

A Review of Outsourcing and Upgrading of Global Value Chains in Manufacturing

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Abstract

As an important strategic means of promoting innovation in the service industry and upgrading its position in the global value chain, service outsourcing has attracted increasing attention in the context of economic globalization. In particular, the impact of service outsourcing on the global value chain of the manufacturing industry has gradually become a key research object for scholars in various fields. This paper explores the relationship between service outsourcing and the enhancement of the global value chain within the manufacturing sector from the perspective of literature review. First, it presents the conceptual definitions and measurement methods of service outsourcing and global value chain status. Second, it separately examines the economic effects of service outsourcing on the upgrading of global value chains. Then, it reviews the relevant literature on the impact of international service outsourcing on global value chain status from an empirical perspective. Finally, this paper provides a summary review of the relevant research literature from four perspectives: research perspective, research level, research methods and research results, and points out the future research direction.

Keywords: Outsourcing, Upgrading of Global Value Chains, Manufacturing Industry Sector, Service Industry Sector

Introduction

Affected by geopolitical tensions, inflationary pressures, monetary policy adjustments, supply chain disruptions, and uneven global economic recovery, the global economy is currently under the shadow of a once-in-a-century economic crisis, and the international economic landscape may face a new round of reshuffle. Therefore, for developing countries, it is becoming increasingly important to find new development ideas and growth points in the context of a global economic downturn.

In recent years, the development of economic globalization and global value chains, the free flow of various resources and production factors internationally, and the further refinement of international division of labor have led to an increasing number of enterprises transferring and entrusting the relatively disadvantaged links in the industrial chain to other enterprises. This practice not only reduces production costs but also enhances the industry's competitiveness by integrating and utilizing global high-quality resources. Consequently, the emergence of manufacturing and service outsourcing has been observed. Therefore, service outsourcing, as a new method of division of labor, has initiated a global wave of outsourcing in the service industry.

Unlike manufacturing outsourcing, services can be used as intermediate inputs in the production of products in any sector and industry. With the diversification of service outsourcing, participants can act as both contractors and subcontractors. Participants can not only choose to outsource labor-intensive, low-tech, and low-profit service businesses to external contractors but also to more refined and specialized outsourcing services so as to effectively integrate and broaden the depth and breadth of factor resource allocation (Xiaobi et al., 2020). In addition, the roles of contractors and subcontractors can be continuously adjusted and reorganized with the upgrading of production stages and changes in the service outsourcing market. In the early stages of production, participants can acquire resources such as technology, knowledge, and experience by taking on high-level production processes in developed economies, thereby improving the technology and efficiency of the entire production department. During the production expansion period, relatively inefficient production links can be outsourced to reduce production costs and improve production efficiency and economic benefits.

Service outsourcing, as a new model to promote industrial transformation and upgrading, has not only driven the development of the modern service industry but also provided strong support for the manufacturing industry. It has generated numerous job opportunities for society and shifted the paradigm of economic development, significantly contributing to the global economy's transformation. For the manufacturing industry, service outsourcing significantly contributes to the development of the industry by reducing costs, conserving resources, enhancing efficiency, focusing on core business, enhancing enterprise competitiveness, and promoting the transformation and upgrading of the manufacturing industry. For developing countries, actively participating in the outsourcing trend and promoting the integration of the manufacturing industry from low-value-added to high-value-added links in the global value chain is a strategic choice to seize new opportunities for industrial transfer and meet new challenges.

Currently, service outsourcing predominantly occurs from developed countries at the upper echelon of the value chain to developing countries at the lower echelon of the value chain. Developing countries utilize external resources by offering low-cost production elements to engage in service outsourcing. Through this process, they amass resources, such as technology and expertise, thereby enhancing their capacity to innovate and elevate their respective sectors. However, currently, the comprehensive advancement of service outsourcing in developing countries remains relatively underdeveloped, and international service outsourcing remains nascent. Coupled with their own limited capital accumulation capabilities and the technological monopoly from developed countries, developing countries

are prone to being trapped in the low-end segments of the global value chain for a long time, thus preventing emerging countries from seizing the opportunity for industrial transformation and enhancement. Consequently, ascending the global value chain is a crucial strategy for developing countries to attain structural transformation. Thus, by examining the effects of service outsourcing on the enhancement of the global value chain in manufacturing, we can think about the relationship between service outsourcing and manufacturing backwards from the perspective of results. Based on the findings, we can offer specific and actionable policy recommendations to promote the development of service outsourcing among local firms. We can also assist businesses in transitioning from dependence on domestic low-end production factors to actively engaging in global competition by utilizing international high-end production factors.

