Influence Mechanism of Intermediate Product Import on GVCs Upgrading in the Manufacturing Industry

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Abstract

This paper analyzes the mechanism of intermediate product import, independent innovation and the upgrading of manufacturing global value chains（GVCs）upgrading. Firstly, starting from the import of intermediate product, which is one of the external sources affecting the upgrading of GVCs in manufacturing industry, the mechanism of the impact of intermediate product import on independent innovation is analyzed, It Included the imitation demonstration effect, the competition effect, the quality effect, the technology spillover effect. These effects promote the ability of industrial innovation and lead to the upgrading of enterprise value chains, and at the same time, they will also inhibit industrial innovation through the squeezing effect, dependency effect and substitution effect. Secondly, the influence mechanism of intermediate product import on GVCs upgrading in manufacturing industry is analyzed. Its own cost effect, category effect and quality effect will form a comparative advantage and directly promote the value chains upgrading. Finally, the paper analyzes the influence mechanism of independent innovation on GVCs upgrading from the perspective of enterprise heterogeneity.

Keywords

Intermediate product; Import; Independent innovation; Manufacturing; Global value chains (GVCs).

1. Introduction

Most scholars at home and abroad have shown that the import of intermediate product can improve the product quality of enterprises through what is commonly known as quality effect, diversification effect and cost effect, and the imitation learning effect and competition effect. It can spread the promotion from enterprises to industries, so as to realize the value chains upgrade of such products in a country or region. The GVCs upgrading of an industry is also closely related to the independent innovation capability of the industry. Innovation can directly complete the process upgrading, product upgrading, function upgrading and chains upgrading from within the industry, and drive the industry to realize the GVCs upgrading. In addition to the direct impact on the upgrading of the value chains, the research of some scholars also proves that the import of intermediate products can affect the position of the industry in the GVCs by influencing independent innovation.

To clarify the relationship between the products' import and independent innovation, on how to affect the interaction between manufacturing GVCs upgrade, and how to direct impact on the GVCs upgrade manufacturing, in this paper, we start from the interactions of products' import and independent innovation, through the analysis of how intermediate product imported through the effect of competition, effects of technology spillover and quality, promote manufacturing industry independent innovation, by squeezing effect, substitution effects, rely on the utility inhibit manufacturing industry independent innovation, and thus influence on the GVCs upgrade manufacturing; Intermediate product import can also directly affect the upgrading of GVCs of manufacturing industry through cost effect, quality effect and category effect. Finally, it analyzes how independent innovation directly affects the GVCs upgrading of the manufacturing industry.

2. Literature Review

GVCs upgrade refers to the migration of enterprises from the lower part of the GVCs to the higher part. It is an important purpose for enterprises, industries and even countries to participate in the GVCs (Tu Niansong and XueDanqing, 2018). Among the factors to enhance market competitiveness, improving its position in the GVCs division of labor is the key. Therefore, it is very necessary to study the upgrading theory of GVCs.

How to upgrade the GVCs? Kaplinsky and Morris (2001) and Humphrey and Schmitz (2002) give basically the same path choice. They point out that according to the degree of difficulty of GVCs upgrading, the upgrading path can be divided into process upgrading, product upgrading, function upgrading and value chains upgrading. The core of process upgrading is to improve the production method, adopt new production process, and improve the production efficiency of products. The key to product upgrading is to improve product quality or produce more valuable products. Functional upgrading requires the transition to more value-creating links; Value chains upgrading means entering new product value chains to achieve cross-industry upgrading. In terms of the degree of difficulty of value chains upgrading, the process upgrading is the easiest to achieve, while the difficulty of value chains upgrading is relatively large.

The core of GVCs upgrading is to shift from the low-end part of value creation to the high-end part of value creation (Du Dawei et al., 2018). In addition to the above four modes of upgrading, are there other ways to enhance the division of labor in GVCS? Ivarsson and Alvstam (2011) pointed out through research that different upgrading strategies should be adopted according to the level of capital intensity of the industry. When the density is high, the production-driven strategy is the first choice, while when the density is low, the purchaser driven upgrade strategy path has better effect. Dijk and Trienekens (2012) pointed out through their research on developing countries that the upgrading of GVCs can be achieved by increasing added value, improving market access, improving governance structure and enhancing partnership. In addition, in view of the choice of path in China in the GVCs division of labor, domestic scholars have also conducted fruitful research, put forward the corresponding strategic path, such as Du Chuanzhong(2017) new emphasis on building with local companies as the "Chain Lord" system of industrial division of labor and Liu Hongman and Lang He (2018) have put forward to cultivate advanced factors of production, promote transformation and upgrading of manufacturing, development of green manufacturing, etc.

