The Impact of Value Chain Embedding on Industrial Structure Optimization

Haobo Luo

College of Statistics and mathematics, Zhongnan University of Economics and Law, Wuhan, China

luohaobo@stu.zuel.edu.cn

Abstract. Value chain embedding refers to the participation of enterprises in the activities of the global value chain and the benefits derived from it. Existing studies have shown that value chain embedding can bring multiple benefits, including improving production efficiency, reducing costs, enhancing product quality, and innovation capabilities, among others. However, the specific impact of value chain embedding on industrial structure optimization is still controversial in current literature. This article analyzes the impact of value chain embedding from the perspectives of manufacturing industry, service industry, industrial sector, and developing countries. By using a literature review approach combined with existing findings, this article summarizes the impacts of value chain embedding and proposes relevant suggestions to promote sustainable economic development. This study has important practical significance for enterprises to effectively embed value chains in their business processes and achieve efficient development.

Keywords: Value chain embeddedness, Industrial structure, Manufacturing, services, Sustainable development.

1. Introduction

1.1. Research Background and Significance

The continuing advance of globalization has made global value chains (GVCs) an increasingly important component of international economic interaction. GVCs refer to the set of activities and links involved in the production and distribution of goods and services, covering material, information and financial flows between different countries and regions.

The worldwide model of production organization has significantly influenced the restructuring of industrial frameworks across different countries and regions. Value chain embedding, in this context, pertains to the seamless integration of value activities across various stages in a company's operations, resulting in the formation of a comprehensive value chain. The process of optimizing industrial structure through value chain embeddedness is a complex and multifaceted theme. For developing countries, participation in GVCs could bring opportunities for technology transfer, employment opportunities and economic growth. By assuming diverse roles within GVCs, these nations can progressively enhance their industrial structure, transitioning from conventional labor-intensive sectors to technology-intensive industries with increased value addition. Conversely, for developed countries, the integration of GVCs may influence their established industrial structure, necessitating additional structural adjustments and innovation.

While there have been studies on GVCs in certain articles, there remains a dearth of literature concerning the influence of value chain embeddedness on the optimization of industrial structures. For the reasons outlined below, it is imperative to consolidate and assess this matter and delve into its prospective avenues for further research. First, a systematic summary of the impact of value chain embeddedness on industrial structure optimization will help people understand the impact of value chain embeddedness on different industries and countries more comprehensively, and provide an in-depth research basis for related theories and policies. Secondly, by analyzing the mechanism of value chain embeddedness, the author can better understand how to optimize the industrial structure and promote industrial upgrading and transformation through the participation in global value chains. Thirdly, it can provide some references and suggestions on the formulation of relevant policies, which

can help governments and enterprises to better formulate and implement relevant policies and promote sustainable economic development.

1.2. Research Contents

This paper is organized along the following lines. First, the author will review the relevant literature and introduce the definition and origin of global value chains. Secondly, this article will analyze the impact of GVCs on different industries and economic sectors, and explore their dynamic mechanisms on industrial restructuring. At the same time, this article will also compare the different situations of GVCs in different countries and regions, analyze the successful cases and summarize the lessons learned from the failures, and better understand the opportunities and challenges of industrial restructuring by comparing the positioning and advantages of different countries in GVCs. Finally, it summarizes the current state of research, points out the deficiencies and problems, and proposes a forward-looking research direction.

2. The Theoretical Framework for Value Chain Embeddedness and Industrial Structure Optimization

2.1. The Value Chain Concept and Its Evolution

Global Value Chains is an economic concept, which refers to the various links and flow paths of value increase that different countries and regions participate in in the production process of products. Porter first found that any enterprise exists in a multi chain value system, and then Krugman made up for the former's weakness in emphasizing the competitive advantage of a single enterprise [1]. The ultimate concept was introduced by Gary Gereffi and fellow scholars in 1994 to characterize the emerging paradigm of commodity production in the era of globalization. As globalization has continued to advance, transnational corporations have established an intricate and multi-tiered global value chain network by engaging in division of labor and collaborative efforts across various countries and regions.

