A Review and Outlook of the Centennial of China's Industrialization: The CPC's Industrialization Strategy

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Abstract: *Industrialization has been a dream for the Chinese nation since modern history and a goal of the Communist Party of China (CPC). Ever since its founding in 1921, the CPC has been exploring a path for China's industrial development based on socialism as the political and institutional premise. Since the founding of the People's Republic of China in 1949, the Chinese people have established a socialist system under the CPC's leadership and carried out industrial development for over seven decades in the world's most populous country, blazing a new trail of socialist industrialization with Chinese characteristics. Under the CPC's leadership, China established an independent and complete industrial system in less than three decades from 1949 to 1978, and developed into the world's largest industrial power with the most complete industrial sectors in over three decades from 1979 to 2016. In its future industrial development, China aims to complete new-type industrialization by 2035, build a modern economic system, reach the level of moderately developed countries in terms of GDP per capita, and develop into a major world industrial power by the centennial of the founding of the People's Republic of China in 2049.*

Keywords: *centennial industrialization, manufacturing industry, economic structure, large industrial nation, industrial powerhouse*

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1. Introduction

Industry has played a dominant role in China's economy over the past decades, and industrialization is the cornerstone for China to achieve its first centennial goal. The concept of industrialization can be defined in the broad and narrow senses. In the narrow sense, industrialization refers to the rapid development of industry characterized by the falling share of agriculture and the rising share of industry in economic output and employment. In the broad sense, industrialization is synonymous to economic development and modernization, and refers to the penetration of mechanized mass production and machinery in all economic sectors. According to Soviet leaders and scholars, the first step of socialist industrialization is to develop heavy industries, particularly machine manufacturing (Institute of Economic Research, the Academy of Sciences of the Soviet Union, 1955). That is to say, the concept of industrialization encompasses rising output and employment share of industrial sectors, as well as changing economic structure and economic modernization.

Prior to the founding of the Communist Party of China (CPC) in 1921, China tried in vain to transform from an agrarian to a modern industrial society because it did not - and could not - find a path

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中国工业化百年回顾与展望：中国共产党的工业化战略

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摘 要： 实现国家工业化，建设世界工业强国，是近代以来中国人的梦想，也是中国共产党的奋斗目标。中国共产党一经成立就开始探索中国实现工业化的道路和条件，认识到只有建立社会主义制度才能确立国家工业化的根本政治前提和制度基础。中华人民共和国成立后，党领导人民建立社会主义制度，在世界上人口最多的国家进行了70多年的大规模工业建设，探索出一条适合中国国情、具有中国特色的社会主义工业化道路。党领导中国工业化的成就集中体现在，1949年至1978年用不到30年的时间建立起独立、完整的工业体系，1979年至2016年用30多年的时间建成门类最齐全的世界第一工业大国。中国工业化的下一个目标是，2035年基本实现新型工业化，建成现代化经济体系，人均国内生产总值达到中等发达国家水平，并在2049年新中国成立100周年建成世界工业强国。

关键词： 百年工业化；制造业；经济结构；工业大国；工业强国

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一、引言

工业在中国经济长期发展中起主导作用，工业化是中国实现第一个百年目标的根基。工业化可以从广义和狭义两个方面定义。在狭义上，工业化是指工业较快地发展，其主要特征是农业产出和就业占国民经济总产出和总就业比重降低，工业产出和就业比重大幅度提高。在广义上，工业化与经济发展、现代化是同义语，是经济社会系统从以农业为主转变为以非农业为主的过程，是机器大工业生产方式向国民经济各个领域渗透和装备国民经济一切部门的过程，也是人均收入持续提高并向高收入国家迈进的过程。苏联领导人和学者认为，社会主义工业化首先是发展重工业及其心脏——机器制造业（苏联科学院经济研究所，1955）。可见，工业化既包括工业产出和就业比重的提高，也涵盖经济结构变化和经济现代化等内容。

在中国共产党成立之前，中国没有也不可能找到符合国情的工业化道路，因而不能实现从传统农业社会向现代工业社会的转变。中国共产党一经成立即自觉肩负起为人民谋幸福和为民族谋复兴的历史使命，成为中国工业化的坚定推动者、先进工业文明的捍卫者和传播者，领导中国从一个落后的农业国建设成世界工

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towards industrialization based on its national conditions. Ever since its founding, the CPC has taken upon itself to seek happiness for the people and fulfill the historic mission of national rejuvenation. It has steadfastly propelled industrial development in China and led China to transform from a backward agrarian country into a major - and increasingly competitive - industrial country. Over the past century since the CPC's founding, China's industrial development has experienced the following four stages under the CPC leadership:

Stage 1 (1921-1949): Reflections and explorations in the new democratic revolution period. Recognizing that all powerful countries around the world were industrialized nations, Chairman Mao and other Party leaders set their eyes on the Soviet Union's path of industrialization. They worked very hard to explore political prerequisites for China's industrialization and path of transformation from an agrarian to an industrial country. Chairman Mao attributed China's backwardness and subjugation to the lack of new industries. China would not be able to develop productive forces without new industries. China must industrialize if it is to secure and strengthen its national independence (Mao, 1999).

Stage 2 (1949-1978): Laying a foundation for the transition from an agrarian to a modern economy, and establishing an independent and complete industrial system. After the founding of the People's Republic of China in 1949, Chinese communists combined the Marxist industrialization theory with China's national conditions. Committed to exploring a path of Chinese socialist industrialization, the CPC adopted a host of strategies, including "giving priority to heavy industries while focusing on both industry and agriculture," "developing the economy in the priority sequence of agriculture, light industries and heavy industries" and "developing agriculture as the foundation and industry as the leading sector."

Stage 3 (1978-2016): Since the reform and opening up was launched in 1978, China has seen rapid economic growth rates and extensively participated in the international division of labor, becoming the world's largest industrial nation. In the 1980s to 1990s, China's industrial development prioritized light industries to address people's daily needs before focusing on the shortage sectors of heavy industries. After the dawn of the 21st century, China started to explore a path of new-type industrialization under increasing environmental and resource pressures.

Stage 4 (2017-2035): China strives to develop into a world-class industrial power by pursuing critical technological innovations, improving its position in the international division of labor, and promoting green and low-carbon development.

China's economic miracle is characterized by the creation of an independent industrial system and ascent into the world's largest industrial nation. Chinese and international academics have extensively examined how China transformed from a backward agrarian country to a major industrial power from different perspectives and stages. Wang and Liu (2009) examined the background, inevitability and experience of China's traditional and new-type industrialization paths. Xu and Wang (2021) reviewed the implications, formation and development of Mao Zedong's industrialization strategy. Jin (2019) discussed the CPC's status and role in China's economic development. Shi (2020) analyzed the achievements, strategic evolution and changing environment of China's industrial development. Hu (2019) examined the strategies and evolving paths of China's industrialization over the past seven decades. Huang and He *et al*. (2021) forecasted China's new-type industrialization process and indicators, and identified the goals and strategic priorities by 2035 and 2050. Lyu (2017) noted that the institutional assurance for China's economic miracle lied in both a market-based economic system and industrial policies to avoid the spontaneity of market-based economic mechanisms. On the basis of the above-mentioned studies, this paper further takes stock of the CPC's reflections and explorations of China's industrialization over the past century, especially the CPC's efforts to establish an independent and complete industrial system and turn China into the world's largest - and increasingly competitive - industrial nation. Discussions in this paper will provide insights on China's economic miracle and industrial development goals in the new era.

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业大国并开启向世界工业强国进军的伟大征程。建党一百年来，党领导的工业化经历了以下四个时期：(1)1921−1949年，新民主主义革命时期的思考探索阶段。毛泽东等党的领导人注意到世界上强大的国家都是工业国，十分关注苏联的工业化道路，对中国实现工业化的政治前提以及如何由农业国转变成工业国进行了深入思考和艰辛探索。毛泽东指出，中国落后和被人欺负的原因，主要是没有新式工业。如果不能建设新式工业，就不能发展生产力。要中国的民族独立有巩固的保障，就必须进行工业化(毛泽东，1999)。(2)1949−1978年，从农业经济向现代经济转变的奠基阶段，建成独立的比较完整的工业体系。中华人民共和国成立后，中国共产党人把马克思主义工业化理论与中国具体国情相结合，致力于探索中国社会主义工业化道路，形成了“在优先发展重工业的条件下，工农业同时并举”“按照农、轻、重的次序安排国民经济”“以农业为基础，工业为主导”等一系列战略构想。(3)1978−2016年，实行改革开放，经济规模快速扩张和参与国际分工的起飞阶段，成为世界第一工业大国。20世纪八九十年代，中国工业发展重点先是面向人民生活需求加强轻工业，再转为加强重工业的短缺行业。进入21世纪以后，针对工业发展造成的环境和资源压力，积极探索新型工业化道路。(4)2017−2035年，积极应对新阶段关键核心技术创新、改善国际分工地位和绿色低碳发展等要求，建设世界工业强国。

建成独立、完整的工业体系和成为世界第一工业大国是中国经济奇迹的最鲜明特征，国内外很多方面关注中国如何从一个落后的农业国转变为世界工业大国。许多文献对中国工业化理论和实践进行了丰富研究，从某些视角和特定阶段回应了这个问题。汪海波、刘立峰(2009)分析了中国传统工业化道路和新型工业化道路的提出背景、客观必然性及其实施过程及联系。徐坤、王智(2021)对毛泽东工业化战略思想的内涵、形成与发展进行了研究。金碚(2019)揭示了中国共产党在中国经济发展中的地位和作用。史丹(2020)分析了中国工业发展成就、战略演变和未来发展环境变化与特征。胡鞍钢(2019)分析了70年中国工业化雄略与道路演变。黄群慧、贺俊等(2021)分析预测了新时代中国新型工业化进程和相关指标，提出了2035年和2050年两个时间节点新型工业化的目标和战略重点。吕政(2017)指出中国经济奇迹的体制保障，在于中国经济体制既能发挥市场作用，又能通过产业政策避免市场经济机制的自发性和盲目性。本文在上述研究基础上，基于更长时期的文献和数据，进一步分析中国共产党一百年来对中国工业化的思考和探索，特别是党执政后领导中国建立独立、完整的工业体系和成为世界第一工业大国的实践，并向世界工业强国进军的历程，力图为深入理解中国经济奇迹和中国工业在新时代的目标提供一定借鉴。

二、新民主主义革命时期(1921−1949年)：推翻三座大山，扫除工业化的障碍

中国近代工业化萌芽于1840年的鸦片战争，19世纪60年代兴起的洋务运动催生了以引进先进技术、创办近代机器大工厂为主要内容的工业化建设，外国资本主义侵略者在香港、广州、上海等通商口岸建设了一些近代工业企业，清朝官僚也创办了机器、武器、采矿、炼铁、纺织工厂，近代军事工业、重工业和民用工业得到零星的发展。到1921年中国共产党成立前后，上海、天津、南京、无锡等地的工业初具规模，纺织、服装和食品加工行业涌现了一批民营企业。日本在中国东北地区建设了以掠夺资源和服务侵略为目标的煤矿、铁矿、钢铁厂。

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2. Era of the New Democratic Revolution (1921-1949): Removing Barriers to China's Industrialization

China's industrialization in its modern history started from the Opium War in 1840. The Westernization Movement since the 1860s led to a wave of industrial development led by the importation of advanced technologies and the establishment of mechanized factories. While foreign capitalist invaders set up modern industrial enterprises in trading ports such as Hong Kong, Guangzhou and Shanghai, Qing Dynasty bureaucrats also established machinery and weaponry factories, extraction industries, steel mills, and textile mills. In this period, China's military, heavy and civil industries developed sporadically. With the CPC's founding in 1921, China's industrial development reached an initial level in cities like Shanghai, Tianjin, Nanjing, and Wuxi, and a group of private enterprises emerged in textiles, clothing and food processing sectors. Japan built coal and iron ore mines and steel mills in China's northeast to exploit China's resources and serve its goals of invasion.