Intermediate product import is the purchase of intermediate products from abroad, is a kind of input between final consumer product and primary products. This form of international trade is different from that of the final product described in the traditional international trade theory. Scholars mainly explain intermediate trade from four aspects: comparative advantage theory, vertical specialization theory, value chains theory and market internalization theory. The theory of comparative advantage is the cornerstone of traditional international trade theory. This traditional international trade theory can also explain the intermediate trade practice, but it must be modified. Lemoine and Kesenci (2002) explained the import of intermediate products based on the modification of the theory of necessary advantages. Hummels (2002) pointed out that vertically specialized production and trade patterns indicate that intermediate trade is an important link between countries and enterprises in the international division of labor. Porter (1985) argue that every enterprise in the increasingly fierce market competition in seeking their own competitive advantage, but any enterprise can't keep ahead in each area, it's decided to each enterprise is in the key link in the economic activities and the key ability on the basis of some relative competitiveness is weak link transferred abroad, and also need to own production and business operation activities related enterprises to establish a stable connection, thus producing the products imported.

Market internalization theory is that modern exist in the external market transaction costs in international trade, because of the external market efficiency and to reduce the transaction costs, forcing the company to seek the unity of control and ownership, many former market trading such as intermediates of "internalization", finally the result change product producers in the market for

vertical control of the traditional mode of production, instead, the company around the product standards in global efficient allocation of resources, in accordance with the standards in the global scope is engaged in the production, the formation of the standard under the control of production components, modules, and the final combination of the new mode of production, As a result, the intra-company trade develops rapidly and the trade of intermediate products increases.

When the national bureau of statistics, in China defined the independent innovation activities of industrial enterprises in 2004, the bureau pointed out that the so-called independent innovation of enterprises, lies in the research and development activities of its enterprises, which is also known as the R&D activities. At present, the domestic scholar during the definition of independent innovation is relatively consistent, namely the independent innovation contains two meanings, the narrow sense and in a broad sense, contains all the first six innovation main body independent innovation and original innovation aspects, this not only includes the innovation of science and technology, but also contain cultural innovation and management innovation, and institutional innovation, namely generalized innovation that contains specific the innovation of science and technology. It also contains an abstract system, culture and management innovation, and so on... In a narrow sense, independent innovation only refers to scientific and technological innovation, that is, technological innovation, emphasizing originality and autonomy (Zhou Yahong et al., 2012); Cheng Wen and Zhang Jianhua (2018)). The support of the theory of independent innovation mainly comes from the theory of technological innovation. Firstly, Schumpeter emphasized the importance of technological innovation in his theory of innovation earlier. However, the importance of technological innovation to economic growth was not recognized by scholars until the 1950s. With the traditional factors of production unable to fully explain economic growth, scholars gradually incorporate technology into the production function as a factor of production. In this regard, Solow (1957) added technological advances to the Solow model, emphasizing its importance as a source of economic growth. Schmookler (1966) used patent data for the first time to measure technological progress. After that, Mansfield (1968), Utterback (1974), Romer (1990) and Nelson (1993) theoretically analyzed the impact of technological innovation on economic development from different perspectives.

Secondly, according to the current theory of technological innovation, there are four schools of thought, namely, neoclassical school, new Schumpeter school, institutional innovation school and national innovation system school. Solow and Romer are representatives of the neoclassical school. This theoretical school takes "market failure" as the research foundation, and the research content is the role of technological innovation in economic growth and the integration of technological innovation into the production function. Mansfield, Arrow and Schwartz are the main representatives of the new Schumpeter school. The main academic viewpoints of this theoretical school include: (1) technological innovation is the result of multiple factors; (2) enterprises are the main body of technological innovation; (3) technological innovation can provide a lasting boost to economic growth. Davis and North are the main representatives of the school of institutional innovation. This theoretical school mainly analyzes the impact of institutional innovation on technological innovation from the perspective of institution. The relationship between system innovation and technology innovation has gone through three stages: "technology innovation determinism", "system innovation determinism" and "interaction between system innovation and technology innovation". Freeman, Nelson and Lundvall are the main representatives of the national innovation system school. The theory emphasized the importance of national innovation system, points out that the national innovation system is the decisive factor for promoting technological innovation. It is the source of technological innovation for a national innovation system, rather than an individual enterprise or an individual. National innovation system is the main body behavior, network and operational mechanism synthesis, the effect of various agents on the technology of interaction is apparent in the digestion, absorption and re-innovation, mix, national innovation system of the whole, as innovation ability was improved.

