

国务院关于印发《中国制造 2025》的通知
(国发〔2015〕28 号)

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

(No.28 [2005] of the State Council)

各省、自治区、直辖市人民政府，国务院各部委、各直属机构：

现将《中国制造 2025》印发给你们，请认真贯彻执行。

To all people’s governments of the provinces, autonomous regions and municipalities directly under the Central Government and all ministries, commissions and departments directly under the State Council,

Here comes “Made in China (2025)”. Please carry it out conscientiously.

国务院

The State Council

2015 年 5 月 8 日

May 8, 2015

中国制造 2025

Made in China (2025)

制造业是国民经济的主体，是立国之本、兴国之器、强国之基。十八世纪中叶开启工业文明以来，世界强国的兴衰史和中华民族的奋斗史一再证明，没有强大的制造业，就没有国家和民族的强盛。打造具有国际竞争力的制造业，是我国提升综合国力、保障国家安全、建设世界强国的必由之路。

Manufacturing industry is the mainstay of national economy, the foundation for building the country, the means for rejuvenating the country and the base for strengthening the country. Since industrial civilization was initiated in the Mid-18th century, the rise and fall history of world power and struggle history of Chinese nation have repeatedly proved that no powerful manufacturing industry, no powerful

and prosperous country and nation. Development of manufacturing industry with international competitiveness is the inevitable course for our country to improve comprehensive national strength, ensure national security and building world power.

新中国成立尤其是改革开放以来，我国制造业持续快速发展，建成了门类齐全、独立完整的产业体系，有力推动工业化和现代化进程，显著增强综合国力，支撑我世界大国地位。然而，与世界先进水平相比，我国制造业仍然大而不强，在自主创新能力、资源利用效率、产业结构水平、信息化程度、质量效益等方面差距明显，转型升级和跨越发展的任务紧迫而艰巨。

Since the founding of the people's Republic of China especially the reform and opening-up, Chinese manufacturing industry has kept rapid expansion and independent and complete industrial system with a complete range has been built to strongly promote the process of industrialization and modernization, significantly enhance comprehensive national strength, and support the World Power status; however, compared with world-class advanced level, Chinese manufacturing industry is still large but not strong and has distinct gap in aspects of capability of independent innovation, resource use efficiency, level of industrial structure, level of industrial structure and quality benefit. Transformation and upgrading task and leaping development task are urgent and arduous.

当前，新一轮科技革命和产业变革与我国加快转变经济发展方式形成历史性交汇，国际产业分工格局正在重塑。必须紧紧抓住这一重大历史机遇，按照“四个全面”战略布局要求，实施制造强国战略，加强统筹规划和前瞻部署，力争通过三个十年的努力，到新中国成立一百年时，把我国建设成为引领世界制造业发展的制造强国，为实现中华民族伟大复兴的中国梦打下坚实基础。

At present, new rounds of scientific and technical revolution and industrial transformation form a historic intersection with China's accelerating the transformation of economic development mode and the pattern of international industrial specialization is being remade. It's necessary to seize this major historic opportunity to implement the strategy of manufacturing power and strengthen overall planning and prospective deployment according to "four comprehensive" strategic layout requirements, strive to build China into a manufacturing power leading the development of world manufacturing industry through efforts in three decades till

centennial anniversary of new China, and lay a solid foundation for realizing the dream of rejuvenation of the Chinese nation.

《中国制造 2025》，是我国实施制造强国战略第一个十年的行动纲领。

Made in China (2025) is the program of action in the first ten years of implementing the strategy of manufacturing power.

一、发展形势和环境

I. Development Situation and Environment

（一）全球制造业格局面临重大调整。

(I). Global manufacturing pattern is in face of significant adjustment

新一代信息技术与制造业深度融合，正在引发影响深远的产业变革，形成新的生产方式、产业形态、商业模式和经济增长点。各国都在加大科技创新力度，推动三维（3D）打印、移动互联网、云计算、大数据、生物工程、新能源、新材料等领域取得新突破。基于信息物理系统的智能装备、智能工厂等智能制造正在引领制造方式变革；网络众包、协同设计、大规模个性化定制、精准供应链管理、全生命周期管理、电子商务等正在重塑产业价值链体系；可穿戴智能产品、智能家电、智能汽车等智能终端产品不断拓展制造业新领域。我国制造业转型升级、创新发展迎来重大机遇。

A new generation of information technology is deeply integrated with manufacturing industry, which is triggering far-reaching industrial transformation and forming new mode of production, industrial form, business model and economic growth point. All countries are increasing scientific and technological innovation to promote new breakthrough in fields of three-dimensional (3D) printing, mobile internet, cloud computing, big data, bioengineering, new energy and new material. Intelligent manufacturing including intelligent equipment and intelligent plant based on Cyber-physical System are leading the transformation of manufacturing mode; network crowdsourcing, collaborative design, large-scale personalized customization, accurate supply chain management, life-cycle management and electronic commerce are remodeling the system of industrial value chain; intelligent terminal products including wearable intelligent product, intelligent household electrical appliance and intelligent vehicle are constantly expanding the frontier for manufacturing industry. Chinese manufacturing industry are embracing significant opportunity for

transformation, upgrading and innovative development.

全球产业竞争格局正在发生重大调整，我国在新一轮发展中面临巨大挑战。国际金融危机发生后，发达国家纷纷实施“再工业化”战略，重塑制造业竞争新优势，加速推进新一轮全球贸易投资新格局。一些发展中国家也在加快谋划和布局，积极参与全球产业再分工，承接产业及资本转移，拓展国际市场空间。我国制造业面临发达国家和其他发展中国家“双向挤压”的严峻挑战，必须放眼全球，加紧战略部署，着眼建设制造强国，固本培元，化挑战为机遇，抢占制造业新一轮竞争制高点。

Significant adjustment of global industry competition pattern is taking place. China is in face of huge challenge in the new round of development. After international financial crisis, developed countries implement the strategy of “reindustrialization” one after another to reshape competitive edge of manufacturing industry and accelerate new pattern of the new round of global trade investment. Some developing countries speed up the planning and layout, take active part in re-specialization of global industry, undertake industrial transfer, and expand international market space. Chinese manufacturing industry is confronted with severe challenge from “bi-directional compression” of developed and other developing countries. It’s necessary to think globally, intensify strategic deployment, keep construction of manufacturing power in mind, consolidate the basis, turn challenge into opportunity, and race to control a commanding point for manufacturing industry in the new round.

（二）我国经济发展环境发生重大变化。

(II) The economic development condition of our county has a huge change

随着新型工业化、信息化、城镇化、农业现代化同步推进，超大规模内需潜力不断释放，为我国制造业发展提供了广阔空间。各行业新的装备需求、人民群众新的消费需求、社会管理和公共服务新的民生需求、国防建设新的安全需求，都要求制造业在重大技术装备创新、消费品质量和安全、公共服务设施设备供给和国防装备保障等方面迅速提升水平和能力。全面深化改革和进一步扩大开放，将不断激发制造业发展活力和创造力，促进制造业转型升级。

With the synchronous propulsion of new industrialization, informatization, urbanization and agricultural modernization, huge potential for domestic demand is releasing constantly, providing the development of Chinese manufacturing industry

with broad space. New equipment requirements in all industries, new consumer demands of the masses, new livelihood requirements on social management and public service and new security needs in national defense construction all require level and capacity promotion of manufacturing industry in aspects of major technical equipment innovation, quality and safety of consumer goods, provision of facilities for public services and defense equipment guarantee. Comprehensively deepening reform and further extending opening up will constantly inspire energy and creativity for the development of manufacturing industry to promote the transformation and upgrading of manufacturing industry.

我国经济发展进入新常态，制造业发展面临新挑战。资源和环境约束不断强化，劳动力等生产要素成本不断上升，投资和出口增速明显放缓，主要依靠资源要素投入、规模扩张的粗放发展模式难以为继，调整结构、转型升级、提质增效刻不容缓。形成经济增长新动力，塑造国际竞争新优势，重点在制造业，难点在制造业，出路也在制造业。

Chinese economic development has entered into a New Normalcy and the development of manufacturing industry is facing new challenge. Constraints of resources and environment are continuously enhanced, cost of production factors including labor force is constantly rising, investment and export growth slows down quite markedly, and it's hard to sustain the extensive development mode mainly replying on investment of resource elements and scale expansion so there is no time to delay structural adjustment, transformation and upgrading, and improvement of quality and efficiency. The focus, difficulty and outlet for forming new engines of economic growth and molding new advantages of international competition all lie in manufacturing industry.

（三）建设制造强国任务艰巨而紧迫。

(III) The task of building a manufacturing power is arduous and urgent

经过几十年的快速发展，我国制造业规模跃居世界第一位，建立起门类齐全、独立完整的制造体系，成为支撑我国经济社会发展的重要基石和促进世界经济发展的重要力量。持续的技术创新，大大提高了我国制造业的综合竞争力。载人航天、载人深潜、大型飞机、北斗卫星导航、超级计算机、高铁装备、百万千瓦级发电装备、万米深海石油钻探设备等一批重大技术装备取得突破，形成了若干具有国际竞争力的优势产业和骨干企业，我国已具备了建设工业强国的基础和条件。

Chinese manufacturing industry ranks first in the world after several decades of rapid expansion. Independent and complete manufacturing system with a complete range that has been established becomes important cornerstone for supporting economic and social development of our country and significant force for promoting economic development of the world. Continuous technological innovation greatly improves comprehensive competitive power of Chinese manufacturing industry. Breakthroughs have been made in a batch of major technological equipments including manned space aircraft, manned deep-sea vehicle, large aircraft, Beidou navigation system, supercomputer, high-speed train, 1000MW power generator and deep-sea oil drilling equipment and several competitive industries and key enterprises with international competitiveness have been formed. China has possessed the basis and conditions for building an industrial power.

但我国仍处于工业化进程中，与先进国家相比还有较大差距。制造业大而不强，自主创新能力弱，关键核心技术与高端装备对外依存度高，以企业为主体的制造业创新体系不完善；产品档次不高，缺乏世界知名品牌；资源能源利用效率低，环境污染问题较为突出；产业结构不合理，高端装备制造业和生产性服务业发展滞后；信息化水平不高，与工业化融合深度不够；产业国际化程度不高，企业全球化经营能力不足。推进制造强国建设，必须着力解决以上问题。

However, China is still in industrialization process and has relatively large gap when compared with advanced countries. Chinese manufacturing industry is large but not strong. Independent innovation capacity is weak, core technology and high-end equipment have high external dependence, and innovation system of manufacturing industry regarding enterprise as the main body is not perfect; product class is not high and it is short of world famous brand; resource utilization efficiency is low and problem of environmental pollution is prominent; industrial structure is irrational and the development of high-end equipment manufacturing industry and manufacture-related service industry are lagging behind; informationalized level is not high and depth of integration with industrialization is not enough; industrial internationalization is not high and enterprises are not competent enough to operate globally. No effort shall be spared to solve the above problems to promote the construction of a manufacturing power.

建设制造强国，必须紧紧抓住当前难得的战略机遇，积极应对挑战，

加强统筹规划，突出创新驱动，制定特殊政策，发挥制度优势，动员全社会力量奋力拼搏，更多依靠中国装备、依托中国品牌，实现中国制造向中国创造的转变，中国速度向中国质量的转变，中国产品向中国品牌的转变，完成中国制造由大变强的战略任务。

In order to build a manufacturing power, it's necessary to firmly seize the rare strategic opportunity at present, actively respond challenge, strengthen overall planning, highlight innovation driving, formulate specific policy, utilize institutional advantage, mobilize all social forces to strive, and rely more on Chinese equipments and Chinese brands to realize the transformation from Made in China to Design in China, from Chinese Speed to Chinese Quality, and from Chinese products to Chinese brands to complete the strategic task of making large Chinese manufacturing stronger.

二、战略方针和目标

II. Strategic Policy and Target

（一）指导思想。

(I) Guiding ideology

全面贯彻党的十八大和十八届二中、三中、四中全会精神，坚持走中国特色新型工业化道路，以促进制造业创新发展为主题，以提质增效为中心，以加快新一代信息技术与制造业深度融合为主线，以推进智能制造为主攻方向，以满足经济社会发展和国防建设对重大技术装备的需求为目标，强化工业基础能力，提高综合集成水平，完善多层次多类型人才培养体系，促进产业转型升级，培育有中国特色的制造文化，实现制造业由大变强的历史跨越。基本方针是：

Comprehensively implement the party's spirits of the 18th National Congress of the Communist Party of China, the 2nd, 3rd and 4th Plenary Sessions of the 18th CPC Central Committee, adhere to the new path of industrialization with Chinese characteristics, take innovative development of manufacturing industry as the subject, take improvement and quality and efficiency as the center, take acceleration of in-depth integration of a new generation of information technology with manufacturing industry as the main line, take promotion of intelligent manufacturing as the main direction, and take satisfaction of requirements of economic and social development and national defense construction on major technological equipment as the target to intensify industrial base capacity and improve the level of integrated integration, perfect multi-level and multi-type talent training system, promote industry

transformation and upgrading, cultivate manufacturing culture with Chinese characteristics and realize a historical leap of making large manufacturing industry stronger. Basic policies are as follows.

--创新驱动。坚持把创新摆在制造业发展全局的核心位置，完善有利于创新的制度环境，推动跨领域跨行业协同创新，突破一批重点领域关键共性技术，促进制造业数字化网络化智能化，走创新驱动的发展道路。

Innovation driving. Insist to place innovation in the key position for the whole development of manufacturing industry, perfect institutional environment favorable for innovation, drive collaborative innovation crossing different fields and industries, break through a batch of key generic technologies in major fields, promote digitization, networking and intelligentization of manufacturing industry, and follow the innovation-driven development path.

--质量为先。坚持把质量作为建设制造强国的生命线，强化企业质量主体责任，加强质量技术攻关、自主品牌培育。建设法规标准体系、质量监管体系、先进质量文化，营造诚信经营的市场环境，走以质取胜的发展道路。

Quality first. Insist to take quality as lifeline for building a manufacturing power, strengthen corporate quality principal responsibility, enhance striving to make technological breakthrough and cultivating independent brand. Construct laws and regulations standard system, quality supervision system, advanced quality culture, create market environment of integrity management, and follow the development path of winning through high quality.

--绿色发展。坚持把可持续发展作为建设制造强国的重要着力点，加强节能环保技术、工艺、装备推广应用，全面推行清洁生产。发展循环经济，提高资源回收利用效率，构建绿色制造体系，走生态文明的发展道路。

Green development. Insist to take sustainable development as the important focal point for building a manufacturing power, strengthen popularization and application of energy-saving and environmental protection technology, process and equipment, and fully implement cleaner production. Develop circular economy, improve resource recycling efficiency, construct green manufacturing system, and follow the development path of ecological civilization.

