China's Industrial Upgrading and Value Chain Restructuring Under the New Development Pattern

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Abstract: *Global industrial chains (GICs) have become a hallmark of the world economy underpinning the global production cycle. Since the reform and opening up was introduced in 1978, China has taken an active role in global value chains (GVCs) and become the world's factory floor. Under the external shocks to GICs, such as US trade frictions with China and the COVID-19 pandemic, China's traditional comparative advantages in manufacturing which include its labor force and costs are waning. This has manifested in a wave of industrial relocations from China to other countries as well as China's weakening international competitiveness. We took stock of the concepts and journey of GVCs and elaborated the intrinsic relationship between GVCs and the new development pattern of "dual circulations". We also analyzed the trends of GVCs, the current status and problems of China's industrial chains, and China's market heft, complete industrial chains and the digital economy as new strengths for industrial chain upgrade. In our conclusion, this paper put forth some policy recommendations for China's industrial chain upgrade in the context of dual circulations.*

Keywords: *industrial chains, industrial relocation, new development pattern, GVCs*
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1. Introduction

Global value chains (GVCs) are a natural trend of the global division of labor and a result of the global allocation of resources by multinational corporations. Historically, global supply chains centered around Europe and North America as manufacturing hubs before evolving into a global supply chain system with Europe, North America, Germany and Japan at the first echelon and the Four Asian Tigers at the second echelon. Since the dawn of the 21st century, China has climbed up the GVC ladder and replaced Japan as Asia's trade hub. The United States, China and Germany have become three regional hubs of the GICs system. After nearly three decades of development, GVCs are faced with multifaceted challenges under the superimposed effects of China-US trade frictions and the COVID-19 pandemic. The fragility of modern supply chains is particularly evident in the context of changes in the world today unseen over the past century and exacerbated by COVID-19. In the midst of the pandemic, supply chain

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新发展格局下中国产业链升级和价值链重构

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摘 要： 全球产业链已成为世界经济的典型特征，是全球生产循环的最本质内容。改革开放以来，中国积极主动地融入全球价值链，中国制造畅销全球，成为“世界工厂”。近年来，中美贸易摩擦、新冠疫情等外部冲击重塑全球产业链，我国制造业以劳动力总量和成本为核心的传统比较优势逐步弱化，产业链外迁和国际竞争力减弱的现象明显。本文系统梳理总结了全球价值链相关概念和发展历程，并阐述了全球价值链与“双循环”新发展格局的内在逻辑关系，分析了全球产业链发展趋势、中国产业链现状和问题及其产业链升级拥有的市场规模大、产业链完备以及数字经济新优势，在此基础上，提出了在双循环新发展格局下促进产业链升级的政策建议。

关键词： 产业链；产业转移；新发展格局；全球价值链

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一、引 言

形成全球价值链是全球分工的必然趋势，是跨国制造业企业在全球范围内优化资源配置的结果。从发展历程来看，全球供应链早期以欧美为制造中心，二战后逐步发展成为以欧美德日为第一梯队、“亚洲四小龙”为第二梯队的全球供应链体系。21 世纪以来，中国在全球价值链分工的地位显著提升，取代日本成为了亚洲贸易中心。美国、中国、德国成为全球供应链体系的三个区域中心。全球价值链在历经近30年的发展后，在中美经贸摩擦叠加新冠疫情的冲击下面临多重挑战。新冠肺炎疫情加速全球百年未有之大变局的演进，更凸显了现代供应链脆弱的一面。疫情对全球产业链中的某些产业带来了“断链”冲击，动摇了单纯从成本角度考虑所构建的集中度较高的全球化供应链体系，各国、各企业从安全、平稳、多元化等多个维度开始重新审视其供应链。

当前，全球生产布局重构加速，实现中国产业链升级，既是全球生产布局重构的被动需求，也是保障新

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disruptions for some industries upended the highly concentrated GICs system, prompting countries and firms to rethink their supply chains from the dimensions of security, stability and diversification.

Amid rapid restructuring of the global production network, China needs to upgrade its industrial chains to keep pace with changing GVC layouts while creating a new, high quality development pattern. In this context, the CPC Central Committee has made an important, science-based assessment and strategic choice to "create a new development pattern with domestic circulation as the mainstay and domestic and international circulations reinforcing each other".[1] Under the new development pattern, the coordination, efficiency and security of domestic and international value chains are China's top priority. Based on this analysis, this paper reviews relevant concepts and theories of GVCs, examines the trends of GVCs, and offers some policy recommendations on China's industrial competitiveness and industrial chain upgrade based on supply chain strengths in the context of the "dual circulations".

2. GVCs and the New Development Pattern

2.1 Concepts of Industrial, Supply and Value Chains

The idea of industrial chains originated from British classical economist Adam Smith's discussions on the division of labor. Early Western economists believed that industrial chains were primarily driven by internal activities within individual manufacturing companies. With the expansion of capitalist production, Alfred Marshall (1962), the founder of the neoclassical school of economics, extended the division of labor to one between firms, laying the foundation for the modern industrial chain theory (Marshall, 1962). Although the concept of industrial chains originates from Western neoclassical economic theories, Western academics have yet to systematically investigate industrial chains as an independent tier of economic organization (Zhang and Wu, 2011). Instead, they focus their researches on the manifestations of industrial chains (Shao and Li, 2007; Cheng, *et al.*, 2008).

Overall, two intrinsic characteristics can be found in the definitions of industrial, value and supply chains: (i) The division of labor in production. From the perspective of economics, the division of labor is an intrinsic attribute of industrial, value and supply chains. The idea of industrial chains stems from British classical economist Adam Smith's statement on the division of labor and its economic growth effects. Baldwin (2013) believed that the division of labor in production had undergone two critical rounds of unbundling, i.e. the first round of division of labor that started with the Industrial Revolution driven by steam engines and the second round of division of labor driven by progress in information and communication technologies (ICTs). Each division has led to a further geographical diffusion of production. (ii) Production cycle. Industrial, value and supply chains are manifestations of economic circulation on the supply side. Industrial chains, value chains or supply chains embody a chain or network structure of R&D design, processing and manufacturing, and marketing. They comprise a production cycle and are the manifestations of economic circulation on the supply side. When such production cycle is confined to a country or region, a domestic value chain is formed and constitutes the bulk of a domestic circulation. When it is extended to the international division of labor, an international value chain comes into existence and becomes the core of an international circulation. In this sense, a "dual circulations" development pattern is manifested as GVCs on the supply side.

Yet, differences exist in the definitions of industrial, value and supply chains. The first difference is between materials and value. Supply chains provide goods and services and reflect the supply, demand and distribution of materials. Supply chain management aims to match supply with demand at the lowest cost and with the highest efficiency. Value chains transmit the value embodied in products or services and reflect value creation and profit distribution. The second difference is between macro and

[1] Xi Jinping's speech at the meeting held on May 14th, 2020 by the Standing Committee of the Political Bureau of the CPC Central Committee, Source: https://baijiahao.baidu.com/s?id=1666662571284303629&wfr=spider&for=pc, accessed on June 30, 2021..

发展格局得以高质量实现的主动应对。在此背景下，党中央提出“构建国内国际双循环相互促进的新发展格局”[1]的重大科学判断和重要战略选择。在新发展格局下，国内国际价值链的协调、高效、安全发展是重中之重。鉴于此，本文系统总结梳理全球价值链的相关概念和理论，分析全球价值链的发展趋势，在“双循环”新发展格局背景下探讨如何以价值链优势稳定和提升我国产业竞争力，促进产业链升级。

二、全球价值链与新发展格局

（一）产业链、供应链和价值链的概念

产业链的思想最早起源于英国古典经济学家亚当·斯密有关分工的论述。早期的西方经济学家认为产业链主要是制造业企业内部的活动，随资本主义生产的扩大，新古典经济学派的代表人物马歇尔（1962）把分工扩展到企业与企业之间，强调了企业间分工的重要作用，这应该是现代产业链理论的真正来源。尽管产业链的思想源于西方古典经济理论，但长期以来西方学者并没有将产业链作为一个独立的经济组织层次来进行系统的研究（张伟和吴文元，2011），而是将研究的中心放在产业链的表现形式上（邵昶和李健，2007；程宏伟等，2008）。

总的来看，产业链、价值链和供应链的定义具有两个本质特点：①生产分工。从经济学角度来看，分工是产业链、价值链、供应链的本质。产业链的思想起源于英国古典经济学家亚当·斯密有关分工的论述，指出分工促进经济增长。Baldwin（2013）认为产品的生产分工经历了两次极为关键的“分拆”（Unbundling），即蒸汽革命带来动力革命的第一次大分工、信息和通信技术（ICT）进步带来信息革命的第二次大分工。每一次“分拆”都使产品生产的地理区域进一步扩散。②生产循环。产业链、价值链和供应链是经济循环在供给侧的具体体现。产业链、价值链或供应链都体现着研发设计、加工制造、市场营销等生产过程构成的链条或网状结构，其本身就构成了一种生产循环，同时也是整体经济循环在供给侧的具体体现。当这种生产循环仅局限于一国（地区）时，就形成国内价值链，构成国内大循环主要部分；当延展到国际分工时，就形成了国际价值链，成为国际大循环的核心部分。因此“双循环”新发展格局在供给侧方面的具体体现就是全球价值链。

但是，产业链、价值链和供应链等定义还是有一定区别的。①物质与价值的区分。供应链所传递的是产品与服务，是对物质供需和流通的考察；供应链管理追求链运作成本低、运行效率高以及有效对接供求；价值链所传递的则是寄托于产品或服务之内的价值，是对价值创造和利益分配的考察。②宏观与微观的区分。产业链是上下游企业之间原材料、技术、中间产品和服务相互交换的供需关系。供应链的连接是产业链生产的基础，产业链是多种供应链的综合体。供应链更侧重微观企业的管理和决策，而产业链和价值链相对宏观，政府管理部门更多地从产业链、价值链的视角管理和决策。同时，产业链是价值链的物质基础，是价值实现和增值的载体。价值链是从产业链各环节所实现的价值增值角度进行考察，反映产业链各环节的价值增值情况。一旦企业供应链在全球布局，就形成了全球供应链，进而就出现了全球产业链、全球

[1] 资料来源：习近平主席在2020年5月14日中央政治局常委会的讲话，https://baijiahao.baidu.com/s?id=1666662571284303629&wfr=spider&for=pc，访问日期：2021年6月30日。

micro dimensions. Industrial chains form the supply and demand relationship for the exchanges of raw materials, technologies, intermediate inputs and services between upstream and downstream enterprises. Supply chain links are the foundation for industrial chain production, and industrial chains integrate various sorts of supply chains. While supply chains have more to do with the management and decision-making at the firm level, government authorities make policies based on broader considerations of industrial and value chains. Moreover, industrial chains are the material basis of value chains and the vehicle for value realization as well as value addition. Value chains reflect value addition in each stage of an industrial chain. A corporate supply chain, once deployed on a global scale, becomes a global supply chain as the basis for the emergence of global industrial and value chains.

2.2 Necessity of the New Development Pattern: From a GVC Perspective

The past three decades have seen great transformations in the nature of international trade. Technological, institutional and political developments have enabled the global distribution of increasingly fragmented and scattered production processes. Countries specialize in various production processes and intermediate inputs, such as parts and components, under a global production network. This has prompted increased trade in intermediate inputs within a country or among nations, which accounts for close to 2/3 of global trade. Instances of trade in intermediate inputs are common in our economic life. Xing and Detert (2010) discovered from an anatomy of iPhone's value chain that value addition from assembly and processing in China accounted for less than 3.60 US dollars (3.60%) from each 100 US dollars' worth of an iPhone while the majority share of value addition was captured by Germany, Japan and the US. Such GVC division of labor is evident from high-tech products such as aircrafts, automobiles and iPods (Linden *et al.*, 2009) to consumer necessities, Barbie dolls (Tempest, 1996) and sneakers.