The period between 1921 and 1949 is China's New Democratic Revolution era. By organizing workers' movements, the CPC relied on revolutionary forces to clear a path for China's modernization and national rejuvenation. From 1921 to 1927, the CPC started to explore China's industrial development in the era of the New Democratic Revolution by combining economic and political struggles. After the Great Revolution of 1927 failed, the CPC started to explore new paths of revolution and development. Led by Mao Zedong and other CPC leaders, soldiers and civilians in the revolutionary bases focused on economic development to break through blockades imposed by enemies. The Party adjusted its industrial development guidelines by allowing the existence and development of the private sector and protecting national capitalist industry and commerce in the revolutionary bases. The Party and the government explored various elements of the economy and established state-run industries as a pillar of the new democratic economy. They developed military industries for the Revolutionary War, and restored manufacturing cooperatives. In 1932, the Chinese Soviet Ad Hoc Central Government enacted the *Interim Regulations on the Organization of Cooperatives*, which provided a unified charter for manufacturing cooperatives across regions. In 1939, Mao Zedong called for "working with our own hands" to overcome hardships in the revolutionary bases for fighting against Japanese aggression. In 1941, the CPC Central Committee decided to launch a mass production campaign, and some resistance base areas stepped up industrial development and established factories for the production of bedding and clothing, straw shoes and charcoal. Industrial development in this period vigorously supported China's resistance against Japanese aggression. As in the words of Comrade Mao Zedong, "we must develop industry to defeat Japanese aggressors and build a new China." "Without industry there can be no solid national defense, no well-being for the people, no prosperity or strength for the nation" (Mao, 1991). "We must have industry to defeat Japanese imperialism; China must industrialize so as to secure its national independence. Our Communist Party should strive for China's industrialization" (Mao, 1999).

During the Liberation War, the CPC further explored the development strategies for industrialization in the era of the New Democratic Revolution, and adopted the principle that production in the liberated areas should focus on agriculture as the mainstay supplemented by industrial production. In 1949, Mao Zedong laid out his strategic vision of industrialization for New China at the Second Plenum of the Seventh CPC Central Committee. He called for "addressing problems in establishing an independent and complete industrial system" and "steadily transforming China from an agrarian to an industrial country and building China into a great socialist country" (Mao, 1991). In September of the same year, the First Plenum of the Chinese People's Political Consultative Conference (CPPCC) adopted the *Common Program of the CPPCC*, which elaborated economic policies for New China and set out a plan to gradually restore and develop heavy industries and lay the groundwork for national industrialization. The *Common Program* also called for restoring and growing textiles and other light industries to promote national development and people's livelihoods.

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1921–1949年为新民主主义革命时期，这期间党致力于领导工人运动，依靠革命力量推翻阻碍现代化和民族复兴的经济制度。1921–1927年，党通过经济斗争与政治斗争相结合的方式，开始探索新民主主义革命时期工业化的发展和工作实践。1927年大革命失败后，党开始探索新的革命和发展道路，毛泽东等党的领导人领导根据地军民积极进行经济建设，开展打破敌人经济封锁的斗争。党调整了工业的指导思想，在红色根据地内允许私人经济的存在和发展，保护民族资本主义工商业。党和政府开展了发展多种经济成分的探索，创建新民主主义经济新的重要经济形式——国营工业，兴办革命战争所需的军需工业，着手恢复和发展手工业生产合作社。1932年，中华苏维埃临时中央政府颁布了《合作社暂行组织条例》，为各地手工业生产合作提供了统一的章程。1939年，为克服抗日根据地的困难，毛泽东发出“自己动手”的号召。1941年党中央决定开展大生产运动，一些抗日根据地根据战争需要加强了工业建设，兴办了一批被服厂、草鞋厂、炭窑厂等工业企业，有力地支持了战时需求。正如毛泽东同志所说：“为着打败日本侵略者和建设新中国，必须发展工业。”“没有工业，便没有巩固的国防，便没有人民的福利，便没有国家的富强。”（毛泽东， 1991）“要打倒日本帝国主义，必须有工业；要中国的民族独立有巩固的保障，就必须工业化。我们共产党是要努力于中国的工业化的。”（毛泽东，1999）

解放战争时期，面对新的形势，党进一步探讨新民主主义工业化的发展战略，提出解放区开展生产运动要贯彻以农业为主、工业为辅的方针。1949年，毛泽东在党的七届二中全会上对新中国的工业化进行了战略设计，提出“解决建立独立的完整的工业体系问题”“使中国稳步地由农业国转变为工业国，把中国建设成一个伟大的社会主义国家”（毛泽东，1991）等目标。同年9月，中国人民政治协商会议第一届全体会议通过的《中华人民政治协商会议共同纲领》，阐述了新中国的经济政策，明确有计划有步骤地恢复和发展重工业，创立国家工业化的基础。同时，恢复和增加纺织业及其他有利于国计民生的轻工业，供应人民日常消费需求。

但是，由于帝国主义、封建主义和官僚资本主义三座大山的压迫，半封建半殖民地的政治制度和经济制度的束缚，近代工业多为官僚控制的官办工业或由外国资本支配的商办工业，民族工业在这个夹缝中受到双重挤压，中国工业发展缓慢。到1949年新中国成立时，中国国民经济极其落后，使用机器的现代工业产值仅占工农业生产总值的17%左右，其中多是为帝国主义服务的修配厂以及提供原料、半制成品的矿山和工厂。鸦片战争至新中国成立这一百多年的实践说明，在新民主主义革命取得胜利和社会主义制度建立之前，中国可以发展一点工业，但不可能实现工业化。

三、国民经济恢复和计划经济时期（1949–1978年）：建成独立的比较完整的工业体系

1949年中华人民共和国成立，中国共产党成为领导国家工业化的核心力量，中国走上波澜壮阔的社会主义工业化道路。1952年国民经济恢复后，党和毛泽东同志从强国富民的战略高度决定开启以工业化为中心的经济建设并进行社会主义改造，描绘了一幅变落后的农业国为先进的工业国、彻底改变中国经济和技术落后状态的宏伟蓝图，并领导人民探索中国社会主义工业化道路。综合表1至表4的数据可知，从1952年到1978

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In China's modern history, most industries were controlled by either bureaucrats or foreign capitalists. Under the oppression of imperialism, feudalism and bureaucratic capitalism and constrained by the political and economic systems of Old China as a semifeudal and semicolonial country, China's national industries struggled to survive and thrive. Before the founding of New China in 1949, China's economy was extremely underdeveloped, and mechanized modern industries only accounted for around 17% of the output value of industry and agriculture, and most of those industries were repair shops, mineral extraction facilities and factories run by imperialists. China's "century of humiliation" from the Opium War in 1840 to the founding of the People's Republic of China in 1949 indicates that before the victory of China's New Democratic Revolution and the establishment of socialist system, China was unable to complete industrialization although some industries could develop at a preliminary level.

3. Era of Initial Economic Recovery and Planned Economy (1949-1978): Establishing an Independent and Relatively Complete Industrial System

Since the founding of the People's Republic of China in 1949, the Communist Party of China (CPC) has become a critical force for China's industrialization. Since then, China has embarked upon a grand path of socialist industrialization. After an initial economic recovery by 1952, the CPC led by Comrade Mao Zedong decided to launch a campaign of industry-led economic development and socialist reform to boost national strengths and people's welfare. A grand blueprint was envisaged to transform China from a backward agrarian country into an advanced industrialized nation, put an end to economic and technological backwardness, and lead the Chinese people onto a path of socialist industrialization.

As can be learned from data in Tables 1 and 4, the manufacturing sector and the secondary industry as a share of China's GDP rose from 17.6% and 20.9% in 1952 to 44.08% and 48.20% in 1978, respectively, and the secondary industry as a share of China's total workforce jumped from 7.39% to 17.30%. Accordingly, the primary industry fell from 50.5% to 28.1% as a share of China's GDP and from 83.5% to 70.5% as a share of China's total workforce with GNI per capita reaching 200 US dollars, up from 120 US dollars in 1970. China's gross industrial output as a share of GDP rose from 17.6% in 1952 to 44.08% in 1978. The output of major industrial goods grew sharply.

With the benchmark output index of 100 for 1978, in 1952, China's output of crude oil, chemical fertilizers and power generation equipment was less than 1, the output of electric power and cement was less than 5, the output of chemical fibers, automobiles, ethylene and integrated circuits was non-existent, and the output of raw coal was only 10.7. By the year 1978, energy, metallurgy, machinery, chemical engineering and national defense industries reached a considerable scale, and great progress was made in aerospace, electronics, aviation, automobiles, precision machine tools, nuclear industry and petrochemical engineering.

Rapid progress was made in light industries such as textiles, sugar, and paper-making. The manufacturing industry became the dominant industry of China's economy. Before 1949, Old China could not manufacture a single car, aircraft, tank and tractor. After the founding of the People's Republic of China (PRC), the Chinese government led by the CPC prioritized heavy industries and set up an independent and complete industrial system.

Yet overemphasis on steel output and heavy industries led to an overconsumption of intermediate products and a scarcity of final products to meet people's necessities. The proportion between light and heavy industries became distorted, and non-farm industries failed to create sufficient jobs in proportion to their contribution to economic growth. China's light industries as a share of gross industrial output value fell from 64.47% in 1952 to 43.10% in 1978, and the share of heavy industries expanded from 35.53% to 56.90%. Value-added in China's primary industry as a share of GDP fell sharply, but agricultural employment as a share of total employment decreased at a slower pace compared with change in output. In this period, China's industrialization can be roughly divided into four stages:

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年，工业和第二产业增加值占GDP的比重分别从17.6%和20.9%提高到44.08%和48.20%，第二产业就业人数占国民经济总就业人数比重从7.39%提高到17.30%。相应地，第一产业增加值占GDP的比重从50.5%下降到28.1%，第一产业就业人数占国民经济总就业人数的比重从83.5%下降到70.5%，人均GNI从1970年的120美元增加到200美元。主要工业产品产量大幅增长，以1978年产量指数为100，1952年原油、化肥、发电设备不到1，发电量、钢、水泥不到5，化学纤维、汽车、乙烯、集成电路是空白，原煤仅为10.7。到1978年，能源、冶金、机械、化工、国防等工业已经达到相当规模，航天、电子、飞机、汽车、精密机床、核工业和石油化工进步显著，纺织、食糖、造纸等轻工业得到较快发展，工业成为国民经济的主导产业。尤其是重工业优先发展和独立的比较完整的工业体系的建成，从根本上改变了旧中国一辆汽车、一架飞机、一辆坦克、一辆拖拉机都不能造的畸形工业结构，工业改造国民经济各部门的能力显著增强。但是，由于长期坚持“以钢为纲”，过度强调重工业，中间产品消耗过多，用于人民生活的最终产品过少，出现了轻重工业比例关系失调和非农产业就业比重增长滞后于产出占比的增长。在工业总产值中，轻工业占比从1952年的64.47%下降到1978年的43.10%，重工业占比相应地从35.53%提高到56.90%。第一产业增加值占GDP比重下降较快，但农业就业人数占总就业人数的比重下降缓慢且滞后于产出占比变化。这一时期，中国工业化大致分为四个阶段。

（一）1949–1952年工业恢复和发展

恢复遭受战争破坏的工农业生产，遏制国民党统治时期持续10多年的通货膨胀，既是新中国亟待解决的经济问题，也是开启社会主义工业化的必要条件。工业恢复和发展重点放在关系国计民生的矿山、钢铁、电力、机械制造、化工、纺织等行业，在东北地区和内地有计划地建设了一批骨干企业。在党和政府的领导下，国民经济迅速恢复和发展，现代工业也有所发展，技术水平得以提高，工业总产值快速增长，主要工业产品产量都超过了新中国成立前最高产量水平，奠定了中国由农业国向工业国转变的基础。