--结构优化。坚持把结构调整作为建设制造强国的关键环节，大力发展先进制造业，改造提升传统产业，推动生产型制造向服务型制造转变。优化产业空间布局，培育一批具有核心竞争力的产业集群和企业群体，走提质增效的发展道路。

Structure optimization. Insist to take structural adjustment as the key link for building a manufacturing power, strive to develop advanced manufacturing industry, transform and upgrade traditional industry, and promote the transformation from production-oriented manufacturing to service-oriented manufacturing. Optimize industrial spatial distribution, cultivate a batch of industrial clusters and enterprise groups with core competitiveness, and follow the development path of improving quality and efficiency.

--人才为本。坚持把人才作为建设制造强国的根本，建立健全科学合理的选人、用人、育人机制，加快培养制造业发展急需的专业技术人才、经营管理人才、技能人才。营造大众创业、万众创新的氛围，建设一支素质优良、结构合理的制造业人才队伍，走人才引领的发展道路。

Talent orientation. Insist to take talents as the foundation for building a manufacturing power, establish and perfect scientific and reasonable selecting, employing and educating mechanism, accelerate cultivation of professional and technical talents, managerial and administrative talents, and skilled talents urgent needed by the development of manufacturing industry. Create an atmosphere for mass entrepreneurship and innovation, build a talent team with superior quality and rational structure for manufacturing industry, and follow the talent led development path.

（二）基本原则。

(II) Basic principles

市场主导，政府引导。全面深化改革，充分发挥市场在资源配置中的决定性作用，强化企业主体地位，激发企业活力和创造力。积极转变政府职能，加强战略研究和规划引导，完善相关支持政策，为企业发展创造良好环境。

Market driving and government guidance. Comprehensively deepen the reform, give full play to the decisive effect of market in resource allocation, intensify enterprise subject position, and inspire enterprise vitality and creativity. Positively change government functions, strengthen strategic research and planning guidance, and perfect related supportive policies to create a favorable environment for enterprise

development.

立足当前，着眼长远。针对制约制造业发展的瓶颈和薄弱环节，加快转型升级和提质增效，切实提高制造业的核心竞争力和可持续发展能力。准确把握新一轮科技革命和产业变革趋势，加强战略谋划和前瞻部署，扎扎实实打基础，在未来竞争中占据制高点。

Focus on the present and take a long-term perspective. Specific to bottleneck and weak link restrict the development of manufacturing industry, accelerate transformation, upgrading and improvement of quality and efficiency, and practically improve core competitiveness and sustainable development capacity of manufacturing industry. Accurately grasp a new round of scientific and technical revolution and industrial transformation trend, strengthen strategic planning and prospective deployment, make a solid foundation, and occupy the commanding height in further competition.

整体推进，重点突破。坚持制造业发展全国一盘棋和分类指导相结合，统筹规划，合理布局，明确创新发展方向，促进军民融合深度发展，加快推动制造业整体水平提升。围绕经济社会发展和国家安全重大需求，整合资源，突出重点，实施若干重大工程，实现率先突破。

Integral advance and regional breakthrough. Insist on the combination of all the activities of the nation like moves in a chess game and guidance to different categories of enterprises for the development of manufacturing industry, make overall planning and rational distribution, define the direction of innovation, promote in-depth development of military and civilian integration, and accelerate the improvement of integral level of manufacturing industry. On basis of great demands of economic and social development and national security, integrate resources, highlight key points, implement several major projects, and take the lead in making breakthrough.

自主发展，开放合作。在关系国计民生和产业安全的基础性、战略性、全局性领域，着力掌握关键核心技术，完善产业链条，形成自主发展能力。继续扩大开放，积极利用全球资源 and 市场，加强产业全球布局和国际交流合作，形成新的比较优势，提升制造业开放发展水平。

Independent development and open cooperation. In the fundamental, strategic and overall field related with national welfare, the people's livelihood and industrial security strive to master key technology, perfect industrial chain, and develop

independent development ability. Continue to enlarge opening, actively use global resources and market, strengthen global layout and international exchanges and cooperation to develop new comparative advantage and improve opening development level of manufacturing industry.

（三）战略目标。

(III) Strategic target

立足国情，立足现实，力争通过“三步走”实现制造强国的战略目标。

Based on the national conditions and reality, strive to achieve the strategic target of manufacturing power through “three steps”.

第一步：力争用十年时间，迈入制造强国行列。

The first step: strive to spend ten years to enter into the league of manufacturing powers.

到 2020 年，基本实现工业化，制造业大国地位进一步巩固，制造业信息化水平大幅提升。掌握一批重点领域关键核心技术，优势领域竞争力进一步增强，产品质量有较大提高。制造业数字化、网络化、智能化取得明显进展。重点行业单位工业增加值能耗、物耗及污染物排放明显下降。

Up to 2020, basically realize industrialization, further consolidate the status as a manufacturing power, and greatly promote informationalized level of manufacturing industry. Grasp a batch of key technologies in major fields, further enhance competitiveness in advantageous field, and considerably improve product quality. Achieve remarkable progress in digitization, networking and intelligentization of manufacturing industry. Obviously reduce energy consumption and material consumption of industrial added value and pollutant emission from key industry units.

到 2025 年，制造业整体素质大幅提升，创新能力显著增强，全员劳动生产率明显提高，两化（工业化和信息化）融合迈上新台阶。重点行业单位工业增加值能耗、物耗及污染物排放达到世界先进水平。形成一批具有较强国际竞争力的跨国公司和产业集群，在全球产业分工和价值链中的地位明显提升。

Up to 2025, greatly promote overall quality of manufacturing industry, remarkably strengthen innovation ability, obviously improve overall labor productivity, and make integration of industrialization with informatization step into new phase. Energy consumption and material consumption of industrial added value

and pollutant emission from key industry units reach the world’s advanced level. Cultivate a batch of transnational corporations and industrial clusters with relatively strong international competitiveness and significantly improve the status in global industrial division and value chain.

第二步：到 2035 年，我国制造业整体达到世界制造强国阵营中等水平。创新能力大幅提升，重点领域发展取得重大突破，整体竞争力明显增强，优势行业形成全球创新引领能力，全面实现工业化。

The second step: up to 2035, Chinese manufacturing industry reaches the intermediate level of league of global manufacturing powers on the whole. Greatly promote innovation ability, make major breakthrough in development in key fields, obviously enhance overall competitiveness, develop global innovation guiding ability for advantaged industries, and comprehensively realize industrialization.

第三步：新中国成立一百年时，制造业大国地位更加巩固，综合实力进入世界制造强国前列。制造业主要领域具有创新引领能力和明显竞争优势，建成全球领先的技术体系和产业体系。

The third step: when new China has been founded for one hundred years, further consolidate the status as a manufacturing power and enter into the league of global manufacturing powers by virtue of comprehensive strength. Develop innovation guiding ability and obvious competitive advantage in major fields of manufacturing industry and build world-leading technological system and industrial system.

2020 年和 2025 年制造业主要指标

Primary indicators of manufacturing industry in 2020 and 2025

类别 Category	指 标 Indicator	2013 年 2013	2015 年 2015	2020 年 2020	2025 年 2025
创新能力 Innovation ability	规模以上制造业研发经费内 部支出占主营业务收入比重 (%) Ratio of internal R&D expenditure to business income of manufacturing industry	0.88	0.95	1.26	1.68

	beyond scale (%)				
	规模以上制造业每亿元主营业务收入有效发明专利数 (件) ¹ Number of valid invention patents of manufacture beyond scale per 100 million RMB of main business income of manufacture beyond scale (pc) ¹	0.36	0.44	0.70	1.10
质量效益 Quality efficiency	制造业质量竞争力指数 ² Manufacturing quality competitiveness index ²	83.1	83.5	84.5	85.5
	制造业增加值率提高 Increase of value-added rate in manufacturing industry	-	-	比 2015 年提高 2 个百分点 Increase by 2% than 2015	比 2015 年提高 4 个百分点 Increase by 4% than 2015
	制造业全员劳动生产率增速 (%) Growth rate of overall labor productivity in manufacturing industry (%)	-	-	7.5 左右 (“十三五”期间年均增速) About 7.5% (annual growth rate during the “13th five-year” plan period	6.5 左右 (“十四五”期间年均增速) About 6.5% (annual growth rate during the “14th five-year” plan period
两化融合 Integration of informatization and industrialization	宽带普及率 (%) ³ Broadband penetration (%) ³	37	50	70	82
	数字化研发设计工具普及率 ⁴ (%) Penetration of digital R&D design tool ⁴ (%)	52	58	72	84

	关键工序数控化率 ⁵ (%) Numerical control rate of key process ⁵ (%)	27	33	50	64
绿色发展 Green development	规模以上单位工业增加值能耗下降幅度 Falling range of energy consumption per industrial added value above scale	-	-	比 2015 年下降 18% Fall by 18% than 2015	比 2015 年下降 34% Fall by 34% than 2015
	单位工业增加值二氧化碳排放量下降幅度 Falling range of carbon dioxide emission per industrial added value above scale	-	-	比 2015 年下降 22% Fall by 22% than 2015	比 2015 年下降 40% Fall by 40% than 2015
	单位工业增加值用水量下降幅度 Falling range of water consumption per industrial added value above scale	-	-	比 2015 年下降 23% Fall by 23% than 2015	比 2015 年下降 41% Fall by 41% than 2015
	工业固体废物综合利用率 Multipurpose utilization rate of industrial solid waste (%)	62	65	73	79

1 规模以上制造业每亿元主营业务收入有效发明专利数＝规模以上制造企业有效发明专利数/规模以上制造企业主营业务收入。

1. Number of valid invention patents of manufacture beyond scale per 100 million RMB of main business income of manufacture beyond scale = number of valid invention patents of manufacture beyond scale / main business income of manufacture beyond scale.

2 制造业质量竞争力指数是反映我国制造业质量整体水平的经济技术综合指标，由质量水平和发展能力两个方面共计 12 项具体指标计算得出。

2. Manufacturing quality competitiveness index is synthetic economic and technical index reflecting integral quality level of Chinese manufacturing industry and

is calculated by 12 specific indicators in two aspects, i.e., quality level and development ability.

3 宽带普及率用固定宽带家庭普及率代表, 固定宽带家庭普及率=固定宽带家庭用户数/家庭户数。

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

4 数字化研发设计工具普及率=应用数字化研发设计工具的规模以上企业数量/规模以上企业总数量(相关数据来源于3万家样本企业,下同)。

4. Penetration of digital R&D design tools = number of enterprises applying digital R&D design tools beyond scale / total number of enterprises beyond scale (related data comes from 30,000 sample enterprises, hereinafter inclusive)

5 关键工序数控化率为规模以上工业企业关键工序数控化率的平均值。

5. Key process numerical control rate is average value of key process numerical control rates of enterprises beyond scale.

三、战略任务和重点

III. Strategic Tasks and Priorities

实现制造强国的战略目标, 必须坚持问题导向, 统筹谋划, 突出重点; 必须凝聚全社会共识, 加快制造业转型升级, 全面提高发展质量和核心竞争力。

In order to realize the strategic target of manufacturing power, problem orientation shall be insisted and, overall planning shall be made and priorities shall be highlighted; consensus of the whole society shall be built, transformation and upgrading of manufacturing industry shall be accelerated, and development quality and core competitiveness shall be comprehensively improved.

(一) 提高国家制造业创新能力。

(I) Improve national manufacturing innovation ability

完善以企业为主体、市场为导向、政产学研用相结合的制造业创新体系。围绕产业链部署创新链, 围绕创新链配置资源链, 加强关键核心技术攻关, 加速科技成果产业化, 提高关键环节和重点领域的创新能力。

Perfect manufacturing innovation system taking enterprise as the subject and market as the orientation and making combination of production, learning, scientific research and practical application. Deploy innovation chain based on industrial chain, deploy resource chain based on innovation chain, strengthen striving to make technological breakthrough in core technologies, accelerate industrialization of scientific and technological achievements, and improve innovation ability in key links and major fields.

加强关键核心技术研发。强化企业技术创新主体地位，支持企业提升创新能力，推进国家技术创新示范企业和企业技术中心建设，充分吸纳企业参与国家科技计划的决策和实施。瞄准国家重大战略需求和未来产业发展制高点，定期研究制定发布制造业重点领域技术创新路线图。继续抓紧实施国家科技重大专项，通过国家科技计划（专项、基金等）支持关键核心技术研发。发挥行业骨干企业的主导作用和高等院校、科研院所的基础作用，建立一批产业创新联盟，开展政产学研用协同创新，攻克一批对产业竞争力整体提升具有全局性影响、带动性强的关键共性技术，加快成果转化。

Strengthen research and development of key technologies. Intensify the principle status of enterprise technological innovation, support enterprises to promote innovation ability, facilitate construction of national technological innovation demonstration enterprise and enterprise technology center, and fully absorb enterprises to participate in decision making and implementation of national science and technology plan. Aim at national great strategic demand and future industrial development commanding height, and regularly learning, formulate and release technological innovation roadmap for major fields of manufacturing industry. Continue to make early implementation of national science and technology major project and support research and development of key technologies through national science and technology plan (such as special project and fund). Give play to leading role of industry backbone enterprises and fundamental role of institutions of higher learning and scientific research institutions, build a batch of industry innovation alliances, carry out collaborative innovation of production, learning, scientific research and practical application, make breakthroughs in a batch of key generic technologies having overall influence and strong leading function to integral promotion of industrial competitiveness, and accelerate achievement transformation.

提高创新设计能力。在传统制造业、战略性新兴产业、现代服务业等重点领域开展创新设计示范，全面推广应用以绿色、智能、协同为特征的先进设计技术。加强设计领域共性关键技术研发，攻克信息化设计、过程集成设计、复杂过程和系统设计等共性技术，开发一批具有自主知识产权的关键设计工具软件，建设完善创新设计生态系统。建设若干具有世界影响力的创新设计集群，培育一批专业化、开放型的工业设计企业，鼓励代工企业建立研究设计中心，向代设计和出口自主品牌产品转变。发展各类创新设计教育，设立国家工业设计奖，激发全社会创新设计的积极性和主动性。

Improve innovation design ability. Carry out innovative design demonstration in major fields of traditional manufacturing industry, strategic emerging industries and modern service industry and comprehensively popularize the application of advanced design technology characterized by green, intelligence and cooperation. Strengthen the research and development of key generic technologies in the field of design, make breakthroughs in generic technologies about informatization design, process integration design, complex process and system design, develop a batch of key design tools with independent intellectual property, and construct a perfect innovative design of ecosystem. Build several innovative design clusters with global influence, cultivate a batch of professional and open industrial design enterprises, and encourage OEM enterprises to set up research and design centers to make transformation to original design manufacturing and export of independent branded products. Develop various education of creative design, set up national industrial design award, and inspire the enthusiasm and initiative of social innovative design.