To sum up, a large number of scholars have paid attention to the theory and practice of intermediate product trade, technological innovation and GVCs upgrading of manufacturing industry. However,

there is little literature on the influence mechanism of intermediate product import and independent innovation on GVCs upgrading in the manufacturing industry. In the context of global economic integration, it is of great significance in both theoretical and practical research to discover the mechanism of the influence of intermediate product import and independent innovation on the GVCs upgrading of manufacturing enterprises, so as to determine the position of enterprises and industries in the GVCs of manufacturing industry. In view of this, this paper attempts to analyze the mechanism on the basis of synthesizing the previous theories.

3. Influence mechanism of import of intermediate products on independent innovation

3.1 Facilitation

The import of intermediate products can promote the independent innovation capability of enterprises mainly through the following three channels: Firstly, the import of intermediate products can bring the intensified competition to domestic enterprises and stimulate the independent innovation of domestic enterprises; Secondly, the technology spillover of imported intermediate products will generate technology spillover to enhance the strength of independent innovation of enterprises, and this technological spillover will be reflected in horizontal spillover and vertical spillover. Thirdly, high-quality imported intermediate products can produce a quality effect for enterprises to save related costs so that enterprises can concentrate on independent research and on the development of core businesses.

3.1.1. Competitive Effect

Adam Smith stated that the basis of international trade is the absolute difference between labor productivity and the production costs incurred by various countries. Ricardo believed that costs should be compared according to the relative differences in technological level between countries, and the benefits of labor productivity should be obtained by exporting products with comparative advantages and importing products with comparative disadvantages.

It can be seen by the classical theory of international trade, that companies choose imported products, because of imports of intermediate product in such aspects as technology, price, function, quality has a comparative advantage, the import of these products, can make the domestic production of homogeneous products at a competitive disadvantage. In the market, competitive disadvantage of the enterprise is sought to avoid to be eliminated in the competition. It will be dedicated to the research and development and technological innovation, so as to improve product technology content, increase business performance. This kind of market competition brought by the import of intermediate products intensifies, which causes domestic enterprises to carry out technological innovation, that is, the competitive effect of intermediate imports.

The competitive effect is mainly to improve the innovation ability of enterprises and even industries by affecting the efficiency of resource allocation. On the one hand, under the influence of competitive effect, if domestic inefficient enterprises still lack innovation ability and quality, their market share will gradually decline, and they will be eliminated by the market. If inefficient enterprises can increase innovation, improve product quality and strengthen management system, they could gradually transform into efficient enterprises. In addition, the import of intermediate products will transfer production factors from inefficient enterprises to efficient enterprises, improve the efficiency of resource allocation, and thus enhance the innovation strength of enterprises. On the other hand, the competition effect will affect the innovation ability of enterprises by affecting their price elasticity of demand. Because the imports of intermediate product has comparative advantage, domestic products' price will change accordingly, relative price changes by changing the production cost of enterprises, which in turn, changes enterprise behavioral decision making: the production of similar products enterprise product price will be lower, extrusion production cost, the enterprise needs to intensify research and development to reduce the production cost or improve product quality; The purchase cost of enterprises using similar intermediate products will be reduced, and the enterprises will

optimize the allocation of resources, invest more funds in the research and development of new products, and improve the innovation ability of enterprises.

Therefore, the import of intermediate products can stimulate the innovation impetus of enterprises through the effect of competition, improve the production efficiency of enterprises, and further enhance the innovation strength of related industries through the optimization of resource allocation, so as to penetrate into the higher links of the value chains.

3.1.2. Technology Spillover Effect

The intermediate products of advanced technology imported by enterprises of the host country can obtain technology spillover through imitation demonstration effect, "Learning by doing" effect and contextual effect.