Throughout its evolution, GVCs have undergone a succession of transformations. Initially, GVCs were predominantly controlled by major transnational corporations (TNCs) that, via arrangements for division of labor and consolidation of resources, gained mastery over the critical nodes of the entire production chain. However, with the development of information technology and the expansion of global supply chains, more and more small and medium-sized enterprises (SMEs) and emerging market countries have joined GVCs. Through their participation in GVCs, these enterprises have gained access to technology, management experience and market opportunities, thereby enhancing their competitiveness.

2.2. The Concept and Objectives of Industrial Structure Optimization

The optimization of industrial structure entails the modification and enhancement of the weights and configurations of diverse industrial sectors within the national economy. The objective is to maximize the benefits of economic development, optimize resource allocation, and achieve economic sustainability goals. Its objective is to enhance the competitiveness, innovation capacity, and productivity of the entire economy while fostering economic transformation and advancement. Two primary criteria are used to assess the optimization of industrial structure: transitioning from low-end to high-end and internal characteristics [2].

Specifically, the objectives of industrial structure optimization include the following: first, to improve the efficiency of the economy, optimize the allocation of resources, improve the efficiency of resource utilization and productivity, and reduce production costs. Secondly, the aim is to foster industrial upgrading and transformation by transitioning traditional industries into modern ones characterized by high value-added and advanced technology. This initiative seeks to boost industrial competitiveness and innovation capacity. Thirdly, it will strengthen the innovation drive, promote the

development of new industries and transform the economy from labor-intensive to knowledge-intensive and technology-intensive. Fourth, it will promote the interaction and synergistic development of urban and rural economies, strengthen the connection between agricultural modernization and rural industrial development, and realize integrated urban and rural development. Fifthly, improve the efficiency of resource utilization, reduce the degree of dependence on resources, promote green and low-carbon development, and realize sustainable development. The trajectory of China's forthcoming industrial restructuring revolves around prioritizing high-tech sectors, driving the enhancement of the overall industrial framework via advancements in the modern service and manufacturing industries [3].

2.3. The Relationship Between Value Chain Embeddedness and Industrial Structure Optimization

There exists a significant correlation between value chain integration and the optimization of industrial structure. By effectively integrating into the value chain, businesses can achieve efficient resource allocation and utilization, consequently enhancing the value of their products or services and attaining competitive advantages.

First, value chain embedding can promote the optimization of industrial structure. In a complex industrial ecosystem, different enterprises undertake different value activities. By integrating inter-firm cooperation and coordination into the value chain, the efficiency and synergy of the whole industry can be improved. For example, in supply chain management, enterprises can realize the optimization of raw material procurement, production process and product logistics through close cooperation with suppliers, manufacturers and distributors, so as to improve the overall efficiency of the industry. Secondly, through value chain embedding, enterprises can search for and expand their core competencies and match different links in the value chain with their own core competencies through internal vertical integration or external cooperation. They can also utilize their own areas of expertise to form complementary relationships with other enterprises and achieve division of labor and cooperation. This optimized industrial structure can promote innovation and growth of enterprises and further consolidate their competitive advantages. In addition, value chain embedding can also promote industrial upgrading and transformation. By cooperating with enterprises in other segments, enterprises can obtain more market information and technological innovations, and such close cooperative relationships can help enterprises identify market changes and opportunities earlier.

In summary, value chain embedding and industrial structure optimization are complementary. By deeply embedding themselves in the entire value chain, enterprises can achieve the circulation of resources, capabilities and information, promote industrial optimization and upgrading, improve their competitiveness and reduce costs.

3. The Impact of Value Chain Embeddedness on the Optimization of Industrial Structure

3.1. The Impact of Value Chain Embeddedness on Industrial Structure in Different Industry Contexts

In the manufacturing sector, embedding in GVCs can directly promote the transformation and upgrading of the manufacturing industry. Through engagement in Global Value Chains (GVCs), Chinese manufacturing enterprises can surpass the constraints of low-end integration and achieve the objective of transformation and upgrading [4]. At the same time, Chinese equipment manufacturing enterprises participating in GVCs face more intense international competition, and this competitive effect enhances their global resource allocation capacity [5].