推进科技成果产业化。完善科技成果转化运行机制，研究制定促进科技成果转化和产业化的指导意见，建立完善科技成果信息发布和共享平台，健全以技术交易市场为核心的技术转移和产业化服务体系。完善科技成果转化激励机制，推动事业单位科技成果使用、处置和收益管理改革，健全科技成果科学评估和市场定价机制。完善科技成果转化协同推进机制，引导政产学研用按照市场规律和创新规律加强合作，鼓励企业和社会资本建立一批从事技术集成、熟化和工程化的中试基地。加快国防科技成果转化和产业化进程，推进军民技术双向转移转化。

Promote industrialization of scientific and technological achievements. Perfect transformation and operation mechanism for scientific and technological

achievements, learning and formulate instructions for promoting the transformation of scientific and technological achievements and the industrialization, establish and perfect a platform for releasing and sharing information of scientific and technological achievements, and improve technology exchange market-centered system for technology transfer and industrialization service. Perfect transformation and motivation mechanism for scientific and technological achievements, promote application and disposal of scientific and technological achievements and reform of revenue management in public institutions, and improve scientific evaluation and market pricing mechanism for scientific and technological achievements. Perfect transformation and collaborative promotion mechanism for scientific and technological achievements, guide closer cooperation of production, learning, scientific research and practical application, and encourage enterprises and social capitalists to set up a batch of pilot test bases for technology integration, curing and engineering realization. Accelerate transformation and industrialization process of scientific and technological achievements and facilitate bi-directional transfer and transformation of military-civil technology.

完善国家制造业创新体系。加强顶层设计，加快建立以创新中心为核心载体、以公共服务平台和工程数据中心为重要支撑的制造业创新网络，建立市场化的创新方向选择机制和鼓励创新的风险分担、利益共享机制。充分利用现有科技资源，围绕制造业重大共性需求，采取政府与社会合作、政产学研用产业创新战略联盟等新机制新模式，形成一批制造业创新中心（工业技术研究基地），开展关键共性重大技术研究和产业化应用示范。建设一批促进制造业协同创新的公共服务平台，规范服务标准，开展技术研发、检验检测、技术评价、技术交易、质量认证、人才培养等专业化服务，促进科技成果转化和推广应用。建设重点领域制造业工程数据中心，为企业提供创新知识和工程数据的开放共享服务。面向制造业关键共性技术，建设一批重大科学研究和实验设施，提高核心企业系统集成能力，促进向价值链高端延伸。

Perfect national manufacturing innovation system. Enhance top-level design, expedite the establishment of manufacturing innovation network taking innovation center as the core carrier and public service platform and engineering data center as the important pillars, and build market-oriented selection mechanism for innovative direction and risk sharing and benefit sharing mechanism inspiring innovation. Fully

utilize existing scientific and technological resources, adopt new mechanisms and new patterns including government and social capital cooperation and industrial innovation strategic alliance of production, learning, scientific research and practical application, develop a batch of manufacturing innovation centers (industrial technology research bases), and carry out research on key generic technologies and demonstration of industrialization application. Build a batch of public service platforms promoting manufacturing collaborative innovation, standardize service norms, carry out specialized services including technology research and development, test and detection, technical evaluation, technology transaction, quality authentication and talent training, and facilitate the transformation, popularization and application of scientific and technological achievements. Establish manufacturing engineering data centers in major fields to provide enterprises with open sharing service about innovation knowledge and engineering data. On basis of key generic technologies for manufacturing industry, build a batch of major scientific research and experimental facilities to improve system integration abilities of core enterprises and promote extension to the high end of value chain.

专栏 1 制造业创新中心（工业技术研究基地）建设工程

Column 1 Construction engineering of manufacturing innovation centers (industrial technology research bases)

围绕重点行业转型升级和新一代信息技术、智能制造、增材制造、新材料、生物医药等领域创新发展的重大共性需求，形成一批制造业创新中心（工业技术研究基地），重点开展行业基础和共性关键技术研发、成果产业化、人才培养等工作。制定完善制造业创新中心遴选、考核、管理的标准和程序。

Based on major generic demands for transformation and upgrading in key industries and innovative development in the fields of a new generation of information technology, intelligent manufacturing, additive manufacturing, new material and biological medicine, form a batch of manufacturing innovation centers (industrial technology research bases), emphatically carry out research and development of industry base and key generic technologies, industrialization of research results and talent training, and formulate perfect standards and programs for selection, assessment and management of manufacturing innovation centers.

到 2020 年，重点形成 15 家左右制造业创新中心（工业技术研究基地），力争到 2025 年形成 40 家左右制造业创新中心（工业技术研究基地）。

Emphatically form about 15 manufacturing innovation centers (industrial technology research bases) up to 2020 and strive to form about 40 manufacturing innovation centers (industrial technology research bases) up to 2025.

加强标准体系建设。改革标准体系和标准化管理体制，组织实施制造业标准化提升计划，在智能制造等重点领域开展综合标准化工作。发挥企业在标准制定中的重要作用，支持组建重点领域标准推进联盟，建设标准创新研究基地，协同推进产品研发与标准制定。制定满足市场和创新需要的团体标准，建立企业产品和服务标准自我声明公开和监督制度。鼓励和支持企业、科研院所、行业组织等参与国际标准制定，加快我国标准国际化进程。大力推动国防装备采用先进的民用标准，推动军用技术标准向民用领域的转化和应用。做好标准的宣传贯彻，大力推动标准实施。

Strengthen the construction of standard system. Reform standard system and system of standardization management, organize implementation of manufacturing standardization improvement plan, and carry out comprehensive standardization in major fields including intelligent manufacturing. Give play to the important role of enterprises in standard establishment, support the construction of standard propulsion alliances in major fields, build standard innovation research base, and collaboratively promote research and development of products and standard establishment. Formulate group standards meeting the requirements of market and innovation and establish self-disclosure and supervision system for enterprise product and service standards. Encourage and support enterprises scientific research institutions and industrial organizations to participate in setting international standards, and accelerate the internationalized process of Chinese standards. Vigorously promote the adoption of advanced civilian standard for national defense equipment and promote the transformation and application of military technical standard to civilian field.

强化知识产权运用。加强制造业重点领域关键核心技术知识产权储备，构建产业化导向的专利组合和战略布局。鼓励和支持企业运用知识产权参与市场竞争，培育一批具备知识产权综合实力的优势企业，支持

组建知识产权联盟，推动市场主体开展知识产权协同运用。稳妥推进国防知识产权解密和市场化应用。建立健全知识产权评议机制，鼓励和支持行业骨干企业与专业机构在重点领域合作开展专利评估、收购、运营、风险预警与应对。构建知识产权综合运用公共服务平台。鼓励开展跨国知识产权许可。研究制定降低中小企业知识产权申请、保护及维权成本的政策措施。

Intensify the exploitation of intellectual property. Strengthen reserve of key technologies and intellectual properties in major fields of manufacturing industry and construct industrialization-oriented patent portfolio and strategic layout. Encourage and support enterprises to use intellectual properties to participate in market competition, cultivate a batch of advantageous enterprises with comprehensive strength of intellectual property, support the construction of knowledge property integration, and promote main market players to carry out collaborative application of intellectual properties. Steadily promote the decryption and marketization application of defence intellectual property. Establish and perfect intellectual property review mechanism, and encourage and support industry backbone enterprises and specialist agencies to cooperatively carry out patent appraisal, acquisition, operation, risk early warning and response in major fields. Build public service platforms for comprehensive application of intellectual property. Encourage the implementation of transnational intellectual property licensing. Study and formulate policy measures for reducing application, protection and right safeguarding costs of intellectual properties for middle and small-sized enterprises.

（二）推进信息化与工业化深度融合。

（II）Promote in-depth integration of informatization and industrialization

加快推动新一代信息技术与制造技术融合发展，把智能制造作为两化深度融合的主攻方向；着力发展智能装备和智能产品，推进生产过程智能化，培育新型生产方式，全面提升企业研发、生产、管理和服务的智能化水平。

Accelerate the promotion of integrative development of a new generation of information technology and manufacturing technology and take intelligent manufacturing as main attack direction for in-depth integration of informatization and industrialization; focus on the development of intelligent equipment and product, promote the intelligentization of productive process, cultivate new-type production

modes, and comprehensively improve intelligentized level of enterprise research and development, production, management and service.

研究制定智能制造发展战略。编制智能制造发展规划，明确发展目标、重点任务和重大布局。加快制定智能制造技术标准，建立完善智能制造和两化融合管理标准体系。强化应用牵引，建立智能制造产业联盟，协同推动智能装备和产品研发、系统集成创新与产业化。促进工业互联网、云计算、大数据在企业研发设计、生产制造、经营管理、销售服务等全流程和全产业链的综合集成应用。加强智能制造工业控制系统网络安全保障能力建设，健全综合保障体系。

Study and formulate intelligent manufacturing development strategy. Compile intelligent manufacturing development plan, define development target, key task and major layout. Accelerate the formulation of intelligent manufacturing technical standard, and establish and perfect standard system for intelligent manufacturing and integration management of informatization and industrialization. Intensify application traction, build intelligent manufacturing industry alliance, and synergistically promote research and development of intelligent equipment and product, system integration innovation and industrialization. Facilitate comprehensive and integrated application of industry network, cloud computing and big data in the complete flow and whole industry chain covering enterprise research and development, production and manufacturing, operation and management, and sales service. Strengthen the construction of safety assurance ability of intelligent manufacturing industrial control system and improve comprehensive supporting system.

加快发展智能制造装备和产品。组织研发具有深度感知、智慧决策、自动执行功能的高档数控机床、工业机器人、增材制造装备等智能制造装备以及智能化生产线，突破新型传感器、智能测量仪表、工业控制系统、伺服电机及驱动器和减速器等智能核心装置，推进工程化和产业化。加快机械、航空、船舶、汽车、轻工、纺织、食品、电子等行业生产设备的智能化改造，提高精准制造、敏捷制造能力。统筹布局和推动智能交通工具、智能工程机械、服务机器人、智能家电、智能照明电器、可穿戴设备等产品研发和产业化。

Accelerate the development of intelligent manufacturing equipment and product. Organize the research and development of intelligent manufacturing equipments including high-end CNC machine tool, industrial robot and additive manufacturing

equipment with functions of depth perception, intelligent decision making and automatic performance and intelligent core devices including intelligent production line, new type sensor, intelligent measuring meter, industrial control system, servo motor, driver and reducer, and promote engineering realization and industrialization. Accelerate the intellectualized reconstruction of production equipments in machinery industry, aircraft industry, ship industry, auto industry, light industry, textile industry, food industry, electron industry and other industries, and improve precision manufacturing and agile manufacturing abilities. Make overall arrangement and promote research, development and industrialization of products including intelligent transportation means, service robot, intelligent household electrical appliance, intelligent lighting appliance and wearable device.

推进制造过程智能化。在重点领域试点建设智能工厂/数字化车间，加快人机智能交互、工业机器人、智能物流管理、增材制造等技术和装备在生产过程中的应用，促进制造工艺的仿真优化、数字化控制、状态信息实时监测和自适应控制。加快产品全生命周期管理、客户关系管理、供应链管理系统的推广应用，促进集团管控、设计与制造、产供销一体、业务和财务衔接等关键环节集成，实现智能管控。加快民用爆炸物品、危险化学品、食品、印染、稀土、农药等重点行业智能检测监管体系建设，提高智能化水平。

Promote the intelligentization of manufacturing process. Make pilot project construction of intelligent plants or digital workshops in major fields, accelerate the application of technologies and equipments including intelligent human-machine interaction, industrial robot, intelligent logistics management and additive manufacturing in manufacturing process, facilitate simulating optimization, digital control, real-time information monitoring and self-adaptation control of manufacturing technology. Accelerate the popularization and application of systems for product lifecycle management, customer relation management and supply chain management, expedite the integration of key links including group management and control, design and manufacturing, supply-production-sale assembly, and business and financial cohesion to realize intelligent management and control. Accelerate the construction of intelligent detection and supervision systems in key industries of civil explosive, food, printing and dyeing, rare earth and pesticide, and improve the intelligent level.

深化互联网在制造领域的应用。制定互联网与制造业融合发展的路线图，明确发展方向、目标和路径。发展基于互联网的个性化定制、众包设计、云制造等新型制造模式，推动形成基于消费需求动态感知的研发、制造和产业组织方式。建立优势互补、合作共赢的开放型产业生态体系。加快开展物联网技术研发和应用示范，培育智能监测、远程诊断管理、全产业链追溯等工业互联网新应用。实施工业云及工业大数据创新应用试点，建设一批高质量的工业云服务和工业大数据平台，推动软件与服务、设计与制造资源、关键技术与标准的开放共享。

Deepen the application of internet in manufacturing field. Formulate the roadmap for integrative development of internet and manufacturing industry and define development direction, target and path. Develop internet-based new-type manufacturing modes including personalized customization, crowdsourcing design and cloud manufacturing, and promote the formation of R&D, manufacturing and industrial organization modes based on dynamic perception of consumer demand. Establish an open industrial ecosystem with complementary advantages and win-win cooperation. Accelerate the implementation of R&D and application demonstration of Internet of Things technology and cultivate new industrial internet applications including intelligent monitoring, remote diagnostics management and full industrial chain tracing. Implement pilot projects of industrial cloud and innovation application of industrial big data, build a batch of high-quality industrial cloud service and industrial big data platforms, and promote opening and sharing of software & services, design & manufacturing resources, key technologies & standards.

加强互联网基础设施建设。加强工业互联网基础设施建设规划与布局，建设低时延、高可靠、广覆盖的工业互联网。加快制造业集聚区光纤网、移动通信网和无线局域网的部署和建设，实现信息网络宽带升级，提高企业宽带接入能力。针对信息物理系统网络研发及应用需求，组织开发智能控制系统、工业应用软件、故障诊断软件和相关工具、传感和通信系统协议，实现人、设备与产品的实时联通、精确识别、有效交互与智能控制。

Strengthen the construction of internet infrastructure. Strengthen the construction planning and layout of industrial internet infrastructure and build industrial internet with low delay, high reliability and broad coverage. Accelerate the deployment and construction of fiber optic network, mobile communication network and wireless

local area network in nesting zone of manufacturing to realize upgrading of information network broadband and improve enterprise broadband access capability. In view of requirements of R&D and application of information physical system network, organize the development of intelligent control system, industrial application software, fault diagnostic software, related tools, and sensing and communication system protocol to realize real-time linkage, precise recognition, effective interaction and intelligent control of people, equipment and product.