Model Utility

By importing high-tech intermediate products, the technologies, knowledge, services and management concepts, behind the final products will facilitate the enterprise. Firstly, by digesting and absorbing these technologies, domestic enterprises copy them at a lower cost, and imitate and innovate with the characteristics of regional products, so that enterprises can overcome the technological threshold, improve the technological content of products, and enhance the innovation ability of enterprises. Secondly, the intermediate products with high technology content need to be matched with high production technology. Enterprises will upgrade and optimize the manufacturing process by imitating the advanced production technology, and management concept of foreign countries. The upgrading and optimization of the manufacturing process, can also improve the technical content of products, and enhance the innovation ability of enterprises. Finally, the introduction of new technologies, will stimulate the innovative thinking ability of relevant personnel, deepen the understanding of key technologies pertaining to technical personnel, and improve their ability to think innovatively.

The "Learning by doing" Effect

The "Learning by doing" effect is the further deepening of the exemplary effect. It because of its international acceptance as a concept, cultural background, habits and customs, and also because many products are not able to get through towards direct import. For a high technical content of products in the process of production, will exist a "threshold effect", namely technology development to a certain extent is difficult to a further breakthrough, how to through to the high technology content of imported products to further improve the upgrade, breakthrough or weaken "threshold effect", requires enterprises in practice continuously study, bring the new breakthrough. In addition to directly imitating and learning the new and high end technology of imported intermediate products, in actual practice, it also improves the product quality, and improves the innovation ability of enterprises, through continuous learning, which is the "using middle school" effect of imported intermediate products. Through this effect, enterprises can improve and upgrade their product design, upgrade their value chains, and enhance their international competitive advantage.

Contextual Effect

The contextual effect is a longitudinal extension of the exemplary effect and the utility of "learning by use". Manufacturing has very good spatial characteristics. When an enterprise obtains advanced technology, other companies can, through investigation study the personnel flow between enterprises, and enterprise management training in a way, so as to obtain technical improvement. With the new technology in the enterprise an imitating model between the utility and the effect of the "high school" has been further study and improvement, and eventually be able to increase the industry within the region’s innovational capabilities.

From the technology spillover effect, it can be found that by importing intermediate products, enterprises can not only acquire the high and new technology of intermediate products themselves, also improve the innovation ability of enterprises and industries through continuous learning.

3.1.3. Quality Effect

The influence of high quality intermediate product import on the innovation ability of enterprises is mainly realized through internal transmission effect and external competition effect.

Internal Transmission Effect

The import of high-quality intermediate products can, on the one hand, promote enterprises to produce other parts with higher quality to match them, and on the other hand, more closely match the core parts developed by enterprises, which can promote the virtuous circle within enterprises, improve the quality of final products, and promote enterprises to realize product upgrading. The improvement of the final product quality, increases the enterprise market competition advantage, with higher product value. High quality products make the enterprise has the pricing power, necessary for the enterprise to improve product price, and to increase corporate profits. In this manner the increase in profit enterprises, will have more capital investment innovation work, and eventually improve enterprise innovation ability. (Maurice Kugle and Eric Verhoogen, 2009).

External Competition Effect

The external competition effect brought by the import of high quality intermediate products, is mainly reflected by the intensification of the market competition for intermediate products, and the intensification of the market competition, of final products. The introduction of foreign high-quality intermediate products, on the one hand, can form a substitution effect for China's intermediate products, eliminate low-quality intermediate products, inefficient enterprises, and also promote the quality upgrade of intermediate products. The other side can enrich the types of intermediate products in the importing country, intensify the competition of intermediate products at the same level, and stimulate the innovation of enterprises. The internal transmission mechanism can increase the production quality of the final product, and have a positive impact on the final product market. In order to maintain market share, other enterprises producing similar final products will increase the incentive for innovation and R&D.

Intermediates imports can through the above effect to stimulate innovation, but we also find that, due to the technology especially high and new technology with "threshold effect", want to learn by direct imitation model may be difficulty, moreover by institutional constraints for the protection of intellectual property rights, enterprise is difficult to directly to imitate the production, the will to enterprise's innovation ability of restraining.

3.2 Inhibition

If an enterprise chooses to import intermediate products, it will give up the choice of domestic similar products, the market share of domestic enterprises producing similar products will be reduced, the profit will be reduced, the research and development capital will be reduced, and the innovation motivation will be insufficient. In addition, the imported intermediate products will directly replace domestic products due to their high quality and relatively low price, reducing the R&D motivation of domestic enterprises, while the import of intermediate products can save costs and improve the production quality of enterprises, so it is easy for enterprises to form import dependence on these intermediate products and give up independent R&D. Therefore, the inhibition of trade liberalization on enterprise innovation is mainly manifested in the squeezing effect brought by intensified market competition, the decreasing production enthusiasm of domestic enterprises after being squeezed, the substitution effect caused by the substitution of imported intermediate products, and the dependency effect caused by the direct introduction of high-tech products.