Service Outsourcing and the Upgrading of Global Value Chains: Concept Definition

Service Outsourcing

With the development of information technology and the Internet in the 1990s, the coordination costs and transaction costs between regions began to decline. At the same time, the intensification of global competition has led companies to increasingly pursue low-cost operations. All of this has led companies to continuously outsource production processes, and the content of outsourcing has gradually shifted from the manufacturing sector to the service sector. Outsourcing of service processes has begun to become a new trend. As a result, scholars from different countries have studied and explained the differences between service outsourcing and manufacturing outsourcing. Feng (2007) categorises outsourcing into two types: manufacturing outsourcing and service outsourcing, based on the economic characteristics of the outsourcing transfer and transaction entities. Manufacturing outsourcing pertains to the activities involved in manufacturing and processing, or specific assembly or final assembly tasks of products; whereas service outsourcing relates to particular activities or service processes within the production framework. Yi (2007) believes that there are significant differences between manufacturing outsourcing and service outsourcing, and that the analytical methods and conclusions of manufacturing outsourcing cannot be directly applied to the study of the global service outsourcing value chain. It can be seen that service outsourcing is not the same as service industry outsourcing, but rather the outsourcing of service links, which may come from the service industry or the manufacturing industry.

During the research and practice of service outsourcing, scholars or enterprises in different countries have different emphases when interpreting service outsourcing, but generally it can be broadly divided into two categories. The first category is defined from the perspective of the nature and characteristics of service outsourcing. Liming and Liwen (2007) define service outsourcing as business restructuring, which is the process of transferring part of a company's production or service operations to other contracted companies for outsourced production according to specific processes. Feng (2007) constructed an economic analysis framework for international service outsourcing from the perspective of intra-product division of labour. He pointed out that 'although service outsourcing is, in the direct sense, a micro-decision-making behaviour in business management, the generalisation of such micro-behaviours represents a change in the overall production method at the macro level. The concept of outsourcing essentially involves a particular form of division of labour among various links and sections "within a product". The division of labour in the production

process is carried out on an international scale, forming an important micro-foundation for the current economic globalisation.' Xiaojuan (2008) discussed the applicability of traditional international division of labour theory to the study of service outsourcing and pointed out that 'the essence of service outsourcing is the integration of human capital market contracts and labour service enterprise contracts, which is a fundamental change in the way human capital is allocated.' Nan (2007) pointed out from the perspective of the law of international industrial transfer that service outsourcing is a business phenomenon in the process of international transfer of modern service industry, which is in line with the law of international industrial transfer and international division of labour.

In addition, some scholars have also classified service outsourcing according to its scope and characteristics. Feng (2007) divides outsourcing into domestic outsourcing and international outsourcing, depending on whether the outsourcing parties are located in the same country or region. If the outsourcing partners belong to different countries or regions, it is called international outsourcing. International outsourcing has other similar expressions, such as offshoring.

Value Chain Upgrading

The upgrading of the global value chain in the manufacturing industry means an improvement in the position of the global value chain in the manufacturing industry. It denotes the transition of the manufacturing industry from low-end segments reliant on extensive low-level production inputs to high-end segments that utilise substantial high-level production inputs. For enterprises, it is the process of transformation from labor-intensive economic entities with lower profits to capital-technology-intensive economic entities with higher profits; for industries, it refers to the optimization of inter-industry structure and the improvement of intra-industry efficiency;

Kogut (1985) introduced the notion of the value-added chain. The value chain model segments the product manufacturing process and the realisation of the product's final value into distinct components to highlight the interconnection among these components. Gereffi (1993) introduced the concept of the global commodities chain derived from the value chain. The global commodity chain model delineates the value chain network consisting of many firms and underscores the cooperative link among these entities in the commodity production and distribution process. Later, Gereffi (2001) formally proposed the concept of a global value chain. Immediately afterwards, Kaplinsky and Morris (2000), Humphrey and Schmitz (2002) and other scholars defined the upgrading of global value chains and proposed four upgrading models of global value chains: process upgrading, product upgrading, functional upgrading and chain upgrading. Among the four upgrading models, process upgrading is achieved by introducing production processes with higher technological content or restructuring and transforming the original production system to improve production efficiency and reduce production costs, thereby enhancing the core competitiveness of the enterprise. Product upgrading is achieved by increasing the complexity and technological content of the product, adding new functions and benefits, or introducing new product lines, shifting from simple low value-added products to complex high value-added products, and expanding the market share of the product. Functional upgrading is the to obtain higher added value; value chain upgrading is the process of switching from a lower-profit industrial chain to another, higher-profit industrial chain by cultivating a new value chain. Enterprises use the competitive

advantages gained in a specific value chain to embed themselves in a new, more profitable value chain. Therefore, by improving technological level and comprehensive capabilities, enterprises can engage in production processes or links with higher added value in the value chain, thereby improving their profitability. Koopman et al (2010) believe that the upgrading of value chains is mainly reflected in the rising status of global value chains (GVCs). Countries or regions no longer rely on the international division of labour determined by existing factor endowments, but strive to develop advantages in higher value-added and higher-level links in order to take the initiative in the international division of labour system and achieve dominance in the global value chain.

