China's Manufacturing Outlook towards 2035

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Abstract: *Over the past seven decades since the founding of the People's Republic of China in 1949, China has emerged as the factory floor of the world. Manufacturing prowess has undergirded China's industrial growth, competitiveness, and leading-nation status. The Fifth Plenum of the 19th CPC Central Committee vowed to "basically complete new-type industrialization, ICT revolution, urbanization, and agricultural modernization and build a modern economic system by 2035." To achieve this goal, China must steadfastly advance supply-side structural reforms, strengthen the real economy, develop advanced manufacturing, and upgrade traditional industries. China must create a stable and competitive supply chain and enhance the dynamism of market entities. At the heart of these priorities lies innovation. In conclusion, this paper puts forth policy recommendations on China's manufacturing strength and competitiveness towards 2035. Specifically, China should leverage its market heft and "whole-nation" strength to push forward industrial transition, deepen market-based factor allocation reforms, encourage entrepreneurship, and embrace international cooperation and competition.*

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In October 2020, the Fifth Plenum of the 19th CPC Central Committee envisioned a grand goal for China's development in the coming 15 years: "Basically complete new-type industrialization, ICT revolution, urbanization and agricultural modernization, and build a modern economic system by 2035." Without doubt, the manufacturing industry plays a pivotal role in achieving this goal. A world-class manufacturing system is essential to a country's competitiveness, national security, and sustainable development. In the new era of Chinese socialism, China must blaze a new trail of industrial development and enhance manufacturing strength as part of our efforts for national rejuvenation.

1. China's Manufacturing Development: Current Status and Achievements

China's emergence as the world's largest manufacturing nation since 1949 has been a rags-to-riches story. After decades of growth in industrial output, China has developed a complete industrial system. Great progress has been made in innovation, industrial transition, and economic sustainability. Industrial strengths have underpinned China's modernization drive, competitiveness, and leading-nation status.

Industrial capacity: In 2019, China's manufacturing value-added reached 26.9 trillion yuan, or 28.1% of the world total, ranking the first for ten straight years. China is home to all industrial

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面向2035年的中国制造业高质量发展

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摘　要：新中国成立70年多来，制造业发展取得举世瞩目的成就，发展规模世界第一、创新能力显著提高、产业结构持续优化、优质企业快速崛起、开放水平不断提升，从而为加快推动我国工业化和现代化进程、提升国际竞争力、建成世界大国形成重要支撑。党的十九届五中全会提出，2035年“基本实现新型工业化、信息化、城镇化、农业现代化，建成现代化经济体系”，这要求必须紧紧抓住供给侧结构性改革这一主线，坚持把做实做强做优实体经济作为主攻方向。从制造业领域来看，就是坚持把创新摆在发展全局的核心位置，加快发展先进制造业、以更大力度推进传统产业转型升级，注重提升产业链供应链稳定性与竞争力，大力增强市场主体活力与发展能力。在此基础上，本文从依托超大规模市场优势牵引转型升级、发挥新型举国体制优势构建制造业创新体系、深化要素市场化配置改革、激发和弘扬企业家精神、以高水平对外开放打造国际合作和竞争新优势等角度，提出了面向2035年推进制造业高质量发展、建设制造强国的对策与建议。

关键词：2035年；制造业发展；新要求

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党的十九届五中全会提出，到2035年基本实现新型工业化、信息化、城镇化、农业现代化，建成现代化经济体系。这无疑对作为立国之本、兴国之器、强国之基的制造业高质量发展提出了更高的要求。打造具有全球水准的制造业体系，是提升国家综合国力与核心竞争力、保障国家安全和促进可持续发展的必由之路。在建设中国特色社会主义的新时代，坚持走中国特色新型工业化道路，加快制造强国建设，加快发展先进制造业，对于实现中华民族伟大复兴的中国梦具有特别重要的意义。

一、中国制造业的发展现状与成就

1949年以来，我国制造业发展取得举世瞩目的成就，实现了“由小到大”的转变，成为世界第一制造大国。主要工业产品产量大幅跃升，目前拥有全球最完整的产业体系和不断增强的科技创新能力，产业结构持续优化升级，经济发展的全面性、协调性和可持续不断增强，从而为加快推动我国工业化和现代化进程、提升国际

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sectors in the United Nations industry classification system, ranking the first in the world in terms of the output of over 200 types of industrial goods. China accounts for over 50% of global output of air conditioners, TV sets, fridges and washing machines, and more than 30% and 50% of global output of automobiles and new energy vehicles, respectively. China has established a complete and independent modern manufacturing system and a global supply chain network. With a group of globally important manufacturing clusters, China plays an indispensable role in the international division of labor.

Innovation: In 2019, China's R&D spending reached 2.21 trillion yuan, an increase of 12.5%, or 0.7 percentage points higher than in the previous year. For four straight years, China's R&D spending maintained double-digit growth. In the same year, China's R&D intensity stood at 2.23%, up 0.09 percentage points from the previous year. Manufacturing R&D spending accounted for 1.43% of revenue from the primary business, up 0.48 percentage points from 2015, overshooting the target of 1.26% set for the 13th Five-Year Plan (FYP) period. China has created a manufacturing innovation network consisted of 17 national and over 100 provincial manufacturing innovation centers. Breakthroughs have been made in a host of critical technologies and products such as Chang'e lunar probe, Long March 5 Series Launch Vehicle, C919 jumbo jet, and flat panel display glass substrate. Rapid conversion of R&D results into productivity has expedited China's industrial transition and upgrade. According to the Global Innovation Index of the World Intellectual Property Organization (WIPO), China's innovation ranking climbed from 29th place in 2015 to the 14th in 2020. Progress in science and technology contributed as much as 59.5% to China's economic growth.