（二）“一五”计划时期的重工业优先发展

在国民经济恢复即将完成的1952年，毛泽东为党制定了过渡时期总路线，提出社会主义工业化的命题，并将实现国家的社会主义工业化与完成对农业、手工业和资本主义工商业的社会主义改造一道确定为国家在过渡时期的总任务。这一阶段社会主义工业化的优先任务是建立现代化大机器工业，形成独立、完整的工业体系，使社会主义工业成为整个国民经济中起决定作用的领导力量。《中华人民共和国发展国民经济的第一个五年计划》（1953–1957年）作为实现党的总路线的一个重大步骤，对中国工业化的许多重大问题，如重工业与轻工业、地方工业与中央工业、私营工业与国营工业等关系都做了论述和安排。“一五”计划明确提出优先发展重工业，基本建设投资向钢铁、有色金属、电力、煤矿、石油、机器制造、化学、建筑材料、木材等重工业倾斜，机器制造和冶金工业被视为重中之重。

毛泽东把农业和工业作为经济进步和国家强盛的基础，并提出在优先发展重工业的条件下，发展工业和发展农业同时并举，使农业能够和工业得到相适应的发展（毛泽东，1999）。优先发展重工业，依托已经建立和发展起来的重工业基础发展轻工业，并使农业生产机器化，是苏联社会主义工业化道路的核心内容。作为经

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3.1 Stage 1 (1949-1952): Industrial Recovery and Development

New China must recover its war-ravaged industrial and agricultural production and put an end to the decade-long inflation under the rule of the Kuomintang Party. These economic issues must be addressed before opening a new chapter of socialist industrialization in New China. In this period, China's industrial recovery and development focused on sectors such as mineral extraction, iron and steel, electric power, machinery manufacturing, chemical engineering and textiles. In the northeast and interior provinces, China established a group of key enterprises. Under the leadership of the CPC and the government, China swiftly recovered and developed its economy, made progress in modern industries, enhanced technological strengths, and rapidly increased gross industrial output value. The output of China's major industrial products exceeded the highest level before 1949, laying an initial groundwork for China's transition from an agrarian to an industrialized country.

3.2 Stage 2 (1953-1957): Priority on Heavy Industries

In 1952 when China's economic recovery was about to complete, Mao Zedong laid out the General Line for the Transition Period of the Party, put forth socialist industrialization, and identified socialist industrialization and the socialist reforms of agriculture, manufacturing and capitalist industry and commerce as national tasks for the transition period. In this stage, the priority of socialist industrialization was to establish modern large machine industries, develop independent and complete industrial systems, and establish socialist industries as the decisive steering forces of the economy. As an important step for implementing the Party's General Line, the *First Five-Year Plan of the People's Republic of China for National Economic Development (1953-1957)* made discussions and arrangements on a range of issues related to China's industrialization, including the relationship between heavy and light industries, local and central industries, and private and state-run industries. The First Five-year Plan (FYP) gave priority to heavy industries and focused capital construction investments on heavy industries including iron and steel, nonferrous metals, electric power, coal extraction, petroleum, machine manufacturing, chemical engineering, construction materials and timber. In particular, machine manufacturing and metallurgy industries were deemed as top priorities.

Mao Zedong considered agriculture and industry as the foundation for economic progress and national prosperity. He called for developing industry and agriculture at the same time and at a coordinated pace (Mao, 1999). A key aspect of the Soviet Union's path of socialist industrialization is to give priority to heavy industries, develop light industries based on heavy industries, and mechanize agricultural production. For China as an economically and technologically backward country, the Chinese communists expected to achieve national industrialization following this path. Heavy industries received priority because they were the premise for China to manufacture industrial equipment and weaponry, mechanize agriculture, and boost agricultural and consumer goods production. The approach of prioritizing heavy industries and modernizing agriculture and other sectors reflects Mao Zedong's thought of establishing an independent and complete industrial system.

During the First FYP period (1953-1957), China's central government focused resources on key projects of great importance to national industrialization. With the implementation of 156 Soviet-aided projects involving 694 engineering and construction institutions, China greatly enhanced its industrial capabilities in a broad range of sectors, including iron and steel, metallurgy, mining equipment, automobile and tractor manufacturing, electric power, coal, nonferrous metals, and chemical sectors.

Upon the completion of the First FYP, China had developed manufacturing capabilities from scratch for power generation, metallurgy and mining equipment, as well as machine tools, automobiles, jet planes, large steel works and high-quality alloy steel. In particular, China established its aviation industry consisted of Nanchang Aircraft Factory, Zhuzhou Aircraft Engine Factory, Shenyang Aircraft Factory and Shenyang Aircraft Engine Factory. With new jet plane models rolled out from Shenyang

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济发展和技术极其落后的国家，中国共产党人自然也期待用这种路径实现国家工业化。新中国工业化选择优先发展重工业的逻辑，是因为只有建立起强大的重工业，才能制造现代化的工业设备，改造重工业和轻工业，制造现代化武器，为农业提供拖拉机、收割机和其他现代化农业机械，并增加农业和消费品工业生产。优先发展重工业以及用先进技术装备改造农业和国民经济其他部门的思想，体现了毛泽东建立独立、完整的工业体系的思想。

“一五”期间，中央集中力量发展国家工业化的重要项目，特别是苏联帮助中国设计的以156个单位为中心、由限额以上的694个建设单位组成的工业建设，建成了一批钢铁联合企业、汽车制造厂、拖拉机制造厂、重型机器制造厂，形成了一批将在国家工业化进程中长期发挥示范和引领作用的大型骨干工业企业，极大地提高了中国钢铁、冶金和矿山装备、汽车和拖拉机、电力、煤炭、有色金属、基本化学等现代工业生产能力，扩展了中国工业类别。中国过去不能够制造的一些发电、冶金、矿山等设备和机床、汽车、喷气式飞机、大型钢材和合金优质钢，在“一五”计划完成时已经能够制造了。尤其是，航空工业领域建设了南昌飞机厂、株洲航空发动机厂、沈阳飞机厂、沈阳航空发动机厂，1956年沈阳飞机厂试制成功新型喷气式飞机，标志着中国成为当时世界上少数几个能够制造喷气式飞机的国家之一。生产力空间布局上，迅速壮大了东北工业基地，新建华北、西北、华中和西南等新的工业基地，形成了一批新的工业城市，改善了中国工业的地区分布，使中国工业面貌焕然一新。

为调动各方面积极性，加快工业化进程，1956年召开的中共八届二中全会制定了“中央工业和地方工业同时并举，大型企业和中小型企业同时并举，洋法生产和土法生产同时并举”（中共中央文献研究室，1995）的方针。许多地方因地制宜、轰轰烈烈地建设了一批工业项目。这些地方工业项目不仅服务农业生产和人民生活，而且有力地支援了国家大工业生产和出口。“一五”计划的实施和计划指标超额完成，使中国在生产力薄弱的基础上得以进行大规模经济建设，开启了中国人百年来梦寐以求的从落后的农业国向先进的工业国转变的历史篇章，为此后长时期的国家工业化奠定了初步基础。

（三）“大跃进”及国民经济调整时期的工业化

在“一五”计划辉煌成果和三大改造基本完成的基础上，党中央决定1958–1962年实施“二五”计划。《关于发展国民经济的第二个五年计划的建议的报告》要求继续进行以重工业为中心的工业建设并建立中国社会主义工业化的巩固基础，提出在大约三个五年计划时期内基本上建成一个完整的工业体系。为此，“二五”计划期间发展壮大了冶金、机器制造、电力、煤炭和建筑材料等工业部门的建设，攻克了冶金、采矿、电站、石化等现代化大型设备的设计和制造技术，比较落后的石油工业、化学工业和无线电工业得到积极建设，中国工业的技术水平有显著提高。国家需要而又缺乏的各种重型设备、工程机械、专用机床、精密机床和仪表等制造业，钢材和主要的有色金属的数量和品种，稀有金属的开采和提炼、有机化工以及原子能的和平利用等薄弱部门，在“二五”计划期间均得到加强和发展。

1958至1960年被称为“大跃进”的年代。“大跃进”在工业方面的初衷是打破常规，采用先进技术，加快钢铁工业发展，钢铁和其他主要工业产品产量赶上或超过英国。具体做法上，提出“以钢为纲”的口号，全党全民

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Aircraft Factory in 1956, China became one of the few countries in the world capable of manufacturing jet planes. To improve the regional layout of productivity, China swiftly expanded its northeast industrial base, created new industrial bases in the northern, northwestern, central and south western regions, and built new industrial cities.

The Second Plenum of the Eighth CPC Central Committee held in 1956 enacted the policy of "developing central and local industries, large and small and medium-sized enterprises, and foreign and local production methods at the same time" (Literature Research Office of the CPC Central Committee, 1995). Many localities launched industrial projects to support agricultural production, meet people's necessities, and support industrial production and export. The implementation of the First FYP and the over-fulfilment of production plans allowed China to carry out economic development on a mass scale despite its weak productivity, unveiling a new historical chapter of turning China from a backward agrarian country into an advanced industrial nations. Progress made in the FYP period has laid the groundwork for China's industrialization in the following decades.

3.3 Industrialization during the Great Leap Forward and a Period of China's Economic Adjustment

Based on the brilliant achievements of the First FYP period and the completion of the socialist reforms, the CPC Central Committee decided to implement the Second FYP from 1958 to 1962. The *Report on the Proposal for the Second FYP for the Development of the National Economy* calls for furthering industrial development based on heavy industries and establishing the foundation for China's socialist industrialization. The *Report* also puts forth a plan to initially develop a complete industrial system within three FYPs. During the Second FYP period, China strengthened such industrial sectors as metallurgy, machine manufacturing, electric power, coal and building materials, developed large equipment technologies. Great efforts were made to develop petroleum, chemical and radio industries from rather low levels, resulting in a significant improvement of China's industrial performance. The Second FYP period saw further development in the manufacturing of heavy equipment, engineering machinery, special machine tools, precision machine tools and instruments, steel and nonferrous metals, the extraction and refinery of rare metals, organic chemical engineering, and the peaceful use of atomic power.

The period from 1958 to 1960 is referred to as the era of the Great Leap Forward. The intention for the Great Leap Forward was to expedite the development of iron and steel industry with advanced technologies and catch up with or overtake the UK's output of steel and other major industrial products. Vowing to "take steel as the key link for all-out development," the Chinese government called upon the whole Party and people to set up steel mills of all sizes. With unrealistic production targets and rush for quick results, the Great Leap Forward led to steel production with extremely poor quality and distorted the proportion of economic sectors. In 1961, the CPC Central Committee decided to readjust China's economy, slow down industrial growth rate, restructure the industrial mix, and shut down and convert loss-making enterprises and enhance management to boost economic performance, overcome the setbacks of the Great Leap Forward, and bring the economy back to normal. Since 1962, China's economic situation started to recover. In 1964, China launched the Third Front Movement with the implementation of a group of industrial projects and improved transportation in southwest China such as Sichuan and Guizhou. After the adjustment, China brought its economic development back to a normal track and restored industrial development.

In August and September 1963, Mao Zedong put forth a two-step approach for China's industrial development in a revised first draft on China's industrial development. Following this approach, China may establish an independent and complete industrial system at a basic level before reaching internationally advanced levels (Literature Research Office of the CPC Central Committee, 1996).