These studies have been followed by improvements in the measurement of GVCs at the macro and micro levels. Having been widely applied in the trade sector, GVC theories and methods have been placed at the forefront of international trade research, about one third of the latest papers on international trade are related to GVCs (Inomata, 2017). Some scholars referred to the GVC theory as the New-New-New trade theory. Some scholars argued that even if GVCs are not synonymous to international trade, they are typical manifestations of international trade (Park *et al.*, 2013).

New developments in the global division of labor and international trade have led to the emergence of new theories and research methodologies for international trade (GVC accounting), which call for new development strategies.

Firstly, GVCs are a supply-side manifestation of domestic and international dual circulations. The mutual reinforcement between domestic and international circulations is reflected in the coordination, efficiency and security of domestic and international value chain operations. Featuring a chain or network structure comprising global R&D, manufacturing and marketing, GVCs consist of coordinated and efficient interactions between domestic and international value chains.

Secondly, GVC management concepts embody the new development pattern of "dual circulations" and its underlying concepts. The new development pattern of "dual circulations" marks a furtherance of the new development concept. In establishing a new development pattern, the key is to make concerted progress in innovative, balanced, green, open and shared development as aspects of the new development concept. As an integrated set of management philosophies and methodologies, the GVCs management strategy is underpinned by the core concepts of integration, cooperation, coordination and shared benefits. The supply chain management system encompasses product R&D and design, manufacturing and processing, transportation, distribution, and sales with the participation of various stakeholders, including manufacturers, suppliers, warehouse operators, distribution centers, and distributors. All those links are correlated with each other, and any missing step could cripple an entire supply chain. This is why GVCs management requires consolidation, cooperation and coordination for shared benefits, which

价值链。

（二）新发展格局的必要性：全球价值链视角

近30年来，国际贸易的本质发生了巨大变化，技术、制度和政治发展使得生产过程在全球布局，生产过程日益碎片化和分散化。各国积极参与全球生产网络体系，各自从事生产过程中某一具体环节，通过进口大量零部件等中间品进行全球生产，导致了全球乃至一国之内的大量中间品贸易。据统计，全球贸易中近2/3属于中间品贸易。具体案例在我们生活中司空见惯，如Xing 和 Detert（2010）对iPhone价值链的“麻雀式”的解剖分析发现：100美元的iPhone，中国提供中间环节的组装和加工而获取的增加值不到3.60美元（3.60%），其余的增加值基本被德国、日本、美国等国家俘获。从高技术产品的波音飞机、汽车、iPod（Linden等， 2009）到日常用品和玩具芭比娃娃（Tempest，1996）、新兴的平衡跑鞋等产品，我们都能看到这种全球价值链分工现象。

随之，在宏观和微观层面对全球价值链的测度方法日益完善，全球价值链理论和方法在贸易领域的推广，现已成为国际贸易研究领域的最新前沿和热点，国际贸易将近1/3的最新论文都是与全球价值链相关的，甚至有学者称全球价值链贸易理论为“新新新贸易理论” （Inomata，2017）。甚至有专家认为，即使全球价值链不是国际贸易的同名词，那也是国际贸易的典型代表（Park等，2013）。

全球生产分工和国际贸易的新发展，促进了国际贸易的新理论和方法（全球价值链核算）的产生，同时也要求新的发展战略布局与之相适应。

首先，全球产业链是双循环在供给侧的集中体现，国内国际双循环互相促进主要体现国内价值链和国际价值链的协调高效安全的循环和运转。全球价值链是由在全球范围的研发设计、加工制造、市场营销等生产过程构成的链条或网状结构，其本身就构成了一种生产循环，包含国际价值链和国内价值链的协调高效运转和循环。

其次，全球价值链管理理念是双循环新发展理念的具体体现。双循环新发展格局是新发展理念的深化和提升。加快构建新发展格局，关键是要做到对新发展理念中的创新发展、协调发展、绿色发展、开放发展、共享发展的一体把握、协同推进。而全球价值链管理是一种集成的管理思想和方法，全球价值链管理战略的核心理念是整合、合作、协调、共享。整个供应链管理系统包括制造商、供应商、仓库，配送中心和渠道商等一起进行的产品研发设计、制造加工、运输、分销以及销售的管理过程，整个管理过程中环环相扣，中间缺少了任何一个步骤都会造成整个供应链的停滞状态，因此全球价值链管理需要整合、合作和协调，最终实现利益共享，这些理念正是新发展理念的体现。

最后，促进产业向价值链高端攀升，摆脱低端锁定和增强产业竞争力，必须构建以国内大循环为主的新发展格局。改革开放以来，中国以大力发展加工贸易的形式参与到国际大循环中，出口导向型的经济增长模式使中国取得了巨大的经济成就。在此过程中，一方面，中国产业体系不断完善，已经成长为全球工业门类最齐全的国家，包含联合国所有工业门类；另一方面，中国产业尽管有大幅度的升级，但在深度参与全球价值链的过程中，处于低附加值环节，产业竞争力与发达国家相比还有很大差距。正因为中国产业链锁定在全球价

coincide with the new development concept.

In fostering a new development pattern, China must rely on domestic circulation as the mainstay if it is to climb up the value ladder, escape low-end lock-up, and enhance industrial competitiveness. Since reform and opening up was launched in 1978, China has taken an active part in the international circulation by vigorously developing processing trade, and made great economic achievements under an export-oriented economic growth model. In this process, China has continuously improved its industrial system and become a country with the most complete industrial sectors in the world, which includes all industrial sectors under the United Nations classification. Despite significant upgrades, China's industries remain at the mid- and low-end processes of the industrial chain and are vulnerable to trade restrictions by developed countries, which pose grave problems to China's supply chain security. Sanctions against Chinese companies like ZTE and Huawei have revealed that China cannot rely on foreign countries for critical technologies. With its massive domestic market, China should create a new development pattern with domestic circulation as the mainstay, promote demand-driven indigenous innovation, develop critical technologies, and climb up the value ladder.

3. Directions and Trends of GVCs Restructuring

The distribution of GVCs has always been subject to various factors with dynamic adjustment. So long as the economies of scale and comparative advantages exist, the COVID-19 pandemic will not reverse the regionalization of GVCs. In fact, this process has been accelerated by the political factor of a changing international order, the economic factor of market and technological changes and the security concerns of industrial chains.

3.1 Access to Economies of Scale and Comparative Advantages as the Base

The economies of scale and comparative advantages determine the continuation and deepening of cross-border division of labor. In different stages of development across countries, cross-border production will continue to contribute to the economies of scale and comparative advantages amid a changing international order, the digital economy, and the Fourth Industrial Revolution.

A changing international order affects the system of the intra-product division of labor but cannot shake the foundation of intra-product division of labor. By transforming the way production is organized, technology progress lays the foundation for the intra-product division of labor. With technology progress, geographically dispersed production generates sufficient economies of scale and comparative advantages. Since the second "unbundling" of globalization, the trends toward cross-border and fragmented production will not reverse with a changing international order. Led by the US with the participation of Canada and Mexico, a North America regional production network took shape as early as before the end of the Cold War. With the sophistication of information and communication technologies (ICTs) and the end of the Cold War, the United States dominated a liberal international order, and East Asia began to participate in the global production network, which marks a regional dispersion of intra-product division of labor. Amid a changing international order, the only change is the system of intra-product division of labor rather than the reality of intra-product cross-border division of labor. Intra-product division of labor refers to the designation of participants in specific links of the division of labor at various geographical locations. The division of labor system stays in a state of dynamic adjustment.

Technology revolution will further deepen the intra-product division of labor and reduce the cost of transaction within and between production processes. The impact of technology revolution on the intra-product cross-border division of labor is investigated with the digital economy as an example. The digital economy has further reduced the cost of transaction between production processes. The digital economy comprises digital industrialization and industrial digitalization. While the former is new demand created by new supply and drives economic growth, the latter is focused on transforming

值链的中低端环节，所以更易受到发达国家的限制，产业链安全问题严重。中兴事件、华为被制裁等都充分说明了关键“卡脖子”环节一味依赖国外是不可行的。中国有超大规模的国内市场，构建以国内大循环为主的新发展格局，有利于实现需求拉动的自主创新，从而攻克关键技术，实现中国产业向价值高端环节攀升。

三、全球产业链重构方向和发展趋势

全球产业链的重构并不是一个新鲜事物，全球产业链的布局一直受各种因素的影响，且处于动态调整之中。规模经济和比较优势仍然存在，疫情冲击不会改变全球产业链向区域化调整的大趋势。国际秩序转变的政治因素，市场、技术变革带来的经济因素，以及产业链的安全顾虑只是加速了这一进程。

（一）以获取规模经济和比较优势为基础并未动摇

规模经济和比较优势是生产跨境分工能否持续和深化的决定因素。无论是国际秩序转变，还是数字经济，亦或是第四次工业革命到来，在世界各国发展阶段不一的情景下，跨境生产仍会使规模经济和比较优势发挥作用。

国际秩序的转变无法动摇产品内分工的基础，其影响的是产品内分工的体系。产品内分工的基础来自技术进步对生产组织方式的影响，即技术进步是否能够支撑其生产在地理上的分离，从而获得规模经济和比较优势的好处。自全球化的第二次“分拆”以来，生产的跨境碎片化从不因国际秩序的转变而发生逆转。早在冷战结束之前，以美国主导，加拿大和墨西哥深度参与的北美区域生产格局就已出现。随着ICT技术的进一步成熟和冷战结束后由美国霸权主导自由主义国际秩序，东亚参与到全球生产网络之中，而这只是产品内分工的区域扩散。因此，国际秩序的转变，所改变的仅仅是产品内分工体系，而不是产品内跨境分工的事实。产品内分工体系是指分工的参与者是谁、参与者承担的环节，以及地理区位等问题。分工体系一直处于动态调整中。

技术革命会进一步深化产品内分工，降低生产环节的生产成本和生产环节之间的交易成本。以数字经济为例，分析技术革命对产品内生产跨境分工的影响，数字经济进一步降低生产环节之间的交易成本。数字经济可分为数字产业化和产业数字化，前者是新供给创造出来的新需求，是新的经济增长点；而后者则侧重于改变生产组织的形式，可能影响生产全球化的进程。具体而言，就生产组织而言，数字化平台因提供了充分的需求和供给信息，将传统以企业为中心的生产模式转变为以产品为中心。[2]数字化生产之于全球生产而言，其可能使产品的生产进一步突破企业的边界，使产品内分工更为细化，但是其本质是进一步降低生产的交易成本和提高生产效率，与稍早的信息和通信技术（ICT）革命对全球化的影响相似，仅是程度问题。

第四次工业革命并不影响规模经济和比较优势在产品生产中发挥作用，而这两个因素是产品内分工跨境的动力。第四次工业革命是以人工智能、新材料技术、分子工程、石墨烯、虚拟现实、量子信息技术、可控核聚变、清洁能源以及生物技术为技术突破口的工业革命，其实质和特征是提高资源生产率、减少污染排放、改

[2] 资料来源：https://www.iyiou.com/analysis/202011251011636，访问日期：2021年6月30日。

the way production is organized.[2] Digital production further extends production beyond the boundary of firms and further refines the intra-product division of labor. However, digital production is essentially a means for lowering the cost of transaction and raising the efficiency of production. In this sense, digital production has similar effects on globalization compared with earlier information and communication technologies (ICTs), and the only difference lies in the magnitude of impact.

In the Fourth Industrial Revolution, the economies of scale and comparative advantages in production continue to drive the intra-product cross-border division of labor. The Fourth Industrial Revolution is an industrial revolution spearheaded by artificial intelligence (AI), new materials, molecular engineering, graphene, virtual reality, quantum information technology, controlled nuclear fusion, clean energy, and biotechnology. This new round of industrial revolution is characterized by higher productivity, less pollution, changing ways of life, and flexibility and adaptability.[3] The Fourth Industrial Revolution will vastly enhance productivity and transform the way production is organized. South Korea, Singapore, Germany, Japan and Denmark boast the highest levels of automation in the world, and fully participate in GVCs with relatively low cost of labor and high productivity.