Improving industry structure: Since the 18th CPC National Congress, China has carried out supply-side structural reforms, adjusted industrial structure, improved industrial organization, and made great progress in developing the real economy led by the manufacturing industry. The iron and steel industry achieved the target of reducing excess capacity by 150 million tons in the 13th Five-Year Plan period two years ahead of time. In 2019, China's industrial operating rate recovered to 80.0%, the highest in almost seven years. Digital manufacturing developed apace. In June 2020, the penetration of digital R&D and design tools reached 71.5% among leading manufacturing companies, up 14.8 percentage points over 2015. The penetration of CNC machine tools for critical processes stood at 51.1%, up 3.8 percentage points over 2015. Emerging industries developed from strength to strength, outpacing overall economic growth. In the period 2016-2019, China's high-tech manufacturing industry recorded an annual average value-added growth of 11.2%, which is much higher than the average growth of 6.0% for all industries. High-tech manufacturing value-added as a share of the total value-added of large industries increased from 11.8% in 2015 to 14.4% in 2019. Equipment manufacturing value-added as a share of the total value-added of large industries rose by 0.7 percentage points to reach 32.5%. Emerging industries have become the key driving forces of China's manufacturing development.

Competitive manufacturing firms: In such fields as information technology, rail transportation and new energy vehicles, China has seen an emergence of innovative and competitive companies, "small but beautiful" firms, and niche-market champions. These companies have become leaders in their respective sectors in terms of output capacity, technology, managerial competence, and market share. In 2020, 124 Chinese companies ranked among "Fortune Global 500" companies, including 38 with manufacturing as the main business - the highest in the world. Among the top 500 most valuable global brands in 2020, 18 manufacturing brands were from China. Among the top 100 companies for digital economy released by *Forbes* magazine in 2019, 14 were from China.

Increasing openness: General Secretary Xi Jinping stressed on many occasions that "reform and opening-up is China's basic national policy and a fundamental impetus of China's development." With a host of opening-up policies enacted in recent years, China's manufacturing industry has entered a new era of integrating into the global economic system in all respects. China has relaxed manufacturing market access for foreign capital, taken steps to phase out equity ratio restrictions in sectors such as automobiles, shipbuilding and aircraft manufacturing, and encouraged high-speed railway, nuclear

竞争力、建成世界大国形成重要支撑。

一是发展规模世界第一。2019年，我国制造业增加值达26.9万亿元，相当于全球制造业总增加值的28.1%，已连续十年占据世界首位。我国已成为拥有联合国产业分类中全部工业门类的国家，200多种工业品的产量稳居世界首位，其中空调、彩色电视机、冰箱、洗衣机产量已占据全球50%以上的市场份额；汽车及其中的新能源汽车产量分别占据全球30%、50%以上的市场份额，目前我国已经建成门类齐全、独立完整的现代制造业体系和在全球范围内优化资源配置的供应链体系，培育了一批在全球有重大影响力的制造业集群，在国际产业分工中发挥着不可或缺的重要作用。

二是创新能力显著增强。从我国的经费投入上看，2019年，我国研究与试验发展（R&D）经费支出达2.21万亿元，增长12.5%，增速较上年加快0.7个百分点，连续4年实现两位数增长；R&D经费投入强度为2.23%，比上年提高0.09个百分点。其中，规模以上制造业研发经费内部支出占主营业务收入的1.43%，与2015年相比，增长了0.48个百分点，提前超额完成“十三五”规划的预期目标（1.26%）；构建了以17家国家制造业创新中心为核心、以100余家省级制造业创新中心为补充的制造业创新网络。一批关键技术和产品取得重大突破，诸如“嫦娥”揽月、“胖五”飞天、C919大型客机用材、平板显示基板玻璃等实现突破，科学技术转化为现实生产力的步伐明显加快，有力推动了产业转型升级。根据世界知识产权组织“全球创新指数”资料显示，2020年我国创新指数排名已从2015年的第29位上升到第14位，科技创新取得了重大进展；科技进步对经济增长的贡献率达到59.5%。

三是产业结构持续优化。党的十八大以来，我国坚持以供给侧结构性改革为主线，产业结构调整力度不断加大，产业组织形式持续优化，以制造业为代表的实体经济取得长足发展。钢铁行业提前两年完成“十三五”去产能1.5亿吨目标；2019年产能利用率恢复到80.0%，升至近七年的最高水平。制造业数字化转型速度明显加快。据统计，2020年6月，我国制造业重点领域企业数字化研发设计工具普及率为71.5%，与2015年相比增长了14.8个百分点；关键工序数控化率为51.1%，与2015年相比增加了3.8个百分点。新兴产业发展势头强劲，增速持续快于总体经济增速。2016~2019年期间，我国高技术制造业增加值年度平均增长幅度达到11.2%，明显高于全部工业6.0%的平均增速，占规模以上工业增加值比重由2015年的11.8%升至2019年的14.4%；装备制造业增加值占规模以上工业增加值的比重也提高0.7个百分点，升至32.5%。新兴产业正在成为带动制造业发展的主要力量。

四是优质企业快速崛起。伴随制造业迅速发展，诸如信息通信、轨道交通、新能源汽车等新兴产业领域出现了一批创新能力突出、引领作用大、发展潜力好、国际竞争力强的企业，以及一大批在细分市场和领域具有较强专业化能力和水平的“专精特新”小巨人企业和单项冠军企业。这些企业在生产规模、研发水平、管理能力及市场拓展等方面已成为制造业各领域的领头羊，在全球市场上发挥着积极作用。2020年，我国入选“财富世界500强”的企业有124家，其中以制造业为主营业务的企业有38家，居世界首位。2020年全球最具价值品牌500强中，我国有18个制造业品牌上榜。《福布斯》发布的2019全球数字经济百强企业榜单中，我国有14家企业上榜。

五是开放水平不断提升。习近平总书记多次强调，“改革开放是中国的基本国策，也是推动中国发展的根本动力”。近年来，我国实施新一轮高水平开放，推动形成全面开放新格局，制造业正在进入全面开放、全面融

power and satellite industries to go global. In 2019, China exported industrial goods to 200 countries and regions, which accounted for 71% of China's total export volume. In the same year, China ranked the 31st among 190 economies in the *Global Business Climate Report 2020* published by the World Bank, advancing 15 places compared with the previous year.