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大办钢铁，大中小钢铁厂同时建设。由于产量任务指标脱离实际和不顾客观规律的急于求成，“大跃进”给中国经济造成钢产量不合格率较高和国民经济比例严重失调等问题。为克服“大跃进”造成的困难，使国民经济步入正轨，1961年党中央决定对国民经济进行调整，调低工业增长速度，调整工业内部结构，关停并转部分亏损企业，加强企业管理，提高企业经济效益。1962年始，经济形势逐渐恢复。1964年启动三线建设，在四川、贵州等西南地区建设了一批工业项目，并努力改变这些地区的交通运输条件。通过调整，国民经济发展回到正常轨道上来，工业的发展也得以恢复。

1963年八九月间经毛泽东修改的关于工业发展问题初稿，提出中国工业发展可以按两步走来考虑，首先建立一个独立的完整的工业体系，再使中国工业接近世界的先进水平（中共中央文献研究室，1996）。根据毛泽东的指示，1964年12月，周恩来在中共三届全国人大一次会议上所做的《政府工作报告》中，明确阐述了两步走战略：“今后发展国民经济的主要任务，总的说来，就是要在不太长的历史时期内，把我国建设成为一个具有现代农业、现代工业、现代国防和现代科学技术的社会主义强国，赶上和超过世界先进水平。为了实现这个伟大的历史任务，从第三个五年计划开始，中国的国民经济发展，可以按两步来考虑：第一步，建立一个独立的比较完整的工业体系和国民经济体系；第二步，全面实现农业、工业、国防和科学技术的现代化，使中国经济走在世界的前列。”（周恩来， 1984）1975年1月，周恩来在中共四届全国人大一次会议上所做的政府工作报告中，重申了四个现代化的目标和两步走战略。

（四）“文革”时期的工业发展

这期间中国制定和实施了“三五”和“四五”两个五年计划。《中华人民共和国1966—1970年的国民经济发展计划》（“三五”计划）提出，适当加强国防建设，努力突破尖端技术；与支援农业和加强国防相适应，加强基础工业，使国民经济建设进一步建立在自力更生的基础上。《中华人民共和国1971—1975年的国民经济发展计划》（“四五”计划）强化了以备战和三线建设为中心的经济建设思想，提出集中力量建设大三线，狠抓钢铁、军工、基础工业和交通运输的建设，初步建成独立、比较完善的工业体系和国民经济体系，促进国民经济新飞跃。尽管由于“文化大革命”的干扰，中国国民经济和工业发展出现较大起伏，但是由于广大干部职工和知识分子响应毛主席“抓革命、促生产”“把国民经济搞上去”的指示，工业总产值在1967年和1968年衰退后，1969年起开始好转和恢复，中国工业化建设继续前行，“三五”计划、“四五”计划的主要任务指标基本上如期完成。特别是，这两个五年计划把国防建设放在第一位，三线建设和其他重点建设项目取得了许多重大成果，形成了以重庆为中心的兵器工业基地、以成都为中心的航空工业基地、以重庆为中心的造船工业基地，西北地区的航天、航空、武器、电子和光学仪器等工业得到发展，使西南、西北等广大的内地发展成为初具规模的战略后方，进一步改善了中国工业布局。

为扭转“文革”初期的混乱局面，党中央、国务院于1969年、1970年多次召开会议，采取“三线”建设、发展地方“五小”工业、调整经济管理体制等措施恢复经济。中央再次强调大中小企业同时并举、中央工业和地方工业同时并举的“两条腿走路”方针，各地立足本地资源，在不与农业争劳动力、不与大工业争原材料和燃料动力的条件下，兴建了一批小钢铁、小煤窑、小机械修造、小水泥、小化肥等“五小”工业，县、乡、社工业得到快

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According to Mao Zedong's vision, Zhou Enlai elaborated a two-step strategy in his Government Work Report delivered at the First Session of the Third National People's Congress: "Our principal task for developing the economy is to build China into a strong socialist country with modern agriculture, modern industries, modern national defense and modern science and technology, and reach and overtake internationally advanced levels. To achieve this great historic mission, we may follow a two-step approach for China's economic development since the Third FYP: The first step is to establish an independent and relatively complete industrial system and national economic system; the second step is to modernize agriculture, industry, national defense and science and technology to bring China's economy to an internationally advanced level" (Zhou Enlai, 1984). In January 1975, Premier Zhou Enlai reaffirmed the four modernization goals and the two-step strategy in his government work report delivered at the First Session of the Fourth National People's Congress.

3.4 China's Industrial Development during the Cultural Revolution (1966-1976)

During this period, China enacted and implemented two FYPs, including the third and the fourth FYPs. The *Plan of the People's Republic of China for National Economic Development in 1966-1970* ("Third Five Year Plan") called for enhancing national defense and achieving breakthroughs in cutting-edge technologies; while supporting agriculture and reinforcing national defense, China should strengthen basic industries and pursue independent economic development. The *Plan of the People's Republic of China for National Economic Development in 1971-1975* ("Fourth FYP") reinforced the principle of combat readiness and the Third Front Movement, calling for concentrating resources on the Third Front development. In the Fourth FYP period, China made great efforts to develop iron and steel, defense, basic industries and transportation, initially established independent and relatively complete industrial and economic systems, and brought the economy to a new level.

Despite wild swings in China's economic and industrial development due to interference from the Cultural Revolution, after a brief recession in 1967 and 1968, China's gross industrial output started to recover in 1969 thanks to the hard work of cadres, employees and intellectuals to live up to Chairman Mao's instructions to "grasp revolution and promote production" and "bolster the national economy." China's industrial development pressed ahead, and key objectives set for the Third and Fourth FYPs were achieved as expected. In particular, these FYPs gave priority to national defense, yielded key results in the Third Front Movement and other major construction projects, developed weaponry industrial base centered around Chongqing, the aviation industry base centered around Chengdu, and shipbuilding industry base centered around Chongqing. Through the development of industries such as aviation, aerospace, weaponry, electronics and optical instruments, China's interior regions in the southwest and northwest were turned into strategic rears, further improving China's industrial layout.

To reverse the chaotic situation in the early stage of the Cultural Revolution, the CPC Central Committee and the State Council held multiple rounds of conferences in 1969 and 1970, and decided to recover the economy by launching the Third Front movement, developing the "five small" local industries, i.e. small coal mines, steel mills, cement plants, chemical fertilizer plants, and hydro-power stations at or below county level, and adjusting economic administration. The Central Government once again called for developing large, medium-sized and small enterprises and central and local industries at the same time. The CPC Central Committee adopted the principle of "walking on two legs," i.e. giving prominence to both large, medium-sized and small enterprises and central and local industries. Based on local resources, various localities developed the "five small industries" without vying with agriculture for labor force and large industries for raw materials and fuel. In this manner, county, township and commune-level industries developed rapidly. The "five small industries" flourished outside cities and formal planning to serve agriculture, utilize local resources, and satisfy local demand.

Commune and production brigade enterprises developed since the Great Leap Forward in the late 1950s morphed into market-based economic entities after the reform and opening up was launched in

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速发展。在城市和正式计划之外发展起来的“五小”工业，具有服务农业、利用地方资源、满足本地需求的特点。这一时期连同20世纪50年代末大跃进时期在人民公社体制下发展起来的社队企业，改革开放后通过市场建立了与消费需求和上下游企业的联系，20世纪八九十年代发展成为乡镇企业和中国工业化的重要方面军，创造了乡村工业和乡镇企业异军突起的奇迹，20世纪90年代中后期成为中国民营经济的主要来源。20世纪八九十年代，乡镇企业是中国经济最具活力的组成部分，其异军突起不仅增加了农民收入，吸纳了大量农村剩余劳动力，而且促使国有企业和集体企业对市场需求做出快速反应，推动国民经济从计划经济向市场经济转换。

经毛泽东批准，1972年和1973年中国实施了大规模引进先进技术装备的“四三”方案，用43亿美元集中从日本、联邦德国、法国、意大利、荷兰、瑞士、美国等西方发达国家进口了一批发电、化纤、化肥、钢铁、煤炭、石油、化工等成套设备和单机，建立了与西方发达资本主义国家的经济联系。利用这些当时世界先进技术装备兴建的一批大型工业项目，主要布局在北京、上海、天津、武汉、南京等东部沿海地区和大庆、吉林等东北地区。这两次引进的先进技术装备，在改革开放初期的工业发展中发挥了巨大作用，为1978年以后的对外开放和大规模技术引进埋下了伏笔。

把中国由落后的农业国变为先进的工业国，是毛泽东这一代中国共产党人的重要奋斗目标。到20世纪70年代末这些目标绝大部分均已实现或接近实现。中国工业化的任务虽然还没有最终完成，特别是就业结构变化和城市化水平相对滞后，工业增加值占世界工业增加值的比重变化不大，人均收入水平提高不快。但中国建成了独立、的比较完整的工业体系和国民经济体系，在国民经济总量上实现了工业主导以及由农业国向工业国跨越的目标。这些举世瞩目的成就，不仅使中国能够基本上依靠自己的力量，为国民经济各部门和国防

表1 中国工业总产值及轻重工业比例变化情况（单位：亿元、%）

年份	工业总产值	在工业总产值中				霍夫曼系数
		轻工业总产值	轻工业占总产值比重	重工业总产值	重工业占总产值比重	轻工业总产值/重工业总产值
1952	349	225	64.47	124	35.53	1.81
1957	704	387	54.97	317	45.03	1.22
1970	2117	976	46.10	1141	53.89	0.86
1977	3725	1638	43.97	2087	56.03	0.78
1978	4237	1826	43.10	2411	56.90	0.76
1980	5154	2430	47.15	2724	52.85	0.89
1990	23924	11813	49.38	12111	50.62	0.98
2000	85674	34095	39.80	51579	60.20	0.66
2010	698591	200072	28.64	498519	71.36	0.40
2016	1158998	262998	22.69	896000	77.31	0.29
2017	1133161	239499	21.14	893661	78.86	0.27
2019	1067397	194830	18.25	872,568	81.75	0.22

资料来源：1992年、2001年、2011年《中国统计年鉴》（本表以当年价格计算）。2016–2019年的产值作者通过对应《中国统计年鉴》规模以上工业企业主要指标中的“营业收入”分类加总计算。

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1978. In the 1980s and 1990s, those enterprises developed into township and village enterprises (TVEs) as key forces for China's industrialization and the backbone of China's private economy in the mid- and late 1990s. In the 1980s and 1990s, TVEs became the most vibrant part of China's economy. Their emergence not only raised farmers' income and created jobs for rural surplus labor, but prompted China's state-owned enterprises (SOEs) and collective enterprises to respond to changing market demand, expediting the transition of China's economy from the planned economy to a market-based one.

With Mao Zedong's approval, China imported power generation, chemical fiber, chemical fertilizer, steel, coal and chemical engineering equipment and machinery worth 4.3 billion US dollars from the former Federal Republic of Germany, France, Italy, the Netherlands, Switzerland and the United States, thus establishing economic ties with capitalist countries in the Western world. Most of the large industrial projects with those internationally advanced technologies and equipment were located in China's eastern or coastal cities such as Beijing, Shanghai, Tianjin, Wuhan and Nanjing, as well as northeastern cities such as Daqing and Jilin. These two rounds of technology importation played a tremendous role in China's industrial development in the early stage of reform and opening up, laying the groundwork for opening up and mass technology importation after 1978.

Transforming China from a backward agrarian country into an advanced industrialized nation was an important goal for Chinese communists of Mao Zedong's generation. By the end of the 1970s, most of their goals were achieved or near completion. Yet China's industrialization remained incomplete. In particular, changes in China's employment structure and urbanization were slow. China's industrial value-added as a share of world total changed little, and per capita income grew slowly. However, China established an independent industrial system and a relatively complete national economic system. With industries assuming a dominant position in the economy, China transformed from an agrarian into an industrial country. These remarkable achievements allowed China to provide increasing technologies, equipment and raw materials for various economic sectors and national defense, supply daily consumer goods, accelerate the agricultural mechanization process, and break through imperialist blockades. Industrial development safeguarded China's national economic independence and defense security and laid a solid economic and technological foundation for China's development into the world's largest

Table 1: China's Gross Industrial Output and Change in the Proportion of Light and Heavy Industries (in 100 million yuan, %)

Year	Gross industrial output value	As a share in gross industrial output value				Hoffman coefficient
		Gross output value of light industries	Light industries as a share of total economic output value	Gross output value of heavy industries	Heavy industries as a share of total economic output value	Gross output value of light industries / gross output value of heavy industries
1952	349	225	64.47	124	35.53	1.81
1957	704	387	54.97	317	45.03	1.22
1970	2,117	976	46.10	1,141	53.89	0.86
1977	3,725	1,638	43.97	2,087	56.03	0.78
1978	4,237	1,826	43.10	2,411	56.90	0.76
1980	5,154	2,430	47.15	2,724	52.85	0.89
1990	23,924	11,813	49.38	12,111	50.62	0.98
2000	85,674	34,095	39.80	51,579	60.20	0.66
2010	698,591	200,072	28.64	498,519	71.36	0.40
2016	1,158,998	262,998	22.69	896,000	77.31	0.29
2017	1,133,161	239,499	21.14	893,661	78.86	0.27
2019	1,067,397	194,830	18.25	872,568	81.75	0.22

Source: *China Statistical Yearbooks* of 1992, 2001 and 2011 (calculated at current-year price in this table). The output values of 2016-2019 are calculated by the authors by aggregating the business revenues of the primary indicators of industrial enterprises above designated scale in the *China Statistical Yearbooks*.