Compared to the manufacturing sector, the service industry has lower asset specificity, higher levels of integration and penetration, and more diverse methods of creating value. As a result, it is easier to achieve horizontal leaps in the global value chain [6]. Once China's service industry is

integrated into the global value chain, its export technology complexity is significantly improved, especially for the low technology intensive service industry [7]. In addition, deepening value chain embeddedness has also played a positive role in promoting China's industrial transformation and upgrading, especially in labor-intensive industries and high-tech industries [8].

Previous research indicates that the influence of value chain integration on industrial structure varies across different industry contexts. For manufacturing industries, participation in GVCs can promote transformation and upgrading and enhance the ability to allocate global resources, while for service industries, GVC embeddedness can enhance the technological sophistication of exports and play a positive role in industrial transformation and upgrading.

3.2. A Case Study of Industrial Structure Optimization at the National Level

The deepening of the supply base of GVCs and the development of local clusters at the bottom end of GVCs has provided some developed country SMEs with the opportunity to subcontract their operations directly to local clusters in developing countries, thus obviating the need for overseas investment [6]. This approach can help developing country clusters to better integrate into global value chains and achieve economic growth. In the process of realizing economic growth, developing countries often face two bottlenecks: insufficient financial savings and trade deficits. In order to fill these two gaps, developing countries need to introduce foreign capital into their economies [9].

Developing countries usually participate in the division of labor system of GVCs in the form of OEM, without having to invest in advanced factor accumulation and technological innovation capacity to reap the benefits [10]. In addition, there are usually three ways for developing countries to integrate their industrial clusters into GVCs: first, through contractual embedding, i.e., signing contracts with foreign firms to realize integration; second, by attracting foreign-invested enterprises to promote integration; and third, by supplying products or services to foreign markets to integrate into the GVCs [11]. These approaches enable developing countries' industrial clusters to better interface with GVCs and thus gain more opportunities and benefits.

4. Challenges and Coping Strategies: Path Choices for Achieving Industrial Structure Optimization

According to the observation of the trend of change in the integration path, low-technology industries have begun to transform, but there is still a huge development space for technological upgrading; while medium- and high-technology industries are facing the unfavorable situation of being confined to the low-end downstream segments [12]. In order to cope with these challenges, Chinese foreign trade enterprises can adopt the following strategies to optimize and upgrade their industrial structure.

4.1. Entering Emerging or Underdeveloped Markets

By entering emerging or underdeveloped markets with lower levels of economic development, foreign trade enterprises can realize high-end embeddedness and enhance value-added in order to realize internationalization and upgrading [13].

4.2. Strengthening the Financing Environment and Technological Support

In formulating industrial development strategies, producer-driven industrial clusters should strengthen the financing environment and technological support in order to support enterprises in technological upgrading and innovation [14].

4.3. Promotion of Infrastructure Development

Strengthening infrastructure development, particularly in the areas of transportation, communications and energy, in order to improve the operational efficiency and quality of all links in the industrial chain.

4.4. Promote the Merger and Reorganization of Upstream and Downstream Enterprises

By encouraging cooperation and integration between upstream and downstream enterprises, the company can achieve the optimal allocation of resources, improve the integration of the supply chain, and thus enhance the competitiveness of the entire industrial chain.

In addition, different strategies need to be adopted for the impact of the integration of global value chains on low technology industries and high-tech industries. For low technology industries, technological upgrading and innovation should be strengthened to offset the negative impact of the global value chain. For the high-tech industry, although the introduction of imitation technology path has not significantly improved its value-added rate, it can still play a greater role in the global value chain through technological innovation and continuous improvement of core competitiveness [15].

Through the comprehensive application of the above strategies, Chinese foreign trade enterprises can actively cope with the challenges of industrial structure optimization, and achieve industrial transformation and upgrading and international competitiveness.