Service Outsourcing and Upgrading of Global Value Chains: Measurement Methods **Measurement Methods for Service Outsourcing**

The methods used in domestic and foreign literature to measure the level of service outsourcing can be divided into two main directions: one is to use the IMF balance of payments to measure, which is mainly based on the degree of similarity between the data items of international trade in services and the trade in services highly related to service outsourcing (Amit i& Shang-Jin Wei, 2005; Jingdong and Jiechang, 2013). However, this method has the problems of lagging data updates and the possibility of ignoring some forms and types of service outsourcing. Another approach is to measure outsourcing from the perspective of input-output, and the specific indicators are as follows: IITI (the proportion of imported intermediate inputs in total inputs), IIGO (the proportion of imported intermediate inputs in total output), IITM (the proportion of imported intermediate inputs in total imports), and the vertical specialisation index. In subsequent studies, Ling (2009) and others also used the IITI indicator to measure the outsourcing level of China's manufacturing industry. Yijun (2008) used Hummels et al's (2001) vertical specialization index method to measure the outsourcing level of China's manufacturing industry. Another commonly used method for measuring service outsourcing from an input-output perspective is the 'FH' index proposed by Feenstra and Hanson (1997, 1999). This index uses the proportion of imports of service inputs in total intermediate inputs as a measure of service outsourcing, and is widely used at home and abroad (Egger and Egger , 2003; Gorg & Hanley, 2003; Geishecker, 2006; Haiyun & Ling, 2009). The FH index more comprehensively characterises the outsourcing nature of an industry and has been widely used by the United Nations, the International Monetary Fund and many other countries and institutions. In subsequent research, Qifei and Weifu (2017) and Qifei and Qiang (2018) constructed a formula for measuring onshore outsourcing based on the FH index, using the proportion of intermediate inputs in the industry after excluding imported intermediate inputs as the denominator, and calculated the offshoring and onshoring indices at the industry level for Chinese provinces.

Measurement Methods for Value Chain Upgrading

(1) Value Dimension

① National level

National-level value chain upgrading is mostly assessed using non-competitive input-output tables (I-O tables). There are two sorts of I-O tables: single-country I-O tables and multi-country I-O tables. Single-country I-O tables encompass the origins of inputs and the endpoints of outputs, as well as the complex techno-economic relationships between sectors in terms of mutual provision and consumption of products. Multi-country input-output tables

add the supply and consumption relationships at the country-industry level to single-country input-output tables, so that the cross-border flow of value can be measured.

Vertical Specialisation Share Index (VS Index): Hummels et al. (2001) first proposed the vertical specialisation share index. Based on a country's input-output table, the value added of the country's export products is divided into domestic value added and foreign value added. The degree of vertical specialisation is calculated to reflect the degree to which the country participates in the global production chain (referred to as the HIY method). He defined the value of a country's imports of intermediate products as a proportion of the value of exports as the VS index, and the proportion of a country's value added in foreign exports as the VS1 index. However, the VS1 index cannot be calculated from a country's input-output table, and a cross-country input-output table must be used instead. The vertical specialisation share index is applicable to those cases where production is completed in two or more countries and goods cross borders at least twice. Hummels, Ishii, and Yi (2001) posited in their calculation method for the VS index that the value of all imported intermediate products solely reflects the value of foreign inputs, and that the ratio of imported intermediate products utilised as inputs in the production of domestic consumer goods and export products is identical, this method can cause serious deviations when used in countries such as China where processing trade accounts for a large proportion of foreign trade. This can lead to significant differences in the intensity of imported intermediate goods in processing export production and other sources of demand such as domestic final sales and normal exports, which in turn leads to a serious underestimation of the share of foreign value added in its exports. Based on the VS1 index, Daudin, Riffar and Schweisguth (2011) proposed the VS1* index (referred to as the DRS method). They defined VS1* as the proportion of the value of a country's exports that are intermediate goods imported by other countries for the production of final consumer goods, which are then re-exported to the country.

Value added export ratio (VAX Ratio): also known as the proportion of domestic factor value retained in exports. Johnson and Noguera (2012) proposed a method of value added trade statistics based on value added. In this method, value added exports refer to the value added created in a country that is ultimately absorbed by other countries, and thus truly reflect the actual scale and benefits of a country's export trade. The export value added ratio reflects a country's value added capacity and export competitiveness, and can to some extent measure a country's position in the global value chain. However, this method can reflect the double-counting of trade value-added, but it cannot focus on the import channels of trade value-added entering the final consuming country, nor does it take into account the domestic value-added part that is absorbed by the country after returning.

KPWW method, KWW method and WWZ method: ① In order to more accurately measure the degree of participation of a country or region in the global value chain of international trade, Koopman, Power, Wang and Wei (2010) proposed the KPWW method based on the HIY method for measuring the vertical specialization index. They use the non-competitive input-output table between countries to identify the domestic value-added and foreign value-added components of a country's total exports, and divide total exports into five parts, and based on this decomposition, constructed indicators to measure the degree of participation in global value chains and the division of labour status of industries—GVC_position and GVC_participation—to assess the extent and scope of a nation's