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表2 中国产出和就业的结构变化（单位:%、美元）

年份	第一产业增加值占GDP比重	第一产业就业占国民经济总就业比重	工业占GDP比重	第二产业增加值占GDP比重	第二产业就业占国民经济总就业比重	人均GNI（美元）	人均GNI在世界的排名
1952	50.5	83.5	17.6	20.9	7.4		
1957	40.3	81.2	25.4	29.7	9.0		
1970	35.2	80.8	36.7	40.5	10.2	120	113
1977	29.4	无	42.6	47.1	无	190	130
1978	28.1	70.5	44.1	48.2	17.3	200	138
1990	27.1	60.1	36.59	41.6	21.4	330	166
2000	15.9	50.0	40.2	50.9	22.5	940	150
2010	10.2	36.7	40.1	46.8	28.7	4340	128
2016	8.1	27.7	32.9	39.6	28.8	8270	94
2017	7.5	27.0	33.1	39.9	28.1	8740	89
2019	7.1	25.1	32.0	38.6	27.5	10390	78
2020	7.7			37.8			

资料来源：工业占GDP比重，1952年和1957年数据根据1999年《中国统计年鉴》计算，其余年份根据联合国统计局数据计算，https://unstats.un.org/unsd/snaama/Downloads。人均GNI及其在世界的排名来自世界银行，https://databank.worldbank.org/。第一产业、第二产业就业占总就业人员比重，来自对应年份的《中国统计年鉴》。2020年数据取自国家统计局网站对应年份的《统计公报》。

建设提供越来越多的技术装备和原材料，为人民生活提供必要的消费品，加快了农业机械化进程，而且有力地突破了帝国主义封锁，保障了国家经济独立和国防安全，也为中国在改革开放时期发展成为世界第一制造业大国奠定了牢固的经济和技术基础。

四、改革开放后的继续发展：工业大国的新型工业化（1978-2016年）

1978年12月，中共十一届三中全会作出把全党工作重点转移到社会主义现代化建设上来，实行改革开放的历史性决策，中国工业化由此进入向世界工业大国迈进的新阶段。改革开放初期，中国调整了轻重工业比例关系，20世纪八九十年代纺织和食品以及其他轻工业发展较快。20世纪90年代后期轻工业有了较充分发展后，发展重点再次从轻工业转向资本和技术密集的重工业。对外开放不仅使中国加快了对世界先进技术的引进和消化、吸收，紧跟世界信息化和科学技术发展步伐，而且使中国能够参与全球化发展，从世界市场获取所需的原材料和设备等投入品，扩大制成品和高技术产品出口。中国由此发展成为世界第二大经济体和第一工业大国，外汇储备连续多年位居世界第一，工业品出口构成从初级产品转变为纺织、服装、玩具等劳动密集型产品，再转变为以机器设备和电子信息产品为主的复杂产品，用几十年时间走完了发达国家几百年走过的工业化历程。综合表1和表4的数据，1978年至2019年，第一产业增加值占GDP的比重从28.1%下降到7.1%，就业比重从70.53%下降到25.10%。同期工业增加值占GDP的比重从44.08%降低到32.00%，工业总产值从4237亿元增至1067397亿元，工业增加值占世界工业增加值的比重从3.41%提高到24.94%。人均国民总收入（GNI）及其在世界的位次是反映工业化水平和人民富裕程度的综合指标。中国人均GNI从1978年的200美元、位列

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Table 2: Changes in China's Output and Employment Structure (%, US dollars)

Year	Value-added of the primary industry as a share of GDP	Employment in the primary industry as a share of total employment	Manufacturing industry as a share of GDP	Value-added from the secondary industry as a share of GDP	Employment in the secondary industry as a share of total employment	GNI per capita (US dollars)	Worldwide ranking of GNI per capita
1952	50.5	83.5	17.6	20.9	7.4		
1957	40.3	81.2	25.4	29.7	9.0		
1970	35.2	80.8	36.7	40.5	10.2	120	113
1977	29.4	N/A	42.6	47.1	N/A	190	130
1978	28.1	70.5	44.1	48.2	17.3	200	138
1990	27.1	60.1	36.59	41.6	21.4	330	166
2000	15.9	50.0	40.2	50.9	22.5	940	150
2010	10.2	36.7	40.1	46.8	28.7	4,340	128
2016	8.1	27.7	32.9	39.6	28.8	8,270	94
2017	7.5	27.0	33.1	39.9	28.1	8,740	89
2019	7.1	25.1	32.0	38.6	27.5	10,390	78
2020	7.7			37.8			

Source: Industry as a share of GDP and data of 1952 and 1957 are calculated based on *China Statistical Yearbook* for 1999, and data in the rest years are calculated based on data from the United Nations Statistics Division (UNSD) downloaded from https://unstats.un.org/unsd/snaama/Downloads. GNI per capita and world rankings are from the World Bank downloaded from https://databank.worldbank.org/. Employment in the primary and secondary industries as a share of total workforce is from *China Statistical Yearbook* for corresponding years. Data for 2020 are from the *Statistical Communique* on the website of the National Bureau of Statistics (NBS) for relevant years.

manufacturing nation.

4. Further Development after Reform and Opening Up: New-type Industrialization for a Major Industrial Nation (1978-2016)

In December 1978, the Third Plenum of the 11th CPC Central Committee made a historic decision to shift the focus of its work to socialist modernization and implement the reform and opening up, which ushered in a new chapter of China's transformation into a major world industrial power. In the early stage of reform and opening up, China adjusted the proportion between heavy and light industries. In the 1980s and 1990s, China's textiles, food and other light industries developed rapidly. With light industries in full swing in the late 1990s, China refocused from light industries to capital- and technology-intensive heavy industries. Opening up allowed China to not only import and assimilate internationally advanced technologies to keep pace with progress in ICTs and scientific and technological research, but reap the dividends of globalization, access raw materials, equipment and other inputs from the global market, and export more finished goods and high-tech products.

In this manner, China became the world's second-largest economy and largest manufacturing nation with the highest foreign exchange reserves for many straight years. China's industrial exports shifted from primary products to labor-intensive products such as textiles, clothing and toys before upgrading to more sophisticated products like machinery, equipment and IT devices. China completed an industrialization process that took centuries for developed countries to complete. As can be seen in Tables 2 and 3, from 1978 to 2019, value-added from the primary industry as a share of China's GDP fell from 28.1% to 7.1%, and the share of employment in the primary industry shrank from 70.53% to 25.10%. During the same period, industrial value-added as a share of China's GDP decreased from 44.08% to 32.00%, China's gross industrial output rose from 423.7 billion yuan to 106.7397 trillion

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世界第138名提高到2019年的10390美元、位列世界第78名，进入中等偏上收入国家行列。这期间工业国际竞争力显著提高，出口和进口占世界的比重分别从0.78%和0.81%提高到10.87%和10.28%。其中，工业制成品出口占出口贸易总额的比重由37.4%增至94.6%，初级产品出口的占比由50.3%降为5.4%。

（一）1978—1991年转折阶段的工业结构调整

1978年召开的中共十一届三中全会重申建设社会主义现代化强国的目标，决定将全党工作的着重点转移到社会主义现代化建设上来，提出让地方和工农业企业在国家统一计划的指导下有更多的经营管理自主权，中国进入改革开放新时期。1980年，党中央、国务院进一步明确，加强先前发展不足的轻工业和劳动密集型行业，着重解决轻重工业的比例失调问题，调整重工业的服务方向，使之从主要为新的建设和重工业自身服务转变为更好地为农业、轻工业服务，为国民经济的技术改造服务，加快轻工业发展。为此，国家停建缓建一批基本建设和重工业项目，轻纺工业投资和原料进口大幅度增加，保证轻纺工业生产所需。1982年，党的十二大将能源与农业、交通、教育和科学一道确立为经济发展的战略重点。1984年10月，中共十二届三中全会通过的《中共中央关于经济体制改革的决定》提出中国社会主义经济是公有制基础上有计划的商品经济，坚持多种经济形式和经营方式共同发展，增强企业活力是以城市重点的整个经济体制改革的中心环节等论断。党对经济体制的上述新认识推动了以城市为重点的经济体制改革。1987年党的十三大阐述了社会主义初级阶段理论，提出了党在社会主义初级阶段的基本路线。1988年修改宪法，确认私营经济的合法地位。同年，国务院决定将140个市县新划入沿海经济开放区，进一步加大对外开放步伐。这一时期中国工业经历了一个生机蓬勃的加速发展阶段，为20世纪90年代及之后的继续发展作了铺垫。

中共十一届三中全会后至“七五”计划完成，工业部门普遍进行了结构调整和技术改造，工业发展迅速。“五五”计划后三年狠抓燃料、动力、原材料工业，“六五”计划期间集中力量高速度发展基础工业，建设了一批具有战略意义的项目，形成若干个比较强大的工业基地。“七五”计划提出把建设重点转到现有企业的技术改造和改建扩建上来，走内涵型为主的扩大再生产的路子。这期间的建设和改造较快地提升了工业生产能力，工业总产值和主要工业产品产量大幅度增长，参见表1和表4。工业产值在向上攀升的同时，轻重工业比例向轻工业占比提高的方向变化。轻工业占比从1978年的43.10%提高到1980年的47.15%和1990年的49.38%，相应地重工业占比呈现较大幅度的下降。这表明工业发展中轻重工业比例失调及能源、原料短缺等问题基本得到解决，中国工业发展步入稳步发展的健康轨道。

（二）1992—2001年工业结构的进一步调整

以1992年邓小平南方谈话和党的十四大为标志，中国经济体制改革进入建立社会主义市场经济体制的新阶段，所有制结构、国有企业以及中央与地方财政关系等改革全面展开，国民经济市场化、社会化程度明显提高，工业化也向纵深发展。所有制结构方面，公有制为主体、多种经济成分共同发展的格局初步确立。这一时期，中国出口部门快速发展，民营企业和外资、港澳台资企业成为重要的出口商。国有企业方面，大中型国有企业进行了公司制和股份制改革试点，组建了一批大型企业集团，国有中小企业改革也取得显著成效，国

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yuan, and industrial value-added as a share of world total grew from 3.41% to 24.94%. Gross national income (GNI) per capita and its ranking in the world reflect the level of industrialization and people's affluence. China's GNI per capita increased from 200 US dollars in 1978 to 10,390 US dollars by 2019 with its world ranking up from 138th place to the 78th place, joining the rank of upper middle-income countries. In this period, China's industrial competitiveness significantly increased with exports and imports as a share of world total up from 0.78% and 0.81% to 10.87% and 10.28%, respectively. China's exports of industrial finished goods as a share of China's total exports increased from 49.7% to 94.6%, and primary products as a share of China's total export plunged from 50.3% to 5.4%.