5. Conclusion

By reviewing and summarizing the current studies, this paper finds that there are still some research gaps in the relationship between value chain embeddedness and industrial structure optimization. Firstly, the relationship between value chain embeddedness and industrial structure optimization in different types of industrial clusters lacks in-depth exploration. Secondly, the impact mechanism of value chain embeddedness on industrial structure adjustment needs further research. In addition, the relationship between value chain embeddedness and industrial structure optimization under different economic policy backgrounds still needs to be explored. In the future research, the author can conduct more in-depth research in the following aspects. First, the relationship between value chain embeddedness and industrial structure optimization in different types of industrial clusters can be studied through empirical research method and big data. Secondly, quantitative research methods such as system dynamics modeling can be applied to examine the influence mechanism of value chain embeddedness on industrial structure adjustment from a dynamic perspective. In addition, value chain embeddedness and industrial structure optimization under different economic policies can also be analyzed through comparative research methods.

In summary, the relationship between value chain embeddedness and industrial structure optimization is a complex and important research area. The author needs to further study the specific situation in different types of industrial clusters and explore their influence mechanisms in different stages and contexts. At the same time, this paper needs to strengthen the combination of theoretical and empirical research and utilize various research methods to provide more accurate guidance for policy makers and stronger support for industrial development.

References

[1] Zhang Hui. Research on Global Value Chain Theory and China's Industrial Development. China Industrial Economy, 2004, (05): 38-46.

[2] He Ping, Chen Dandan, Jia Xiyue. Research on Industrial Structure Optimization. Statistical Research, 2014, 31 (07): 31-37.

[3] He Dexu, Yao Zhanqi. Effects of China's industrial restructuring, optimization and upgrading objectives and policy measures. China Industrial Economy, 2008, (05): 46-56.

[4] Yu Donghua, Tian Shuang. The Impact Mechanism of Embedded Global Value Chain on the Transformation and Upgrading of China's Manufacturing Industry. Reform, 2019, (03): 50-60

[5] Pan Qiuchen. Research on the Impact of Global Value Chain Embedding on the Transformation and Upgrading of China's Equipment Manufacturing Industry. World Economic Research, 2019, (09): 78-96+135-136.

[6] Liu Yi, Xia Jiechang. Embedding and upgrading of service industry clusters under the global value chain - case analysis of creative industries. China Industrial Economy, 2009, (12): 56-65. 7.

[7] Liu Zhibiao, Zhang Jie. The formation, breakthrough and countermeasures of captive networks in developing countries under the global OEM system - based on the comparative perspective of GVC and NVC. China Industrial Economy, 2007, (05): 39-47.

[8] Li Huijuan, Cai Weihong. The Impact of Global Value Chain Embedding on the Technical Complexity of China's Service Industry Export. International Trade Issues, 2017, (01): 70-80.

[9] Wang Yuyan, Lin Hanchuan. Can Global Value Chain Embedding Improve the Effect of Industrial Transformation and Upgrading - Empirical Test Based on China's Industrial Panel Data. International Trade Issues, 2015, (11): 51-61.

[10] Zhang Hui. Research on the Upgrading Mode of Local Industrial Clusters under the Global Value Chain. China Industrial Economy, 2005, (09): 11-18.

[11] Zhang Shaojun, Liu Zhibiao. Industrial transfer of global value chain model - power, impact and inspiration for China's industrial upgrading and regional coordinated development. China Industrial Economy, 2009, (11): 5-15.

[12] Wang Lan, Li Hongyan. Research on the path of China's manufacturing industry integrating into the global value chain - perspective of embedded location and value-added capability. China Industrial Economy, 2015, (02): 76-88.

[13] Xu Hui, Xu Shouren, Wang Ruizhi. Enterprise internationalization transformation and innovation path embedded in the global value chain - cross case study based on six foreign trade enterprises. Science of Science Research, 2014, 32 (01): 73-83.

[14] Zhang Hui. Global value chain dynamic mechanism and industrial development strategy. China Industrial Economy, 2006, (01): 40-48.

[15] Hu Yanan, Yu Donghua. Global value chain embedding, technology path selection and high-quality development of manufacturing industry. Science and technology progress and countermeasures, 2021, 38 (21): 44-52.