专栏 2 智能制造工程
Column 2 Intelligent manufacturing engineering
<p>紧密围绕重点制造领域关键环节，开展新一代信息技术与制造装备融合的集成创新和工程应用。支持政产学研用联合攻关，开发智能产品和自主可控的智能装置并实现产业化。依托优势企业，紧扣关键工序智能化、关键岗位机器人替代、生产过程智能优化控制、供应链优化，建设重点领域智能工厂/数字化车间。在基础条件好、需求迫切的重点地区、行业和企业中，分类实施流程制造、离散制造、智能装备和产品、新业态新模式、智能化管理、智能化服务等试点示范及应用推广。建立智能制造标准体系和信息安全保障系统，搭建智能制造网络系统平台。</p> <p>到 2020 年，制造业重点领域智能化水平显著提升，试点示范项目运营成本降低 30%，产品生产周期缩短 30%，不良品率降低 30%。到 2025 年，制造业重点领域全面实现智能化，试点示范项目运营成本降低 50%，产品生产周期缩短 50%，不良品率降低 50%。</p> <p>Carry out integrated innovation and engineering application of the integration of a new generation of information technology and manufacturing equipment closely on basis of key links of major manufacturing field. Support the research cooperation of production, learning, scientific research and practical application, develop intelligent product and self-controlled intelligent equipment, and realize industrialization. Depend on advantageous enterprises and stick to intelligentization of key process, robot replacement of key position, intelligent optimized control of productive process and optimization of supply chain to build intelligent plants or digital workshops in major fields. Make classified implementation of pilot demonstration and application promotion of flow manufacturing, discrete manufacturing, intelligent equipment and product, new business mode, intelligent management and intelligent service in key</p>

areas, industries and enterprises with good basic conditions and urgent demands. Establish intelligent manufacturing standard system and information security system and set up intelligent manufacturing network system platform. Intelligent level in major fields of manufacturing industry rises significantly, operating cost of pilot demonstration project falls by 30%, product production cycle shortens by 30% and defect rate falls by 30% up to 2020. Comprehensively realize intelligentization in major fields of manufacturing industry, operating cost of pilot demonstration project falls by 50%, product production cycle shortens by 50% and defect rate falls by 50% up to 2025.

（三）强化工业基础能力。

(III) Intensify basic capability of industry

核心基础零部件（元器件）、先进基础工艺、关键基础材料和产业技术基础（以下统称“四基”）等工业基础能力薄弱，是制约我国制造业创新发展和质量提升的症结所在。要坚持问题导向、产需结合、协同创新、重点突破的原则，着力破解制约重点产业发展的瓶颈。

Basic capability of industry covering core basic components (components and parts), advanced basic technologies, key basic materials and basis of industrial technology (hereinafter jointly referred to as “four bases”) is weak, which is the crucial reason restricting innovative development and quality promotion of Chinese manufacturing industry. Principles of problem orientation, supply & demand combination, collaborative innovation and priority breakthrough shall be followed to break the bottleneck restricting the development of major industries.

统筹推进“四基”发展。制定工业强基实施方案，明确重点方向、主要目标和实施路径。制定工业“四基”发展指导目录，发布工业强基发展报告，组织实施工业强基工程。统筹军民两方面资源，开展军民两用技术联合攻关，支持军民技术相互有效利用，促进基础领域融合发展。强化基础领域标准、计量体系建设，加快实施对标达标，提升基础产品的质量、可靠性和寿命。建立多部门协调推进机制，引导各类要素向基础领域集聚。

Promote integrating development of “four bases”. Formulate industrial strength implementation plan and define key direction, main target and implementation path. Formulate industrial development guidance directory of “four bases”, release

industrial strength development report, and organize the implementation of industrial strength project. Make overall planning of military and civilian resources, carry out research cooperation of dual-use technologies, support the mutual effective utilization of military and civilian technologies, and promote the integrative development in fundamental fields. Intensify the construction of standard and measurement system in fundamental fields, accelerate the implementation of benchmarking and standard attainment, and improve the quality, reliability and lifetime of basic product. Establish a multisectoral coordination mechanism and guide various elements to gather in fundamental fields.

加强“四基”创新能力建设。强化前瞻性基础研究，着力解决影响核心基础零部件（元器件）产品性能和稳定性的关键共性技术。建立基础工艺创新体系，利用现有资源建立关键共性基础工艺研究机构，开展先进成型、加工等关键制造工艺联合攻关；支持企业开展工艺创新，培养工艺专业人才。加大基础专用材料研发力度，提高专用材料自给保障能力和制备技术水平。建立国家工业基础数据库，加强企业检验检测数据和计量数据的采集、管理、应用和积累。加大对“四基”领域技术研发的支持力度，引导产业投资基金和创业投资基金投向“四基”领域重点项目。

Strengthen the construction of innovation ability about “four bases”. Intensify prospective fundamental researches and spare no effort to solve key generic technologies influencing product quality and stability of core basic components (components and parts). Establish fundamental technology innovation system, utilize existing resources to set up a research institution for key generic fundamental technology, and carry out research cooperation of key manufacturing technologies including advanced forming and processing; support enterprises to carry out technology innovation and cultivate professional technological talents. Intensify research and development efforts in basic special materials and improve self-sustaining capacity and preparation technology level of special materials. Set up a database of national industry foundation and strengthen the acquisition, management, application and accumulation of enterprise test data and measurement data. Intensify the strength of support for technology research and development in the field of “four bases” and lead industrial investment fund and venture investment fund to major projects in the fields of “four bases”.

推动整机企业和“四基”企业协同发展。注重需求侧激励，产用结合，协同攻关。依托国家科技计划（专项、基金等）和相关工程等，在数控机床、轨道交通装备、航空航天、发电设备等重点领域，引导整机企业和“四基”企业、高校、科研院所产需对接，建立产业联盟，形成协同创新、产用结合、以市场促基础产业发展的新模式，提升重大装备自主可控水平。开展工业强基示范应用，完善首台（套）、首批次政策，支持核心基础零部件（元器件）、先进基础工艺、关键基础材料推广应用。

Promote the synergetic development of whole-machine enterprises and enterprises of “four bases”. Pay attention to excitation at demand side, combination of production and application, and collaborative research. Depend on national science and technology plans (special projects and funds) and related projects to guide supply & demand docking between whole-machine enterprises and enterprises, colleges and universities, and scientific research institutions of “four bases”, form collaborative innovation, combination of production and application, and new pattern of promoting industrial development by market, and improve self-controllable level of major equipments in major fields of CNC machine tool, railway transportation equipment, aerospace and power generation assembly. Carry out industrial strength demonstration application, perfect the first set and first batch of policies, support the popularization and application of core basic components (components and parts), advanced fundamental technologies and key fundamental materials.

<p>专栏 3 工业强基工程</p> <p>Column 3 Industrial strength engineering</p>
<p>开展示范应用，建立奖励和风险补偿机制，支持核心基础零部件（元器件）、先进基础工艺、关键基础材料的首批次或跨领域应用。组织重点突破，针对重大工程和重点装备的关键技术和产品急需，支持优势企业开展政产学研用联合攻关，突破关键基础材料、核心基础零部件的工程化、产业化瓶颈。强化平台支撑，布局和组建一批“四基”研究中心，创建一批公共服务平台，完善重点产业技术基础体系。</p> <p>Carry out demonstration application, establish reward and risk compensation mechanism, and support the first batch of or trans-field applications of core basic components (components and parts), advanced fundamental technologies and key</p>

fundamental materials. Organize priority breakthrough and support advantageous enterprises to make research cooperation of production, learning, scientific research and practical application to break through bottlenecks in engineering realization and industrialization of key fundamental materials and core basic components in view of key technologies and demands for major projects and key equipments. Intensify platform support, arrange and establish a batch of research and development centers of “four bases”, build a batch of public service platforms, and perfect the technical foundation system for key industries.

到 2020 年，40% 的核心基础零部件、关键基础材料实现自主保障，受制于人的局面逐步缓解，航天装备、通信装备、发电与输变电设备、工程机械、轨道交通装备、家用电器等产业急需的核心基础零部件（元器件）和关键基础材料的先进制造工艺得到推广应用。到 2025 年，70% 的核心基础零部件、关键基础材料实现自主保障，80 种标志性先进工艺得到推广应用，部分达到国际领先水平，建成较为完善的产业技术基础服务体系，逐步形成整机牵引和基础支撑协调互动的产业创新发展格局。

Realize automotive safeguard of 40% of core basic components and key fundamental materials, gradually relieve the situation under the control of others, and make popularization and application of advanced manufacturing technologies for core basic components (components and parts) and key fundamental materials urgently needed by industries of space equipment, communication equipment, power generation and transmission equipment, engineering machinery, railway transportation equipment and household electrical appliance up to 2020. Realize automotive safeguard of 70% of core basic components and key fundamental materials, make popularization and application of 80 kinds of symbolic advanced technologies, some of which reach the international leading level, complete the establishment of relatively perfect basic service system for industrial technologies, and gradually form industrial innovation and development pattern with coordination and interaction between full-machine traction and basic support.

（四）加强质量品牌建设。

(IV) Strengthen quality and brand construction

提升质量控制技术，完善质量管理机制，夯实质量发展基础，优化

质量发展环境，努力实现制造业质量大幅提升。鼓励企业追求卓越品质，形成具有自主知识产权的名牌产品，不断提升企业品牌价值和中国制造整体形象。

Improve quality control technology, perfect quality management mechanism, lay a solid foundation for quality development, optimize quality development environment, and strive to realize substantial promotion of manufacturing quality. Encourage enterprises to pursue excellent quality, form branded products with independent intellectual properties and constantly improve enterprise brand value and overall image of Chinese manufacturing.

推广先进质量管理技术和方法。建设重点产品标准符合性认定平台，推动重点产品技术、安全标准全面达到国际先进水平。开展质量标杆和领先企业示范活动，普及卓越绩效、六西格玛、精益生产、质量诊断、质量持续改进等先进生产管理模式和方法。支持企业提高质量在线监测、在线控制和产品全生命周期质量追溯能力。组织开展重点行业工艺优化行动，提升关键工艺过程控制水平。开展质量管理小组、现场改进等群众性质量管理活动示范推广。加强中小企业质量管理，开展质量安全培训、诊断和辅导活动。

Popularize advanced quality management technologies and methods. Build standard conformity identification platform for major products, promote major product technologies and safety standards to fully reach the international advanced level. Carry out demonstration activities of quality benchmark and leading enterprise and popularize advanced management modes and methods including excellent performance, six sigma, lean production, quality diagnosis and continuing quality improvement. Support enterprises to improve on-line quality monitoring, on-line control and quality tracing ability in product life cycle. Organize to implement technology optimization actions in major industries to promote the control level of key process. Carry out demonstration and popularization of mass quality management activities including quality management group and site improvement. Strengthen quality control of middle and small-sized enterprises and carry out quality safety training, diagnosing and counseling activities.

加快提升产品质量。实施工业产品质量提升行动计划，针对汽车、高档数控机床、轨道交通装备、大型成套技术装备、工程机械、特种设备、关键原材料、基础零部件、电子元器件等重点行业，组织攻克一批

长期困扰产品质量提升的关键共性质量技术，加强可靠性设计、试验与验证技术开发应用，推广采用先进成型和加工方法、在线检测装置、智能化生产和物流系统及检测设备等，使重点实物产品的性能稳定性、质量可靠性、环境适应性、使用寿命等指标达到国际同类产品先进水平。在食品、药品、婴童用品、家电等领域实施覆盖产品全生命周期的质量管理、质量自我声明和质量追溯制度，保障重点消费品质量安全。大力提高国防装备质量可靠性，增强国防装备实战能力。

Accelerate the promotion of product quality. Implement industrial product quality improvement action plan, organize to break through a batch of key generic quality technologies disturbing the promotion of product quality for a long time, strengthen development and application of reliability design, experiment and verification technology, generalize the adoption of advanced forming and processing methods, on-line measuring device, intelligent manufacturing, intelligent logistics system and checkout equipment in view of key industries of automobile, high-end CNC machine tool, railway transportation equipment, large-scale technology equipment, engineering machinery, special equipment, key raw material, basic component and electron component to make indicators including performance stability, quality reliability, environmental suitability and service life of key physical products reach the comparatively leading level compared with the international counterpart. Implement quality control, quality self-statement and quality tracing systems covering the product life cycle in fields of food, drug, infant and children product and household appliance and guarantee quality safety of key consumer goods. Vigorously improve the quality reliability of national defense equipment and enhance the battle effectiveness of national defense equipment.

完善质量监管体系。健全产品质量标准体系、政策规划体系和质量管法律法规。加强关系民生和安全等重点领域的行业准入与市场退出管理。建立消费品生产经营企业产品事故强制报告制度，健全质量信用信息收集和发布制度，强化企业质量主体责任。将质量违法违规记录作为企业诚信评级的重要内容，建立质量黑名单制度，加大对质量违法和假冒品牌行为的打击和惩处力度。建立区域和行业质量安全预警制度，防范化解产品质量安全风险。严格实施产品“三包”、产品召回等制度。强化监管检查和责任追究，切实保护消费者权益。

Perfect quality supervision system. Improve product quality standard system, policy planning system and quality management laws and regulations. Strengthen industry access and market exit management in major fields related with livelihood and security. Establish system for compulsory report of product accidents consumer goods production and operation enterprises, improve quality credit information collection and release system and intensify corporate quality principal responsibility. Take quality violation record as important content of corporate credit rating, establish quality blacklist system and intensify striking and punishing force against quality violation and counterfeit brand behavior. Establish early warning system for regional and industrial quality safety to prevent and resolve risk of product quality safety. Strictly implement “three-guarantee” system and product recall system. Intensify risk-based surveillance and to practically protect consumer rights and interests.

夯实质量发展基础。制定和实施与国际先进水平接轨的制造业质量、安全、卫生、环保及节能标准。加强计量科技基础及前沿技术研究，建立一批制造业发展急需的高准确度、高稳定性计量基标准，提升与制造业相关的国家量传溯源能力。加强国家产业计量测试中心建设，构建国家计量科技创新体系。完善检验检测技术保障体系，建设一批高水平的工业产品质量控制和技术评价实验室、产品质量监督检验中心，鼓励建立专业检测技术联盟。完善认证认可管理模式，提高强制性产品认证的有效性，推动自愿性产品认证健康发展，提升管理体系认证水平，稳步推进国际互认。支持行业组织发布自律规范或公约，开展质量信誉承诺活动。

Consolidate the foundation of quality development. Formulate and implement manufacturing quality, safety, sanitation, environmental protection and energy conservation standards that align with international advanced level. Strengthen the research on measuring technological base and cutting-edge technology, establish a batch of highly accurate and stable metrological primary standard urgently needed by the development of manufacturing industry, and improve national quantity-transfer and source tracing abilities related with manufacturing industry. Strengthen the construction of national industrial measuring and testing center and construct national measuring technology innovation system. Perfect inspection and detection technology guarantee system, build a batch of high-level production quality control and technical evaluation laboratories and product quality supervision and inspection centers for

industrial products, and encourage the establishment of professional testing technology alliance. Perfect certification and accreditation management mode, improve the effectiveness of mandatory product certification, promote sound development of voluntary product certification, improve management system certification level, and steadily facilitate international mutual recognition. Support industrial organizations to release self-regulatory codes or conventions and carry out quality credibility commitment activities.