2. China's Manufacturing towards the Year 2035

In the new era of Chinese socialism, the CPC Central Committee has vowed to turn China into a moderately prosperous society in all respects by 2020, basically achieve socialist modernization by 2035, and build a strong socialist modern country by the middle of this century. The Fifth Plenum of the 19th CPC Central Committee called for achieving the "new four organizations," i.e. industrialization, ICT revolution, urbanization and agriculture modernization, by 2035. With these priorities in mind, China must enhance its manufacturing strength and digital economy, steadfastly carry out supply-side structural reforms, improve the economic structure, beef up the real economy, shift growth drivers, and develop a stable and modern supply chain based on a new pattern of domestic and international "dual circulations."

2.1 Giving Prominence to Innovation

China's manufacturing industry is fraught with supply and demand imbalances. Excess supply at the low end coexists with a scarcity of supply at the high end. Homegrown innovations are lacking, and generic industrial technologies insufficient, making technology upgrade extremely difficult in sectors with a high concentration of small and medium-sized businesses. Due to the limitations of technical processes, standards and intellectual property protection, Chinese OEM manufacturers and system integrators are heavily dependent on foreign suppliers for critical materials and components. As noted by General Secretary Xi Jinping, "only by grasping core technologies in our own hands will China be able to protect our national security in economic, defense and other spheres." China's failure to control core technologies in various fields stems from the lack of innovation among Chinese companies (Li, 2019).

As the soul of manufacturing, innovation provides an inexhaustible impetus to a country's industrial development. China must follow a market-oriented approach and help businesses congregate innovation factors, focusing on key technological bottlenecks such as integrated circuit (IC) chips, biotechnology, aviation and aerospace, and core components. China must enhance R&D inputs to develop core technologies and components and achieve a historic breakthrough of technology independence.

China should encourage businesses to partner with universities and R&D institutions to create innovation consortia, undertake national R&D programs, deploy and iterate new technology, and commercialize R&D results.

Leading enterprises should work with upstream and downstream companies to develop an ecosystem to bring about synergy in innovation.[2]

2.2 Promoting Advanced Manufacturing

Today's world is experiencing profound changes unseen in a century. Uncertainties loom large amid the COVID-19 pandemic, China-US trade tussle, and the WTO's crisis. In the digital economy, software-defined and data-driven smart manufacturing is gaining ground (Zhang and Xu, 2018). Advances in new technologies, not least information technology, have transformed traditional manufacturing such as CNC machine tools and maritime, aviation, and aeronautic equipment. On the other hand, new technologies gave rise to new industries like additive manufacturing, bio-manufacturing, and micro-and-nano manufacturing. In most of these sectors, China still lags far behind leading industrialized countries with

[1] Unlike traditional technology innovation, integrated innovation puts a premium on front-end and back-end connections, knowledge diffusion, and risk sharing. Integrated innovations help firms create an innovation ecosystem, enhance innovation, and share innovation risks.

入全球经济体系的新时期。目前，一般制造业外商投资准入有序放开，汽车、船舶、飞机相关领域正逐步取消股比限制，高铁、核电、卫星等成体系走出国门。据统计，2019年我国已向全球200个国家或地区出口工业品，出口额约占我国总出口的71%。在世界银行基于全球190个经济体的《2020年营商环境报告》中，中国排第31位，较上年提升15位。

二、面向2035年中国制造业的新要求

从2020年全面建成小康社会到2035年基本实现社会主义现代化，再到21世纪中叶全面建成社会主义现代化强国，是党中央对新时代中国特色社会主义发展做出的重大战略安排。面向党的十九届五中全会提出的2035年基本实现“新四化”的目标要求，必须坚定不移推动制造强国、质量强国、网络强国和数字中国建设，紧紧抓住供给侧结构性改革这一主线，坚持把做实做强做优实体经济作为主攻方向，转变发展方式、优化经济结构、转换增长动力，在“双循环”新发展格局下努力提高产业链供应链稳定性和现代化水平。

（一）坚持把创新摆在制造业发展全局的核心位置

目前，我国制造业存在较为严重的供需结构性失衡问题，低水平供给过剩与高水平供给不足并存；企业技术创新水平较低，自主创新能力匮乏；产业共性技术支撑不足，特别是中小企业集中的行业，技术改造异常艰难；受工艺、技术标准和知识产权保护等因素影响，关键材料和核心零部件等基础配套能力薄弱成为产业发展的“卡脖子”问题，对整机生产和系统集成形成严重制约。关键核心技术受制于人不仅成为制约制造业高质量发展的瓶颈，也对国家经济安全构成重大风险。习总书记指出：“只有把关键核心技术掌握在自己手中，才能从根本上保障国家经济安全、国防安全和其他安全”（习近平，2015）。企业是技术创新的主体。我国在若干领域不能掌握关键核心技术，与企业技术创新能力薄弱有着密切的关系（李国杰，2019）。

创新是制造业发展的灵魂，是转型升级的不竭动力。增强制造业创新能力，一要坚持需求导向、问题导向，坚持以市场为导向，强化企业创新主体地位，引导和促进各类创新要素向企业集聚，通过聚焦集成电路芯片、生物科技、航空航天、核心部件一批“卡脖子”关键前沿技术短板，以更大力度加大研发创新投入，全面加强核心技术攻关，加快研究实施关键零部件、核心技术的可替代性措施，努力在自主可控方面实现历史性突破。二要全面推动产学研实现更深程度融合，鼓励以企业为主组建创新联合体，承担国家重大科技项目，构建制造业协同创新网络，创造有利于新技术快速大规模应用和迭代升级的独特优势，加大技术成果转化应用投资，加速成果转化，形成科技创新支撑产业升级的协同效应。三要发挥龙头企业的引领支撑作用，吸引产业链上下游企业集聚，依托产业链补链和服务链升级，形成和完善互促共生的产业生态圈，促进协同创新，发挥产业链价值链融通创新合力[1]。

[1] 融通创新与传统技术创新的不同之处在于它更强调创新链条前后端联系的紧密性、知识分享的动态性和风险共担的多元性。实际上，融通创新不仅是企业构建创新生态系统的重要抓手，也是提高创新绩效、分担创新风险的重要基础。

respect to innovation, quality, branding, and environmental performance.