3.2 Regionalization and Localization of GICs

Since the cross-border intra-product division of labor will not change, the question of GVCs restructuring becomes one that relates to the cross-border distribution or choice of location. The choice of production sites is subject to exogenous factors such as the international order and market, and the COVID-19 challenges to supply chain security are new factors of influence.

A changing international order is shaping the regional layout of GICs. In its major-power competition with China, the United States sought to decouple from China's industrial chains, thereby suppressing China's development through GVCs disruptions. The United States launched an attack against China in the high-tech sector, and on March 23, 2018, then US President Donald Trump placed tariffs on imports from China's aviation and aerospace, information and communications technology, and machinery sectors based on the results of a Section 301 investigation. Further restrictions were imposed against global investments from Chinese high-tech firms, targeting at China's high-tech exports. The United States also launched attacks on China's high-tech industrial chains. In March 2016 and April 2018, the United States issued injunctions prohibiting US high-tech firms from supplying components, software, equipment and other technological products to ZTE, a Chinese telecom manufacturer. These attacks not only stifled ZTE but weakened China's telecom industry chain. Since then, the United States has also put Huawei, a telecommunications equipment company, on its trade blacklist, prohibiting global suppliers with US technology from shipping goods to Huawei. As a result, Huawei's 5nm Kirin chip production came to a halt. Meanwhile, the US lobbied its trade partners to ban Huawei gear, forcing them to comply. The US attacks on China's high-tech sector will drive China to innovate and seek alternative suppliers from the high-tech industry chain.

Security considerations will lead to industrial chain regionalization and diversification. In many parts of the world, the COVID-19 pandemic has halted production and impeded imports, setting the scene for industrial chain disruptions. Some countries have ceased to completely rely on cross-border production to protect their industrial chain security. For instance, the Japanese government considered relocating enterprises back to Japan to form independent and secure value chains under its control. Soon after the eruption of the COVID-19 pandemic, China provided medical supplies to countries around the world. Recognizing the health industry's importance to national security, then US President Donald Trump decided to relocate the health industry back to the US with the expectation to form an independent health industry. Yet history tells us that in the era of globalization, it appears unfeasible

[2] Source: https://www.iyiou.com/analysis/202011251011636, accessed on June 30, 2021..

[3] From Baidu encyclopedia: https://baike.baidu.com/item/%E7%AC%AC%E5%9B%9B%E6%AC%A1%E5%B7%A5%E4%B8%9A%E9%9D%A9%E5%91%BD/2983084?fr=aladdin, accessed on June 30, 2021..

变生活方式、灵活易变。[3] 提高生产效率和改变生产的组织形式是第四次革命要实现的，但其作用与第二次工业革命（电气革命）对产品内生产分工跨境的影响相类似。韩国、新加坡、德国、日本、丹麦是世界上自动化程度最高的国家，生产效率提高导致人力成本很低，但是其仍然充分参与到全球产业链之中。

（二）全球产业链向区域化和本土化方向发展

在理解产品内分工跨境的现象不会改变之后，全球产业链的重构所涉及的问题就变成生产环节跨境布局问题或者区位选择问题。生产环节区位选择受外生因素的影响，国际秩序、市场是传统的影响因素，而疫情带来的产业链安全问题是新的影响因素。

国际秩序的转变塑造全球产业链的区域格局。中美大国竞争格局对全球产业链的直接影响是美国寻求与中国在产业链上的“脱钩”，抑制中国的发展。美国在高科技领域对中国进行打压，2018年3月23日的美国总统特朗普以“301调查”的结果为依据对中国的航空航天、信息和通信技术、机械等行业的进口商品大规模加征关税，并限制中国高科技企业在全球投资，精准打击中国的高科技产品出口。此外，美国还悍然发动对中国高科技产业链的打击。中兴事件让人印象深刻，2016年3月和2018年4月，美国两次发布禁令，禁止美国的高科技企业向中兴供应元器件、软件、设备等技术产品，打击的不仅是中兴通讯，而是整个中国通信产业链。在此之后，美国也对华为进行打击，禁止使用美国技术的全球供应商向华为供货，这使麒麟5纳米芯片生产完全停止。同时，在全球范围内游说各国不使用华为通信产品，许多国家遵从美国而禁用华为，这是明显的站队行为。美国对中国高科技产业链的打击，在迫使中国自主创新的同时，也使得中国在高科技产业链上寻求替代供应商。

安全考量将使产业链周边化和多元化。疫情在一定程度上扰乱了生产秩序并阻碍了进口，这是产业链中断的客观背景。一些国家为了使产业链能够完整运转，其产品不再完全依赖跨境生产。如日本在疫情期间汽车产业受到较大影响，基于安全考虑，日本政府计划将企业回迁日本，欲形成“自主可控”的价值链。另外，当疫情在全球暴发之时，中国卫生医疗产品供给全球，美国认为卫生医疗产业链受制于人危害国家安全，决心在未来将医疗产业链搬回美国，维护产业链安全，以期形成自主可控的产业链。但是从历史事件中，我们可以看到，在全球化时代，产业链迁回本国而获得自主可控的道路似乎不太可行。福岛核事故引发全球高科技产业链的供应链危机后，供应链安全顾虑并未导致欧美高科技企业大面积将供应链多元化，日本仍旧是全球高技术零部件的重要供应基地，在对效率与安全的权衡中，效率占据上风。

周边化和多元化是兼顾效率与安全的折中办法。将产业链完全迁回本国几乎不可行，对于大国来说，其工业体系比较完备，如中国、美国，有形成“自主可控”产业链所需的工业门类基础，但是这将违背规模经济和比较优势，产品内分工之所以能在全球铺开，其依靠的正是不同国家在生产环节上的比较优势。对于小国来说，一方面，因其工业体系不健全，少有国家具有形成完备产业链的能力；另一方面，发展中国家正是凭借出

[3] 来自于百度百科
https://baike.baidu.com/item/%E7%AC%AC%E5%9B%9B%E6%AC%A1%E5%B7%A5%E4%B8%9A%E9%9D%A9%E5%91%BD/2983084?fr=aladdin，访问日期：2021年6月30日。

for countries to move entire industrial chains back to their home soil for security considerations. The Fukushima nuclear accident led to a temporary crisis of global high-tech supply chains. However, Japan remains an important source for the supply of high-tech components globally, and security concerns did not lead high-tech firms from the US and Europe to diversify away from Japan on a mass scale. In a delicate balance between efficiency and security, efficiency gained the upper hand.

Regionalization and diversification are a compromise between efficiency and security. It is all but impractical for countries to move entire industrial chains back to their home turf. Large countries like China and the United States possess relatively complete industrial chains. Yet it goes against the principles of economies of scale and comparative advantage for them to build complete supply chains in their home soil. The very basis for global intra-product division of labor is the comparative advantages of countries for different production processes. On one hand, small countries with incomplete industrial systems are unlikely to forge complete industrial chains on their own. On the other hand, developing countries have managed to grow their economies based on factor cost advantage before completing industrialization. No matter for developed or developing countries, the creation of independent industrial chains is faced with a trade-off between cost imposition and industrial chain independence. It is inadvisable for developing countries to cope with rare and temporary supply chain crises at the expense of economic development. While leading nations seek to regionalize and diversify their supply chains, smaller countries continue to participate in industrial chain systems dominated by major countries.

With China's new comparative advantages of market heft and complete industrial sectors forged closer industrial chains in East Asia, and the COVID-19 pandemic has sped up the relocation of industrial chains to Asia. Market is a critical driver of industrial agglomeration. China has become a center of global industrial and supply chains partly because of its market opportunities for Asian countries. Since reform and opening up, China's economic strengths and external demand have been increased. Meanwhile, advanced economies have seen their domestic demand stagnate since the 1980s, especially after the global financial crisis of 2008, and supply chains started to concentrate in emerging markets. As can be seen from data in Table 1, major Asian economies (from economic rather than geographical perspective) exported more to China, Japan and South Korea combined than they did to the United States in 2019. While exports from Vietnam, Indonesia, Malaysia and Thailand to China, Japan and South Korea combined accounted for 0.308, 0.305, 0.242 and 0.239 of their total exports, respectively, exports from the same countries to the United States accounted for 0.232, 0.106, 0.097 and 0.127 of their total exports China and the United States accounted for similar shares of exports from Japan and Thailand. South Korea, Indonesia and Malaysia exported significantly more to China than to the US. Vietnam exported much less to China than to the United States. The external markets of these Asian countries are in East Asia. China's comparative advantage in the manufacturing sector has evolved from low labor cost to a complete industrial system based on in-depth GVCs participation. With

Table 1: Exports of Major Asian Economies to China, the US and China, Japan and South Korea Combined as a Share of Their Total Exports in 2019

Exporting countries	China	US	China, Japan and S. Korea
Japan	0.191	0.199	—
South Korea	0.251	0.136	—
Vietnam	0.157	0.232	0.308
Indonesia	0.167	0.106	0.305
Malaysia	0.142	0.097	0.242
Thailand	0.120	0.127	0.239

Note: Compiled by authors of this paper according to the UN Comtrade database (https://comtrade.un.org/data/).

口导向发展策略，发挥要素成本优势才得以在没有实现工业化的前提下获得经济发展。构建自主可控的产业链，无论是在发达国家还是在发展中国家都面临着对“成本强加”与产业链自主的权衡。并且，发展中国家相比发达国家所需成本更加高昂，牺牲经济发展为全力应对罕见的供应链危机的做法在一定程度上是不可取的。未来的发展趋势将是大国在关键行业寻求区域化、多元化，小国继续参与大国主导的产业链体系。

中国超大规模的市场和工业门类齐全的新比较优势使东亚产业链更为紧密，疫情使全球产业链加速向东亚转移。市场是产业链聚集的关键因素。中国之所以成为全球产业链、供应链中心，一方面，东亚各国的市场在中国。中国在改革开放之后经济实力增强，需求增加。与此同时，发达国家自20世纪80年代以来需求停滞，特别是2008年金融危机之后，需求进一步下降，供应链向新兴市场聚集。从表1的数据可以看到，2019年东亚主要国家对中日韩出口均高于对美国的出口，越南、印度尼西亚、马来西亚、泰国对中日韩的出口占本国出口的比重分别为0.308、0.305、0.242和0.239，而对美国出口占本国出口的比重分别为0.232、0.106、0.097和0.127；主要国家对中国和美国的出口中，日本和泰国对中美的出口基本相当，韩国、印度尼西亚、马来西亚等国对中国出口要明显高于对美国的出口，越南对中国的出口明显低于对美国的出口。由此可见，东亚国家的外部市场在东亚，并且主要在中国。另一方面，中国在制造领域的比较优势已经由过去的廉价劳动力成本优势，转化为因深度参与全球价值链而形成具备全产业门类的新比较优势。东亚在疫情期间，疫情控制良好，在世界三大生产网络中率先复苏，结合中国庞大的市场规模和制造能力，东亚区域价值链的联系将会进一步加强。东亚区域产业链供应链的良好运转也将吸引区域外的投资流入，从而壮大东亚区域价值链，使产业链向区域外延伸，东亚制造供应全球的局面有可能出现，全球产业链加快向东亚转移。

全球产业链的区域化、周边化和多元化是国际秩序、市场规模、安全与效率等多方面权衡的结果。在产业链的区位转移方面，全球产业链、供应链向东亚区域加速转移是可预见的。

（三）数字经济塑造全球经济的新格局

当前全球制造业正在加快迈向智能化时代，人工智能技术对制造业竞争力的影响越来越大，将使制造业发生深刻变革。世界主要国家纷纷围绕核心技术、顶尖人才、标准规范等强化部署，力图在新一轮国际科技和产业博弈中掌握主动权。数字化和信息化是制造业及其产业链条智能化发展的重中之重。

根据中国信息通信研究院（2021）的《全球数字经济白皮书——疫情冲击下的复苏新曙光》的数据，2020

表1 2019年东亚主要国家对中国、美国和中日韩的出口占本国出口的比重

出口国	中国	美国	中日韩
日本	0.191	0.199	—
韩国	0.251	0.136	—
越南	0.157	0.232	0.308
印度尼西亚	0.167	0.106	0.305
马来西亚	0.142	0.097	0.242
泰国	0.120	0.127	0.239

注：根据联合国商品贸易数据库（https://comtrade.un.org/data/）整理。

laudable efforts in containing the COVID-19 pandemic, East Asia took the lead among the three global manufacturing networks to recover. Given China's large market and manufacturing prowess, East Asia's regional value chain connections will further strengthen. Well-functioning industrial and supply chains in East Asia will attract external investments that further boost East Asia's regional value chains and extend industrial chains outside the region. In this manner, East Asia will enhance its position as a global manufacturing hub and serve as a destination for an accelerating relocation of global industrial chains.

