the reform of the market access system, implement negative list management, strengthen in-process and post-process supervision, and comprehensively clean up and abolish policies and measures that are not conducive to the construction of a unified national market. Implement a scientific and standardized industry access system, formulate and improve access standards for energy conservation, land conservation, water conservation, environmental protection, technology, safety, etc. in the manufacturing industry, strengthen supervision and inspection of the implementation of national mandatory standards, unify law enforcement, and guide enterprises to carry out structural adjustment and transformation and upgrading through market-oriented means. Effectively strengthen supervision, crack down on the production and sale of counterfeit and shoddy products, severely punish market monopoly and unfair competition, and create a good production and operation environment for enterprises. Accelerate the development of technology markets and improve the mechanisms for the creation, application, management and protection of intellectual property rights. Improve the policy measures such as employee placement, debt repayment, and enterprise conversion involved in the elimination of backward production capacity, and improve the market exit mechanism. Further reduce the burden on enterprises, implement a list of charges involving enterprises, establish a national database of charges involving enterprises, abolish various unreasonable charges and levies, and strengthen supervision, inspection and accountability. Promote the construction of a credit system for manufacturing enterprises, build a credit database for Made in China, and establish and improve a dynamic evaluation mechanism for corporate credit, incentives for keeping promises, and punishment mechanisms for breaking promises. Strengthen the construction of corporate social responsibility, and promote the self-declaration and supervision system of corporate product standards, quality, and safety.

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(III) Improve financial support policies.

Deepen reforms in the financial sector, broaden financing channels for the manufacturing industry, and reduce financing costs. Actively leverage the advantages of policy-based finance, development finance, and commercial finance, and increase support for key areas such as new generation information technology, high-end equipment, and new materials. Support the Export-Import Bank of China to increase its service efforts for the manufacturing industry to go global within its business scope, encourage the National Development Bank to increase its loan issuance to manufacturing enterprises, and guide financial institutions to innovate products and businesses that meet the characteristics of manufacturing enterprises. Improve the multi-level capital market, promote the standardized development of regional equity markets, and support qualified manufacturing enterprises to go public and raise funds at home and abroad and issue various debt financing instruments. Guide venture capital, private equity investment, etc. to support the innovative development of manufacturing enterprises. Encourage qualified manufacturing loans and leasing assets to carry out securitization pilot projects. Support large-scale manufacturing enterprise groups in key areas to carry out pilot projects for the integration of industry and finance, and promote the transformation and upgrading of the manufacturing industry through financial leasing. Explore and develop insurance products and services suitable for the development of the manufacturing industry, and encourage the development of loan guarantee insurance and credit insurance business. Under the premise of controllable risks and commercial sustainability, increase support for manufacturing enterprises to conduct resource exploration and development, establish research and development centers and high-tech enterprises, and acquire and merge overseas through domestic guarantees and foreign loans, foreign exchange and RMB loans, debt financing, equity financing, etc.

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(IV) Increase fiscal and tax policy support.

Make full use of existing channels to strengthen fiscal support for the manufacturing industry, focus on key areas of manufacturing transformation and upgrading such as smart manufacturing, “four bases” development, and high-end equipment, and create a good policy environment for the development of the manufacturing industry. Use the government and social capital cooperation (PPP) model to guide social capital to participate in the construction of major manufacturing projects, enterprise technological transformation and key infrastructure construction. Innovate the fiscal funding support method, gradually shift from “subsidizing construction” to “subsidizing operation”, and improve the efficiency of fiscal funding. Deepen the management reform of science and technology plans (special projects, funds, etc.), support scientific and technological research and development and demonstration applications in key areas of the manufacturing industry, and promote technological innovation, transformation and upgrading, and structural layout adjustment in the manufacturing industry. Improve and implement government procurement policies that support innovation, and promote the research and development and large-scale application of innovative products in the manufacturing industry. Implement and improve incentive policies such as the use of the first major technical equipment, and improve the incentive and constraint mechanisms of research and development and use units in product innovation, value-added services and demonstration applications. Implement tax policies that are conducive to the transformation and upgrading of the manufacturing industry, promote value-added tax reform, improve the method of calculating and verifying enterprise research and development expenses, and effectively reduce the tax burden of manufacturing enterprises.

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(V) Improve the multi-level talent training system.

Strengthen the overall planning and classified guidance of manufacturing talent development, organize and implement manufacturing talent training plans, increase the training of professional and technical talents, business management talents and skilled talents, and improve the talent training system from research and development, transformation, production to management. With the improvement of modern business management level and enterprise competitiveness as the core, implement the enterprise business management talent quality improvement project and the national small and medium-sized enterprise galaxy training project to cultivate a group of outstanding entrepreneurs and high-level business management talents. Focus on high-level, urgently needed and scarce professional and technical talents and innovative talents, implement the professional and technical talent knowledge update project and the advanced manufacturing excellent engineer training plan, build a number of engineering innovation training centers in colleges and universities, and create a team of high-quality professional and technical talents. Strengthen vocational education and skills training, guide a number of general undergraduate colleges and universities to transform into applied technology colleges and universities, establish a number of practical training bases, carry out pilot demonstrations of modern apprenticeship system, and form a team of technical and skilled talents with complete categories and superb skills. Encourage enterprises to cooperate with schools to cultivate scientific research personnel, technical and skilled talents and compound talents urgently needed by the manufacturing industry, deepen the reform of the enrollment and training mode of engineering doctoral and master’s degree graduate students in related fields, and actively promote the integration of industry, academia and research. Strengthen the forecast of industrial talent demand, improve various talent information databases, and build an industrial talent level evaluation system and information release platform. Establish a talent incentive mechanism and increase the recognition and reward of outstanding talents. Establish and improve talent service institutions for the manufacturing industry, and improve the system and mechanism for the flow and use of talents. Adopt various forms to select various outstanding talents, with a focus on professional and technical talents to study and train abroad, and explore the establishment of international training bases. Increase the efforts to attract talents to the manufacturing industry, and introduce leading talents and scarce talents.