involvement in the global division of labour and commerce. The KPWW method decomposes and constructs indicators to measure a country's degree of integration into the global value chain and, to a certain extent, reflects whether industrial sectors are biased towards the upstream or downstream. ②Accordingly, Wang et al. (2013) and Koopman et al. (2014) disaggregated the overall export trade flow into value added and introduced comprehensive value added accounting frameworks (known as the WWZ method and KWW method, respectively). With the development of cross-country input-output tables, it has become possible to trace the whereabouts of each part of the value of exported products. Koopman, Wang and Wei (2014) have therefore constructed an accounting method based on cross-country input-output tables to decompose the total value of a country's exports, which improves the measurement of the global value chain participation index and the global value chain location index (referred to as the KWW method). The method divides the total value of exports into four parts: domestic value added absorbed abroad, domestic value added returned, double counting, and foreign value added in domestic exports. Each of these four parts can be further divided into those realised through the export of intermediate products and those realised through the export of final products. This method achieves two 'unifications': the unification of national income accounting and international trade accounting, and the unification of various indices measuring the degree of vertical specialisation into a single framework. Its innovation lies in the decomposition of the pure double counting part, which avoids its impact on domestic value added. However, this method can only disaggregate a nation's total exports, and cannot be specified to the industry level. It cannot reflect the heterogeneity of different exports when various value-added and double-counting decompositions are carried out, and therefore to some extent underestimates the foreign part of value-added exports (Borin and Mancini (2017)). ③Wang, Wei and Zhu (2013) proposed a framework for decomposing total trade flows at multiple levels (including the national/sectoral level, bilateral level, and bilateral/sectoral level), and thus established a complete set of algorithms for converting official trade statistics into trade value-added statistics, and breaks down a country's (or a country's industry's) total exports into 16 value-added components such as domestic value added (including absorption abroad and repatriation of capital), foreign value added and pure double counting. This method is also known as the WWZ method. The WWZ method further expands the decomposition of the total value of exports to the sectoral, bilateral and 'bilateral-sectoral' levels, offering a more empirical foundation for decision-making in the study of the global industrial chain.

Most domestic and foreign scholars have continued to use the KWW and WWZ methods when measuring value dimensions, and have conducted in-depth research on this basis. Jiang Xi and Liu Sicheng (2014) used I-O table data from the WIOD database to calculate the added value of China's manufacturing industry and its 14 sub-sectors' exports to the United States. Luo Changyuan and Zhang Jun (2014) provide a theoretical research framework for understanding China's value added. By using the OECD/WTO TiVA data to decompose China's exports, they found that the domestic value added of China's exports shows a 'U'-shaped development trend. Gao Yunsheng et al. (2015) used WIOD input-output data to measure the value-added component of China's exports to the EU. Los et al. (2016) used the 'hypothesis extraction method' to more easily measure the domestic value added in exports. Although this method is consistent with the results of the KWW method, it cannot decompose the foreign part of value-added exports. Miroudot and Ye (2019) decomposed GDP to obtain the pure domestic value-added and the export component of the domestic value-added.

② *Enterprise level*

The measurement method for trade added value based on input-output tables has three problems: First, the input-output table implicitly assumes fixed input-output coefficients, and the estimation results cannot capture the impact of exogenous shocks such as price changes on the input-output decisions of enterprises. Second, as a macro estimation method, it cannot reflect the heterogeneity of enterprises within an industry. Third, the availability of data. Therefore, some studies have begun to measure trade added value based on micro-enterprise data.

Upward et al. (2013), Kee and Tang (2016), and Alfaro et al. (2019) constructed enterprise-level domestic value-added indicators from the perspective of individual enterprises, and measured China's actual trade gains from participating in the division of labour in global value chains. Zhang Jie, Chen Zhiyuan and Liu Yuanchun (2013) comprehensively considered trade agents, indirect imports of intermediate products and imports of capital goods, providing a more accurate method for measuring enterprise trade value-added at the micro level. Zheng and Yu (2014) use firm-level data to measure the trade value-added rate of China's exports from 1999 to 2007 from a firm perspective. Tang, Wang and Wang (2014) further consider firm characteristics such as firm size and ownership structure, and combine China's input table by firm type and combined it with Chinese industrial census data and trade statistics. Pan An and Dai Ling (2020) developed a three-dimensional characteristic measurement index method for GVC division of labour, utilising the GVC participation index, GVC division of labour degree index, and GVC division of labour concentration index inside the total trade accounting framework.

Location Dimension

① *Average Propagation Length and Value added Propagation Length*

Dietzenbacher et al. (2005) addressed the concept of "length" in production linkages for the first time by introducing the input-output model of "Average Propagation Length (APL)" and utilised this model to assess cross-border linkages across key European nations. On this basis, Inomata (2008) and Escaith and Inamata (2013) conducted relevant extended analyses and extended this model to the international input-output framework. Dietzenbacher and Romero (2007) believe that the average propagation step can be divided into two dimensions: forward and backward. The former can measure the average stage number experienced by the intermediate input sector. Ye et al. (2015) constructed the APL index from the perspective of added value by using the number of circulation links of added value in the entire production process, and demonstrated the equivalence between its special form and the measurements of Fally (2012) and Miller and Temurshoev (2017).

② *Upstream and Downstream Degrees*

Fally (2012) first defined the number of production stages and used the distance from production to final demand to characterise the concept of upstreamness. Antràs et al. (2012) computed the upstream index by a weighted average utilising a recursive framework to indicate the extent of an industry's reliance on other industries, i.e. the higher the industry's position in the value chain, the higher its upstreamness and the greater its dependence on other industries. If an industry produces final consumer goods, then the upstream degree of that industry is 1; if the products produced by that industry are used in the production of other industries, then the upstream degree of that industry will gradually increase. Backer

and Miroudot (2013) and Ni Hongfu et al. (2016) extended this model to an international input-output model. Antràs and Chor (2018) utilised data from the World I-O Table spanning 1995 to 2011 to assess the positioning of industrial companies in different countries across the global value chain through upstream and downstream degrees.