The regionalization and diversification of global industrial chains stem from the joint effects of international order, market size, security and efficiency. Foreseeably, global industrial chains and supply chains will relocate to East Asia at an accelerating pace.

3.3 New Pattern of the Global Economy Shaped by the Digital Economy

In the era of artificial intelligence (AI), the manufacturing industry is increasingly influenced by the transformative forces of AI. Focusing on core technologies, talents and standardization, leading nations are preparing to spearhead a new round of international technological and industrial competition. Digitalization and ICT applications are identified as top priorities for the smart development of the manufacturing industry and its industrial chains.

According to the *White Paper on the Global Digital Economy: New Dawn of Recovery under the COVID-19 Pandemic(2021),* published by the China Academy of Information and Communications Technology (CAICT), in the year 2020, the global digital economy reached an aggregate output of 32.6 trillion US dollars, accounting for 43.7% of global GDP aggregate, and the digital economy generated a value addition worth 24.4 trillion US dollars. China's digital economy stood at 5.4 trillion US dollars, trailing only to the United States. Despite the widening gaps, it should be noted that China has made great achievements in the digital economy sector, which has breathed tremendous new momentum into China's economic development.

By gathering global participants, digital platforms increase the efficiency of cross-border search and coordination and allow small businesses to participate. By aggregating mass options, the e-commerce market increases the transparency of pricing and comparison and achieves cross-border flow of goods on a mass scale. The transfer of global business costs and risks and the rising importance of knowledge and intangible assets have increased the risks for fostering digital capabilities and labor skills. Production automation has reduced the value of labor cost arbitrage and made it possible for decisions to be made geographically close to customers. Firms may derive significant efficiency from new technologies of production and logistics, but they require end-to-end integration to unleash full potentials. In this manner, the digital economy is influencing the pattern of the global division of labor in all respects. According to the *2018 World Trade Report* by the World Trade Organization (WTO) (2018), over half of global trade in services and over 12% of cross-border trade in goods have achieved digitalization. The WTO also forecasts that driven by digital technologies, global trade will add an additional two percentage points each year from 2016 to 2030 (Yang *et al.*, 2020).

4. Current Status of and Problems in China's Industrial Chain Development

4.1 Evolution of China's Industrial Chain Layout

China's industrial chain layout has experienced five stages of development (Hu, 2020).

Stage 1 (1949-1964): Implementation of the 156 Projects. With aid from the former Soviet Union, China carried out the "156 Projects", giving priority to heavy industries and national defense. The "156 Projects" were distributed in 17 provincial-level regions with the eastern, central, western and northeastern regions accounting for 2.73%, 24.84%, 28.10% and 44.33%, respectively. Most of Soviet aid went to the northeastern region with a solid industrial foundation.

Stage 2 (1965-1978): The Third-Front Movement. For national defense purpose, China launched

年，全球数字经济生产总值达到32.60万亿美元，占GDP的比重为43.70%，其中，发达国家的数字经济增加值达到24.40万亿美元。中国数字经济规模5.40万亿美元，仅次于美国。中美之间的数字经济规模差距从2018年的7.61万亿美元扩大到2020年的8.20万亿。尽管这种差距在扩大，但需要指出的是，中国在数字经济领域取得了巨大成就，数字经济对中国经济的发展带来了巨大的新动能。

数字化平台可以将全球各地的参与者聚集起来，提高跨境搜寻和协调的效率，并能让小企业参与进来，电子商务市场通过汇集大量的选择，使得定价和比较更加透明，实现大规模的跨境流动。全球业务的成本和风险都在转移，知识和无形资产的重要性日益上升，加大了培养数字能力和劳动力技能的风险，生产自动化降低了劳动力成本套利的价值，并使基于靠近客户的地理位置决策成为可能。企业可以从生产和物流方面的新技术中显著地提升了效率，但他们需要跨境供应商网络进行端到端集成，以实现全部潜力。因此，数字经济正在全方位影响着全球分工格局。根据World Trade Organization(2018)的《2018年世界贸易报告》，目前全球服务贸易中超过一半的比例、跨境货物贸易中有12%以上的比例都已实现数字化；该组织同时预测，在数字技术的带动下，2016~2030年全球贸易每年将额外增加2个百分点(杨耀武等，2020)。

四、中国产业链的发展现状与问题

(一)中国产业链布局演变历程

中国产业链布局大致经历以下五个发展阶段(胡安俊，2020)：

(1)1949~1964年：156项项目阶段。在苏联的援助下，中国开展了“156项项目”，优先发展重工业，保障国家国防安全。从区域布局来看，“156项项目”分布于17个省，对东部、中部、西部和东北地区的投资比重分别为2.73%、24.84%、28.10%和44.33%，投资重点在工业基础较好的东北地区。

(2)1965~1978年：三线建设阶段。为了国防战备，中国在内地的十几个省份开展了以战备为中心、以工业交通和国防科技为基础的大规模基本建设。三线地区新增固定资产1145亿元，占到全国的33.58%，西部地区是三线建设的主要区域，占三线建设总投资的80.56%。

(3)1978~1998年：东部率先改革开放。在此阶段东部GDP占全国的份额从43.56%提高到52.67%，产业向东部集聚。

(4)1999~2008年：区域协调发展。为了缩小区域间差距，中国政府自20世纪末开始实施区域协调发展战略，先后推行了西部大开发、东北振兴、中部崛起等战略，引导产业向中西部和东北地区转移。

(5)2008年以后：产业向海外转移阶段。2008年金融危机以后，产能过剩、企业运营成本快速提高，中国企业海外投资意愿不断提高。“走出去”战略和“一带一路”倡议的提出均推动中国产业向外转移。

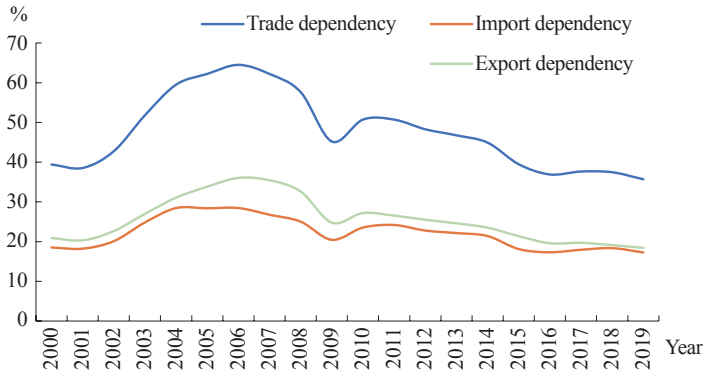

Figure 1: China's Trade Dependency

Source: The World Bank Development Indicators Database, https://data.worldbank.org/indicator.

a massive campaign of military, industrial and transportation infrastructure construction in more than a dozen provinces in interior regions away from coastlines. The Third-Front regions added fixed assets worth 114.5 billion yuan, or 33.58% of national total. As a primary region for the Third-Front development, the western region accounted for 80.56% of total investment for the Third-Front Movement.

Stage 3 (1978-1998): The eastern coastal region took the first step of reform and opening up. In this stage, the eastern region as a share of China's total GDP increased from 43.56% to 52.67%, and industries concentrated in the eastern region.

Stage 4 (1999-2008): Balanced regional development. Since the late 20th century, the Chinese government has started to implement a balanced regional development strategy and successively implemented strategies to develop China's western region, revitalize the northeast, promote the rise of the central region, and guide industrial relocation to the central, western and northeastern regions.

Stage 5 (since 2008): Overseas industrial relocation. Since the global financial crisis erupted in 2008, excess domestic capacity and rising operating cost have prompted Chinese companies to invest overseas. The implementation of the going global strategy and the Belt and Road Initiative (BRI) has facilitated the overseas relocation of China's industries.

4.2 Current Status of China's Industrial Chain Development

4.2.1 External circulation of China's industrial chain lost momentum

Overall, trade dependency measures the reliance of China's industrial chains on external demand and supply. Moreover, trade dependency is a crude indicator of the status of external circulation in China's industrial chains. Here, trade dependency is defined by total trade volume as a share of GDP and can be further decomposed into import dependency and export dependency. Overall, the external circulation of China's industrial chains experienced volatility in its status from 2000 to 2019, which soared at first before spirally decreasing. Specifically, the status of China's industrial external circulation increased swiftly in 2001-2006 after China's WTO entry before reaching its peak (64.48%) in 2006. From 2007 to 2009, China's trade dependency decreased sharply amid the global financial crisis. From 2010 to 2019, China's trade dependency brieflyrised due to a recovery in the global economy before steadily decreasing. In 2019, China's trade dependency stood at 35.68%, and the status of its external industrial circulation became less important compared with 2000. Export and import dependencies have shown similar trends with trade dependency, which is an indication that China's industrial chains have become dominated by the domestic circulation.

4.2.2 Evolving regional structure of China's industrial chains

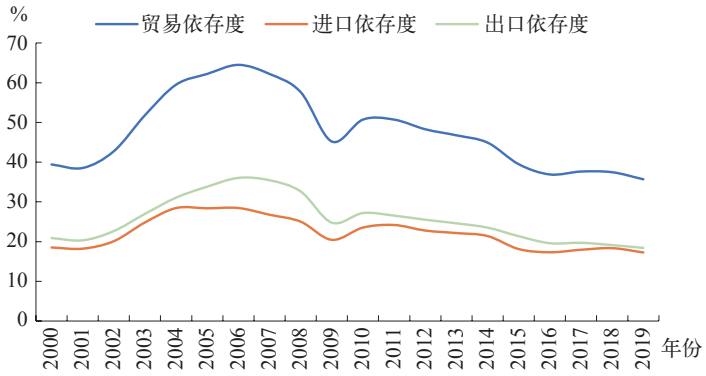

图1 中国的外贸依存度

数据来源：世界银行发展指标数据库，https://data.worldbank.org/indicator。

（二）中国产业链发展现状

1.中国产业链外循环地位下降

在整体层面，贸易依存度可用于评价中国产业链对外部需求和供给的依赖，从而大致表明外循环在中国产业链中的地位现状。此处的贸易依存度用贸易总额与GDP的比重来定义，可以进一步分为进口依存度和出口依存度。总体上，2000~2019年，中国产业链的外循环地位大致经历了先迅速上升，随后波动下降的趋势。具体地，2001~2006年，中国加入WTO后贸易依存度迅速上升，在2006年达到最高点（64.48%）；2007~2009年，贸易依存度开始下降，并在金融危机的影响下下降速度较快；2010~2019年，随着全球经济的恢复，贸易依存度有短暂的上升，之后稳步下降，2019年依存度为35.68%，并且2019年外循环地位已经不及2000年。出口依存度和进口依存度也表现出与贸易依存度相类似的变化趋势，这意味着中国产业链已经转变为由内循环主导（见图1）。