推进制造业品牌建设。引导企业制定品牌管理体系，围绕研发创新、生产制造、质量管理和营销服务全过程，提升内在素质，夯实品牌发展基础。扶持一批品牌培育和运营专业服务机构，开展品牌管理咨询、市场推广等服务。健全集体商标、证明商标注册管理制度。打造一批特色鲜明、竞争力强、市场信誉好的产业集群区域品牌。建设品牌文化，引导企业增强以质量和信誉为核心的品牌意识，树立品牌消费理念，提升品牌附加值和软实力。加速我国品牌价值评价国际化进程，充分发挥各类媒体作用，加大中国品牌宣传推广力度，树立中国制造品牌良好形象。

Promote manufacturing brand construction. Lead enterprises to establish brand management systems, improve inherent quality and consolidate the foundation for brand development in view of the overall process covering research and development innovation, manufacturing, quality control and marketing service. Support a batch of professional service organizations for brand cultivation and operation to carry out services including brand management consulting and market promotion. Improve registered administration system for collective mark and certification mark. Create a batch of industrial clusters and regional brands with distinctive characteristics, strong competitiveness and good market reputation. Build brand culture and lead enterprises to enhance brand awareness based on quality and reputation, establish brand consumption concept and improve brand added value and soft power. Accelerate the internationalized process of Chinese brand value evaluation, give full play to the role of various media, intensify efforts in propagandizing and popularizing Chinese brands, and set up a good image of Chinese manufacturing brands.

（五）全面推行绿色制造。

（V）Fully implement green manufacturing

加大先进节能环保技术、工艺和装备的研发力度，加快制造业绿色改造升级；积极推行低碳化、循环化和集约化，提高制造业资源利用效

率；强化产品全生命周期绿色管理，努力构建高效、清洁、低碳、循环的绿色制造体系。

Intensify efforts in research and development of advanced energy-saving and environmental protection technology, process and equipment and accelerate green transformation and upgrading of manufacturing industry; actively carry out low carbonization, circularization and intensification, and improve resource utilization efficiency in manufacturing industry; intensify green management of product life cycle and strive to establish an efficient, clean, low-carbon and circular green manufacturing system.

加快制造业绿色改造升级。全面推进钢铁、有色、化工、建材、轻工、印染等传统制造业绿色改造，大力研发推广余热余压回收、水循环利用、重金属污染减量化、有毒有害原料替代、废渣资源化、脱硫脱硝除尘等绿色工艺技术装备，加快应用清洁高效铸造、锻压、焊接、表面处理、切削等加工工艺，实现绿色生产。加强绿色产品研发应用，推广轻量化、低功耗、易回收等技术工艺，持续提升电机、锅炉、内燃机及电器等终端用能产品能效水平，加快淘汰落后机电产品和技术。积极引领新兴产业高起点绿色发展，大幅降低电子信息产品生产、使用能耗及限用物质含量，建设绿色数据中心和绿色基站，大力促进新材料、新能源、高端装备、生物产业绿色低碳发展。

Accelerate green transformation and upgrading of manufacturing industry. Fully promote green transformation of iron and steel industry, non-ferrous industry, chemical industry, architectural material industry, light industry, printing and dyeing industry and other traditional manufacturing industries, vigorously develop and promote technical equipment of green technologies including waste heat and pressure recovery, water circulation utilization, heavy metal pollution reduction, substitution of poisonous and harmful raw materials, utilization of industry waste residues, desulphurization and denitration removal, and accelerate the application of processing technologies including clean and efficient casting, forging, welding, surface treatment and cutting to realize green production. Strengthen research and development of green product, generalize techniques of light weight, low power consumption and easy recovery, constantly promote energy efficiency of terminal energy-using products including motor, boiler, internal combustion engine and electric appliance, and accelerate the elimination of backward mechanical and electrical products and

technologies. Actively lead green development of emerging industries in a high starting point, substantially reduce energy consumption in production and use of electronic information products as well as content of restricted substances, build green data centers and green bases, and energetically promote green and low-carbon development of new material industry, new energy industry, high-end equipment industry and biology industry.

推进资源高效循环利用。支持企业强化技术创新和管理，增强绿色精益制造能力，大幅降低能耗、物耗和水耗水平。持续提高绿色低碳能源使用比率，开展工业园区和企业分布式绿色智能微电网建设，控制和削减化石能源消费量。全面推行循环生产方式，促进企业、园区、行业间链接共生、原料互供、资源共享。推进资源再生利用产业规范化、规模化发展，强化技术装备支撑，提高大宗工业固体废弃物、废旧金属、废弃电器电子产品等综合利用水平。大力发展再制造产业，实施高端再制造、智能再制造、在役再制造，推进产品认定，促进再制造产业持续健康发展。

Promote efficient cyclic utilization of resources. Support enterprises to strengthen technological innovation and management, enhance green and lean manufacturing capacity and substantially reduce energy consumption, material consumption and water consumption. Continuously improve green and low-carbon energy use ratio and carry out the construction of industrial park and enterprise distributed green and intelligent micro grid to control and reduce fossil energy consumption. Fully implement cycle production mode and promote link symbiosis, material supply and resource sharing among enterprise, park and industry. Promote industrialized and standardized development of resource recycling industry, intensify support of technical equipment, and improve comprehensive utilization level of large industrial solid wastes, scrap metals and waste electrical and electronic equipments. Strive to develop remanufacturing industry, implement high-end remanufacturing, intelligent remanufacturing and in-service remanufacturing, promote product identification, and facilitate sustainable and healthy development of remanufacturing industry.

积极构建绿色制造体系。支持企业开发绿色产品，推行生态设计，显著提升产品节能环保低碳水平，引导绿色生产和绿色消费。建设绿色工厂，实现厂房集约化、原料无害化、生产洁净化、废物资源化、能源

低碳化。发展绿色园区，推进工业园区产业耦合，实现近零排放。打造绿色供应链，加快建立以资源节约、环境友好为导向的采购、生产、营销、回收及物流体系，落实生产者责任延伸制度。壮大绿色企业，支持企业实施绿色战略、绿色标准、绿色管理和绿色生产。强化绿色监管，健全节能环保法规、标准体系，加强节能环保监察，推行企业社会责任报告制度，开展绿色评价。

Actively build a green manufacturing system. Support enterprises to develop green product, implement ecological design, significantly improve energy conservation, environmental protection and low carbon level, guide green production and green consumption. Construct green plants to realize plant intensification, hazard-free treatment of raw materials, production purification, reclamation of wastes and low carbonization of resources. Develop green parks, promote industry coupling of industrial parks, and realize zero release. Create a green supply chain, accelerate the establishment of procurement, production, marketing, recycling and logistics systems, and implement extended producer responsibility system. Expand green enterprises and support enterprises to implement green strategies, green standards, green management and green production. Intensify green supervision, improve environmental protection laws and regulations and standard systems, strengthen energy conservation and environmental monitoring, implement corporate social responsibility reporting system, and carry out green evaluation.

专栏 4 绿色制造工程
Column 4 Green manufacturing engineering
<p>组织实施传统制造业能效提升、清洁生产、节水治污、循环利用等专项技术改造。开展重大节能环保、资源综合利用、再制造、低碳技术产业化示范。实施重点区域、流域、行业清洁生产水平提升计划，扎实推进大气、水、土壤污染源头防治专项。制定绿色产品、绿色工厂、绿色园区、绿色企业标准体系，开展绿色评价。</p> <p>Organize and implement transformation of specific techniques about promotion of energy efficiency, cleaner production, water saving and pollution control, and cyclic utilization in traditional manufacturing industry. Carry out major energy conservation and environmental protection, comprehensive utilization of resources,</p>

remufacturing and industrialization demonstration of low-carbon technology. Implement performance promotion plan for cleaner production in key areas, fields and industries, and steadily promote special source control projects about air, water and soil pollution. Formulate standard systems for green product, green plant, green park and green enterprise, and carry out green evaluation.

到 2020 年，建成千家绿色示范工厂和百家绿色示范园区，部分重化工业能源资源消耗出现拐点，重点行业主要污染物排放强度下降 20%。到 2025 年，制造业绿色发展和主要产品单耗达到世界先进水平，绿色制造体系基本建立。

Up to 2020, construction of thousands of green demonstration factories and hundreds of green demonstration parks is completed, a turning point appears in energy and resource consumption in some heavy chemical industries, and emission intensity of major pollutants from key industries falls by 20%. Up to 2025, green development and unit consumption of major products of manufacturing industry reach worlds' advanced level and green manufacturing system is established.

（六）大力推动重点领域突破发展。

（VI）Vigorously promote breakthrough development of major fields

瞄准新一代信息技术、高端装备、新材料、生物医药等战略重点，引导社会各类资源集聚，推动优势和战略产业快速发展。

Focus on strategic emphases including a new generation of information technology, high-end equipment, new material and biological medicine, guide agglomeration of various social resources, and promote fast expansion of competitive and strategic industries.

1. 新一代信息技术产业。

1. A new generation of information technology industry

集成电路及专用装备。着力提升集成电路设计水平，不断丰富知识产权（IP）核和设计工具，突破关系国家信息与网络安全及电子整机产业发展的核心通用芯片，提升国产芯片的应用适配能力。掌握高密度封装及三维（3D）微组装技术，提升封装产业和测试的自主发展能力。形成关键制造装备供货能力。

Integrated circuit and special equipment. Strive to promote integrated circuit design level, constantly enrich intellectual property (IP) nuclear and design tools, break through core universal chips related with national information and network

security as well as development of electronic machine industry, and promote applicable and adaptive abilities of domestic chips. Grasp high density packaging and three-dimensional (3D) microassembly technologies and promote independent development ability of packaging industry and testing ability. Develop supply ability for key manufacturing equipment.

信息通信设备。掌握新型计算、高速互联、先进存储、体系化安全保障等核心技术，全面突破第五代移动通信（5G）技术、核心路由交换技术、超高速大容量智能光传输技术、“未来网络”核心技术和体系架构，积极推动量子计算、神经网络等发展。研发高端服务器、大容量存储、新型路由交换、新型智能终端、新一代基站、网络安全等设备，推动核心信息通信设备体系化发展及规模化应用。

Information communication equipment. Grasp core technologies about new-type calculation, high speed interconnection, advanced memory and systemized security, comprehensively break through fifth generation mobile communication (5G) technology, core route switching technology, super high speed and large capacity intelligent optical transmission technology, “future network” core technology and system structure, and actively promote the development of quantum computation and neural network. Research and develop equipment about high-end server, bulk-storage memory, new route switching, new-type intelligent terminal, new generation of base station and network security, and promote systematic development and scale application of core information communication equipment.

操作系统及工业软件。开发安全领域操作系统等工业基础软件。突破智能设计与仿真及其工具、制造物联与服务、工业大数据处理等高端工业软件核心技术，开发自主可控的高端工业平台软件和重点领域应用软件，建立完善工业软件集成标准与安全测评体系。推进自主工业软件体系化发展和产业化应用。

Operating system and industrial software. Develop industrial basic software such as operating system in security area. Break through high-end core technologies including intelligent design and simulation as well as tools, manufacturing instrumentation and service, and industrial big data processing for industrial software, develop self-controlled high-end industrial platform software and application software in major fields, establish and perfect industrial software integration standard and secure testing and evaluating system. Promote systematic development and scale

application of independent industrial software.

2. 高档数控机床和机器人。

2. High-end CNC machine tool and robot

高档数控机床。开发一批精密、高速、高效、柔性数控机床与基础制造装备及集成制造系统。加快高档数控机床、增材制造等前沿技术和装备的研发。以提升可靠性、精度保持性为重点，开发高档数控系统、伺服电机、轴承、光栅等主要功能部件及关键应用软件，加快实现产业化。加强用户工艺验证能力建设。

High-end CNC machine tool. Develop a batch of precise, high-speed, efficient and flexible CNC machine tools, basic manufacturing equipments and the integrated manufacturing system. Accelerate the research and development of cutting-edge technologies including additive manufacturing technology and equipments including high-end CNC machine tool. Focus on the reliability and precision retaining ability to develop major functional components and key application software including high-end CNC system, servo motor, bearing and optical grating and accelerate the realization of industrialization. Strengthen the construction of user process verification capacity.

机器人。围绕汽车、机械、电子、危险品制造、国防军工、化工、轻工等工业机器人、特种机器人，以及医疗健康、家庭服务、教育娱乐等服务机器人应用需求，积极研发新产品，促进机器人标准化、模块化发展，扩大市场应用。突破机器人本体、减速器、伺服电机、控制器、传感器与驱动器等关键零部件及系统集成设计制造等技术瓶颈。

Robot. In view of application requirements on service robot about medical treatment and health, household service, education and entertainment, and industrial robots and specialized robots in auto industry, machinery industry, electronic industry, danger manufacturing industry, national defense and military industry, chemical industry and light industry, actively research and develop new products to promote the development of robot standardization and modularization and enlarge market application. Break through technical bottlenecks for design and manufacture of key components including robot body, reducer, servo motor, controller and sensor, and also the system.

3. 航空航天装备。

3. Aerospace equipment

航空装备。加快大型飞机研制，适时启动宽体客机研制，鼓励国际合作研制重型直升机；推进干支线飞机、直升机、无人机和通用飞机产业化。突破高推重比、先进涡桨（轴）发动机及大涵道比涡扇发动机技术，建立发动机自主发展工业体系。开发先进机载设备及系统，形成自主完整的航空产业链。

Aeronautical equipment. Accelerate the development of large aircraft, timely activate the development of wide-bodied airliner, and encourage the development of heavy helicopter by international cooperation; promote the industrialization of artery aircraft, regional aircraft, helicopter, unmanned aerial vehicle and general-purpose plane. Break through technologies for engine with thrust-weight ratio advanced turboprop (turboshaft) and turbofan engine with large bypass ratio and establish industrial system for independent development of engine. Develop advanced airborne equipment and system and form an independent and complete aviation industry chain.

航天装备。发展新一代运载火箭、重型运载器，提升进入空间能力。加快推进国家民用空间基础设施建设，发展新型卫星等空间平台与有效载荷、空天地宽带互联网系统，形成长期持续稳定的卫星遥感、通信、导航等空间信息服务能力。推动载人航天、月球探测工程，适度发展深空探测。推进航天技术转化与空间技术应用。

Space equipment. Develop a new generation of launch vehicle and heavy vehicle to promote the capacity to access space. Accelerate the infrastructure construction of national space for civil use, develop space platforms including new-type satellite, effective load, ground-air-space broadband internet system, and form spatial information service abilities including satellite remote sensing, communication and navigation. Promote manned space flight and moon exploration projects, and properly develop deep-space exploration. Promote the transformation of space technology and application of space technology.