Advanced manufacturing presents an opportunity for China to enhance its industrial strength and compete internationally. In our journey towards new-type industrialization, China must invest more in high technology or advanced manufacturing, improve supply structure, and foster new growth engines.

China should develop strategic emerging industries, including new-generation information technology, biotechnology, new energy, new materials, high-end equipment, new energy vehicles, environmental protection, and aviation, aerospace, and maritime equipment. China should encourage the commercialization of advanced and frontier technologies and mass manufacture products with superior technology.

China should apply the internet, big data and artificial technology in the real economy, foster a group of strategic emerging industries with unique advantages and core competitiveness, and develop smart manufacturing led by robotics, precision machines, and intelligent equipment sets.

2.3 Upgrading Traditional Industries

Traditional industries represent a lion's share of China's industrial system, accounting for 80% of the value-added of large industries. They exert a far-reaching influence on China's industrial growth.[2] Traditional industries like textiles, clothing and home appliances are vital to employment, trade, and growth. Many strategic emerging industries such as new energy vehicles and new materials have upgraded from traditional industries. Amid the COVID-19 pandemic in 2020, traditional industries have proven to be vital to shoring up industrial growth.

Industrial transition is driven by innovation, intended to increase value-added and competitiveness, and manifested in innovative technologies, management practices, business models, corporate organizational forms, and industrial linkages (Liu, 2018). China should carry out supply-side structural reforms, enhance innovation, quality and branding, and raise labor and total factor productivity to facilitate industrial upgrade towards medium- and high-end links of the value chain. China should encourage new-generation ICT applications to transform the production factors, processes and supply chains of the manufacturing industry. China should develop smart management, smart manufacturing and smart services, and promote green and service-based manufacturing. China should expedite the integrated applications of new technologies, processes, materials, equipment, and business modes. Through ICT application, automation and supply chain management, companies should strive to enhance their technology and innovation capacity with respect to fundamental components, critical basic materials, and advanced basic processes (Research Group of the Institute of Industrial Economics, CASS, 2020).

2.4 Building a Stable and Competitive Supply Chain

Since reform and opening up, China has maintained rapid economic growth by taking an active part in the international division of labor, making the most of foreign markets and resources (Liu, 2020). Achievements under this growth model stemmed from the effective integration between international high-end factors, particularly critical technologies and markets, and domestic low-cost factors. Amid rapid socio-economic development, great changes have taken place in China's demand structure and production function. Disconnects within the manufacturing system have surfaced, as manifested in an over-dependence on foreign countries for critical technologies. The COVID-19 pandemic that

[2] Traditional industries are underpinned by stable and mature technologies, focusing on exogenous growth. With a small price elasticity of demand, their products are of low value-added. The share of traditional industries in China's GDP is shrinking, and so is their contribution to economic growth. The textiles sector, which used to be an emerging industry in the early stage of industrialization, has evolved into a traditional industry in the mid- and late stages of industrialization. New technology may also breathe life into traditional industries, turning them into emerging industries. What are deemed as traditional industries in China's eastern coastal region are likely to be regarded as emerging industries when they relocate to central and western regions.

（二）加快发展先进制造业

当前，全球正处于百年未有之大变局，新冠疫情、中美贸易摩擦、世贸组织陷入危机等不确定性陡增，第三次全球化浪潮进入深度调整期。数字经济、共享经济、产业融合正在重塑传统实体经济的形态，制造业加速向数字化、网络化、智能化发展，软件定义、数据驱动、平台支撑、服务增值、智能主导的特征日趋明显（张永明和许志勇，2018）。从现实看，我国先进制造业大致由两部分构成，一部分是传统制造业吸纳、融入先进制造技术和其他高新技术（尤其是信息技术）后，提升为先进制造业，如数控机床、海洋工程装备、航天装备、航空装备等；另一部分是新兴技术成果产业化后形成的、带有基础性和引领性的产业，如增量制造、生物制造、微纳制造等。与主要工业发达国家和实现制造强国的目标相比，我国多数领域在技术创新、质量品牌、环境友好等方面还有很大差距。

发展先进制造业是我国补齐产业基础能力短板、抢占未来产业制高点的重要途径，也是参与国际竞争的先导力量。在实现新型工业化的征程中，应在现有产业基础上厘清前进方向，努力扩大高技术或高端制造业投资，优化供给结构，培育新的增长动能。首先，积极发展新一代信息技术、生物技术、新能源、新材料、高端装备、新能源汽车、绿色环保以及航空航天、海洋装备等新科技驱动的战略性新兴产业，推动先进技术、前沿技术的工程化转化和规模化生产，在抢占新兴产业发展先机的同时，力争形成一批不可替代的拳头产品。其次，推动互联网、大数据、人工智能等新技术同实体经济深度融合，构建一批具有独特优势与核心竞争力的战略性新兴产业集群。第三，加速培育应用数字技术的智能制造业，着力提升企业系统集成能力、智能装备开发能力和关键部件研发生产能力，以机器人及其关键零部件、高速高精加工装备和智能成套装备为重点，大力发展智能制造装备和产品。