2.中国产业链区域结构及其变化

中国产业结构升级在过去20年取得了长足的进步。从图2可以看到，绝大多数省份第二产业占比均出现明显的下降，随着经济发展第三产业比重在各省都将上升，各省普遍实现了产业结构升级。2020年在同一区域内各省的产业结构相似程度较高。从图3可以看到，华北地区中，除北京外，天津、河北、山西、内蒙古第二产业占比较为接近；华东地区中，除上海外，江苏、浙江、安徽、福建、江西、山东的第二产业比重接近；中部地区中，河南、湖北、湖南的第二产业占比基本相当。

中国第二产业主要集中在东部沿海和中部省份，东部各省的占比在增加，产业有向中部和西南转移的微弱趋势。从图4可以看到，江苏和广东的第二产业占全国第二产业的比重最大，分别达到了11.54%、11.34%，东部的浙江、安徽、福建、江西、山东，中部的河南、湖北、湖南，以及西南的四川占比也相对较高。从1998~2020年各省第二产业占全国第二产业比重的变动来看（见图5），华北的北京、河北、天津、山西，以及东北地区下降趋势较为明显；东部的江苏、安徽、福建、江西，中部的河南、湖北、湖南，西南的四川、重庆、贵州，西北的陕西上升趋势较为明显。

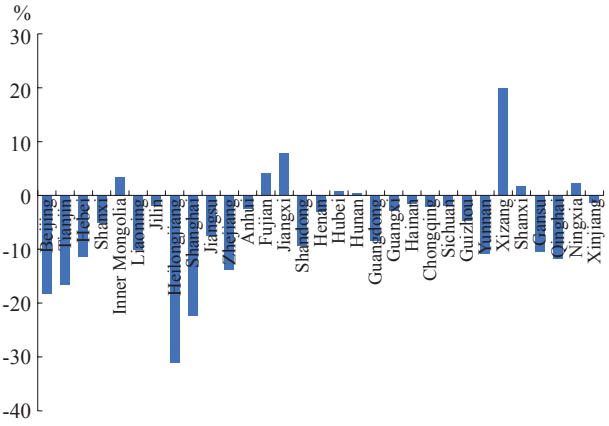

Figure 2: Secondary Industry as a Share of the Economy in China's Provincial Jurisdictions from 1998 to 2020

Source: Statistical yearbooks and 2020 statistical communiques of various provincial-level regions.

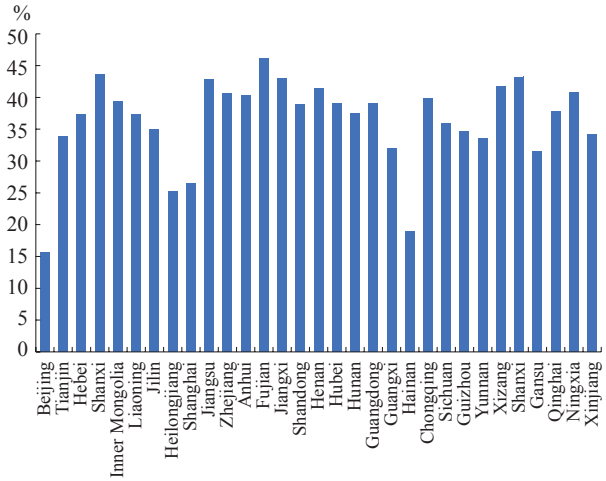

Figure 3: Share of the Secondary Industry for Various Provincial Jurisdictions in China in 2020

Source: Statistical communiqués for various provincial-level regions in 2020.

The past few decades have seen remarkable progress in China's industrial upgrade. As can be seen from Figure 3, most provinces have experienced an upgrade in their industrial structure, as manifested in a sharp decline in the share of their secondary industries and a rising share of the tertiary industry amid economic development. In 2020, various provinces within the same region shared similarities in their industrial structure. As can be seen from Figure 3, the secondary industry accounted for similar shares in the economy of provincial jurisdictions in North China except for Beijing, including Tianjin, Hebei, Shanxi and Inner Mongolia. In Eastern China except for Shanghai, the secondary industry accounted for similar shares in Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, and Shandong provinces. In the central region, the secondary industry made up for similar shares in Henan, Hubei and Hunan provinces.

China's secondary industry is concentrated in the eastern coastal region and the central region. While eastern provinces continue to account for dominant shares of the secondary industry, there has been a slight trend of industrial relocation to the central and southwestern regions. As can be seen from Figure 4, Jiangsu and Guangdong provinces boast the highest shares of the secondary industry in national total, reaching 11.54% and 11.34%, respectively, and the percentage is even higher for Zhejiang, Anhui, Fujian, Jiangxi and Shandong in East China, Henan, Hubei and Hunan in Central China, and Sichuan in Southwest China. Judging by change in each province's secondary industry as a share of national total from 1998 to 2020 (Figure 5), Beijing, Hebei, Tianjin and Shanxi in North China and the northeast have seen the greatest decline in their shares of secondary industry. The share of secondary industry increased the most for Jiangsu, Anhui, Fujian and Jiangxi provinces in East China, Henan, Hubei and Hunan in Central China, Sichuan, Chongqing and Guizhou in Southwest China, and Shaanxi in Northwest China.

4.3 Problems in China's Industrial Chains

4.3.1 Premature deindustrialization: China's manufacturing industry as a share of the economy declined

The manufacturing industry best reflects a country's technological and economic strengths. About 80% of technology progress and innovation applications occur in the manufacturing industry, where progress in labor productivity is the most evident and can significantly boost economic development. The manufacturing industry also best embodies industrial chain division of labor. Given these traits, the current status of China's industrial chain development can be best analyzed with the manufacturing industry as an example. Despite great achievements in manufacturing development, China's manufacturing industry has accounted for a decreasing share of the economy. As can be seen from Figure 6,

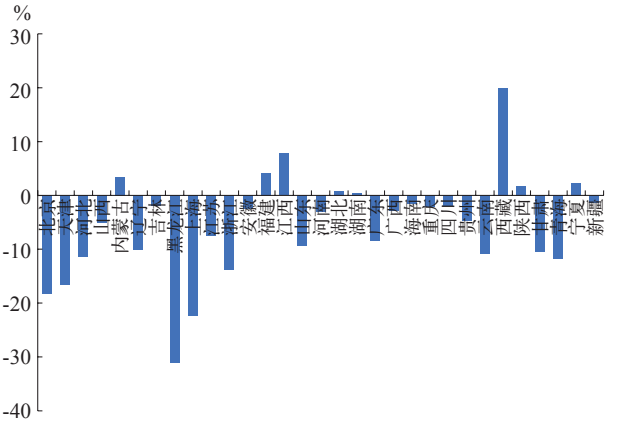

图2 1998~2020年中国各省份第二产业占比的变动

数据来源：各省统计年鉴和各省2020年统计公报。

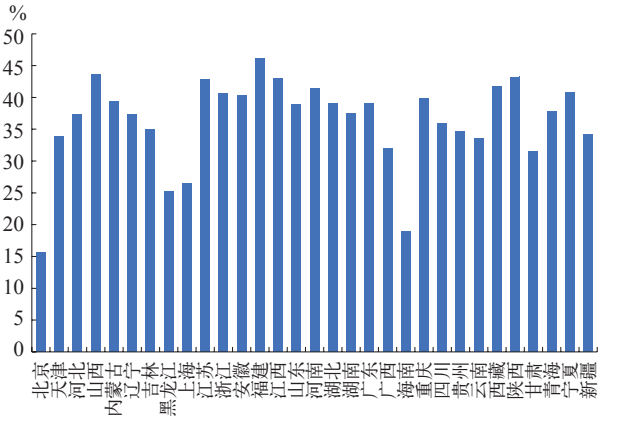

图3 2020年中国各省份第二产业占比

数据来源：各省2020年统计公报。

（三）中国产业链存在的问题

1.中国制造业比重下降，呈现过早去“工业化”

制造业最能体现一个国家的科技实力和经济实力，约有80%的技术进步和创新应用都在制造业，制造业是劳动生产率进步表现最充分的领域，具有显著带动经济发展的重要作用，也是最能体现产业链分工的行业。以制造业来分析中国产业链发展现状更具代表性。

目前，中国制造业发展取得了显著的成效，但制造业比重呈现下降趋势。从图6可以看出，中国制造业总体规模从2010年稳步提升，2010年制造业增加值为13.00万亿元，到2019年增加至的28.10亿万元，实现绝对数量上的翻一番；但是在GDP占比呈下降趋势，从2011年峰值31.90%降至2019年28.4%，基本维持在28.00%以上。

另外，从制造业增加值总量来看，我国制造业增加值在全球遥遥领先。2019年，我国制造业增加值占到全球制造业增加值的28.00%，而美国制造业增加值份额为17.00%。但是，与发达国家相比，我国制造业发展水平相对较低。比如，中国在钢铁、铜、水泥、化纤、造船、汽车等领域有数百种制造业产品的产量居世界第一位，但这些产业技术密集度不高，属于中低度技术密集型，在高端芯片、工业软件、高端数控机床等领域自给率严重不足。

再从制造业就业比重来看，2013年起中国制造业城镇就业增长率开始下降，2014年制造业就业人数就开始缩减，近年来缩减情况更加明显。到2019年，制造业单位城镇就业人口将近3832万人，较2018年制造业人数下降了8.92%，制造业私营企业和个体就业人数达5908万人，较2018年制造业就业人数仅增长2.28%。制造业比重下降有一定客观性。伴随产业深度分工与演化，服务型制造业不断壮大，因此，传统意义统计口径下制造业占经济的比重会出现结构性下降，但在中国尚未进入高收入国家行列的背景下需要高度警惕过早“去工业化”陷阱。

2. 中国制造业处于价值链低端，整体附加值低

虽然中国产业不断向中高端升级，但是总体上产业附加值还有待提高，与制造强国的差距还十分明显。

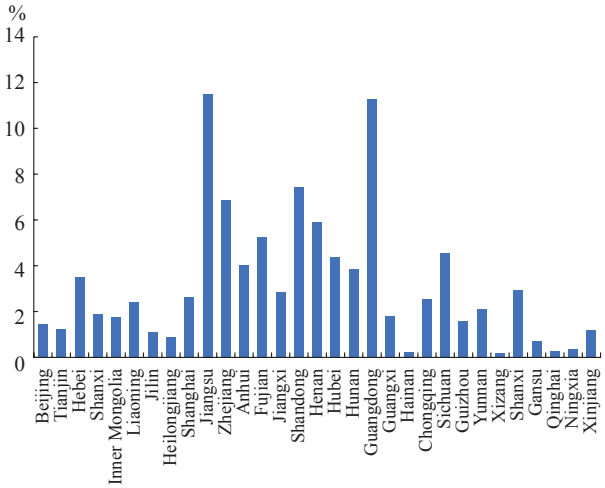

Figure 4: Provincial Jurisdictions as a Share in China's Secondary Industry in 2020

Source: The same as above.

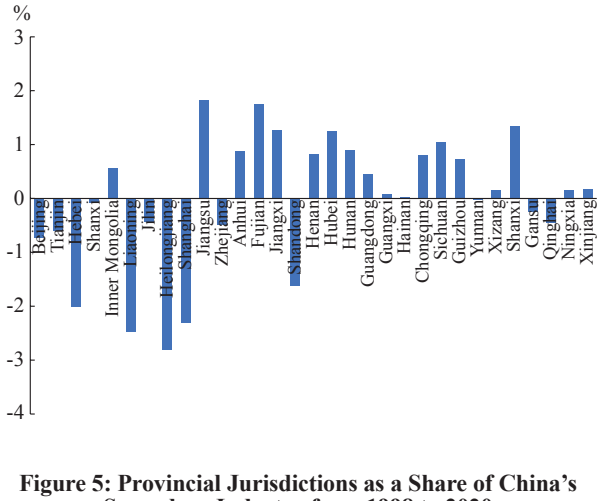

Figure 5: Provincial Jurisdictions as a Share of China's Secondary Industry from 1998 to 2020

Source: Statistical yearbooks and 2020 statistical communiques of various provincial-level regions.