③ *Production Length*

Muradov (2016) defines production length as the average number of times that the value added created by production factors circulates during the sequential production of total output, and can be decomposed into intermediate goods production and final goods production according to the form of total output products, and can be decomposed into cross-border intermediate goods production and cross-border final goods production according to whether or not they cross borders. Wang et al. (2017) adopt the same definition and use the KWW method to decompose production into a purely domestic component, a final goods trade component (Ricardian trade), and a GVC component, and employ the ratio of forward and backward production lengths to estimate the position of the global value chain division of labor by completely analysing export commerce and domestic demand. The larger the value, the closer a country's manufacturing industry is to upstream links such as research and development and design, and the production of key components in the global value chain division of labour system, leading and controlling the global value chain division of labour system, and having strong risk resistance.

Other Dimensions

① *Export Prices*

Schott (2004) found that there are price differences between developed and developing countries for the same product. Feenstra (2006) believes that the concept of product price plays an important role in analysing international trade, and explores how differences in product prices in different countries affect trade patterns and national welfare. Fontagn, Gaulier, and Zignago (2008) discovered that the majority of export products from developed nations are high-value items, positioning them at the upper echelon of the value chain, whereas most export products from developing nations are low-value items, placing them at the lower tier of the value chain. Shi Bingzhan (2010) uses the difference between the export price of a product and the world average export price to indicate the position in the international division of labour. Hu Zhaoling and Song Jia (2013) analysed the position of China's manufacturing industry in the international division of labour from two levels: product and industry, by studying the changes in export prices. They found that the level of international division of labour in China's manufacturing industry is still relatively low, but has improved since China's accession to the WTO. The division of labour position of low-tech products is higher than that of medium-to-high-tech products.

② *Export Technology Content*

Hausmann et al. (2007) proposed a method for measuring the technological complexity of export products by introducing the Product Complexity Index (PCI). The study found that the contribution of product complexity to economic growth has a significant positive impact. This means that export products with higher technological complexity not only bring higher economic benefits, but also promote the competitiveness and status of the country in the global market. Schott (2008) analysed data on Chinese export products from 1992 to 2005 to assess the relative complexity of items utilising the Technology Content Index (TCI). The study

found that the relative complexity of China's export products showed a clear upward trend, especially in high-tech and knowledge-intensive industries. Qiu Bin, Ye Longfeng and Sun Shaoqin (2012) used export technology complexity to measure China's global value chain division of labour position in 24 manufacturing industries from 2001 to 2009. Liu Weilin and Li Lanbing (2014) assessed the export technology complexity of 27 manufacturing sectors in China from 2001 to 2010, revealing that the importation of intermediate products from OECD countries negatively impacts China's export technology complexity, whereas the importation of intermediate products from non-OECD countries positively influences it.

③ *Indicators of Value-Added Trade-Based Measurement of the Division of Labour in Value Chains*

Some scholars have built new indicators to measure the location of value chain division of labor based on trade value added. Commonly utilised indicators include revealed comparative advantage and the position inside the value chain division of labour.

Wang, Wei and Zhu (2013) redefined the revealed comparative advantage, which indicates a country's industrial export competitiveness, based on domestic value added, replacing export value with export domestic value added. Later, some scholars used the modified RCA index to measure international competitiveness. Cui R. and Zhang Y. (2019) use a modified RCA from the perspective of value added to assess the international competitiveness of emerging economies. Tang H. and Zhang H. (2009) use this method to analyse the position of China's manufacturing industry in the global value chain. However, Amighini's (2004) research pointed out that in the international division of labour under global value chains, the degree of dependence between a country's imports and exports of products is increasing. Under this situation of high dependence on imports and exports, the RCA index, which only considers a country's exports of products, can no longer adapt to the new development of intra-product production and trade division, and cannot accurately reflect a country's international competitiveness of products. Therefore, the NET (net trade index) was proposed, which takes both imports and exports into account and can more accurately evaluate a country's international competitiveness of products.

The Economic Effect of Outsourcing on the Upgrading of Global Value Chains *Productivity Effect*

Since the early 1990s, the role of outsourcing in improving total factor productivity has gradually attracted widespread attention from academia. From a macro perspective, Egger et al. (2001) used data from 18 Australian manufacturing industries from 1990 to 1998 to examine the impact of outsourcing on productivity. Assuming that the import share of intermediate inputs was the same and controlled for the interaction between outsourcing and low-skilled labour and capital-intensive labour, outsourcing to Eastern European countries was found to have a significant positive impact on total factor productivity. Olsen (2006) found that outsourcing in the service sector will bring about more productivity gains than outsourcing in the manufacturing sector. From a microeconomic perspective, Antràs and Helpman (2004) used data from Spanish manufacturing enterprises from 1990 to 2002 and found through empirical analysis that the reason for the substantial increase in labour productivity in the manufacturing sector was international outsourcing of services. Among these, for every 1% increase in offshore outsourcing, labour productivity in manufacturing enterprises would increase by 2.5%. Ma Fang et al. (2012) used the software information

industry as an example and found that service outsourcing can effectively improve the efficiency of independent innovation, resource utilization efficiency, and promote the transformation and upgrading of the economic structure.