4.海洋工程装备及高技术船舶。大力发展深海探测、资源开发利用、海上作业保障装备及其关键系统和专用设备。推动深海空间站、大型浮式结构物的开发和工程化。形成海洋工程装备综合试验、检测与鉴定能力，提高海洋开发利用水平。突破豪华邮轮设计建造技术，全面提升液化天然气船等高技术船舶国际竞争力，掌握重点配套设备集成化、智能化、模块化设计制造核心技术。

4. Marine engineering equipment and high-tech ship. Energetically develop support equipments and key systems about deep-sea detecting, resource exploitation and utilization and marine operation, and dedicated devices. Promote the development and engineering realization of deep-sea space station and large floating structure. Form abilities for comprehensive test, detection and identification of ocean engineering equipment and improve ocean development and utilization level. Break through design and manufacturing technology for luxury cruise ship, comprehensively promote international competitiveness of high-tech ships including liquefied natural gas carrier, and grasp core design and manufacturing technologies for integration, intelligentization and modularization of key corollary equipments.

5. 先进轨道交通装备。加快新材料、新技术和新工艺的应用，重点突破体系化安全保障、节能环保、数字化智能化网络化技术，研制先进可靠适用的产品和轻量化、模块化、谱系化产品。研发新一代绿色智能、高速重载轨道交通装备系统，围绕系统全寿命周期，向用户提供整体解决方案，建立世界领先的现代轨道交通产业体系。

5. Advanced railway transportation equipment. Accelerate the application of new material, new technology and new process, make priority breakthroughs in systemized security technology, energy-saving and environmental protection technology, and digital intelligent network technology, and develop advanced, reliable and applicable products and light-weight, modular and spectrum products. Research and develop a new generation of green, intelligent, high-speed and heavy-duty railway transportation equipment system, provide users with integrated solution in view of system life cycle, and establish world-leading modern rail transit industry system.

6. 节能与新能源汽车。继续支持电动汽车、燃料电池汽车发展，掌握汽车低碳化、信息化、智能化核心技术，提升动力电池、驱动电机、高效内燃机、先进变速器、轻量化材料、智能控制等核心技术的工程化和产业化能力，形成从关键零部件到整车的完整工业体系和创新体系，推动自主品牌节能与新能源汽车同国际先进水平接轨。

6. Energy-efficient and new energy vehicle. Continue to support the development of electric automobile and fuel cell car, grasp core technologies for low carbonization, informatization and intelligentization of automobile, promote engineering and industrialization abilities of core technologies about power battery,

drive motor, efficient internal combustion engine, advanced transmission, light-weight material and intelligent control, form a complete industrial system and innovation system from key components to finished automobile, and promote energy-saving and new energy automobiles of independent brands in line with international advanced level.

7. 电力装备。推动大型高效超净排放煤电机组产业化和示范应用，进一步提高超大容量水电机组、核电机组、重型燃气轮机制造水平。推进新能源和可再生能源装备、先进储能装置、智能电网用输变电及用户端设备发展。突破大功率电力电子器件、高温超导材料等关键元器件和材料的制造及应用技术，形成产业化能力。

7. Electronic equipment. Promote the industrialization and demonstration application of large and efficient ultra-clean coal emission power unit and further improve the manufacturing level of hydroelectric generating set with ultra-large capacity, nuclear power unit and heavy duty gas turbine. Promote the development of new energy and renewable energy equipments, advanced energy storing devices, and smart grid power transmission and transformation and user terminal equipments. Break through manufacturing and application technologies for key components and materials including high power electronic devices and high-temperature superconducting material, and form industrialization ability.

8. 农机装备。重点发展粮、棉、油、糖等大宗粮食和战略性经济作物育、耕、种、管、收、运、贮等主要生产过程使用的先进农机装备，加快发展大型拖拉机及其复式作业机具、大型高效联合收割机等高端农业装备及关键核心零部件。提高农机装备信息收集、智能决策和精准作业能力，推进形成面向农业生产的信息化整体解决方案。

8. Agricultural machinery equipment. Give priority to developing advanced agricultural machinery equipments used in main productive process involving breeding, farming, planting, managing, collecting, transporting and storing for grain, cotton, oil, sugar and other cereals in a large quantity and strategic economic crops, and accelerate the development of high-end agricultural machinery equipments and key components including large tractor and its multiple operation tools, large and efficient combine-harvester. Improve the abilities for information gathering, intelligent decision making and precise operating of agricultural machinery equipments, and promote the overall solution of the informatization oriented towards

agricultural production.

9.新材料。以特种金属功能材料、高性能结构材料、功能性高分子材料、特种无机非金属材料 and 先进复合材料为发展重点，加快研发先进熔炼、凝固成型、气相沉积、型材加工、高效合成等新材料制备关键技术和装备，加强基础研究和体系建设，突破产业化制备瓶颈。积极发展军民共用特种新材料，加快技术双向转移转化，促进新材料产业军民融合发展。高度关注颠覆性新材料对传统材料的影响，做好超导材料、纳米材料、石墨烯、生物基材料等战略前沿材料提前布局和研制。加快基础材料升级换代。

9. New material. Take special functional metallic material, high performance structural material, functional high molecule material, special function inorganic nonmetal material and advanced composite material as developing emphases to accelerate the research and development of key technologies including advanced smelting, consolidation forming, vapor deposition, section processing and highly efficient combining and equipments for preparing new materials, strengthen fundamental research and system construction, and break through industrialization preparation bottleneck. Actively develop special new material for military and civilian use, accelerate bi-directional technology transfer and transformation, and facilitate military-civilian integrated development in new material industry. Pay high attention to the influence of disruptive new material to traditional material and make good overall arrangement and development of strategic frontier materials including superconducting material, nanometer material, graphene and biobased material in advance. Accelerate the upgrading and updating of basic material.

10.生物医药及高性能医疗器械。发展针对重大疾病的化学药、中药、生物技术药物新产品，重点包括新机制和新靶点化学药、抗体药物、抗体偶联药物、全新结构蛋白及多肽药物、新型疫苗、临床优势突出的创新中药及个性化治疗药物。提高医疗器械的创新能力和产业化水平，重点发展影像设备、医用机器人等高性能诊疗设备，全降解血管支架等高值医用耗材，可穿戴、远程诊疗等移动医疗产品。实现生物 3D 打印、诱导多能干细胞等新技术的突破和应用。

10. Biomedical and high-performance medical apparatus. Develop new products of chemical medicine, traditional Chinese medicine and biotechnology medicine for serious disease and new-mechanism and new-target point chemical medicine,

antibody-based drug, antibody-drug conjugate, new structural protein and polypeptide drugs, new generation vaccine, innovative Chinese medicine with remarkable clinical advantage, and individual-based treatment medicine are included. Improve the innovation ability and industrialization level of medical apparatus, and give priority to developing high-performance diagnostic equipments including image documentation equipment and medical robot, high-value medical consumables including fully-degradable intravascular stent, and wearable and remote diagnostic mobile medical products. Realize breakthrough and application of biological 3D printing technology, induced pluripotent stem cell technology and other new technologies.

<p>专栏 5 高端装备创新工程</p> <p>Column 5 High-end Equipment Innovation Project</p>
<p>组织实施大型飞机、航空发动机及燃气轮机、民用航天、智能绿色列车、节能与新能源汽车、海洋工程装备及高技术船舶、智能电网成套装备、高档数控机床、核电装备、高端诊疗设备等一批创新和产业化专项、重大工程。开发一批标志性、带动性强的重点产品和重大装备，提升自主设计水平和系统集成能力，突破共性关键技术与工程化、产业化瓶颈，组织开展应用试点和示范，提高创新发展能力和国际竞争力，抢占竞争制高点。</p> <p>Organize and implement a batch of innovative and industrialized special and major projects such as large aircraft, aero-engine and gas turbine, civil aerospace, intelligent green train, energy saving and new energy automobile, ocean engineering equipment and high-tech vessel, complete set of equipment for intelligent power grid, high-end numerical control machine tool, nuclear power equipment, high-end diagnosis equipment, etc. Develop a batch of symbolic and highly promotional key products and major equipment, improve the independent design level and system integration capability, break through common key technologies and engineering and industrialization bottleneck, organize and carry out pilot and demonstration application, improve innovation and development capability and international competitiveness, and take the commanding height of competition.</p> <p>到 2020 年，上述领域实现自主研制及应用。到 2025 年，自主知识产权高端装备市场占有率大幅提升，核心技术对外依存度明显下降，基础配套能力显著增</p>

强，重要领域装备达到国际领先水平。

Realize independent development and application in the above area by 2020. Increase the market share of high-end equipment with proprietary intellectual property right significantly, reduce the foreign dependence of core technologies remarkably, improve the ability to provide auxiliary infrastructures significantly, and reach international leading level for equipment in key fields by 2025.

（七）深入推进制造业结构调整。

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

推动传统产业向中高端迈进，逐步化解过剩产能，促进大企业与中小企业协调发展，进一步优化制造业布局。

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

持续推进企业技术改造。明确支持战略性重大项目和高端装备实施技术改造的政策方向，稳定中央技术改造引导资金规模，通过贴息等方式，建立支持企业技术改造的长效机制。推动技术改造相关立法，强化激励约束机制，完善促进企业技术改造的政策体系。支持重点行业、高端产品、关键环节进行技术改造，引导企业采用先进适用技术，优化产品结构，全面提升设计、制造、工艺、管理水平，促进钢铁、石化、工程机械、轻工、纺织等产业向价值链高端发展。研究制定重点产业技术改造投资指南和重点项目导向计划，吸引社会资金参与，优化工业投资结构。围绕两化融合、节能降耗、质量提升、安全生产等传统领域改造，推广应用新技术、新工艺、新装备、新材料，提高企业生产技术和效益。

Keep promoting technological transformation of enterprises. Clarify the policy direction of supporting the technological transformation of strategic major projects and high-end equipment, stabilize the scale of guiding fund of the central government for technological transformation, and establish a

long-term mechanism for supporting technological transformation of enterprises by interest subsidy and other means. Promote relevant legislation of technological transformation, strengthen the incentive and constraint mechanisms, and improve and promote the policy system of technological transformation of enterprises. Support key industries, high-end products, and key steps for technological transformation, guide enterprises to use advanced and appropriate technologies, optimize product structure, improve design, manufacturing, workmanship, and management level all-around, promote such industries as iron and steel, petrifaction, engineering machine, light industry, and textile to develop towards high-end of the value chain. Study and work out technological transformation investment guideline for key industries and guiding plan for key projects, attract social funds to participate in the investment, and optimize the industrial investment structure. Promote the application of new technologies, new processes, new equipment, and new materials encircling the transformation in such traditional fields as integration of IT application with industrialization, energy saving and cost reducing, quality improvement, safe production, etc., and improve the production technology level and benefit of the enterprises.

稳步化解产能过剩矛盾。加强和改善宏观调控，按照“消化一批、转移一批、整合一批、淘汰一批”的原则，分业分类施策，有效化解产能过剩矛盾。加强行业规范和准入管理，推动企业提升技术装备水平，优化存量产能。加强对产能严重过剩行业的动态监测分析，建立完善预警机制，引导企业主动退出过剩行业。切实发挥市场机制作用，综合运用法律、经济、技术及必要的行政手段，加快淘汰落后产能。

Resolve the conflict of surplus capacity steadily. Strengthen and improve the macro control and implement the policies by industries and categories under the principle of “transfer a batch after resolving a batch and eliminate a batch after integrating a batch” to resolve the conflict of surplus capacity

effectively. Strengthen the codes of practices and entry management, and promote the enterprises to improve the technology and equipment level and optimize the inventory capacity.

Strengthen the dynamic monitoring and analysis of industries with surplus capacity, establish and improve early warning mechanism, and direct enterprises to quit surplus industries actively. Give full play to the market mechanism and apply legal, economic, technological, and necessary administrative means in combination, and accelerate closing down outdated production facilities.

促进大中小企业协调发展。强化企业市场主体地位，支持企业间战略合作和跨行业、跨区域兼并重组，提高规模化、集约化经营水平，培育一批核心竞争力强的企业集团。激发中小企业创业创新活力，发展一批主营业务突出、竞争力强、成长性好、专注于细分市场的专业化“小巨人”企业。发挥中外中小企业合作园区示范作用，利用双边、多边中小企业合作机制，支持中小企业走出去和引进来。引导大企业与中小企业通过专业分工、服务外包、订单生产等多种方式，建立协同创新、合作共赢的协作关系。推动建设一批高水平的中小企业集群。

Promote coordinated development of large, small, and medium enterprises. Strengthen the dominant position of enterprises in the market, support the strategic cooperation between enterprises and multi-industry and cross-regional merger and reorganization, improve the large-scale and intensive management level, and cultivate a batch of enterprise groups with strong core competitiveness. Motivate the venturing and innovation vigor of small and medium enterprises, and develop a batch of professional “small giant” enterprises with outstanding main businesses, strong competitiveness, good potential for growth, and specialized in market segments. Give play to the Sino-foreign small and medium enterprises cooperation park demonstration, and make use of the bilateral and multi-lateral small and medium enterprises cooperation mechanism to support the small and medium enterprise to go abroad and come to China. Direct large enterprises and small and medium enterprises to establish

collaborative innovation and win-win cooperation relationship through work specialization, service outsourcing, make-to-order, and other means. Promote the construction of a batch of small and medium enterprises cluster with high level.

优化制造业发展布局。落实国家区域发展总体战略和主体功能区规划，综合考虑资源能源、环境容量、市场空间等因素，制定和实施重点行业布局规划，调整优化重大生产力布局。完善产业转移指导目录，建设国家产业转移信息服务平台，创建一批承接产业转移示范园区，引导产业合理有序转移，推动东中西部制造业协调发展。积极推动京津冀和长江经济带产业协同发展。按照新型工业化的要求，改造提升现有制造业集聚区，推动产业集聚向产业集群转型升级。建设一批特色和优势突出、产业链协同高效、核心竞争力强、公共服务体系健全的新型工业化示范基地。

optimize the development layout of the manufacturing industry. Implement the overall strategy of regional development and the overall functional area planning of the country, give comprehensive consideration to such factors as resources and energy, environment capacity, and market space, work out and implement the layout plan of key industries, and adjust and optimize the layout of major productive forces. Improve the industrial transfer guidance list, establish a national industrial transfer information service platform, create a batch of carrying on industry transfer demonstration park, direct industries to transfer in a reasonable and orderly manner, and promote coordinated development of the manufacturing industries of the east-central-west regions. Actively promote the industrial coordinated development of the Beijing-Tianjin-Hebei Region and the Yangtze River Economic Zone. Transform and improve existing manufacturing agglomerate region according to the requirements for new industrialization, and promote the industrial agglomeration to transform and upgrade to industrial cluster. Construct a batch of new industrialization demonstration bases with outstanding specialties and advantages,

highly efficient industrial chain collaboration, strong core competitiveness, and perfect public service system.

(八) 积极发展服务型制造和生产性服务业。

(VIII) Actively develop the service-oriented manufacturing and producer service industries.