3.2.1. Extrusion Effect

Trade liberalization can make the products' import tariff slash, disguised form the phenomenon of lower import costs, if the relative cost is lower than domestic products, intermediates, domestic enterprises will choose the direct import intermediates and give up domestic orders, caused the domestic enterprise market share decline, falling profits, enterprise innovation power, crowding out.

3.2.2. Substitution Effect

The substitution effect mainly restrains enterprise innovation from two aspects: product substitution and technology substitution. Due to the relatively low price of imported intermediate products, enterprises will choose imported intermediate products instead of domestic purchase or independent production, which will inhibit the production innovation of enterprises. At the same time, outsourcing has more production advantages than independent research and development, and the original independent research and development will have to be replaced by imports, thus crowding out domestic innovation.

3.2.3. Dependency Effect

Dependence effect more happens in small and micro-enterprises, large scale enterprises can strengthen the research and development production needed intermediates, micro and small enterprises are often in the research and development funds is less, the lack of high-tech talents, slow speed of hardware equipment updates caused by lack of innovation, and imported intermediates can save development costs and time, trade liberalization of import products' price cut will make form import dependence has a disadvantage of enterprise resources, reducing enterprises innovation enthusiasm.

To sum up, the import of intermediate products will not only promote enterprise innovation, but also inhibit it. The specific transmission path is shown in Figure 1. This paper asserts the view that the import of high quality intermediate product, will enhance the independent innovation ability of enterprises on the whole.

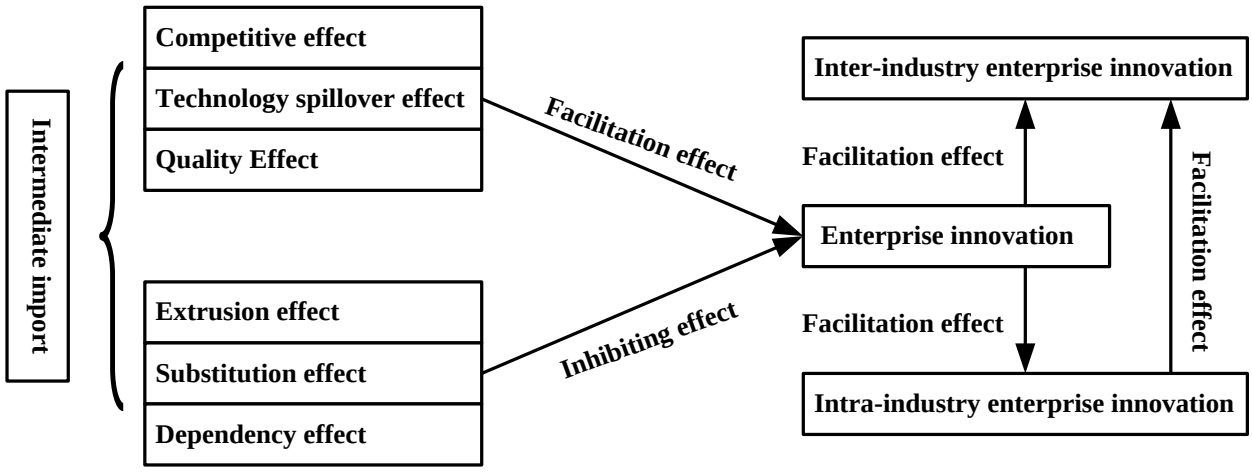

Figure. 1 Transmission Mechanism of Intermediate Product Import Influencing Enterprise Innovation

3.3 Influence Mechanism from the Perspective of Enterprise Heterogeneity

It can be seen from the analysis that the import of intermediate products does have an impact on enterprise innovation, but does it have the same impact on all enterprises? It has been mentioned above that some inefficient enterprises may have poor absorptive capacity, and may exit the market directly, due to the impact of competitive effect. This section mainly analyzes the impact of import of intermediate products, on the innovation degree of enterprises, which are of a different nature.