4.1 Adjustment of China's Industrial Structure in 1978-1991

The Third Plenum of the 11th CPC Central Committee held in 1978 reaffirmed the goal of building a strong socialist modern country and made the decision to shift the focus of the whole Party's work to socialist modernization. It called for granting more business autonomy to local and agricultural and industrial enterprises under unified state planning, ushering in a new era of reform and opening up. In 1980, the CPC Central Committee and the State Council identified the underdeveloped light industries and labor-intensive industries as priorities to shift the distorted proportion between light and heavy industries, putting heavy industries at the service of agriculture, light industries, and technological upgrade. Under this principle, the Chinese government put on hold a group of capital construction and heavy industry projects, beefed up investments in textiles and other light industries to ensure their development.

In 1982, the 12th CPC National Congress identified energy, agriculture, transportation, education and scientific research as strategic priorities for economic development. In October 1984, the Third Plenum of the 12th CPC Central Committee enacted the *Decisions of the CPC Central Committee on Institutional Economic Reforms*. The *Decisions* defined China's socialist economy as a planned commodity economy based on public ownership and called for the common development of various forms of economy and greater business vitality. With a new understanding about economic systems, the Party stepped up economic reforms focused on cities. The 13th CPC National Congress in 1987 elaborated the theory of the primary stage of socialism and put forth the Party's basic line for the primary stage of socialism. In 1988, the *Constitution of the People's Republic of China* was revised to recognize the lawful status of the private sector of the economy. In the same year, the State Council decided to include 140 cities and counties into coastal economic development zones to broaden economic openness. In this period, China experienced vibrant industrial development, laying the groundwork for further development since the 1990s.

From the Third Plenum of the 11th CPC Central Committee in 1978 to the completion of the Seventh FYP in 1990, most of China's industrial sectors had undergone structural adjustment and technology upgrades, which led to rapid industrial development. In the three years following the Fifth FYP period (1976-1980), China focused on developing fuel, power and raw material industries. In the Sixth FYP period (1981-1985), China focused its resources on developing basic industries, establishing strategically important projects, and forming a few powerful industrial bases. In the Seventh FYP period (1986-1990), China shifted its development priority to the technological upgrades and renovation of existing enterprises on a path of endogenous expanded reproduction. During this period, China swiftly increased its manufacturing prowess through construction and renovation, resulting in sharp increases in gross industrial output and the output of primary industrial products, as shown in Table 1 and Table 4. Amid rising industrial output, light industries represented a growing share of the economy, up from 43.10% in 1978 to 47.15% in 1980 and 49.38% in 1990. Meanwhile, the share of heavy industries decreased sharply, as shown in Table 4. The implication is that the disequilibrium between light and heavy industries and the shortage of energy and raw materials was resolved during this period, and that China's industrial development entered a healthy track of stable development.

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有企业的体制机制发生较大变化，解决了国有企业经营机制不适应市场经济要求的问题。中央与地方财政关系方面，把地方财政包干制改为在合理划分中央与地方事权基础上的分税制，明确界定中央税、地方税和中央与地方共享税，形成中央税收和地方税收体系，推行以增值税为主体的流转税制度，极大地调动了地方发展工业的积极性。2001年中国加入世界贸易组织，抓住经济全球化和世界多极化发展机遇，全面融入国际产业分工体系，非公有制经济加快发展，外资、台资企业形成了一波涌入热潮。中国从容应对加入世界贸易组织的新变化，不失时机地推进改革开放，更紧密地融入世界产业分工体系，获得了更为广阔的经济发展空间。

为解决长期形成的结构性矛盾和粗放型增长问题，“八五”和“九五”计划期间继续推进了工业结构调整。这期间工业结构调整的突出特点，一是加强基础工业和基础设施建设，在内蒙古、山西、陕西以及东北地区续建和新建了一批大型煤矿，电力方面建设了一批水电、煤电、坑口电站和核电站，原材料中钢铁、有色、化工等产能增长较快，改造和扩建了一批铁路、汽车、造船、电力、石油等专用钢材和不锈钢生产线，利用基础设施建设的引致需求带动原煤、原油、电、钢、乙烯、化肥等主要工业产品产量大幅度增加。二是重视加工工业改造。用新技术、新工艺、新装备改造机械工业和轻工业，基础机械、基础零部件、基础工艺的技术改造，数控机床等重要基础机械以及液压、气动、密封、仪器仪表等重要机械基础件受到重视，发电和输变电、连轧连铸、矿山、乙烯、化肥等大型成套设备以及关键产品自主生产能力显著提升。机械、石油化工、汽车、电子、家电、纺织等产业生产能力快速增长，加工工业产品在国际市场上形成比较优势，出口大幅度增加。三是高技术产业快速成长。电子信息、生物工程、新材料、核能、航空、航天、海洋工程等高技术产业化取得明显进展。四是把发展电子工业放在突出位置。“八五”计划将大规模集成电路、微电子、计算机、光纤通信和程控交换设备、消费类电子产品确定为电子工业的发展重点。“九五”计划将集成电路、新型元器件、计算机和通信设备确定为电子工业的发展重点，大力推广电子信息技术和装备在国民经济行业的应用，用电子技术改造传统工业，并从投资分配、技术开发、设备更新、产业政策和组织管理等方面，为电子工业发展和推广应用创造条件。硬件和软件都得到发展，电子元器件、专用高精密设备和仪器、专用材料的研制和生产取得很大进步，在迎头赶上世界先进水平的目标上取得了积极进展。

（三）2002—2016年：积极探索新型工业化道路和成为世界第一工业大国

进入21世纪，中国经济总量增长较快，重工业占工业总产值的比重提高到60%以上，资源环境约束趋紧，先污染后治理的传统工业化道路难以为继，客观要求中国走出一条不同于发达国家的工业化道路。2002年，党的十六大提出走新型工业化道路。相对于传统工业化道路，新型工业化道路更加强调与信息化融合、提高科技含量和经济效率、保护资源环境和充分发挥人力资源优势。中共十六届三中全会通过的《中共中央关于完善社会主义市场经济体制若干问题的决定》要求加快工业改组改造和结构优化升级，积极推进对国有大型企业公司制股份制改革，大力发展个体、私营等非公有制经济，扩大利用外资规模，提高利用外资水平，引导外资更多投向高新技术、先进制造、节能环保、新能源等领域。2007年党的十七大提出“中国特色新型工业化道路”的命题，强调把经济增长动力转变到消费、投资、出口协调拉动和三次产业协同带动上，大力推进信息化与工业化融合，促进工业由大变强。2008年国际金融危机爆发后，中央密切关注危机的发展态势及其对中

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4.2 Further Adjustment in China's Industrial Structure from 1992 to 2001

Comrade Deng Xiaoping's important speeches during his tour in South China in 1992 and the 14th CPC National Congress unveiled a new chapter of China's economic reforms to establish a socialist market economic system. Reforms of ownership structure, state-owned enterprises and central-local fiscal relationship have been carried out on all fronts, contributing to the market-based economy, the private sector and industrial development. Regarding the ownership structure, China initially established an ownership structure with public ownership as the mainstay and the common development of a multi-ownership economy. In this period, China's export sector developed rapidly, and private enterprises, overseas-funded enterprises and enterprises with investments from Hong Kong, Macao and Taiwan became key exporters.

Large and medium-sized state-owned enterprises (SOEs) carried out corporatization and joint-stock pilot reforms and established a group of large corporate conglomerates. Small and medium-sized SOEs also made remarkable progress. Great changes occurred in the institutional mechanisms of SOEs to address the incompatibility between the operational mechanism of SOEs and the requirements of a market-based economy. Concerning the central-local fiscal relationship, the local fiscal responsibility system was reformed into the tax sharing system with a reasonable division of central and local fiscal powers. Central, local and shared taxes were clearly defined to form central and local tax systems. The implementation of a tax turnover system with VAT as the mainstay greatly motivated local governments to develop industries. Through its WTO entry in 2001, China seized the opportunities of economic globalization and the trend towards a multipolar world to integrate into the international division of labor system, which led to a booming private sector and an inrush of overseas-funded and Taiwan-funded enterprises. By responding to the WTO's new changes, China integrated more closely to the international division of labor system through reform and opening up, thus broadening the space of its economic development.

During the Eighth and Ninth FYP periods (1991-2000), China continued to restructure its industries to address structural contradictions and a crude pattern of growth. In this period, China's industrial restructuring had the following prominent features: First, China stepped up the development of basic industries and infrastructure. In Inner Mongolia, Shanxi, Shaanxi and the northeast, China built or rebuilt large coal mines, constructed hydropower stations, thermal power plants, pithead power plants and nuclear power stations. China ramped up the output of iron and steel, nonferrous metals and chemical sectors, renovated and expanded dedicated steel and stainless steel production lines for railways, automobiles, shipbuilding, electric power and petroleum. Infrastructure-incurred demand led to a spike in the output of major industrial goods such as raw coal, crude oil, electric power, steel, ethylene, and chemical fertilizers.

Second, China attached great importance to upgrading the processing industry. New technologies, processes and equipment were applied to upgrade machinery and light industries, giving priority to basic machinery such as CNC machine tools, as well as mechanical components such as hydraulic pressure, pneumatic tools, instruments and apparatuses. Those technological upgrades have led to significant improvements in the domestic supplies of large whole-set equipment and critical products for power generation, transmission and transformation, continuous casting and rolling, mining, ethylene and chemical fertilizers. China boosted production capabilities for machinery, petrochemical industry, automobiles, electronics, home appliances and textiles, developed comparative advantages for processing goods in the international market, and sharply increased exports.

Third, China's high-tech industries developed rapidly. Great progress was made in commercializing advanced technologies in information, bioengineering, new materials, nuclear energy, aviation, aerospace and maritime engineering sectors.

Fourth, prominence was given to the electronics industry. The Eighth Five-Year Plan (1991-1995) identified mass integrated circuits, microelectronics, computers, optical fiber communication, SPC

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表3 中国GDP、工业增加值及进出口占世界的比重（按现价美元计算，单位：%）

年份	工业增加值占世界工业增加值比重	GDP占世界GDP比重	出口占世界出口总额比重	进口占世界进口总额比重	工业制品出口占出口总额比重	工业制品进口占进口总额比重	人均GDP（美元）
1952					17.9	89.4	
1957					28.4	92	
1970	3.35	2.71	0.70	0.68	25.6	82.7	112
1977	3.10	2.15	0.69	0.63	38.5	76.1	183
1978	3.41	2.27	0.78	0.81	37.4	81.4	225
1990	2.47	1.71	1.27	1.01	74.42	84.53	335
2000	6.43	3.60	3.50	3.16	89.78	79.24	939
2002	7.85	4.23	4.50	4.07	91.23	83.31	1125
2010	16.32	9.19	8.40	7.48	94.82	68.93	445
2016	23.34	14.75	10.52	9.53	95.09	65.08	7944
2017	23.76	15.19	10.53	9.82	94.8	68.56	8663
2019	24.94	16.40	10.87	10.28	94.64	64.88	10004
2020							

注：1952—1978年工业制成品出口额以统计年鉴上的工矿产品出口额替代，工业制成品进口额以生产资料进口额的值替代。资料来源：人均GDP、各项指标占世界的比重根据联合国统计局数据计算，https://unstats.un.org/unsd/snaama/Downloads。其余根据对应年份《中国统计年鉴》计算。

国经济发展可能产生的风险与冲击，采取大规模增加政府投资、实行结构性减税、实施十个重点产业调整振兴规划等一揽子措施进行应对，保持了经济平稳较快发展态势。2012年党的十八大对中国特色新型工业化做出进一步的设计和部署，要求推动战略性新兴产业、先进制造业健康发展，加快传统产业转型升级，促进工业化、信息化、城镇化、农业现代化同步发展，实现工业发展由数量规模扩张向质量效益提升的转变。2015年，党的十八届五中全会明确提出以创新、协调、绿色、开放、共享为内容的新发展理念，规定了新时代中国发展的思路、方向和要求。

这期间工业化的突出特点是贯彻新发展理念，加快经济结构战略性调整，改造提升制造业，提高工业整体素质和国际竞争力。一是将国民经济和社会信息化置于优先位置，大力开发电子信息产品和新型元器件等的制造能力，大力推进先进集成电路、高性能计算机、大型系统软件、超高速网络系统、新一代移动通信装备和数字电视系统的产业化，大力推动大数据、云计算、物联网应用，信息化对工业化的带动作用显著增强。二是依托基础设施和重大工程振兴装备制造业，提高重大技术装备研发设计、核心元器件配套、加工制造和系统集成的整体水平，研制高速铁路、新型高效发电设备、超高压直流输变电设备以及大型冶金、化肥和石化成套设备，推动船舶、汽车、冶金建材、石化、轻纺等产业进行结构调整。三是培育战略性新兴产业，加快高技术产业从加工装配等低端环节向研发和先进制造等中高端环节攀升，生物、高端装备制造、新能源、新材料、新能源汽车等战略性新兴产业得到较快发展。四是实施西部大开发、全面振兴东北老工业基地、中部地区崛起等区域经济发展战略，先后在上海、天津、广西、北京、武汉等地推出一系列以综合配套改革为主题的试验区试点策略。

这些措施的实施使中国抓住了新一轮工业革命的机遇，国民经济和社会各领域的信息化水平有很大提

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exchanges, and consumer electronics. The Ninth FYP (1996-2010) identified integrated circuits, new components, and computer and communication devices as priorities for the electronics industry. In this period, China made great efforts to apply information technologies and equipment in economic sectors, upgraded traditional industries with electronics technology, and facilitated the electronics industry's development through investment allocation, R&D, equipment renewal, industrial policy, and organizational management. Progress was made in both hardware and software and the R&D and manufacturing of electronic components, dedicated high-precision equipment and instruments. With those achievement, China made a big step forward in catching up with internationally advanced levels.