China's manufacturing output has been steadily increasing since 2010, doubling from 13.0 trillion yuan in 2010 to 28.1 trillion yuan by 2019. However, China's manufacturing industry as a share of GDP has been on the decline, down from the peak of 31.90% in 2011 to 28.4% in 2019, and stayed above 28.00% for most of the time.

China is the world's leader in manufacturing value-added. In 2019, China's manufacturing value-added accounted for 28.00% of the global manufacturing's total, exceeding the share of 17.00% for the United States. Compared with developed countries, China's manufacturing development remains at a low level. For instance, China ranks first in terms of the output of iron and steel, copper, cement, chemical fibers, shipbuilding, and automobiles. Yet, these industries have medium and low levels of technological intensity. China heavily relies on foreign countries for high-end chips, industrial software and advanced CNC machine tools.

Since 2013, China's urban employment growth rate started to decrease, and since 2014, manufacturing workforce has started to shrink at an accelerating pace. By 2019, China's manufacturing industry created close to 38.32 million urban jobs, down 8.92% from 2018. Private manufacturing enterprises and individual businesses created 59.08 million jobs, up only 2.28% from the manufacturing workforce in 2018. These figures indicate a decrease in the share of the manufacturing industry. With the deepening and evolving industrial division of labor, China's service-based manufacturing has expanded. Hence, the manufacturing industry as a share of the economy will experience a structural decrease under the traditional statistical approach. Before China joins the rank of high-income countries, policymakers should be cautious of a premature deindustrialization trap.

4.3.2 China's manufacturing industry at the low end of the value chain with a limited value addition

Despite China's industrial movement towards mid- and high-end processes, China's overall industrial value addition has yet to increase and trails far behind strong manufacturing nations. As the world's manufacturing floor, China's manufacturing industry initially focused on processing exports, which led to a huge surplus but also became locked up at low value production processes.

In 2017, China's manufacturing industry recorded a value-addition rate of 24.56%, and the manufacturing value-addition rates of the United States, Japan, Germany and the UK all exceeded 45%. Within the manufacturing sector, China's internationally competitive textile sector and communication devices, computers and other electronic equipment manufacturing sector generate far smaller value-

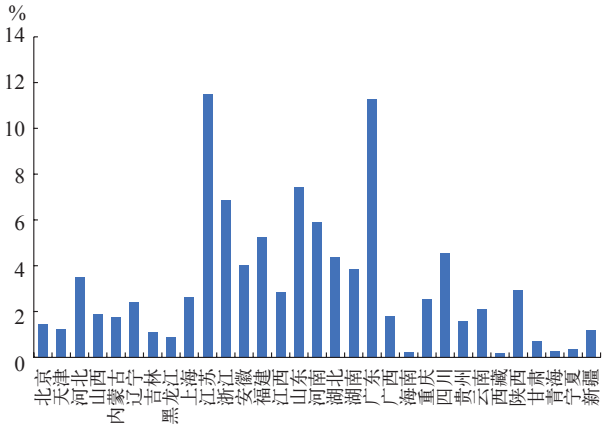

图4 2020年各省第二产业占全国第二产业的比重

数据来源：各省2020年统计公报。

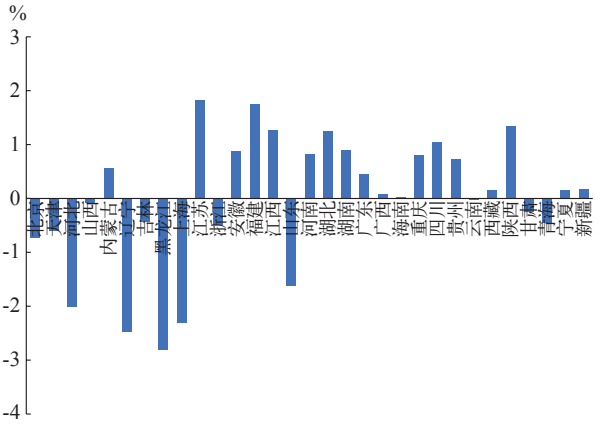

图5 1998~2020各省第二产业占全国第二产业比重的变动

数据来源：各省统计年鉴和各省2020年统计公报。

作为“世界制造中心”，初期中国制造业以加工出口贸易为主，从而获得了巨大的贸易顺差，但同时往往会被锁定在低附加值生产环节。

2017年中国制造业增加值率为24.56%，而美、日、德、英等国家制造业增加值率均在45%以上。在制造业内部，以中国较具国际竞争力的纺织、通信设备计算机及其他电子设备制造业两大类产业为例，它们的附加值率远远低于其他主要工业化国家。2017年中国纺织业的附加值率为22.41%，而其他主要工业国家多在30.00%以上，甚至超过40.00%；中国的通信设备、计算机及其他电子设备制造业的附加值率仅为19.36%，略大于墨西哥(17.18%)，而美国的附加值率高达49.56%。由于产品附加价值相对低，中国并没有充分分享到全球化利益。以麦肯锡对iPad和iPhone的价值构成分析为例，其中原材料成本占比为31%，分销和零售成本占比为15.00%。对于一台iPad，苹果公司获取的利润占比为30.00%，中国大陆的劳动力投入成本却只占2.00%；而对于一台iPhone，苹果公司的利润占比为 58.5%，而中国大陆的劳动力投入成本占比仅为1.8%。

3. 产业基础相对薄弱，关键核心技术存在“卡脖子”问题

自改革开放以来，依靠巨大的市场规模、后发模仿技术、低成本要素供给等比较优势，中国经济实现快速发展，这种发展是一种后发赶超的“快车道”式发展，但是也带来产业基础能力积累不够的弊端。这造成高端产业发展不足，易处于产业价值链中低端环节，产业的数字化、智能化、绿色化和服务化的水平低，关键“卡脖子”技术问题严重，产品档次偏低，标准水平和可靠性不高。工业基础能力薄弱一直是制约中国工业发展的最大短板，包括计量、标准、认证、信息服务等的基础服务体系不完善，信息化背景下的基础软件、操作系统、算法等产业的核心基础主要依赖国外。

2018年，《科技日报》在“亟待攻克的核心技术”的系列报道中，列举了35项“卡脖子”技术。这些关键技术掌握在美欧日等发达国家手中。关键技术和核心零部件高度依赖进口，关键零部件、关键材料和关键元器件等的自给率仅为三分之一。高端数控机床、芯片、光刻机、高端传感器等，存在“卡脖子”的问题，“中国制造”在这些领域的研发和生产依然存在亟须攻破的技术难关。工业信息化部对中国30多家大型企业130多种关键基

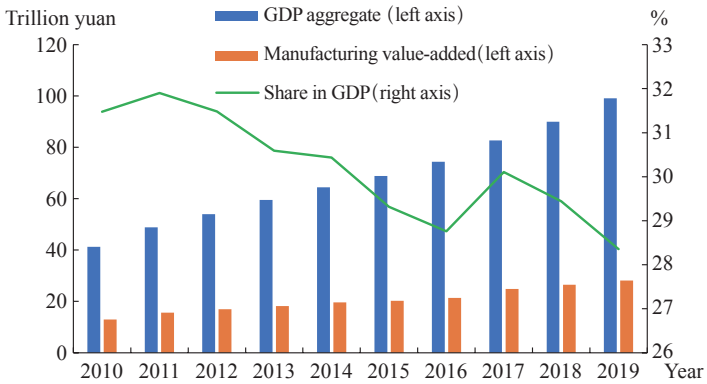

Figure 6: China's Manufacturing Value-Added as a Share in GDP from 2010 to 2019

Source: The National Bureau of Statistics.

added compared with other major industrialized countries. In 2017, China's textile sector generated a value addition rate of 22.41%, and this figure was generally above 30.00% or even 40.00% for other leading industrialized countries. China's communication equipment, computers and other electronic device manufacturing sector had a value addition rate of merely 19.36%, which was somewhat higher than Mexico's (17.18%) and eclipsed by the US figure of 49.56%. Due to its relatively low product value addition rate, China did not fully realize the benefits of globalization. For example, in an analysis of iPad and iPhone's value composition conducted by McKinsey, it was reported that the cost of raw materials account for 31%; the cost of distribution and retail comprise 15%. From each iPad, Apple Corporation's profit represents 30%, and the cost of labor input in the Chinese mainland only equals 2%. For the iPhone, Apple Corporation's profit accounts for 58.5% of the sales price while the cost of labor input in the Chinese mainland only represents 1.8%.

4.3.3 Relying on foreign-controlled critical technologies

Since reform and opening up was launched in 1978, China has achieved rapid economic development based on its market heft, technology imitation, low-cost factor supply, among other comparative advantages. This path of development is a fast track for late-moving countries to overtake more advanced countries. Following this path of imitation, however, China has lost sight of the importance of fundamental industrial capabilities and remained at the mid- and low-end processes of industrial value chains. Its high-end industries are underdeveloped and heavily dependent on foreign technologies. China has yet to increase product premiumization, standardization, and reliability. Weak industrial fundamentals have been the biggest hurdle to China's industrial development. China has yet to develop complete fundamental service systems such as econometrics, standardization, certification, and information services, and lessen its dependence on overseas supplies of fundamental software, operating system, and algorithms.

In 2018, the *Science and Technology Daily* listed 35 critical technologies that China relied on foreign supplies and measured China's gaps with foreign suppliers. These critical technologies were controlled by developed countries led by the US, the EU and Japan. China's self-sufficiency for critical components, materials and devices was only one third. Advanced CNC machine tools, chips, lithography machines, and sensors were subject to foreign technological monopoly. In those sectors, China had yet to achieve technological breakthrough. According to a survey conducted by the Ministry of Industry and Information Technology (MIIT)[4] for more than 30 large enterprises, out of 130 types of critical basic

[4] Source: https://www.guancha.cn/industry-science/2018_07_15_464153.shtml, accessed on June 30, 2021..