（三）以更大力度推进传统产业转型升级

改造提升传统产业是推动制造业高质量发展、建设制造强国的重要任务。传统产业是我国工业体系的重要组成部分，不仅在规模上，也在效率上对整个工业部门的增长产生了深远影响[2]。目前，传统产业占我国规模以上工业增加值的80%，仍然是工业经济的主体。像纺织、服装、家电等传统产业关系到国计民生，不仅是稳就业、稳外贸的重要行业，也是新动能培育的重要来源。比如，新能源汽车、新材料等很多战略性新兴产业，都来自传统产业的转型升级。2020年以来，新冠肺炎疫情对我国经济形成较大冲击，传统产业在稳定工业增长的过程中发挥了重要作用。这表明，在当前我国外部环境发生重大变化、风险和挑战增多、经济下行压力加大的形势下，加快传统产业转型升级，对稳定工业基本面、推动制造业产业链提升、保持经济平稳健康发展具有深远且重要的战略意义。

产业转型升级的实质是以创新为基本驱动力，以提高经济附加值水平和竞争力为目标，以技术、市场、管理、商业模式、企业形态、产业联系等多维创新实践为具体形态的产业演进和变迁过程（刘勇，2018）。推进传统产业转型升级，一是以供给侧结构性改革为主线，通过强化创新驱动、提升质量和品牌、提高劳动生产率和

[2] 传统产业主要有四个特征：一是多以稳定成熟的传统技术为主，增长方式以外延式增长为主，产品需求价格弹性小，附加值较低。二是占国内生产总值比重、对经济增长贡献率等指标长期趋于下降。三是外延动态可变，如纺织工业在工业化初期初级阶段是新兴产业，而进入工业化中期后就演变为传统产业；此外，有些传统产业在吸收了新兴技术后，也会转化为新兴产业。四是在地域上有相对性，如从东部沿海地区向中西部地区转移的加工制造业，在转入地区就有可能是新兴产业。

erupted in early 2020 has affected the world economy in chronic and profound ways. Protectionism and unilateralism continued to spread. Trade and investment disputes intensified. As developed countries stepped up restrictions on key technologies such as chipmaking, integrated circuit and industrial software, China's supply chain has come under threat, giving rise to profound adjustments in global industrial and supply chain layouts.

In this context, a stable and competitive supply chain is vital to China's manufacturing industry. Domestically, our strength lies in the economies of scale, supporting capabilities, and first-mover advantage in some sectors. China should improve our supply chain and replace unstable foreign supplies of critical components with more reliable domestic ones. Furthermore, China should rebuild our industrial fundamentals, develop key products and technologies, and assist firms to move from low-value to high-value links of the "smile curve" such as R&D, design, branding, marketing, and re-manufacturing. Leading firms should strengthen their supply chains, optimize their global supply chain layout, pool global resources for innovation, and step up cross-border innovation and collaboration. China should enhance land support to help achieve our policy goals, bring the financial sector at the service of the real economy, offer tax incentives to innovative firms, and create a conducive environment for industrial chains.

2.5. Enhancing the Vibrancy of Market Entities

In the 2020 Fortune Global 500 list, 36 US manufacturing enterprises made a total profit of 224.91 billion US dollars, and 38 Chinese manufacturing enterprises only made a total profit of 49.48 billion US dollars. Sector-wise, Chinese enterprises lag behind their US peers in such areas as ICT manufacturing, medical devices, pharmaceuticals, defense, aviation, aerospace and engineering, and agricultural equipment manufacturing. Private enterprises and SMEs lack vibrancy. The average life expectancy of China's private enterprises is only 3.7 years, and that of SMEs is as short as 2.5 years. Over the years, the fragility of the private sector has been concealed by rapid economic growth.[3] For most enterprises, the transition from the previous labor-intensive crude pattern of development to a technology and innovation-driven growth pattern presents huge challenges to their corporate strategies, governance structure, and management norms.

No country can become a leading manufacturing power without world-class manufacturing enterprises. To enhance the vibrancy of market entities, China must support enterprises to increase economies of scale following a market-oriented approach, e.g. through mergers and acquisitions (M&As), and grow more competitive by focusing on main business areas, enhancing technology upgrade and innovation, and improving their product chain and innovation chain. Second, China should create an environment of fair competition concerning market access, regulatory approval, operation and management, and public tendering. China should step up fiscal and financial policy support to start-up firms, support business service platforms to increase industry chain coverage, encourage firms to specialize, and foster a group of innovative "Little Giant" and "Champion" businesses. Lastly, China should encourage enterprises to build up their innovation capacity by offering R&D tax credits, streamlining policy implementation, and helping enterprises attract talent and other innovation factors.

3. New Measures for Quality-Oriented Manufacturing Development

At the new starting point of building a socialist modern country in all respects, China must update its development approach to embrace new opportunities and challenges, derive strengths for manufacturing transition from its large-market advantage, create a manufacturing innovation system with whole-nation

[3] In an economic upswing, firms tend to have an impulse to invest profusely across a wide range of sectors. In an economic downturn, however, they run the risk of a capital shortage due to previous reckless investment behaviors.