Subsequently, researchers from diverse nations began to increasingly focus on the effects of outsourcing on the productivity of both the client and the contractor. Gorg & Hanley (2005) used data from 652 Irish electronics companies to find that outsourcing goods has no significant impact on labour productivity in both the upstream and downstream sectors, but outsourcing services has a different impact on the labour productivity of the upstream and downstream sectors. The former has a non-significant negative impact, while the latter has a significant positive impact. They analysed that the reason for this result may be that the upstream sector outsources high-skill links while the downstream sector does the opposite, outsourcing low-skill links and concentrating on the production of high-tech-intensive links. Therefore, service outsourcing has a greater impact on downstream sector labour productivity through the 'learning by doing' effect. Chinese scholars Lv Yanfang and Wang Dong (2010) used panel data from 1998 to 2007 from 11 manufacturing industries in China to study the impact of international outsourcing on total factor productivity. They found that China's acceptance of international outsourcing did not improve the total factor productivity of the manufacturing industry, and that the acceptance of international outsourcing by manufacturing industries that mainly engage in simple processing has a significant negative impact on total factor productivity.

Technology Effect

(1) From the Perspective of the Impact of Service Outsourcing on the Technological Leadership of the Contracting Country

Arora and Gambardella (2004) analysed the impact of service outsourcing on the technological leadership of the contracting country from the perspective of the contracting party. The findings show that outsourcing services allows the United States to concentrate more resources on developing new software, which in turn drives economic growth. The technological leadership of the United States depends on the number and resources of technical experts and engineers around the world, not just within its borders. Bardhan and Jaffee (2005) conducted a systematic study on the relationship between outsourcing, innovation and research and development. They believe that while outsourcing transfers work and technology, it also stimulates innovation, the development of more new technologies, the exploration of more industrial fields, and the creation of new jobs. Therefore, outsourcing countries are not threatened by their technological leadership. Görg and Hanley (2011) used enterprise-level data to conduct a comprehensive empirical analysis of the links between international service outsourcing, domestic outsourcing, profits and innovation. They found that international service outsourcing and domestic outsourcing have a positive impact on enterprise-level innovation activities, but domestic outsourcing has a smaller impact than international outsourcing. They also found that international service outsourcing has a positive impact on profitability, while domestic outsourcing does not.

(2) From the Perspective of the Impact of Service Outsourcing on the Technological Level of the Contracting Country

Pack and Saggi (2001) believe that the technology transfer obtained by the recipient is essentially the diffusion of technology between upstream and downstream links in the value chain. The United Nations Conference on Trade and Development (UNCTAD) believes that the multinational companies outsourcing services in the process play an important role in promoting the technological progress of developing countries that undertake outsourcing. While bringing hardware and technology, they also bring many soft technologies, such as management experience, technical knowledge, market information, etc. Ernst and Kim (2002) established a conceptual model to specifically study the relationship between globalised production networks, the technological diffusion of multinational companies in developed countries, and the technological upgrading of enterprises in host countries. Global production networks are an innovative model of international economic organisation in the context of economic globalisation. Outsourcing a service or product to other countries or regions is a typical form. In order to meet production requirements, technology leaders will transfer technology or knowledge to local companies in the host country to enhance the capabilities of upstream and downstream companies in the industrial chain. The diffused knowledge includes both explicit knowledge that is actively transferred and tacit knowledge that is passively spilled over, and these undoubtedly play a positive role in promoting the host country suppliers' ability to improve their own capabilities and technology levels. At the same time, under the competitive pressure brought about by multinational companies, local competing enterprises that undertake outsourcing will also actively imitate and learn, thereby improving the overall industrial technology level. Long (2005) believes that since outsourcing companies will set corresponding standards and requirements when outsourcing, training will usually be provided to the contractor to meet these standards, which directly improves the quality and skills of the contractor's workforce and promotes the development of technology and innovation in the enterprise. Wang Xiaohong (2008) analysed data from 80 design companies in China and demonstrated that engaging in foreign service outsourcing might generate technology spillover effects and facilitate prospects for technological advancement in organisations. Therefore, from the perspective of the contractor, domestic and foreign research confirms the technology diffusion effect of service outsourcing. However, whether the diffused knowledge and technology can be absorbed and transformed into self-use by the recipient depends on the recipient's own ability to digest and absorb and innovate.