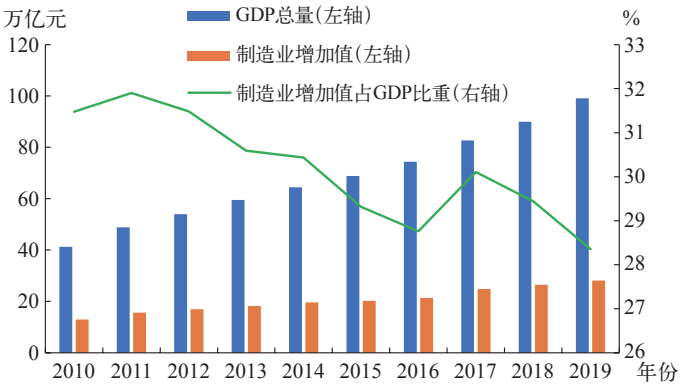

图6 2010~2019年中国制造业增加值及占GDP比重

数据来源:国家统计局。

础材料的调研结果表明[4],32.00%的关键材料仍为空白,52.00%的关键材料依赖进口,大部分计算机和服务器的95.00%高端专用芯片、70%以上智能终端处理器以及绝大部分存储芯片依赖从外国进口。由于产业基础能力薄弱,当前中国许多产业存在"缺芯""少核""弱基"的问题。

五、中国产业链升级的优势

改革开放以来,中国积极主动地融入全球价值链。2001年加入WTO以后,中国在许多方面调整政策以适应国际贸易规则,并不断加大开放力度、缩减"负面清单",提供优化的投资环境和营商环境,吸引全球优秀的跨国公司在中国设立工厂以及研发部,使中国制造畅销全球,成为"世界工厂"。2009年我国成为全球第一大货物出口国,2010年又成为全球第一大制造国。到2019年末,中国制造业增加值高达39019.60亿美元,约占中国GDP总额的27.20%。自2008年金融危机以来,中国对全球经济增长的贡献率超过30%,已经深度融入全球供应链,成为全球供应链的重要参与方,也是全球供应链的核心环节。

(一)产业体量大、产业链完备

在嵌入价值链的过程中,中国制造业不断提升在全球价值链中的地位,同时也形成了其他国家都无法比拟的产业链。中国经过多年的自主发展,形成了最长、最大、相对最完整的产业链。按照联合国工业发展组织的数据,中国是全球唯一拥有全部制造业门类的国家,22个制造业大类行业的增加值均居世界前列;世界500种主要工业品种,目前有约230种产品产量位居全球第一。完整的现代工业体系,确保了我国经济体系的巨大韧性,甚至在外界不可控因素冲击下仍能够有效维护产业链供应链的稳定。

(二)新的比较优势逐渐形成

近年来,虽然中国传统的资源禀赋优势逐步丧失,如低劳动力成本、人口红利等,但新的超越资源禀赋的

[4] 资料来源:https://www.guancha.cn/industry-science/2018_07_15_464153.shtml,访问日期:2021年6月30日。

materials, the surveyed enterprises had no domestic suppliers for 32.00% of critical materials, relied on imports for 52.00% of critical materials, and had to import 95.00% high-end chips, over 70% smart processors, and most memory chips. Currently, China's weak industrial foundation is manifested in a lack of chips, processors, and fundamentals across many industries.

5. China's Strengths for Industrial Chain Upgrade

Since reform and opening up was initiated in 1978, China has actively integrated into GVCs. Since joining the World Trade Organization in 2001, China has adjusted its policies to come to terms with international trade rules. By broadening openness, scaling down the negative list, and offering a conducive business climate, China has emerged as an attractive destination for multinational firms to set up factories and R&D centers, becoming the world's factory floor. China became the world's largest goods exporting nation in 2009 and the world's largest manufacturing nation in 2010. By the end of 2019, China's manufacturing value-added reached 3,901.96 billion US dollars, accounting for 27.20% of China's GDP. Since the global financial crisis erupted in 2008, China has contributed more than 30% of world economic growth and integrated into core processes of GVCs as a key participant.

5.1 Large Industrial Volumes and Complete Industrial Chains

In embedding into value chains, China's manufacturing industry has ascended the GVC ladder and formed incomparable industrial chains. After years of independent development, China has formed the longest, largest and relatively complete industrial chains. According to the United Nations Industrial Development Organization, China is the only country with all manufacturing sectors and ranks high in the world in terms of the value-added of 22 manufacturing sectors. China ranks the first in terms of output of 230 out of 500 types of major industrial goods in the world. A complete modern industrial system ensures China's economic resiliency, allowing China to effectively maintain industrial and supply chain stability despite external shocks beyond its control.

5.2 New Comparative Advantages Are Taking Shape

China's traditional advantages for resource endowment, such as labor cost and demographic dividends, have diminished in recent years. However, China's new comparative advantages are emerging. In terms of production inputs, China's cost advantage for primary production factors, especially cheap labor, is giving way to strengths in advanced production factors such as digital technology. In the decade following the global financial crisis of 2008, China's manufacturing compensation per worker rose from 4,915 US dollars in 2009 to 9,061 US dollars in 2018. This 7% annual average growth rate exceeded not only the world average by close to six percentage points, but the growth rates of India, Indonesia and Mexico. As mentioned before, China has the second largest digital economy in the world. By integrating with the real economy, the digital economy will undoubtedly become a new cornerstone for China's manufacturing competitiveness.

In terms of technological innovations, China's exogenous innovation dividend based on technology transfer from the developed world is giving way to endogenous innovation supported by a large domestic economy. Since reform and opening up was launched in 1978, China has established a relatively complete innovation system through industrial transfer, technology importation, assimilation, integrated innovation, and strategic emulation. The problem is that multinational firms tend to retain core technologies in their home soil and transfer mature technologies to host countries. Their R&D in host countries is focused on adaptations to the local market needs. The dividends of such technology transfer have been more or less exhausted. China's large and multitiered market offers a broad and inclusive environment for businesses to thrive, giving rise to endogenous innovation led by independent, coordinated and integrated innovations.

In terms of the domestic market environment, China's strengths in consumer market, brand

比较优势正在显现。从生产投入要素看，基于初级生产要素尤其是廉价劳动力要素形成的成本优势，逐步向以数字等高级生产要素组成的技术优势转变。金融危机后的十年，中国制造业劳均年工资由2009年的4915美元升至2018年的9061美元，其7.00%的年均增速不仅比全球增速高出近6个百分点，也明显高于印度、印度尼西亚和墨西哥等。目前，正如上文提到的，中国数字经济规模庞大，位列世界第二。通过数据生产要素对实体经济特别是传统制造业的信息化支撑与改造，打造数字经济与实体经济的深度融合，无疑会成为提升制造业核心竞争力不可或缺的力量。

从技术创新看，正由基于发达国家成熟技术转移的外源式创新，向基于大国经济的内源式创新转变。改革开放以来，中国通过承接产业转移和技术引进、引进吸收、集成创新、跟随战略等外源式创新，建立起比较完备的创新体系。但跨国公司往往会将关键核心技术保留在母国，向东道国转移的技术往往是较为成熟的技术，从而东道国的技术开发基本上是出于满足东道国本国市场需求的适应性改进。当前，这种成熟技术转移的红利基本上已经被收割完毕。与此同时，中国具有超大规模市场优势，具有市场空间大、层次多、需求多元化等特征，能够给予企业生存发展更广阔的空间和更具包容性的环境，创新方式将逐步转变为自主创新、协同创新、融合创新为代表的内源式创新。

从国内市场环境来看，超大规模内需市场、良好的消费环境、巨大的消费潜力、超强的品牌意识等新发展机遇正在催生采购者驱动的全球价值链领导者和主力军。我国具有规模广阔、需求多样的国内消费市场，形成了世界上最大规模的中等收入水平群体。超大规模的市场优势，是我国经济发展中形成的新比较优势，是保持经济稳中向好和民生改善的重要支撑，是我国经济社会应对风险挑战的基础，也是中国维护产业链供应链稳定的重要保障。基于明显改善的产业服务和配套环境，不管是消费性服务业还是生产性服务业，越来越多的现代服务业以服务型制造的方式促进了制造业的高端化与柔性化发展。如远程医疗服务需要有低时延的5G网络设备和AR设备与之配套；文化娱乐服务业的数字化生产和消费，同样也需要许多新型制造业产品与之配套。

六、政策建议

全球供应链的运转受阻，这是疫情带来的明显短期冲击。中国需要做的是稳定全球产业链，确保产业链的安全与畅通。中美竞争态势因疫情冲击而显化，全球产业链向区域化发展是未来长期的态势，需早做谋划。

（一）发挥国内超大规模市场优势，提升制造业基础能力和产业链现代化水平

从世界进入百年未有之大变局看，提升产业基础能力和产业链水平，是构建以国内经济循环为主、国内国际经济循环互相促进的新发展格局的题中应有之义。当今世界正经历着新一轮大变革、大调整，国际经济政治秩序深度调整，不确定不稳定因素明显增多。

中国已经具备了以国内经济循环为主导的基础条件。从消费需求看，中国具有规模广阔、需求多样的国内消费市场，拥有全球规模最大的中等收入群体。但是，当前中国消费市场的供给侧水平与国际消费市场相比较低，国内中高端商品和服务的供应仍然滞后于居民对美好生活的需求。需要从供给侧角度来推动居民消

awareness and development opportunities give rise to purchaser-driven GVC champions. China is home to the world's largest middle-income group with a broad and diverse domestic consumer market. An ultra-large market is China's new comparative advantage. Market potentials underpin China's economic stability and welfare improvement. Market heft is the basis for China to cope with socio-economic risks and challenges and maintain industrial and supply chain stability. China has made great improvements in industrial services and business climate. Modern services have expedited high-end and flexible service-based manufacturing development. For instance, telemedicine requires low-latency 5G network gear and AR devices; culture and entertainment services also require digital devices that enable digital features.

6. Policy Implications

Barriers to Global Supply chains stem from the short-term shocks from the COVID-19 pandemic. The current priority for China is to stabilize GICs and ensure GICs security. Amid the pandemic, China-US competition has escalated. Early preparations should be made for GICs regionalization as a long-term trend.

6.1 Enhancing Fundamental Manufacturing Capabilities and Industrial Chain Modernization Based on China's Ultra-Large Market

As the world today experiences changes unseen in a century, China should strive to improve fundamental industrial capabilities and industrial chains as part of its new development pattern characterized by domestic economic circulation as the mainstay and domestic and international circulations reinforcing each other. A new round of great transformations is sweeping across the world today. Amid in-depth adjustments in the international economic and political order, uncertainties and instabilities are on the rise.

In addition, China already has the basic conditions for domestic economic circulation. It has a large and diverse domestic consumer market and the world's largest middle-income group. Yet, the supply side of China's consumer market lacks sophistication compared with the international consumer market. Domestic demand for mid- and high-end goods and services has yet to be effectively satisfied by domestic supplies. China should propel household consumption upgrade from the supply side, increase the effective supply of goods and services in its mid- and high-end and emerging consumer markets, and vigorously introduce high-quality goods and services from the international market (Ni and Ji, 2020). From a supply-side perspective, China boasts the largest and most complete industrial system, and the economic foundation for the domestic circulation to play a dominant role. Under the new development pattern, as pointed out by Huang (2020), "we should enhance the reliance of GVCs on China while expanding opening up and bolstering domestic circulation. This calls for stronger manufacturing and industrial chain capabilities."

6.2 Enhancing Manufacturing Competitiveness and Prevent Industrial Chain Relocation in the Window Period of Pandemic Control

With its shocks to the world economy, the COVID-19 pandemic has catalyzed GVC restructuring. China's success in pandemic control and economic recovery have won a window period to take an initiative in GVC restructuring. To some extent, the pandemic has slowed the migration of China's labor-intensive manufacturing to Southeast Asia. Amid rising factor cost and trade protectionism, China's industrial and supply chains have started to relocate elsewhere. The pandemic alarmed the developed world of the importance of supply chain security. Countries have vowed to re-shore strategic industries such as medical supplies and critical materials and localize the manufacturing of critical products. Yet those attempts to re-shore supply chains have been marred by the pandemic, thus delaying manufacturing relocation from China. This creates a rare window period for China to stabilize and upgrade its manufacturing industrial chains. China should take this opportunity to ramp up R&D, build up manufacturing competitiveness, and curb manufacturing relocation. It should seize this period of

费结构不断升级，增加国内中高端和新兴消费市场商品和服务的有效供给，大力引进国外高质量的商品和服务（倪红福和冀承，2020）。从供给角度来看，中国拥有最为完整、规模最大的工业体系，具备以国内经济循环为主的经济基础。在新发展格局下，要在进一步扩大对外开放的同时，在强化国内循环的同时，注重增强全球产业链供应链对我国的依赖。这就更加要求提高我国制造业基础能力和产业链水平（黄群慧，2020）。