全要素生产率，加快向产业价值链中高端升级。二是以智能制造为主攻方向，用新一代信息技术对制造业进行全要素、全流程、全产业链改造，加快发展智能管理、智能生产和智能服务，推动制造业高端化、智能化、绿色化，发展服务型制造。三是以技术改造和设备更新为主要抓手和突破口，加速新技术、新工艺、新材料、新设备、新业态、新模式的融合应用，尤其是以信息化、自动化、供应链管理为重点，着力提升企业在核心基础零部件（元器件）、关键基础材料、先进基础工艺等方面的技术水平和创新能力，实现流程创新、产品创新和模式转变（中国社会科学院工业经济研究所课题组，2020）。

（四）注重提升产业链供应链稳定性与竞争力

改革以来，我国发挥劳动力等要素低成本优势，抓住经济全球化的重要机遇，充分利用国际分工机会，形成市场和资源“两头在外”发展模式，参与国际经济大循环，推动了经济高速增长（刘鹤，2020）。这种增长成就的实质是国际高端要素（特别是关键技术和市场）与国内低成本要素之间的一种有效对接。随着我国经济和社会快速发展，需求结构和生产函数发生重大变化，生产体系内部循环不畅和供求脱节现象显现，关键技术受制于人的问题突出，结构转换复杂性趋于上升。2020年初，新冠肺炎疫情在全球范围内暴发，对世界经济造成长期、深远的影响。保护主义、单边主义进一步蔓延，贸易和投资争端趋于加剧。发达国家对我国芯片、集成电路、高端软件等“卡脖子”技术的封锁力度加大，加大了产业链安全风险，全球产业格局和供应链配置面临深刻调整。

提升我国产业链供应链稳定性和竞争力，一是要锻长板，强化既有的产业规模优势、配套优势和部分领域先发优势，在把握内循环替代时机的基础上，巩固、改善、创新产业链供应链，推动产业基础高级化和产业链现代化。二是要补短板，实施产业基础再造工程，重视技术因素的“强链”作用，加大重要产品和关键核心技术攻关力度，发展先进适用技术，引导企业从低端加工制造环节向“微笑曲线”两端高附加值的研发、设计、品牌、营销、再制造等环节延伸拓展。三是鼓励和引导优势企业进一步强化全产业链特征，优化全球布局，积极吸引和对接全球创新资源，特别是要鼓励和引导优势企业基于我国超大规模市场优势，进一步加大全产业链投资，提升跨国合作创新水平和协作制造能力。此外，还要通过强化土地要素支撑、提高金融服务实体经济能力、推动减税降负取得实质性进展等途径，优化产业链供应链发展环境。

（五）大力增强市场主体活力与发展能力

在2020年“财富世界500强”中，36家美国制造业企业利润总额为2249.1亿美元，而38家中国制造业企业利润总额只有494.8亿美元。从行业看，中美两国优质企业的差距主要集中在ICT制造业、医疗器械制药业、军工航空航天制造业以及装备制造业（工程机械+农业机械）等领域。从民营企业和中小企业的情况看，市场主体活力不强、企业发展能力有待提升的问题仍然较为突出。据统计，我国民营企业的平均寿命只有3.7年，中小企业更是只有2.5年，如此短的平均寿命反映了部分企业投资和运营能力脆弱。一直以来，企业发展能力的不足在较大程度上被经济高增长所掩盖[3]。对大多数企业来说，从以往依赖劳动力和资

[3] 企业在经济上行期往往会投资冲动，大量进行过度扩张甚至多元化投资；而在下行期则会因草率投资而引发资金链绷紧、断裂以致陷入困境。

advantage, deepen market-based factor allocation reform, inspire entrepreneurship, foster new strengths for international cooperation and competition through opening-up at a higher level, and advance quality-oriented manufacturing development at a deeper level.

3.1 Leveraging Large-Market Advantage

In its quest for quality-oriented manufacturing development, China must unleash its potentials of domestic consumption and innovation,[4] rely more on the domestic market as a vehicle of industrial circulation and a driver of manufacturing output, and reach a dynamic equilibrium in which change in demand drives an upgrade in supply and new supply creates new demand.

China should nudge businesses to respond to changes in domestic demand, such as consumption upgrade, demographic change and rapid urbanization, through market and business transitions from a cost-plus-markup export model to a higher value chain status by raising product value-added, developing home-grown brands, and controlling marketing channels.

China should encourage the commercialization of R&D results based on its domestic market, incentivize indigenous business innovations, disrupt existing industrial boundaries and modes of operation, and stimulate the emergence and growth of new industries, business models, and products.

China should establish a domestic value chain based on its market heft, improve the endogenous momentum, profit mechanism and re-investment assurance for corporate innovation, form a "siphon effect" to draw innovation factors such as pro-innovation policies, resources and professionals to enterprises, and encourage enterprises to allocate, access and consolidate global innovation factors.

3.2 Leveraging a New Whole-Nation Advantage

Our world today is experiencing great changes unseen in a century. Early-moving countries have put up technology barriers in strategic industries. Daunting challenges lie ahead in the organizational change of R&D institutions, the digital transition of R&D paradigms, and industrial transformation. In confronting these challenges and protecting our national security, China must bring into play the strengths of our whole-nation system.[5]

(i) China should focus on critical areas, technologies and technical systems, establish a clear boundary between the government and market, let the market play a decisive role in resource allocation, inspire the innovation dynamism of various entities, give full play to the role of the government in mobilizing resources, and achieve breakthroughs in innovation-driven development.

(ii) China should bring together national R&D institutions and universities to enhance fundamental research and explore frontier technologies.

(iii) China should promote market-oriented innovations in which firms, universities and research institutions cooperate for innovations that drive manufacturing development.

(iv) China should establish innovation and scientific research centers with global influence as new engines of national innovation and development. Also, China should seek institutional innovations and reforms regarding intellectual property ownership, human resources, education, and incentives.

3.3 Deepening the Reform of Market-Based Factor Allocation

Market-based factor allocation is essential to a unified, open, and competitive market system. It also serves as the premise for quality-oriented manufacturing development. In deepening the reform of

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[4] China's hefty market size, once combined with rapid advancements in ICT applications and network-based operations, will become a key driver of technology progress and structural transition in China's manufacturing industry (Sheng, 2019).

[5] The new whole-nation system is an institutional system under the socialist market economic system. While putting a premium on the decisive role of the market in allocating resources and engaging the participation of market entities, it gives play to the government role in achieving specific national priorities (Mu, 2020).