加快制造与服务的协同发展，推动商业模式创新和业态创新，促进生产型制造向服务型制造转变。大力发展与制造业紧密相关的生产性服务业，推动服务功能区和服务平台建设。

Accelerate the coordinated development of manufacturing and service, promote business model innovation and mode innovation, and promote the transformation from production-oriented manufacturing to service-oriented manufacturing. Strive to develop the producer service industry closely related to the manufacturing industry and promote the construction of the service functional area and service platform.

推动发展服务型制造。研究制定促进服务型制造发展的指导意见，实施服务型制造行动计划。开展试点示范，引导和支持制造业企业延伸服务链条，从主要提供产品制造向提供产品和服务转变。鼓励制造业企业增加服务环节投入，发展个性化定制服务、全生命周期管理、网络精准营销和在线支持服务等。支持有条件的企业由提供设备向提供系统集成总承包服务转变，由提供产品向提供整体解决方案转变。鼓励优势制造业企业“裂变”专业优势，通过业务流程再造，面向行业提供社会化、专业化服务。支持符合条件的制造业企业建立企业财务公司、金融租赁公司等金融机构，推广大型制造设备、生产线等融资租赁服务。

Promote and develop service-oriented manufacturing. Study and work out instructions for promoting the development of service-oriented manufacturing and implement the service-oriented manufacturing actions. Carry out pilot demonstration, direct and support manufacturing enterprises to extend the service chain and transform from providing product manufacturing to providing products and services. Encourage manufacturing enterprises to increase the input into service links and develop personalized customized services, life-cycle

management, online precision marketing, online support service, etc. Support qualified enterprises to transform from providing equipment to providing general contracting service of system integration and from providing products to providing integrated solutions. Encourage advantageous manufacturing enterprises to “disintegrate” professional advantages and provide socialized and professional services to the industry through reconstruction of the business process. Support qualified manufacturing enterprises to establish financial institutions such as enterprise financial company and financial lease company, and promote the financial lease services such as large manufacturing equipment and production line.

加快生产性服务业发展。大力发展面向制造业的信息技术服务，提高重点行业信息应用系统的方案设计、开发、综合集成能力。鼓励互联网等企业发展移动电子商务、在线定制、线上到线下等创新模式，积极发展对产品、市场的动态监控和预测预警等业务，实现与制造业企业的无缝对接，创新业务协作流程和价值创造模式。加快发展研发设计、技术转移、创业孵化、知识产权、科技咨询等科技服务业，发展壮大第三方物流、节能环保、检验检测认证、电子商务、服务外包、融资租赁、人力资源服务、售后服务、品牌建设等生产性服务业，提高对制造业转型升级的支撑能力。

Accelerate the development of producer service industry. Strive to develop the information technology oriented to the manufacturing industry, and improve the solution design, development, and comprehensive integration ability of information application system of the key industries. Encourage internet enterprises to develop the innovative mode of mobile electronic commerce, online customization, online to offline, actively develop such businesses as dynamic monitoring and prediction and pre-warning of the market, realize seamless joint with the manufacturing enterprises, and innovate the business coordination process and value creation mode. Accelerate the development of such scientific and technology service industries

as research and development and design, technological transfer, business incubation, intellectual property right, scientific and technological consultation, etc., and develop such producer service industries as third-party logistics, energy saving and environmental protection, inspection and detection certification electronic commerce, service outsourcing, financial lease, human resources service, after-sales service, brand construction, etc., and improve the ability to support the transformation and upgrade of the manufacturing industry.

强化服务功能区和公共服务平台建设。建设和提升生产性服务业功能区，重点发展研发设计、信息、物流、商务、金融等现代服务业，增强辐射能力。依托制造业集聚区，建设一批生产性服务业公共服务平台。鼓励东部地区企业加快制造业服务化转型，建立生产服务基地。支持中西部地区发展具有特色和竞争力的生产性服务业，加快产业转移承接地服务配套设施和能力建设，实现制造业和服务业协同发展。

Strengthen the construction of the service functional area and public service platform. Construct and improve the functional area of producer service industry, and focus on the development of such modern service industries as research and development and design, information, logistics, commerce, finance, etc., and improve the radiating capacity. Construct a batch of public service platforms of producer services based on the manufacturing agglomerate region. Encourage enterprises in the east of China to accelerate the transformation to service-oriented manufacturing and establish producer service bases. Support the central and western regions of China to develop specialized and competitive producer services, accelerate the supporting facilities and capacity building of the places undertaking industrial transfer, and realize coordinated development of the manufacturing industry and the service industry.

（九）提高制造业国际化发展水平。

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

统筹利用两种资源、两个市场，实行更加积极的开放战略，将引进来与走出去更好结合，拓展新的开放领域和空间，提升国际合作的水准和层次，推动重点产业国际化布局，引导企业提高国际竞争力。

Make use of the two resources and two markets as a whole, implement more active opening strategies, combine introduction and going abroad, explore new open fields and spaces, improve the level of international cooperation, promote the international layout of key industries, and direct enterprises to improve their international competitiveness.

提高利用外资与国际合作水平。进一步放开一般制造业，优化开放结构，提高开放水平。引导外资投向新一代信息技术、高端装备、新材料、生物医药等高端制造领域，鼓励境外企业和科研机构在我国设立全球研发机构。支持符合条件的企业在境外发行股票、债券，鼓励与境外企业开展多种形式的技术合作。

Improve the level of using foreign funds and international cooperation. Further open up the general manufacturing industry, optimize the opening structure, and improve the opening level. Direct foreign funds to such high-end manufacturing fields as new generation of information technology, high-end equipment, new materials, biological medicine, etc., and encourage foreign enterprises and scientific research institutions to establish global research and development institutions in China. Support qualified enterprises to issue stocks and bonds abroad, and encourage them to carry out various forms of technical cooperation with foreign enterprises.

提升跨国经营能力和国际竞争力。支持发展一批跨国公司，通过全球资源利用、业务流程再造、产业链整合、资本市场运作等方式，加快提升核心竞争力。支持企业在境外开展并购和股权投资、创业投资，建立研发中心、实验基地和全球营销及服务体系；依托互联网开展网络协同设计、精准营销、增值服务创新、媒体品牌推广等，建立全球产业链体系，提高国际化经营能力和服务水平。鼓励优势企业加快发展国际总承包、总集成。引导企业融入当地文化，增强社会责任意识，加强投资和经营风险管理工作，提高企业境外本土化能力。

Improve transnational operation capability and international competitiveness. Support the development of a batch of transnational companies and accelerate the improvement of core competitiveness through utilization of global resources, reconstruction of business process, integration of industrial chain, and operation of capital market. Support enterprises to carry out merger and acquisition, equity investment, and venture capital investment abroad, and establish research and development centers, experimental bases and global marketing and service system; carry out network coordination design, precision marketing, value-added service innovation, brand promotion through media, etc. through the internet, establish global industrial chain system, and improve the international operating capability and service level. Encourage advantageous enterprise to accelerate the development of internal general contracting and total integration. Direct enterprise to blend in local culture, strengthen the awareness of social responsibility, strengthen investment and operation risk management, and improve the localization capability of enterprises abroad.

深化产业国际合作，加快企业走出去。加强顶层设计，制定制造业走出去发展总体战略，建立完善统筹协调机制。积极参与和推动国际产业合作，贯彻落实丝绸之路经济带和 21 世纪海上丝绸之路等重大战略部署，加快推进与周边国家互联互通基础设施建设，深化产业合作。发挥沿边开放优势，在有条件的国家和地区建设一批境外制造业合作园区。坚持政府推动、企业主导，创新商业模式，鼓励高端装备、先进技术、优势产能向境外转移。加强政策引导，推动产业合作由加工制造环节为主向合作研发、联合设计、市场营销、品牌培育等高端环节延伸，提高国际合作水平。创新加工贸易模式，延长加工贸易国内增值链条，推动加工贸易转型升级。

Deepen international cooperation of the industry and accelerate going out of the enterprises. Strengthen top-level design, work out the overall strategy for the manufacturing industry to go out, and establish and improve the planning and coordination mechanism.

actively take part in and promote international industrial cooperation, implement the important strategic deployment such as the silk road economic belt and the 21st century maritime silk road, accelerate the construction of interconnecting infrastructures with surrounding countries, and deepen the industrial cooperation. Give play to the advantages of opening up along the border and construct a batch of foreign manufacturing cooperation parks in qualified countries and regions. Insist the government promotion and enterprise leading, innovate business model, encourage high-end equipment, advanced technologies, and advantageous capacity to go abroad. Strengthen the policy guidance, promote the extension of industrial cooperation from manufacturing link oriented to high-end links such as cooperative research and development, joint design, marketing, brand cultivation, etc., and improve the international cooperation level. Innovate the processing and trade mode, extend the domestic value-added chain of processing and trade, and promote the transformation and upgrade of processing and trade.

四、战略支撑与保障

IV.Strategic support and guarantee

建设制造强国，必须发挥制度优势，动员各方面力量，进一步深化改革，完善政策措施，建立灵活高效的实施机制，营造良好环境；必须培育创新文化和中国特色制造文化，推动制造业由大变强。

Construct a powerful manufacturing nation, give full play to institutional advantages, mobilize the power on all aspects, further deepen the reform, improve the policies and measures, establish flexible and efficient implementation mechanism, create a favorable environment; cultivate the innovation culture and manufacturing culture with Chinese characteristics, and promote the manufacturing to transform from large-scale and strong.

（一）深化体制机制改革。

(I) Deepen the institutional mechanism reform.

全面推进依法行政，加快转变政府职能，创新政府管理方式，加强制造业发展战略、规划、政策、标准等制定和实施，强化行业自律和公共服务能力建设，提高产业治理水平。简政放权，深化行政审批制度改革，规范审批事项，简化程序，明确时限；适时修订政府核准的投资项目目录，落实企业投资主体地位。完善政产学研用协同创新机制，改革技术创新管理体制机制和项目经费分配、成果评价和转化机制，促进科技成果资本化、产业化，激发制造业创新活力。加快生产要素价格市场化改革，完善主要由市场决定价格的机制，合理配置公共资源；推行节能量、碳排放权、排污权、水权交易制度改革，加快资源税从价计征，推动环境保护费改税。深化国有企业改革，完善公司治理结构，有序发展混合所有制经济，进一步破除各种形式的行业垄断，取消对非公有制经济的不合理限制。稳步推进国防科技工业改革，推动军民融合深度发展。健全产业安全审查机制和法规体系，加强关系国民经济命脉和国家安全的制造业重要领域投融资、并购重组、招标采购等方面的安全审查。

Promote the law-based administration all-around, accelerate transformation of functions of the government, innovate management measures of the government, strengthen the preparation and implementation of the development strategy, planning, policies, and standards of the manufacturing industry, strengthen self-regulation and public service capacity building, and improve the industrial governance level. Streamline administration and delegate power to the lower levels, deepen the administrative approval system reform, standardize the approval matters, simply the procedures, define the time limit; amend the investment project lists approved by the government in due time, and clarify the position of investment subject of enterprises. Improve the policy-industry-university-research-need coordinated innovation mechanism, reform the technological innovation and management mechanism and the project appropriation allotment, results evaluation and transfer mechanism, promote the capitalization and industrialization of scientific and technological achievements, and motivate the innovation energy of the manufacturing industry. Accelerate the

market-oriented reform of factor prices, improve the mechanism of market determined price, allocate public resources reasonably; promote the reform of energy saving, carbon emission permit, emission permit, and water right transaction system, accelerate the ad valorem collection of resource tax, and promote the transformation of environmental protection fee into tax. Deepen the reform of state-owned enterprises, improve company governance structure, develop the mixed ownership economy in order, further eliminate various types of industrial monopoly, and revoke the irrational limitation on non-public sectors of the economy. Promote the reform of science and technology industry of national defense steadily and promote the deep development of military and civilian integration. Improve the industrial safety review mechanism and legal systems, strengthen the safety review on such important fields of the manufacturing industry connecting with the lifelines of the national economy and national security as investment and financing, merger and reorganization, purchasing by invitation to bid, etc.

（二）营造公平竞争市场环境。

(II) Create a fair competitive market environment.

深化市场准入制度改革，实施负面清单管理，加强事中事后监管，全面清理和废止不利于全国统一市场建设的政策措施。实施科学规范的行业准入制度，制定和完善制造业节能节地节水、环保、技术、安全等准入标准，加强对国家强制性标准实施的监督检查，统一执法，以市场化手段引导企业进行结构调整和转型升级。切实加强监管，打击制售假冒伪劣行为，严厉惩处市场垄断和不正当竞争行为，为企业创造良好生产经营环境。加快发展技术市场，健全知识产权创造、运用、管理、保护机制。完善淘汰落后产能工作涉及的职工安置、债务清偿、企业转产等政策措施，健全市场退出机制。进一步减轻企业负担，实施涉企收费清单制度，建立全国涉企收费项目库，取缔各种不合理收费和摊派，加强监督检查和问责。推进制造业企业信用体系建设，建设中国制造信用数据库，建立健全企业信用动态评价、守信激励和失信惩戒机制。强化企业社会责任建设，推行企业产品标准、质量、安全自我声明和监督制

度。

Deepen the reform of market entry system, implement negative list management, strengthen the supervision during and after the events, and clear and revoke the policies and measures which are unfavorable for construction of the national unified market. Implement scientific and standard industrial entry system, work out and improve the energy saving, land saving and water saving, environmental protection, technology, and safety entry standards of the manufacturing industry, strengthen the supervision and inspection for national compulsory standards, execute the laws uniformly, and direct the enterprises to make structural adjustment, transformation, and upgrade through marketization. Strengthen the supervision, strike the acts of manufacturing and selling fake and poor-quality commodities, put severe punishments to market monopoly and unfair competition and practice, and create a favorable production and operation environment for enterprises. Accelerate the development of technology market, and improve the intellectual property right creation, application, management, and protection mechanism. Improve the policies and measures to settle employees, pay debts, and enterprise transformation arising from closing down outdated production facilities. Further lighten the burden on enterprises, implement the enterprise charge list system, establish the national enterprise charge items library, prohibit various irrational charges and allocation, and strengthen the supervision and inspection and accountability. Promote the construction of the enterprise credit system of the manufacturing system, construct a credit database for made in China, establish and improve the enterprise credit dynamics evaluation, trustworthy incentive and dishonesty punishment mechanism. Strengthen the construction of social responsibility of the enterprises, and promote self-statement and supervision system for product standard, quality, and safety of the enterprises.

（三）完善金融扶持政策。

(III) Improve the financial supportive policy.