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(VI) Improve policies for small and medium-sized enterprises.

Implement and improve the fiscal and taxation preferential policies to support the development of small and micro enterprises, and optimize the focus and methods of using special funds for the development of small and medium-sized enterprises. Give full play to the leveraging effect of fiscal funds, attract social capital, and accelerate the establishment of the National Small and Medium-sized Enterprise Development Fund. Support qualified private capital to establish small and medium-sized banks and other financial institutions in accordance with the law, encourage commercial banks to increase the construction of specialized institutions for small and micro enterprise financial services, establish and improve the financing guarantee system for small and micro enterprises, and innovate products and services. Accelerate the construction of a credit reporting system for small and medium-sized enterprises, and actively develop financing leasing, intellectual property pledge loans, credit insurance policy pledge loans, etc. for small and micro enterprises. Build and improve entrepreneurship bases for small and medium-sized enterprises, and guide various venture capital funds to invest in small and micro enterprises. Encourage universities, research institutes, engineering centers, etc. to open and share various experimental facilities for small and medium-sized enterprises. Strengthen the construction of a comprehensive service system for small and medium-sized enterprises, improve the public service platform network for small and medium-sized enterprises, establish an information interconnection mechanism, and provide small and medium-sized enterprises with professional services such as entrepreneurship, innovation, financing, consulting, training, and talent.

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(VII) Further expand the opening up of the manufacturing industry.

Deepen the reform of the foreign investment management system, establish a management mechanism for foreign investment pre-entry national treatment plus negative list, implement a management model with filing as the main and approval as the auxiliary, and create a stable, transparent and predictable business environment. Comprehensively deepen the reform of foreign exchange management, customs supervision, and inspection and quarantine management to improve the level of trade and investment facilitation. Further relax market access, revise industrial policies such as steel, chemicals, and ships, support manufacturing enterprises to introduce advanced technology and high-end talents through commissioned development, patent authorization, crowdsourcing and crowd innovation, and promote the use of foreign capital from focusing on the introduction of technology, funds, and equipment to joint ventures and cooperative development, overseas mergers and acquisitions, and the introduction of leading talents. Strengthen legislation on foreign investment, strengthen the legal protection of manufacturing enterprises going global, standardize enterprises’ overseas business operations, and safeguard the legitimate rights and interests of enterprises. Explore the use of industrial funds, state-owned capital income and other channels to support the going global of high-speed rail, power equipment, automobiles, engineering construction and other equipment and advantageous production capacity, and implement overseas investment and mergers and acquisitions. Accelerate the construction and level improvement of the supporting service institutions for the manufacturing industry to go global, establish a public service platform for manufacturing industry’s overseas investment and a technical trade service platform for export products, and improve the early warning and coordination mechanism for responding to trade frictions and major overseas investment issues.

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(VIII) Improve the organizational implementation mechanism.

Establish a national leading group for the construction of a strong manufacturing country, with a leader of the State Council as the group leader and members from relevant departments and units of the State Council. The main responsibilities of the leading group are: Coordinate the overall work of the construction of a strong manufacturing country, review major plans, major policies, major engineering projects, major issues and important work arrangements, strengthen strategic planning, and guide departments and localities to carry out work. The office of the leading group is located in the Ministry of Industry and Information Technology and is responsible for the daily work of the leading group. Set up a strategic advisory committee for the construction of a strong manufacturing country to study forward-looking and strategic major issues in the development of the manufacturing industry and provide consulting and evaluation for major decisions in the manufacturing industry. Support the construction of new think tanks with Chinese characteristics at multiple levels, in multiple fields and in multiple forms, including social think tanks and corporate think tanks, to provide strong intellectual support for the construction of a strong manufacturing country. Establish a supervision and inspection and third-party evaluation mechanism for the implementation of Made in China 2025 tasks, and improve the statistical monitoring, performance evaluation, dynamic adjustment and supervision and assessment mechanism. Establish a mid-term evaluation mechanism for Made in China 2025, and make necessary adjustments to the goals and tasks in a timely manner.

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All regions and departments should fully understand the significance of building a strong manufacturing country, strengthen organizational leadership, improve work mechanisms, and strengthen departmental coordination and top-down linkage. All regions should study and formulate specific implementation plans based on local realities, refine policy measures, and ensure that all tasks are implemented in place. The Ministry of Industry and Information Technology should work with relevant departments to strengthen tracking analysis and supervision and guidance, and report major matters to the State Council in a timely manner.

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