4.3 Stage 3 (2002-2016): Exploring a Path of New-type Industrialization and Becoming the World's Largest Industrial Power

After the dawn of the 21st century, China has seen rapid growth in its economic aggregate with the share of heavy industries in gross industrial output exceeding 60%. Tightening resource and environmental constraints make the traditional industrialization path of pollution before treatment unsustainable and force China to blaze a new trail of industrial development. In 2002, the 16th CPC National Congress called for embarking on a new path of industrialization underpinned by ICT integration, higher technology and economic efficiency, the protection of natural resources and environment, and the promotion of human resources.

Adopted at the Third Plenum of the 16th CPC National Congress, the *Decisions of the CPC Central Committee on Matters Concerning the Improvement of Socialist Market Economic System* called for expediting industrial restructuring, advancing the joint-stock reform of large state-owned enterprises, vigorously developing the non-public sectors of economy such as individual and private businesses, and attracting more foreign investments in high-tech, advanced manufacturing, energy efficiency and environmental protection, and new energy sectors.

The 17th CPC National Congress held in 2007 put forth the concept of "new-type industrialization with Chinese characteristics," which called for a shift towards consumption, investment and export as new growth drivers and ICT-industry integration to bolster China's industrial strengths. After the global financial crisis erupted in 2008, the Chinese government closely followed the development of the crisis and the potential risks and shocks to China's economic development. It adopted a package of initiatives, including a hefty increase in government investment, structural tax cut and development of ten key industries, and maintained China's stable and rapid economic growth. In 2012, the 18th CPC National Congress further designed and planned the new-type industrialization with Chinese characteristics. Specifically, it laid emphasis on strategic emerging industries and advanced manufacturing, the transition and upgrade of traditional industries, the synchronous development of industrialization, ICT applications, urbanization and agricultural modernization, as well as a shift from quantitative expansion to qualitative improvement of industrial development. In 2015, the Fifth Plenum of the 18th CPC Central Committee adopted the new development concepts of innovative, balanced, green, open and shared development, mapping out China's development in the new era.

In this period, China adopted new development concepts, strategically adjusted economic structure, upgraded manufacturing sectors, and bolstered industrial performance and competitiveness. First, China strove to promote ICT applications in economic and social sectors. Specifically, priority was given to ICT manufacturing, integrated circuits, high-performance computers, large system software, ultra-high-speed network systems, new-generation mobile communication equipment, digital TV systems, and big data, cloud computing and the internet of things (IoT). Great progress was made in ICT applications in industrial sectors.

Second, China vigorously developed equipment manufacturing through the construction of infrastructure and major projects, enhanced R&D and design, critical components, processing, manufacturing, and system integration of key technical equipment. Great efforts were made to develop

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表4 中国主要工业产品产量指数（以1978年为100）

	1952	1958	1970	1977	1980	1990	2000	2010	2016	2020
钢	4.3	25.2	56.0	75.0	116.8	208.8	404.3	2005.1	2541.3	3350.4
原煤	10.7	43.7	57.3	89.0	100.3	174.8	161.5	523.5	551.9	631.1
原油	0.4	2.2	29.5	90.0	101.8	132.9	156.7	195.1	191.9	187.2
发电量	2.8	10.7	45.2	87.1	117.2	242.1	528.3	1639.6	2393.8	3031.6
化学纤维		1.1	35.5	66.7	158.2	581.2	2438.5	10857.3	17169.2	21526.7
汽车			58.5	84.1	149.1	344.7	1388.3	12250.4	18859.2	16985.2
水泥	4.4	14.3	39.5	85.3	122.4	321.4	915.1	2884.6	3694.5	3678.7
化肥	0.5	2.2	28.0	83.3	141.7	216.2	366.5	729.1	762.6	632.2
乙烯			4.0	79.6	128.8	413.4	1235.9	3737.4	4683.5	5679.7
发电设备	0.1	22.7	60.3	65.8	86.7	253.3	258.2	2662.3	2711.8	2733.8
布	34.7	58.6	83.0	92.0	122.1	171.2	251.1	725.3	822.1	417.3
集成电路			13.3		56.7	360.0	19600.0	217500.0	439316.7	871566.7

资料来源：对应年份《中国统计年鉴》和《中华人民共和国2020年国民经济和社会发展统计公报》。

高，工业企业应用计算机和互联网的能力显著增强。中国工业在规模扩张中加快了技术改造和技术升级，在先进制造、尖端制造和战略性新兴产业等领域建设了一批技术起点较高的项目，综合素质实现了新的飞跃，在一些领域成功实现由“跟跑者”向“并跑者”甚至“领跑者”的角色转变。中国已经建成世界门类最齐全的工业体系，成为唯一拥有联合国产业分类中41个大类、191个中类、525个小类的国家，在世界500多种主要工业产品中，中国有220多种工业产品的产量居全球第一。上述成就显著提高了中国工业国际竞争力，巩固了中国的工业大国地位，为中国由工业大国向工业强国转变增添了新动力。但是，长期存在的关键核心技术受制于人和国际分工地位不利等问题对工业强国建设的制约依然突出。

五、新时代的新目标：建设世界工业强国（2017–2035年）

党的十九大决定乘势而上开启全面建设社会主义现代化国家新征程，并作出分两个阶段实现第二个百年奋斗目标的战略部署。第一阶段是经过十五年的努力，到2035年基本实现社会主义现代化和新型工业化，人均国内生产总值达到中等发达国家水平。第二阶段是在此基础上，再经过十五年的努力，到本世纪中叶将中国建成社会主义现代化强国。2020年10月中共十九届五中全会通过的《中共中央关于制定国民经济和社会发展第十四个五年规划和二〇三五年远景目标的建议》提出，坚持创新在中国现代化建设全局中的核心地位，坚定不移建设制造强国、质量强国、网络强国、数字中国，推进产业基础高级化、产业链现代化，提高经济质量效益和核心竞争力。以上部署明确了中国工业化的历史方位以及实现新型工业化和建设世界工业强国这个新时代中国工业化的任务与目标。实现上述任务和目标不仅是量变过程，更重要的是实现质的跃升。如果能够有效应对各种制约和挑战，实现工业持续稳定协调发展，人均收入稳步提高，就能成功完成工业化、实现现代化，顺利进入高收入发达国家行列。如果不能有效应对各种制约和挑战，工业增长陷入停滞甚至衰退，人均收入就会长期滞留在中等收入水平。为如期完成基本实现新型工业化和建设世界工业强国的目标，为基

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high-speed railway, new-type efficient power generation equipment, ultra-high-voltage (UHV) DC power transmission equipment and large whole-set metallurgical, chemical fertilizer and petrochemical equipment. Structural adjustment was made in shipbuilding, automotive, metallurgy and building material, petrochemical and textiles sectors.

Third, China fostered strategic emerging industries (SEIs) and moved from low-end processing and assembly to more advanced R&D and manufacturing. With those efforts, China saw rapid development in SEIs, including biotechnology, high-end equipment manufacturing, new energy, new materials and new energy vehicles.

Fourth, China implemented regional economic development strategies, including the development of the western region, the rejuvenation of the northeast industrial base, and the rise of the central region, and carried out a succession of pilot strategies for integrated reforms in Shanghai, Tianjin, Guangxi, Beijing and Wuhan.

With the implementation of those measures, China has seized opportunities from a new industrial revolution to significantly boost the level of its ICT applications in various economic and social sectors and greatly enhanced computer and internet applications among industrial enterprises. Amid quantitative expansion, China has expedited technological upgrades and launched a group of high-tech projects in such sectors as advanced manufacturing, cutting-edge manufacturing and strategic emerging industries, achieved a new breakthrough in its overall industrial performance, and transformed from followers to leaders in some sectors. China has established the world's most complete industrial system as the only country with 525 subclasses in 191 groups and 41 categories of UN industrial classification. China ranks the first in the world for the output of over 220 types of industrial products out of over 500 types of major industrial products worldwide. These achievements have greatly increased China's industrial

Table 3: China's GDP, Industrial Value-Added and Imports and Exports as a Share of World Total (calculated by current-price US dollar, in %)

Year	Industrial value-added as a share of world industrial value-added	GDP as a share of world GDP	Export as a share of world total export volume	Import as a share of world total import volume	Export of industrial products as a share of total export	Import of industrial products as a share of total import	Per capita GDP (US dollar)
1952					17.9	89.4	
1957					28.4	92	
1970	3.35	2.71	0.70	0.68	25.6	82.7	112
1977	3.10	2.15	0.69	0.63	38.5	76.1	183
1978	3.41	2.27	0.78	0.81	37.4	81.4	225
1990	2.47	1.71	1.27	1.01	74.42	84.53	335
2000	6.43	3.60	3.50	3.16	89.78	79.24	939
2002	7.85	4.23	4.50	4.07	91.23	83.31	1,125
2010	16.32	9.19	8.40	7.48	94.82	68.93	445
2016	23.34	14.75	10.52	9.53	95.09	65.08	7,944
2017	23.76	15.19	10.53	9.82	94.8	68.56	8,663
2019	24.94	16.40	10.87	10.28	94.64	64.88	10,004
2020							

Note: Export volume of finished industrial goods from 1952 to 1978 is substituted by the export of industrial and mineral products, and the import of finished industrial goods is substituted with the import of the means of production. Source: GDP per capita and various indicators as a share of world total are calculated based on data from the United Nations Statistics Division downloaded from https://unstats.un.org/unsd/snaama/Downloads. Other data are calculated based on the China Statistical Yearbooks for various years.