源的粗放发展转向依赖技术和创新的集约发展，本身就是对企业战略理念、治理结构、管理规范等的巨大挑战。

制造强国的建成离不开世界领先的优质企业。增强市场主体活力与发展能力，首先要支持企业以市场为导向，通过兼并收购等方式扩大经营规模，通过聚焦主业、加强技术改造和创新完善产品链、创新链，并进一步做强做优。其次，在市场准入、审批许可、经营运行、招投标等方面创造公平竞争环境。加大对初创企业的财税、金融等政策扶持，支持创业服务平台进一步完善产业链，鼓励企业向专精特优发展，培育发展一批创新能力强的小巨人企业和单项冠军企业。最后，支持企业提升创新能力。在这方面，不仅要全面落实企业研发投入抵扣政策，增强政策实施的操作性和便利性，通过政策引导企业增加研发投入，还要加强对企业引进人才、创新能力建设以及产学研结合的支持，引导和推动创新要素向企业集聚。

三、推动制造业高质量发展的新对策

站在开启全面建设社会主义现代化国家新征程的新起点上，面对新发展阶段的新机遇和新挑战，必须深入贯彻新发展理念，充分挖掘超大规模市场优势对转型升级的牵引动力，依托新型举国体制优势构建制造业创新体系，深化要素市场化配置改革，激发和弘扬企业家精神，以高水平对外开放打造国际合作和竞争新优势，不断将制造业高质量发展向更深层次推进。

（一）发挥超大规模市场优势

推动制造业高质量发展，必须牢牢把握扩大内需这个战略基点，发挥超大规模市场优势和创新潜能[4]，使产业循环过程更多基于国内市场展开，通过与内循环对接，强化制造业产出与国内需求之间的匹配，形成需求变动牵引供给转型升级、新供给创造新需求的更高水平动态平衡。一是引导企业基于内需变化（如消费升级、人口结构变化和城镇化快速发展等），适时进行市场转型和业务转型，从单纯的“成本管控+接单出口”，转向提高产品附加值、培育自主品牌和掌控营销渠道，提升价值链地位。二是依托内需市场推进研发成果的产业化，引导和激励企业加强自主创新，不断突破和颠覆原有产业边界和运行机理，刺激新产业、新业态、新产品在分化中孕育、成长。三是构建基于超大规模市场之上的国内价值链，完善企业创新内生动力机制、盈利机制和再投入保障机制，推动创新政策、创新资源、创业人才向企业集聚，形成集聚创新要素的“虹吸效应”，提高企业对全球创新资源要素的配置、利用和整合能力。

（二）发挥新型举国体制优势

发挥新型举国体制优势，是有效应对世界百年未有之大变局，强化国家战略科技力量，突破战略产业技术壁垒，化解科研组织变革、科研范式数字转型和产业变革的创新挑战，构筑制造业创新发展新优势，有效保

[4] 在超大规模国家基础上形成的超大规模市场优势，作为我国新的比较优势，与飞速发展的信息化、网络化结合，将成为推动制造业重大技术进步和结构变迁的主要力量（盛朝迅，2019）。

market-based factor allocation, China must focus on the following priorities:

(i) Broaden the scope for the market-based allocation of land, labor, capital, and other factors. China should unify urban and rural construction land markets; lift household registration (*hukou*) restrictions for cities except for megacities to ensure smooth social mobility of migrant labor; break institutional barriers to factor flow by improving fundamental stock market systems and allow market-based mechanisms to play a bigger role in picking winners.

(ii) Foster technology and data factor markets. China should grant intellectual property rights to R&D personnel for their research results, reform the rights to the use, disposal and proceeds of R&D results, vigorously develop R&D commercialization service institutions, and encourage new industries and business modes of the digital economy.

(iii) Accelerate market-based factor price reform. Instead of setting specific prices, the government should set pricing rules; government pricing should be completely withdrawn from sectors where market-based pricing should hold sway.

(iv) Improve factor market operation. China should improve factor market transaction platforms and rules and services for factor transactions; enhance supervision over factor transactions and step up law enforcement against monopoly and unfair competition.

3.4 Promoting Entrepreneurship

Entrepreneurs are the backbone of the manufacturing industry. Their management approach and profit model determine how much their firms achieve regarding technological clout, business success, and quality performance.[6] China should create a conducive institutional and policy environment for entrepreneurs, focusing on the following priorities:

(i) Strictly protect the lawful rights and interests of market entities, including their business autonomy and intellectual property rights, form expectations for long-term development, and create an entrepreneurial atmosphere that encourages innovation and tolerates failure.

(ii) Create a level playing field. Not only should firms have equal access to supply-side resources such as capital and talents, but they should also be treated equally on the demand side, e.g. concerning government procurement and market entry.

(iii) Improve market order. China should strictly implement quality, safety and environmental standards and penalize non-compliance; enhance supervision over certification, accreditation, test and inspection institutions and improve their service and competitiveness to ensure consumer recognition of their high-quality products; ramp up crackdowns and penalties on counterfeit and shoddy goods.

(iv) Organize thematic trainings for entrepreneurs and executives to raise their patriotism, broaden their worldview, and spur their strategic thinking and entrepreneurial whim.

3.5 Openning Up the Manufacturing Sector at a Higher Level

In the new era, China must open the manufacturing industry wider to the outside world in all respects (Research Group of the Institute of Industrial Economics, the Chinese Academy of Social Sciences, 2020). Specifically, China should focus on the following priorities:

(i) Integrate into the global value chain at a deeper level. While developing indigenous cutting-edge technologies, China should proactively carry out international cooperation and integrate into the global value chain despite technology trade barriers that impede access to advanced foreign technology.

(ii) Improve business climate. China should implement the national treatment plus negative list system for foreign investment, further expand the scope of access to foreign capital, reduce institutional

[6] Whether a firm can gain an advantage over others through innovation is closely related to entrepreneurs' ambitions and the leadership's competencies. Many private investments failed deplorably in large part due to entrepreneurs' strategic mistakes. Essentially speaking, there is no obsolete industry, only obsolete concepts, standards, technologies, and management practices.