Employment Effect

① *Based on the Perspective of the Outsourcing Country*

Egger and Egger (2003) used Austria as a research sample and found that outsourcing to Russia and Eastern Europe can increase the scale of employment in the country. Amiti M and Wei SJ (2005) empirically tested whether offshoring of services leads to increased unemployment in the outsourcing country, and the results show that offshore service outsourcing in developed countries does not have a negative impact on employment. Therefore, offshore outsourcing of services by developed countries will not have a negative impact on employment. Görg and Hanley (2005) conducted an empirical study from both short-term and long-term perspectives, and the study found that short-term outsourcing of services has a negative impact on employment in the contracting country, while long-term outsourcing of services has a beneficial impact on employment in the contracting country. Egger and Eg (2006) found that short-term outsourcing is not conducive to the employment of low-skilled labour and will cause fluctuations in the job market, using data from EU countries. Amiti, and Ekholm, K (2006) empirically analyzed the impact of service outsourcing

in EU countries on domestic employment. Specifically, if a country's labour market has high rigidity, then outsourcing services will have a dampening effect on labour employment, and it will have a facilitating effect anyway. Qifei et al. (2016) used UNCTAD's database and China's input-output table data to study the impact of service outsourcing on employment. They found that on the one hand, the development of service outsourcing might diminish production expenses and elevate worker salary rates; on the other hand, the development of service outsourcing can lead to a decline in China's overall employment rate, but at the same time it can also increase the demand for skilled labour. In conclusion, from the viewpoint of the outsourcing entity, both local and international research have validated the beneficial impact of service outsourcing on employment within their respective nations. However, the actual direction of the effect depends on the specific circumstances of each country's labour market.

② *From the Perspective of the Contracting Party*

Farrell (2005) examined the employment and wage statistics of the contracting nations and posited that engaging in service outsourcing can generate increased employment and social benefit. Sun Huihuang (2007) established the impact mechanism of international outsourcing on the income distribution of workers in the contracting country, and concluded that outsourcing, especially the transfer of intermediate input production by developed countries, will increase the relative demand for skilled labour in the contracting country, which will in turn increase the relative wages of skilled labour and widen the income gap between skilled and unskilled labour. Chen Jinghua (2007) used statistical analysis methods to analyse the impact of offshoring of the service industry on both the exporting and contracting countries, using the United States and India as examples. The research results show that engaging in offshore outsourcing within the service sector alleviates employment strain and facilitates the advancement of industrial structure in developing nations. Ren Zhicheng and Zhang Erzhen (2008) analysed the employment effects of service outsourcing on host countries, and concluded that service outsourcing can promote employment expansion, increase worker compensation, and upgrade labour skills. A study by Lin Jishuang and Ma Yajuan (2016) found that China's outsourcing and offshoring have had a significant impact on employment in the manufacturing and service industries. Outsourcing is conducive to improving employment levels, while offshoring has the opposite effect. In summary, notwithstanding variations in the effects of service outsourcing on the labour skill structure, most domestic and foreign studies have found that outsourcing has a significant positive effect on employment in the country.

The Impact of Service Outsourcing on the Upgrading of the Global Value Chain in the Manufacturing Industry: An Empirical Perspective

The Impact of Service Outsourcing on the Enhancement of the Value-Added Capacity of the Manufacturing Industry Value Chain

There have been relatively few direct systematic studies on the impact of service outsourcing on the upgrading of the value chain. Existing literature mainly discusses the issue from the perspective of manufacturing servitization, service industry opening up and producer services.

From the perspective of the service-oriented manufacturing industry, Weilin et al. (2014) used a non-competitive input-output table to distinguish between the production of imported intermediate inputs and final consumption purposes. Drawing on the KWW method, they

obtained the intermediate consumption matrix for processing trade, general trade and domestic sales, and the proportion of foreign value in China's manufacturing exports. This was used as an indicator to measure imported services, and it was finally found through econometric analysis that imported services have an enhancing effect on the position of the manufacturing industry in the global value chain. Xiu and Zhongxiu (2018) examined the influence of intermediate inputs of productive services on manufacturing exports of final goods and intermediates, utilising input-output data from 40 economies documented by WIOD 2013 for the period 1995-2011, within the framework of global value chains. The findings indicate that intermediate inputs of productive services significantly enhance the value-added rate of manufacturing exports of final goods, with this effect being more pronounced when the intermediate inputs originate from a developed economy and the manufacturing sector is situated in a developing economy.

In terms of the opening up of the service industry, Jiang Yue and Huang Fanhua (2018) examined industry data from a sample period of 2004-2011. The empirical study found that the opening up of the service industry can promote the growth of domestic added value in China's manufacturing exports. Relatively speaking, the opening up of the service industry has a greater positive effect on the domestic added value of China's capital-intensive manufacturing exports. Yingying (2019) used the World Bank Services Trade Restrictiveness Index and the WIOD database to study the impact of the opening up of the service industry on the upgrading of the manufacturing value chain. The conclusion shows that the liberalisation of trade in services can significantly improve the division of labour position of manufacturing enterprises in the value chain, but the impact mechanism is not analysed in depth. Chao et al. (2020) constructed a theoretical model of the impact of the opening up of the service industry on the domestic value added rate of exports and found using micro-enterprise data that relaxing foreign investment restrictions in the service industry can significantly increase the DVAR of manufacturing enterprises to a certain extent, and a good regional institutional environment will strengthen this effect. Further mechanism tests found that the relaxation of foreign investment restrictions in the service industry promotes the DVAR of enterprises by reducing the relative price of domestic intermediate products and increasing the markup rate of enterprises.