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本实现现代化和建设社会主义现代化强国提供有力支撑，中国工业必须直面各种短板和挑战，全面贯彻新发展理念，以攻克核心技术、改善国际分工地位和提高绿色低碳发展能力为主攻方向，在继续做大总量的基础上，加快传统产业升级、新兴产业培育和先进制造业壮大，努力提高发展质量。

（一）大力推进创新驱动战略，开展核心技术攻关，走创新驱动的工业化道路

新阶段中国工业化之所以强调提高创新能力，是因为建设世界工业强国离不开科技创新的驱动。只有突破关键核心技术制约，才能实现工业的持续发展，并支撑中国迈入高收入经济体行列。正如习近平总书记所说，虽然中国经济总量跃居世界第二，但大而不强、臃肿虚胖体弱问题相当突出，主要体现在创新能力不强，这是中国这个经济大块头的“阿喀琉斯之踵”（习近平，2017）。中国工业创新发展，应当充分发挥中国工业体系完整、制造业规模世界第一和新型举国体制优势，发展壮大以研发、设计为基础的先进制造业，体系化提升制造业的自主创新能力。特别要响应世界科技进步步伐，加快攻克集成电路、数控机床、机器人、智能装备、数字技术、工业软件等领域核心技术，突破关键基础材料、核心基础零部件、先进基础工艺、产业技术基础等瓶颈，促进物联网、大数据、机器人等新技术在工业中的应用，实现战略性新兴产业和前沿技术产业的突破，占领未来产业竞争的制高点，实现技术自立自强。为此，必须提高科技创新政策的目标指向，加强国家战略需求的长期支持能力，加强对关键核心技术攻关组织的指导和支持，完善以政府为主导、各创新主体紧密联系和有效互动的社会系统，更多采取公共部门长期采购、激励商业化需求等方式促进关键核心技术的持续改进和提升，在关键核心技术市场创造者和促进者方面发挥更积极作用。

（二）积极应对国际产业分工新调整，改善国际分工地位，构建自主可控的产业链

在全球化和新一轮科技革命深化的推动下，发达经济体和新兴经济体普遍谋求发展制造业，西方发达国家也试图通过政府支持使制造业国际分工和竞争格局向有利于自己的方向变化。当前逆全球化和保护主义愈演愈烈，国际分工体系正在进行新的调整，研发、设计和先进制造环节的地位和附加值呈现提高趋势，工业仍然具有强大的按全球化方式组织生产的内在动力。中国作为世界第二大经济体和第一制造业大国，是国际产业分工体系不可或缺的重要组成部分。中国应积极响应国际产业分工新的调整，妥善应对全球产业链区域化趋势，构筑向研发、设计、先进制造等价值链高端攀升的内生动力，强化产业链薄弱环节，推动信息化、智能化、网络化等新一代科技与先进制造业融合发展，加强中小型制造企业数字化和智能化改造，促进中小企业与大企业之间的专业分工与融通发展，增强产业链黏性，进而提升在全球生产网络中的地位。政策方面，着力放宽市场准入，改善要素供给和协作配套条件，提高对美国等发达国家先进制造业资本、技术和人才的吸引力。在高端装备和核心零部件、生物制药和下一代半导体材料等尖端领域，通过形成研发、设计和制造紧密交织、相互依赖的专业化协作体系，积极参与全球产业分工和技术合作，提升国际竞争力。

（三）加快发展方式绿色转型，构建低碳工业体系，提高低碳发展能力

低碳发展成为全球普遍接受的理念，世界各国普遍积极推低碳发展。主要发达国家由于已经度过工业化

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Table 4: Output Indexes of China's Major Industrial Products (Benchmark: 100 for 1978)

	1952	1958	1970	1977	1980	1990	2000	2010	2016	2020
Steel	4.3	25.2	56.0	75.0	116.8	208.8	404.3	2005.1	2541.3	3350.4
Raw coal	10.7	43.7	57.3	89.0	100.3	174.8	161.5	523.5	551.9	631.1
Crude oil	0.4	2.2	29.5	90.0	101.8	132.9	156.7	195.1	191.9	187.2
Power consumption	2.8	10.7	45.2	87.1	117.2	242.1	528.3	1639.6	2393.8	3031.6
Chemical fibers		1.1	35.5	66.7	158.2	581.2	2438.5	10857.3	17169.2	21526.7
Automobiles			58.5	84.1	149.1	344.7	1388.3	12250.4	18859.2	16985.2
Cement	4.4	14.3	39.5	85.3	122.4	321.4	915.1	2884.6	3694.5	3678.7
Chemical fertilizers	0.5	2.2	28.0	83.3	141.7	216.2	366.5	729.1	762.6	632.2
Ethylene			4.0	79.6	128.8	413.4	1235.9	3737.4	4683.5	5679.7
Power generation equipment	0.1	22.7	60.3	65.8	86.7	253.3	258.2	2662.3	2711.8	2733.8
Cloth	34.7	58.6	83.0	92.0	122.1	171.2	251.1	725.3	822.1	417.3
Integrated circuits			13.3		56.7	360.0	19600.0	217500.0	439316.7	871566.7

Source: *China Statistical Yearbook* and the *Statistical Communique of the People's Republic of China for National Economic and Social Development in 2020* for relevant years.

competitiveness. Yet dependence on critical foreign technologies and an unfavorable position in the international division of labor stand in the way of China's quest to become a major industrial power.

5. New Goal for the New Era: Transition towards a World-Class Industrial Power (2017-2035)

The 19th CPC National Congress decided to embark upon a new journey of building a socialist modern country in an all-round manner and laid out a strategic plan to achieve two centenary goals in two stages. In the first stage, China will basically achieve socialist modernization and new-type industrialization and reach the level of moderately developed countries in terms of GDP per capita by 2035. In the second stage, China will spend another 15 years to turn itself into a strong socialist modern country by the middle of this century. Adopted at the 5th Plenum of the 19th CPC Central Committee in October 2020, the *Proposals for Formulating the 14th FYP (2021-2025) for National Economic and Social Development and the Long-Range Objectives Through the Year 2035* called for promoting the pivotal role of innovation in China's modernization drive, steadfastly developing China into a strong manufacturing nation with high quality and competitive ICT applications, and advancing industrial sophistication for greater economic efficiency and core competencies. These strategic arrangements have established the objectives and goals of China's industrialization in the new era. It takes not just quantitative change to achieve those tasks and targets. More importantly, we should realize qualitative improvement. China will complete industrialization and modernization and join the rank of high-income developed countries if it overcomes those constraints and challenges, develop its industries in a steady and coordinated manner, and continues to increases per capita income. If it fails to address those constraints and challenges, China risks a stagnation or recession of industrial growth with per capita income trapped at the middle-income level. In achieving new-type industrialization and developing into a major industrial power as part of its broader goal of building a strong socialist modern country, China's industrial development must face up to various weaknesses and challenges, follow new development concepts, and focus on tackling core technologies, improving its international division of labor and pursuing green and low-carbon development. It should upgrade traditional industries, foster emerging industries, and strengthen advanced manufacturing for better development quality and greater aggregate.

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集中推进期，工业碳排放在20世纪七八十年代基本达到峰值。中国由于工业化进程晚于发达国家，能源消费总量接近50亿吨标准煤且还在增长，煤炭消费量占能源消费总量的比重还处于较高水平，与之相关联的碳排放仍呈现增长趋势。由于工业经济规模大，中国资源能源消费和污染排放量多年处于高位，生态环境压力激增，是最大的能源消耗和二氧化碳排放部门。2018年，中国工业能源消费总量为31.1亿吨标准煤，占全国能源消费总量47.2亿吨的65.9%，能源生产和消费活动是碳排放的主要原因。2020年中国宣布二氧化碳排放力争于2030年前达到峰值，努力争取2060年前实现碳中和。中国碳达峰、碳中和目标的提出，不仅要求降低单位国内生产总值能耗和二氧化碳排放强度，而且要控制能源和资源消耗总量，严控高耗能、高污染行业扩张，减轻对资源环境的绝对依赖。这种发展的方向自觉性，要求在高度重视资源、环境约束以及社会公平等问题的基础上继续推进中国工业化（金碚，2019）。为此，中国应倡导绿色低碳发展理念，加快绿色低碳技术应用，提升绿色低碳发展能力，大力采用低碳技术和工艺装备，发展低碳产业，构建低碳工业体系，完善重点行业低碳发展政策，探索技术可行、经济可承受的低碳转型战略，走碳达峰及深度脱碳的绿色发展道路。

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5.1 Follow an Innovation-Driven Strategy and Develop Key Technologies to Support Industrial Development

China attaches great importance to innovation in its new stage of industrialization because no country can become a world-class industrial power without technology innovation. Only by acquiring critical technologies will China develop its industries on a sustainable basis and become a high-income economy. As General Secretary Xi Jinping mentioned, although China has become the second largest economy in the world, it lacks competitiveness and is weak despite its heft, as reflected in its weak innovation capacity, which happens to be the "Achilles' heel" of China as a large economy (Xi Jinping, 2017).

In pursuing industrial innovation and development, China should give full play to its strengths of a complete industrial system, the largest manufacturing output in the world, and new-type whole-country system, focusing on R&D, design and advanced manufacturing. In particular, China should follow international trends in science and technology, and achieve breakthroughs in core technologies in sectors like integrated circuits, CNC machine tools, robotics, smart equipment, digital technologies and industrial software. It should overcome challenges in developing critical materials, components, processes, and technologies. It should apply IoT, big data and robotics in industrial sectors, and strive for progress in strategic emerging industries and frontier technologies. With those efforts, China should seize the high ground for industrial competition, and achieve technological independence and self-reliance. To bring those goals into fruition, China must enhance results-oriented innovation policies, serve strategic national needs, and support research institutions in developing critical technologies. It should improve a government-led social system that links innovation entities. Through public procurement and incentives, the government should support R&D and create a market of critical technologies.

5.2 Improving China's Status in the International Division of Labor and Creating Independent and Self-Controlled Industrial Chains

Driven by globalization and a new round of technological revolution, both advanced and emerging economies are seeking to develop the manufacturing industry, and developed countries in the Western world are also trying to influence the manufacturing division of labor and competition in their favor. Amid rising anti-globalization and protectionist sentiments, new changes are taking place in the international division of labor. While the status and value addition of R&D, design and advanced manufacturing tend to increase, industries still have great endogenous momentum to organize production following the ways of globalization. As the world's second largest economy and the largest manufacturing country, China is an indispensable part of the international industrial division of labor system. It should follow the trends in the international division of labor and global value chain regionalization, and climb up the value chain ladder towards R&D, design, and advanced manufacturing. It should bolster weaknesses of its industrial chains, and apply new-generation ICT, smart and internet-based technologies in advanced manufacturing. Small and medium-sized manufacturing enterprises should apply digital and smart technologies and collaborate with large enterprises to increase industrial chain stickiness and raise their status in the global production network. Policymakers should relax market access, improve factor supply and facilitate industrial cooperation to attract advanced manufacturing capital, technologies and talents from developed countries. In cutting-edge industries such as high-end equipment and core components, biomedicine and next-generation semiconductor materials, China should cooperate with other countries for R&D, design and manufacturing and participate in the global industrial division of labor to sharpen its competitive edge.

5.3 Accelerate the Green Transition and Create a Low-Carbon Industrial System for Low-Carbon Development

Low-carbon development has become a commonly accepted concept globally and a commitment among countries. After experiencing a period of intensive industrialization, major developed countries

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have seen their industrial carbon emissions peak in the 1970s to 1980s. As a late-mover, China saw its total energy consumption approaching 5 billion tce and still rising with coal making up a sizeable share of its energy mix, causing carbon emissions to rise further. China's industrial economy has been the biggest energy consumer and CO_2 emitter over the years, giving rise to significant environmental pressures. In 2018, China's industrial energy consumption totaled 3.11 billion tce, or 65.9% of China's total energy consumption of 4.72 billion tce. China's carbon emissions can be primarily attributed to energy production and consumption. In 2020, China vowed to peak CO_2 emissions by 2030 and achieve carbon neutrality by 2016. Carbon peak and carbon neutrality not only require falling energy intensity and CO_2 emissions, but call for controlling energy and resource consumption, curbing energy-intensive and polluting industries, and reducing the absolute dependence on natural resources and the environment. With this awareness, China should strive to conserve resources, protect the environment, and safeguard social justice (Jin, 2019). Hence, China should apply green and low-carbon technologies, processes and equipment, develop low-carbon industries, formulate low-carbon policies for key sectors, explore technologically feasible and economically acceptable low-carbon transition strategies, and pursue a green development path of carbon peak and decarbonization. CE

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