障国家安全的必然选择[5]。发挥新型举国体制优势，一是聚焦关键环节和关键技术及技术系统问题，明确政府和市场的作用边界，最大限度发挥市场在资源配置中的决定性作用，激发各类所有制创新主体活力，充分发挥政府的资源动员和保障能力，打通创新发展关键环节。二是建设前沿技术领域全覆盖的国家科研院所体系和学科门类齐全的高等教育体系构成的国家研究实验体系，推进科教融合、产教结合，强化前瞻性基础研究和前沿引领技术供给能力。三是建设以企业为主体、市场为导向、产学研深度融合的制造业创新体系，强化产业源头技术创新和协同攻关，支撑制造业创新发展。四是布局建设一批有全球影响力的科技创新中心和综合性国家科学中心，培育国家创新发展新引擎。此外，还要将产权制度、人才制度、教育制度、奖励制度等制度创新和机制改革作为突破口，释放技术创新主体活力，推进科教结合和产学研融通创新。

（三）深化要素市场化配置改革

完善要素市场化配置是建设统一开放、竞争有序市场体系的内在要求，也是推动制造业高质量发展的前提和基础。深化要素市场化配置改革，一是扩大土地、劳动力、资本等要素市场化配置范围。通过城乡建设用地市场并轨、放开放宽除个别超大城市外的城市落户限制以畅通劳动力社会性流动渠道、完善股票市场基础制度等途径，破除要素流动的体制机制障碍，让市场机制的优胜劣汰功能在更大程度上发挥作用。二是加快培育技术和数据要素市场。完善职务科技成果产权制度，调整改革科技成果使用权、处置权和收益权，大力发展技术成果转让服务机构，积极培育数字经济新产业、新业态和新模式。三是加快要素价格市场化改革。推动政府定价机制由制定具体价格水平向制定定价规则转变；政府定价应从能够由市场形成价格的领域完全退出，通过市场竞争形成价格。四是健全要素市场运行机制。健全要素市场交易平台，完善要素交易规则和服务；强化要素交易监管，加强反垄断和反不正当竞争执法。

（四）激发和弘扬企业家精神

在推动制造业高质量发展中，企业家是最主要、最直接也是最关键的主体。企业家以什么理念办企业，以什么方式获取利润，决定了企业的战略远见，乃至企业技术水平、管理能力和产品质量[6]。激发和弘扬企业家精神，关键是要健全、完善企业家成长的制度和政策环境。一是严格保护市场主体经营自主权、财产权等合法权益，加强产权和知识产权保护，形成长期稳定发展预期，鼓励创新、宽容失败，营造激励企业家干事创业的浓厚氛围。二是构建公平的竞争环境。公平竞争既体现在资源、资金、人才等要素获取方面，也体现在政府采购、市场准入等需求侧。这些方面是否公平、公正、公开，在客观上给企业家提供了不同的激励选择。三是优化市场秩序。严格执行相应的质量安全和环保标准，对不符合标准的要严格处罚；加强对相关认证认可、检验检测机构的监管，提高服务和竞争力，使高质量的产品能够得到消费者的认可；对假冒伪劣、侵犯知识产权等行为，要加大打击和处罚力度。四是以培养企业家精神为重点，针对不同层级的民营企业家、企业管理人员开展

[5] 新型举国体制是在社会主义市场经济制度下的体制机制安排，强调既要使市场在资源配置中起决定性作用，注重调动市场主体有效参与，又要更好发挥政府作用，实现国家特定目标（穆荣平，2020）。

[6] 企业能否通过创新获得领先优势，与企业家的战略抱负及领导素质紧密相关。近年来，很多民间投资遭遇滑铁卢式的失败，与以企业家战略思维为主的发展能力不足有很大关系。从本质上讲，没有真正落后的产业，只有落后的观念、标准、技术和管理。

transaction cost through the institutional strengths of free-trade areas and ports, protect intellectual property rights, and create a fair, transparent, law-based and predictable business environment.

(iii) Improve the public service system for firms to go global. China should enhance research on the global industrial chain and value chain, create an information platform for international industrial cooperation, share information about key projects and big data resources, leverage overseas investment platforms such as economic and trade cooperation areas, enhance overseas business associations and other intermediary organizations, and help firms overcome their problems through professional private agencies.

(iv) Reform the World Trade Organization (WTO). Based on in-depth research of WTO rules, China should unite with all possible international forces to maintain the multilateral trading system and create an open world economic system.

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专题培训，帮助其提升爱国意识、拓展世界眼光、提升战略思维、增强创新精神。

（五）推进制造业高水平对外开放

新时代实现制造业高质量发展，更加需要扩大对外开放，形成制造业全面对外开放新格局（中国社会科学院工业经济研究所课题组，2020）。一是深度融入全球价值链。尽管技术贸易壁垒不断加深，引进国外先进技术难度加大，仍然要在加强自主核心技术攻关、努力实现尖端技术突破的同时，坚持积极开展国际合作，充分融入全球价值链，形成“你中有我、我中有你、无法切割”的战略态势。二是持续优化营商环境。通过全面实施外商投资准入前国民待遇加负面清单管理制度，进一步扩大外资准入范围，充分发挥自贸区、自贸港制度优势，切实降低制度性交易成本，加大知识产权保护力度，为全球投资者营造稳定、公平、透明、法治化、可预期的营商环境。三是完善“走出去”公共服务体系。加强全球产业链、价值链研究，搭建国际产能合作信息平台，共享重大项目库、大数据资源，发挥境外经贸合作区等海外投资平台优势，做强海外企业协会和其他中介组织，引导企业借助专业社会力量解决问题。四是积极稳妥地推动世界贸易组织改革。在深入分析研究世界贸易组织（WTO）等现有国际贸易规则及其缺陷的基础上，团结一切国际力量，维护多边贸易体制，建设开放型的世界经济体系。

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