深化金融领域改革，拓宽制造业融资渠道，降低融资成本。积极发挥政策性金融、开发性金融和商业金融的优势，加大对新一代信息技术、高端装备、新材料等重点领域的支持力度。支持中国进出口银行在业务范围内加大对制造业走出去的服务力度，鼓励国家开发银行增加对制造业企业的贷款投放，引导金融机构创新符合制造业企业特点的产品和业务。健全多层次资本市场，推动区域性股权市场规范发展，支持符合条件的制造业企业在境内外上市融资、发行各类债务融资工具。引导风险投资、私募股权投资等支持制造业企业创新发展。鼓励符合条件的制造业贷款和租赁资产开展证券化试点。支持重点领域大型制造业企业集团开展产融结合试点，通过融资租赁方式促进制造业转型升级。探索开发适合制造业发展的保险产品和服务，鼓励发展贷款保证保险和信用保险业务。在风险可控和商业可持续的前提下，通过内保外贷、外汇及人民币贷款、债权融资、股权融资等方式，加大对制造业企业在境外开展资源勘探开发、设立研发中心和高新技术企业以及收购兼并等的支持力度。

Deepen the reform in the financial field, expand the financial channel for manufacturing industry, and reduce financial cost. Give play to the advantages of policy finance, development finance, and commercial finance, and increase the support to the new generation of information technology, high-end equipment, new materials, etc. Support the Export-Import Bank of China to increase the service to manufacturing industry going out within its business cope, encourage the China Development Bank to increase the loan to manufacturing enterprises, and direct financial institutions to innovate products and businesses which are suitable for the characteristics of the manufacturing enterprises. Improve a multi-level capital market, promote standard development of regional equity market, support qualified manufacturing enterprises to list and raise funds and issue various bonds and financial instruments abroad. Direct risk investment and private equity investment to support the innovation and development of manufacturing enterprises.

Encourage qualified manufacturing industry loan and leasing assets to carry out securitization pilot. Support large manufacturing enterprises and groups in key fields to carry out industry and finance integration pilot and promote the transformation and upgrade of the manufacturing industry through financial lease. Explore and develop insurance products and services suitable for development of the manufacturing industry and encourage the development of loans to guarantee the insurance and credit insurance business. Increase the support to manufacturing enterprises to carry out resources exploration and development, establish research and development center and high-tech enterprises and merger and acquisition abroad through overseas loan under domestic guarantee, foreign currency and Renminbi loan, debt financing, equity financing, etc. under the premises of controllable risk and sustainable business.

（四）加大财税政策支持力度。

(IV) Increase the support of fiscal taxation policy.

充分利用现有渠道，加强财政资金对制造业的支持，重点投向智能制造、“四基”发展、高端装备等制造业转型升级的关键领域，为制造业发展创造良好政策环境。运用政府和社会资本合作（PPP）模式，引导社会资本参与制造业重大项目建设、企业技术改造和关键基础设施建设。创新财政资金支持方式，逐步从“补建设”向“补运营”转变，提高财政资金使用效益。深化科技计划（专项、基金等）管理改革，支持制造业重点领域科技研发和示范应用，促进制造业技术创新、转型升级和结构布局调整。完善和落实支持创新的政府采购政策，推动制造业创新产品的研发和规模化应用。落实和完善使用首台（套）重大技术装备等鼓励政策，健全研制、使用单位在产品创新、增值服务和示范应用等环节的激励约束机制。实施有利于制造业转型升级的税收政策，推进增值税改革，完善企业研发费用计核方法，切实减轻制造业企业税收负担。

Make full use of existing channels, strengthen the support of financial funds to the manufacturing industry, focus on key fields in transformation and upgrade of the manufacturing industry such as intelligent manufacturing, “four-basic”

development, high-end equipment, etc., and create a favorable policy environment for development of the manufacturing industry. Use the public-private partnership (PPP) mode to direct social funds to take part in the construction of major projects, enterprise technological innovation, and construction of key infrastructures of the manufacturing industry. Innovate the means of financial support, transform from “construction support” to “operation support”, and improve the use efficiency of financial funds. Deepen the reform of scientific and technology plan (special, funds, etc.) management, support the scientific and technology research and development and application demonstration in key fields of the manufacturing industry, promote the technological innovation, transformation and upgrade, and adjustment of structural layout of the manufacturing industry. Improve and implement the government procurement policies supporting the innovation and promote the research and development and large-scale application of innovative products of the manufacturing industry. Implement and improve the incentive policies for using the first (set) major technological equipment, improve the incentive and restraint mechanism of the research and development unit and using unit in product innovation, value-added service, application demonstration, etc. Implement tax policies favorable for transformation and upgrade of the manufacturing industry, promote the value-added tax reform, improve the accounting method of research and development expenses of the enterprises, and relieve the tax burden of the enterprises of the manufacturing industry practically.

（五）健全多层次人才培养体系。

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

加强制造业人才发展统筹规划和分类指导，组织实施制造业人才培养计划，加大专业技术人才、经营管理人才和技能人才的培养力度，完善从研发、转化、生产到管理的人才培养体系。以提高现代经营管理水

平和企业竞争力为核心，实施企业经营管理人才素质提升工程和国家中小企业银河培训工程，培养造就一批优秀企业家和高水平经营管理人才。以高层次、急需紧缺专业技术人才和创新型人才为重点，实施专业技术人才知识更新工程和先进制造卓越工程师培养计划，在高等学校建设一批工程创新训练中心，打造高素质专业技术人才队伍。强化职业教育和技能培训，引导一批普通本科高等学校向应用技术类高等学校转型，建立一批实训基地，开展现代学徒制试点示范，形成一支门类齐全、技艺精湛的技术技能人才队伍。鼓励企业与学校合作，培养制造业急需的科研人员、技术技能人才与复合型人才，深化相关领域工程博士、硕士专业学位研究生招生和培养模式改革，积极推进产学研结合。加强产业人才需求预测，完善各类人才信息库，构建产业人才水平评价制度和信息发布平台。建立人才激励机制，加大对优秀人才的表彰和奖励力度。建立完善制造业人才服务机构，健全人才流动和使用的体制机制。采取多种形式选拔各类优秀人才重点是专业技术人才到国外学习培训，探索建立国际培训基地。加大制造业引智力度，引进领军人才和紧缺人才。

Strengthen the overall planning and classification direction of talent development in the manufacturing industry, organize and implement the talent cultivation plan of the manufacturing industry, increase the work in cultivating professional technological talents, operation and management talents, and skilled talents, and improve the talent cultivation system from research and development, transformation, production to management. Implement the project for improving quality of the operation and management talents of the enterprise and the galaxy training project for national small and medium enterprises with the core of improving modern operation and management level and competitiveness of the enterprise, and cultivate a batch of excellent entrepreneurs and high-level operation and management talents. Implement the knowledge update project of professional technological talents and the advanced manufacturing and extraordinary engineering training plan focusing on high-level, badly needed professional technological talents, and innovative talents, and construct a batch of project innovation training

centers in high schools and create a professional technological talent team of high quality. Strengthen vocational education and skill training, direct a batch of general undergraduate high schools to transform to applied technology high schools, establish a batch of training bases to carry out modern internship pilot demonstration, and create a technological skilled talent team with complete disciplines and high skill. Encourage enterprises to cooperate with schools to cultivate scientific research personnel, technological skilled talents, and composite talents badly needed for the manufacturing industry, deepen the reform of recruitment and cultivation mode of engineering doctor and master degrees in relevant fields, and actively promote the combination of industry, school, and research. Strengthen the prediction of demands for talents of the industry, improve the information base of various talents, build the talent evaluation system and information publication platform of the industry. Establish the talent incentive mechanism and increase the commends and rewards to excellent talents. Establish and improve the talent service institutions of the manufacturing industry and improve the talent flow and utilization mechanism. Choose excellent talents especially professional technological talents by various means to receive training abroad, and explore the establishment of international training bases. Strengthen the work in introduction of foreign knowledge in the manufacturing industry and introduce leading talents and badly needed talents.

（六）完善中小微企业政策。

(VI) Improve the policies for medium, small, and micro enterprises.

落实和完善支持小微企业发展的财税优惠政策，优化中小企业发展专项资金使用重点和方式。发挥财政资金杠杆撬动作用，吸引社会资本，加快设立国家中小企业发展基金。支持符合条件的民营资本依法设立中小型银行等金融机构，鼓励商业银行加大小微企业金融服务专营机构建设力度，建立完善小微企业融资担保体系，创新产品和服务。加快

构建中小微企业征信体系，积极发展面向小微企业的融资租赁、知识产权质押贷款、信用保险保单质押贷款等。建设完善中小企业创业基地，引导各类创业投资基金投资小微企业。鼓励大学、科研院所、工程中心等对中小企业开放共享各种实（试）验设施。加强中小微企业综合服务体系的建设，完善中小微企业公共服务平台网络，建立信息互联互通机制，为中小微企业提供创业、创新、融资、咨询、培训、人才等专业化服务。

Implement and improve the financial and tax preferential policies supporting the development of small and micro enterprises, and optimize of the focus and means of use of special development funds for medium, small, and micro enterprises. Give play to the leverage of financial funds, attract social funds, and accelerate the establishment of national medium and small enterprise development funds. Support qualified private funds to establish financial institutions such as small and medium banks according to the law, encourage commercial banks to increase the efforts in establishment of special financial service institutions for small and micro enterprises, establish and improve the financial guarantee system for small and micro enterprises, and innovate the products and services. Accelerate the establishment of the credit system of medium, small, and micro enterprises, actively develop the financial lease, intellectual property right mortgage loan, and credit insurance policy mortgage loan to small and micro enterprises. Establish and improve the small and medium enterprises bases and direct various venture investment funds to invest small and micro enterprises. Encourage universities, scientific research institution, and engineering centers to open and share various experimental (testing) facilities to small and medium enterprises. Accelerate the construction of comprehensive service system for medium, small, and micro enterprises, improve the public service platform for medium, small, and micro enterprises, establish the information interlinking mechanism, and provide professional services such as starting a business, innovation, financing,

consultation, training, talent, etc.

(七) 进一步扩大制造业对外开放。

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

深化外商投资管理体制改革，建立外商投资准入前国民待遇加负面清单管理机制，落实备案为主、核准为辅的管理模式，营造稳定、透明、可预期的营商环境。全面深化外汇管理、海关监管、检验检疫管理改革，提高贸易投资便利化水平。进一步放宽市场准入，修订钢铁、化工、船舶等产业政策，支持制造业企业通过委托开发、专利授权、众包众创等方式引进先进技术和高端人才，推动利用外资由重点引进技术、资金、设备向合资合作开发、对外并购及引进领军人才转变。加强对外投资立法，强化制造业企业走出去法律保障，规范企业境外经营行为，维护企业合法权益。探索利用产业基金、国有资本收益等渠道支持高铁、电力装备、汽车、工程施工等装备和优势产能走出去，实施海外投资并购。加快制造业走出去支撑服务机构建设和水平提升，建立制造业对外投资公共服务平台和出口产品技术性贸易服务平台，完善应对贸易摩擦和境外投资重大事项预警协调机制。

Deepen the reform of foreign investment management system, establish foreign investment pre-establishment national treatment and negative list management mechanism, implement the management mode of making records as the main and examination as the assistance, and create a stable, transparent, and predictable business environment. Deepen the reform of foreign currency management, customs supervision, inspection and quarantine management and improve the trade and investment convenience. Further relax control over market access, amend the industrial policies for iron and steel, petrification, and vessels, support manufacturing enterprises to introduce advanced technological and high-end talents through entrusting development, patent licensing, crowd sourcing and crowd creating, promote the transformation of foreign funds from introduction of technologies, funds, and equipment to jointly and cooperative development, foreign merger, and introduction of leading talents. Strengthen the legislation of foreign investment, strengthen the

legal guarantee for manufacturing enterprises to go out, standardize foreign operations of the enterprises, and protect legal rights of the enterprises. Explore the utilization of industrial funds, state-owned capital gains, and other channels to support such equipment and advantages as high-speed train, power equipment, vehicles, and engineering construction to go out and carry out investment and merger abroad. Accelerate the construction and level improvement of the service institutions supporting the manufacturing industry to go out, establish the foreign investment public service platform and the export product technical trade service platform for the manufacturing industry, and improve the coordination mechanism for foreign trade conflict and pre-warning of major foreign investment events.

（八）健全组织实施机制。

(VIII) Improve the organization and implementation mechanism.

成立国家制造强国建设领导小组，由国务院领导同志担任组长，成员由国务院相关部门和单位负责同志担任。领导小组主要职责是：统筹协调制造强国建设全局性工作，审议重大规划、重大政策、重大工程专项、重大问题和重要工作安排，加强战略谋划，指导部门、地方开展工作。领导小组办公室设在工业和信息化部，承担领导小组日常工作。设立制造强国建设战略咨询委员会，研究制造业发展的前瞻性、战略性重大问题，对制造业重大决策提供咨询评估。支持包括社会智库、企业智库在内的多层次、多领域、多形态的中国特色新型智库建设，为制造强国建设提供强大智力支持。建立《中国制造 2025》任务落实情况督促检查和第三方评价机制，完善统计监测、绩效评估、动态调整和监督考核机制。建立《中国制造 2025》中期评估机制，适时对目标任务进行必要调整。

Establish a national powerful manufacturing nation construction leading group of which the leader shall be from the State Council and the members shall be from relevant departments and units of the State Council. Main responsibilities of the leading group include: Coordinate the overall work for building a powerful manufacturing nation, review major planning, major policies,

special and major problems of key projects, and important work arrangement, strengthen the strategic planning, and direct various departments and local departments to carry out the work. Office of the leading group is located at the Ministry of Industry and Information and is responsible for routine work of the leading group. Establish a strategic consultation commission for building a powerful manufacturing nation, study proactive and strategic major problems for development of the manufacturing industry, and provide advices and evaluation for making bid decisions for the manufacturing industry. Support the construction of a multi-level, multi-field, and multi-form new think tank with Chinese characteristics including social think tank and enterprise think tank to provide power intelligence support for building a powerful manufacturing nation. Establish a mechanism for supervision and inspection of implementation of the tasks of the *Made in China 2025* and third-party evaluation, and improve the statistics monitoring, performance evaluation, dynamic adjustment, and supervision and examination mechanism. Establish a medium-term evaluation mechanism for the *Made in China 2025* and make necessary adjustment to the objective task in due time.

各地区、各部门要充分认识建设制造强国的重大意义，加强组织领导，健全工作机制，强化部门协同和上下联动。各地区要结合当地实际，研究制定具体实施方案，细化政策措施，确保各项任务落实到位。工业和信息化部要会同相关部门加强跟踪分析和督促指导，重大事项及时向国务院报告。

Various regions and departments shall fully understand the significance of building a powerful manufacturing nation, strengthen the organization leading, improve the working mechanism, and strengthen departmental coordination and upper and lower linkage. Various regions shall work out specific implementation program and refine the policy measures to ensure various tasks to be implemented. The Ministry of Industry and

Information shall strengthen the tracking, analysis, supervision, and direction jointly with relevant departments, and report major events to the State Council in a timely manner.