（二）抢抓疫情防控窗口期，加快提升制造业核心竞争力和防止产业链外迁

新冠疫情肆虐全球，对世界经济造成巨大冲击，加速催化全球价值链重构。中国在疫情防控和经济恢复上取得较好成就，为在全球价值链重构中赢得主动权提供了机会窗口期。此次疫情在一定程度上减缓了我国劳动密集型制造业向东南亚地区迁移的进程。近年来，受要素成本上升、贸易保护主义、国外制造业回流战略的影响，我国产业链供应链出现外迁趋势。疫情全球大流行，更加使得发达国家认识到产业链安全的重要性，各国纷纷出台政策，鼓励将防疫物资、医药产品、关键原材料等重要和战略产业回流，推动关键产品的生产本土化。但是，由于中国疫情控制较好而国外疫情肆虐，使得发达国家产业链回迁的障碍增多，一定程度上延迟了制造业外迁的进程。为稳定和提升制造业产业链提供了难得窗口期，应该抓住率先控制疫情、率先实现经济恢复的机遇，发挥大规模市场优势和新举国体制优势，加大关键技术攻关，加快提升制造业核心竞争力，防止制造业外迁。抓住疫情导致发展国家“供给真空”窗口期，巩固传统产品出口优势，支持企业开拓国际市场，承接国外订单转移。

疫情期间强大稳定的供应能力和韧性成为保障全球供应链正常运行的重要力量和吸引全球资本回流的重要原因。顺应这一趋势，加大中西部地区承接产业转移能力建设，建设一批高水平工业集聚区，把中西部原材料、土地、能源等要素和东部资本、技术等优势有机结合，在国内形成梯队合理、联系紧密、协同高效的分工协作体系。在稳固国内产业链的同时，促进产业回流国内。优化产业布局，建设高质量的现代产业集群。坚持稳住制造业的供应链体系，防止制造业外迁，尤其要牢牢抓住嵌入全球供应链中龙头企业和关键核心环节。一是以龙头企业为中心建立产业核心区，吸引市场头部企业向产业核心区聚集，建立区域总部、研发中心、结算中心等功能性总部基地。二是通过补链、固链和强链，围绕龙头企业供应链商招引资，以商招商，共同打造产业生态圈，培育一批在细分产品市场位居全球或全国前列的“隐形冠军”“单打冠军”；三是围绕现代产业集群，通过并购重组以规模化、集约化生产方式降低集群内企业之间分工协作的交易成本，提升产业集群内部联盟企业与集群外部上下游企业的谈判议价能力。

（三）积极培育和发展国内产业链和区域价值链，构筑自主可控的全产业链体系

世界产品价值链主要以美国、德国、日本和中国等大国为核心，边缘国家主动嵌入核心价值链，并逐渐形成了北美、欧洲和亚洲的区域价值链。疫情可能会加速中美之间的经济脱钩，而中国产业参与全球价值链的深度将降低。这就需要积极培育和发展国内价值链与区域价值链。疫情后全球价值链重构加快，把握经济率先恢复的窗口期，积极推动与全球产业链更加紧密的合作，加快提升在未来区域和全球供应链网络体系中的协调、控制和主导能力。一方面，加强与“一带一路”等周边区域和重要国家的产业链合作。增强与欧盟、日本、

"supply vacuum" facing developed countries gripped by the pandemic, strengthen traditional export advantages, support firms to explore the international market, and serve as a destination for the transfer of international orders.

With powerful, stable and resilient supply chains, China's economy swiftly recovered from the pandemic, providing a vital force for global supply chain operations. China's supply chain stability has become a key attraction to global capital backflows. Following this trend, China should enhance capabilities for central and western regions to serve as destinations for industrial relocation, create a group of world-class industrial zones, and combine the central and western regions' factor strengths, such as raw materials, land and energy, with the eastern region's strengths in capital and technology. The goal is to establish a domestic division of labor system with reasonable echelons, close ties and efficient coordination. While stabilizing domestic industrial chains, China should strive to bring industries back home, optimize industrial layout, and establish high-quality modern industrial clusters. China should stabilize manufacturing supply chains and prevent manufacturing relocation, focusing on key enterprises and processes of GICs. Firstly, we should establish core industrial zones led by key enterprises and encourage them to set up regional headquarters, R&D centers, and settlement centers. Secondly, we should step up business promotion, strengthen supply chains, develop industrial ecosystems, and foster "implicit champions" and "niche champions" that lead global or nationwide markets. Thirdly, we should reduce the cost of transaction for the division of labor among enterprises within individual clusters by leveraging the economies of scale and intensive operations. Enterprises within an industrial cluster should forge alliances to increase their bargaining power with upstream and downstream enterprises.

6.3 Developing Complete Domestic Industrial Chains and Regional Value Chains

The United States, Germany, Japan and China lie at the heart of GVCs, and peripheral countries become actively embedded into core value chains, forming regional value chains in North America, Europe and Asia. Amid the COVID-19 pandemic, economic decoupling between China and the US is likely to accelerate, and the depth of China's participation in GVCs may decrease. This requires China to proactively foster and develop domestic and regional value chains. After the pandemic, GVC restructuring will accelerate. Leveraging its window period of an early economic recovery, China should deepen cooperation with GVCs and enhance its capabilities to coordinate, control and dominate future regional and global supply chain networks.

China should step up industrial chain cooperation with neighboring regions and important countries involved in the BRI, strengthen ties with the industrial and supply chains of the European Union, Japan and South Korea, and take the initiative in the new round of GVC restructuring through "China+X" industrial chains under the BRI. In addition, China should localize and diversify its supply chains. A national supply chain strategy and supply chain local substitution initiative should be implemented. In critical areas, upstream and downstream enterprises of domestic industrial chains should work together to create independent, secure and reliable domestic supply chain systems. China should strive to substitute high-value imported commodities with domestic replacements via R&D and product upgrades. For products for which no domestic substitute can be found, China should seek new suppliers from the international market, diversify supply chains, and win more time for breakthroughs to be made in critical technologies.

Priority should be given to enhancing the East Asian regional value chain and developing the BRI regional value chain. On the one hand, it is suggested to develop a regional value chain system led by China in East Asia. With their export-oriented policies, East Asian economies have established a mature division of labor system during the rapid expansion of globalization. With a large market, China may scale up investments in East Asia under the Regional Comprehensive Economic Partnership RECP rules for trade and investment facilitation, enhance economic interdependence with East Asia, and create and lead a regional industrial chain network. On the other hand, proactive efforts should be made to develop

韩国的产业链供应链联系，依托“一带一路”构建“中国+X”产业链，在全球价值链重构中掌握主动权。另一方面，推动供应链国产化和多元化。实施国家供应链战略及供应链国产化替代行动计划，协同国内产业链上下游企业，在关键领域和环节构建自主可控、安全可靠的国内生产供应链体系。对于进口依赖程度高的高附加值商品，要加紧技术、产品升级步伐，促进替代过程的实现。对于不可替代的高依赖度产品，积极在国际市场寻求新的供应渠道，实施供应链多元化，为关键核心技术突破争取更多时间。

强化东亚区域价值链，建设“一带一路”区域价值链。一方面，在东亚建设中国主导的区域价值链体系。东亚国家凭借出口导向型政策，在全球化迅速扩张的时代，建立起较为成熟的生产分工体系。中国市场规模优势明显，未来可以抓住区域全面经济伙伴关系协定(Regional Comprehensive Economic Partnership，RCEP)在贸易和投资方面的便利化规则，主动扩大在东亚的投资，加强中国与东亚经济的依存关系，构建中国主导的区域产业链网络。另一方面，积极建设“一带一路”，从而建立与欧洲国家的产业联系，尽可能降低美国与中国在高科技产业领域脱钩的负面效应。

（四）构建国内产业转移的顶层推动机制，推进产业向中西部转移

中西部地区承接产业转移出现问题的症结，有的是国家经济发展的趋势性方向、结构性症结，这是不能改变的；有的是需要国家和地方自身来克服的，如长期存在产业配套问题、营商环境的改善问题、人才等创新要素不足等；有的是由体制机制性症结和国际环境所致，政府可以采取相应的措施予以解决。

一是为中西部地区政策打造新势能。实行土地“占补平衡”新机制，允许土地在东部和中西部之间进行跨省占补平衡和省内城市间的占补平衡。加大对符合国家产业政策和节能环保要求等产业转移的信贷投放力度，在准备金政策、再贷款政策等方面向主要的中西部承接产业转移省份倾斜；地方税率设定上对中西部地区给予优惠；加大对中西部地区的财政转移支付力度，对符合国家产业政策的重大基础设施项目、重大产业项目、高新技术产业项目、出口创汇型项目在税收上给予减免等优惠政策。

二是在中西部地区加快建立若干新型经济特区。改变过去一省一个国家经济战略区的平衡做法，选择在中西部地区区位条件较好的区域性中心城市，建设一批新型经济特区。在特区实施综合性改革和政策措施，比照东南亚国家承接产业转移的政策做法，允许特区有更大的“试错空间”，在政策激励、税收优惠、海关等方面比其他地方更加优惠，鼓励特区加快人口、科技等集聚，提高产业承载能力。

三是建立国内产业转移的顶层推动机制。成立中西部地区承接产业转移领导小组，负责承接产业转移的机制构建、政策制定、重大产业布局、发展评估督导等重大事项工作。制定中西部地区承接产业转移规划，明确各区域产业转移承接重点，避免各省间的无序竞争和产生新的重复建设。在中西部地区布局一批能带动全局、具有世界竞争力的重大产业项目，带动中西部产业集群发展。成立产业转移专项基金，资助地方政府或者企业进行产业搬迁，激励产业搬迁。建立中西部省份与东部地区对接机制，加强东部一线城市和中西部地区对接，建立东部沿海“万亿俱乐部”城市和中西部区域性中心城市产业结对，鼓励“强帮弱、大帮小”。在基础设施上实现无缝对接，推进重大基础设施网络化建设。建立产业转移督导评估机制，及时调整不恰当的政策措施。

the BRI and establish industrial ties with European countries and minimize the adverse impact of US decoupling from China's high-tech sector.

6.4 Creating a Top-Down Mechanism for Domestic Industrial Relocation to Central and Western Regions

In serving as a destination for industrial relocation, China's central and western regions are faced with numerous challenges. While some are structural challenges stemming from national economic trends, others can be overcome by improving supporting industrial capabilities, business climate, and innovation factors such as professionals at the national and local levels. Institutional problems and challenges from the international environment can be addressed at the national level.

Firstly, China should breathe new momentum into policy-making incentral and western regions. A new mechanism of cross-regional land requisition and compensation balance should be put into place, allowing land quotas to be transferred between eastern and central and western regions and cities within the same province. Credit issuance should be increased to industries that meet national industrial policies and energy conservation and environmental protection requirements. Preferential reserve ratio requirement and relending policy should be given to central and western provinces receiving relocating industries. Preferential local tax rates should be granted to central and western regions. Fiscal transfer payments should be ramped up to central and western regions. Tax breaks should be granted to major infrastructure, industrial, high-tech, and exporting projects in line with national industrial policies.

Secondly, China should speed up the development of new special economic zones in the central and western regions. Unlike the balanced approach of establishing one national strategic economic zone in one province, we should create a group of new special economic zones in regional central cities of the central and western regions. In those special zones, we should implement integrated reform and policy measures, tolerate trials and errors, and offer more preferential policy incentives, tax breaks and customs arrangements referencing the policy practices of Southeast Asian countries for serving as destinations for industrial relocation. The special economic zones should be encouraged to attract populations and technologies and increase industrial capacity.

Thirdly, a top-down mechanism should be established to facilitate domestic industrial relocation. China should set up a steering group for industrial relocation to China's central and western regions responsible for the policy-making, planning and supervision of industrial relocation. China should formulate a plan for industrial relocation to central and western regions and identify priorities to avoid disorderly competition and repetitive development. The central and western regions should host a group of world-class industrial projects to facilitate industrial clustering. A special fund of industrial relocation should be established to support local governments or enterprises to relocate industries. Provinces in central and western regions should be paired with tier-one cities in the eastern region, so that cities with GDP above 1 trillion yuan in China's eastern coastal region will assist sister central cities in the central and western regions. Priority should also be given to achieving seamless infrastructure connectivity and grid-based major infrastructure development. Inappropriate policy measures should be corrected under a supervision and evaluation mechanism for industrial relocation.

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