From the perspective of producer services, Jun (2019) examined its impact on the functional upgrading of the value chain from the perspective of the import of producer services. Using data on the domestic value-added rate of enterprise exports, it was found that although the import of producer services promoted the upgrading of enterprise products, the increase in production costs due to imports was greater than the technological innovation brought about by imports. Consequently, the importation of producer services curtailed the rise in the domestic value-added rate of exports from China's manufacturing companies, thereby obstructing functional upgrading. Hui et al. (2020) constructed a preference index for productive service resources based on the measurement method of Antràs et al. (2012), that is, the distance between the productive service resource embedded in the manufacturing sector and the final product is measured after considering the impact of inventory. Using multiple regression methods, it is found that the domestic value-added rate of manufacturing exports shows a 'U'-shaped trend with changes in the preference of productive service resources.

The Impact of Service Outsourcing on the Improvement of the Embedded Position of the Manufacturing Value Chain

Lan and Hongyan (2015) explored the impact of integration into global value chains on the position of China's manufacturing industry in the international division of labour based on the framework of trade in value added. Xing et al. (2016) calculated a variety of indicators to represent the scale of offshoring and found that outsourcing of resources, labour, capital and knowledge-based manufacturing is not conducive to improving the position of the service industry in the global value chain, while outsourcing of knowledge-based services can significantly promote the service industry to climb to a higher position in the global value chain. Qifei and Lu (2020) used comprehensive input-output data in China and found that outsourcing of services has a significant promoting effect on the length of China's industrial chain. Yan and Shanshan (2021) used the upstreamness index proposed by Antràs et al. (2012) to measure the 'value chain position' at the industry level, and constructed a cross-country industry panel data regression. The results show that the opening up of producer services is conducive to the movement of the manufacturing value chain to upstream links, and from the perspective of the impact mechanism, the opening up of producer services promotes the movement of the manufacturing value chain to upstream links by increasing the level of product diversification and promoting technological innovation in manufacturing enterprises.

The Impact of Service Outsourcing on other Indicators of Value Chain Upgrading

Farrell and Zainulbhai (2004) found through a study of India's outsourcing of ITO and BPO that the participation of multinational companies has prompted the effective restructuring of Indian companies, and the sectors that have taken on outsourcing have rapidly improved both in terms of output efficiency and international competitiveness. Xiang (2016) and Qifei et al. (2013) respectively discussed the impact of China's export of manufactured goods on the increase in technological complexity from the perspective of the liberalisation of trade in services and reverse service outsourcing. Yingying and Bin (2018) developed a manufacturing servitization index from a value-added perspective, along with two novel indicators to assess the technical complexity of manufacturing exports based on forward and backward linkages among industrial sectors. They employed these indicators to evaluate the overall servitization level of the manufacturing sector, the technological complexity of manufacturing exports categorised by factor intensity, and the technological complexity of manufacturing across 40 countries (or regions) from 1995 to 2009. Xu and Lian et al. (2018) utilised social network analysis to validate the influence of offshore service outsourcing on enhancing the service industry's status within the global value chain division of labour, employing data from 40 countries spanning 1995 to 2011, while addressing the heterogeneity arising from variations in factor intensity and the structural associations related to offshore service outsourcing.

Summary and Future Prospects of Existing Research

With the deepening of globalisation of production, the concept of 'global value chain' has gradually emerged and become a research hotspot. A review of relevant theories and literature reveals that most domestic and foreign scholars have mainly discussed the upgrading of global value chains from the perspectives of the servitization of manufacturing, the opening up of the service industry and producer services. There have been relatively few studies that directly and systematically examine the upgrading of global value chains in the manufacturing industry from the perspective of service outsourcing. Therefore, there is room for in-depth discussion of this issue:

From a research perspective, the existing literature mainly discusses service outsourcing through a single form, without incorporating the various dimensions of service outsourcing into a complete and unified framework for analysis. Future research can incorporate the impact of service outsourcing on the upgrading of China's manufacturing value chain into a unified analytical framework, and supplement research on the value chain upgrading perspective and the economic effects of service outsourcing from the dual perspectives of traditional service outsourcing and reverse service outsourcing, contractors and contractors, offshore and onshore service outsourcing.

From a research perspective, studies on service outsourcing have mainly focused on the transnational and industry levels, while relatively few studies have been conducted at the enterprise level and the provincial regional level. Therefore, further analysis of the impact of service outsourcing on the global value chain of the manufacturing industry from a regional perspective can provide supplementary information and reference for studying new paths for upgrading the regional industrial value chain.

In terms of research methods, firstly, the existing literature lacks in-depth discussion on the heterogeneity of service outsourcing research. In fact, there are significant differences in service outsourcing among different types of countries, industries, enterprises, and urban agglomerations. Consequently, it is essential to analyse the influence of heterogeneous service outsourcing on the enhancement of manufacturing global value chains. Secondly, the methods for measuring the position in global value chains are relatively simple, and most scholars use methods such as HIY and KWW. A minority of studies use the length of the production chain method to measure the global value chain position index.

From the research results, the research conclusions on the specific impact of service outsourcing on the upgrading of manufacturing value chains are also inconsistent, indicating that there is still a need for further research on the relationship between the two. Future research needs to thoroughly sort out the impact of service outsourcing on the upgrading of manufacturing value chains, analyse the impact mechanism of service outsourcing on the upgrading of manufacturing value chains, and select appropriate empirical research methods and models for research.

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