3.3.1. Influence Mechanism of Intermediate Product Import on Innovation Capability of High, Medium and Low Technology Enterprises

The high-tech industry itself has strong innovation capacity, and its ability to imitate and demonstrate is also strong. It is easier to obtain the independent innovation drive brought by imported intermediate products through the imitation and demonstration effect, technology spillover effect and quality effect. Enterprises with average technical level will be greatly affected by the competition effect. However, given their own technical strength, they are easy to acquire the technology spillover effect of imported intermediate products by learning and imitating, so as to improve their innovation ability. According

to the analysis of Schumpeter's innovation theory, innovation means destruction and destruction, and low-tech enterprises are more vulnerable to the attack of innovation wave and the destruction of their organizations due to their lack of innovation ability. At the same time, Schumpeter effect (Yi Lan et al., 2018) believes that low-tech enterprises, due to their limited strength, tend to pay more attention to short-term extra profits rather than their prospects of becoming leaders. Therefore, the stronger the market competition is, the more they will have a tendency to make profits by cutting prices, and the competition will hinder the innovation of these enterprises.

3.3.2. Influence Mechanism of Import of Intermediate Products on Innovation of Enterprises of Different Sizes

This paper divides enterprises into large enterprises and small enterprises according to the difference between the sales volume and the average sales volume of the industry. Large enterprises have strong factor endowment, knowledge capital and financing ability. When imported intermediate products impact the market, they have strong resistance ability. Moreover, they have more high-end talents. Due to their poor absorption capacity, some small and medium-sized enterprises are difficult to convert the technology of imported intermediate products into their own new technology, and it is difficult to achieve product innovation. On the contrary, they will be impacted by the competition effect. Consequently,, small and medium-sized enterprises with strong absorption capacity can overcome the "threshold effect" to further expand the market scale, form economies of scale, and improve their innovation ability. Therefore, it is difficult to predict the comprehensive impact of imported intermediates on SMEs.

3.3.3. Influence Mechanism of Intermediate Product Import on Innovation of Enterprises under Different Ownership

According to the ownership system, enterprises may be classified as state-owned, private, and foreign capital. State-owned enterprises controlled by the country strong, it is difficult to choose imported or domestic procurement, less reaction to high-tech products to the market competition is not very sensitive, but as a result of its large scale and strength is strong, can quickly get the import products' technology spillovers, thus the whole products' import the smaller effect on its ability to innovate; Private enterprises have unique advantages due to their high efficiency and easy transformation, but they generally have disadvantages such as difficult financing and relatively weak strength. The import of intermediate products will produce negative compression and positive technology spillover on their innovation ability, but the overall effect is not obvious. Because the foreign-capital enterprises have more contact with foreign products and are sensitive to the intermediate products containing high and new technologies, they are more likely to obtain the technology spillover of imported intermediate products.

3.3.4. Influence Mechanism of the Import of Intermediate Products on the Innovation of Enterprises in Different Trade Modes

According to the different processing methods, enterprises are divided into processing trade and general trade enterprises. Processing trade is mainly dependent on integrated processing of imported intermediate products, and most of them are labor-intensive industries. It is difficult for intermediate product imports to produce direct technology spillover. Therefore, the impact of intermediate product imports on innovation ability of processing trade enterprises is small. Generally speaking, it is relatively easy for trading enterprises to obtain technology spillover through the import of intermediate products to improve their innovation ability.

4. Influence Mechanism of Intermediate Product Import on GVCs Upgrading of Manufacturing Industry

There are three reasons why enterprises choose to import intermediate products rather than directly purchase intermediate products from China. Secondly, the domestic lack of relevant intermediate products, intermediate imports can enrich the final products. Finally, the quality of imported intermediate products is far better than that of domestic intermediate products, which can improve the quality of final products. It is manifested in cost effect, category effect and quality effect, among

which the cost effect mainly obtains the market competitive advantage through the cost saving, the category effect and quality effect mainly obtains the market competitive advantage through the product upgrading, and the intermediate product import can directly affect the value chains upgrading through these three effects. Based on these three effects, this section clarifies the influence mechanism of intermediate imports on the GVCs upgrading of manufacturing industry.

4.1 Cost Effect

According to the principle of comparative advantage, compared with domestic products, imported products have the comparative advantage of resource endowment, and their relative prices are lower. The choice of imported intermediate products by importing enterprises can help enterprises reduce production costs, obtain price advantages, and more easily embed into the GVCs, so that the value chains can be upgraded.

4.2 Type Effect

By importing intermediate products, enterprises can make up for the defects of their factor endowments, and create a "complementary" mechanism with domestic intermediate products, so as to increase the final product categories, and achieve product upgrading and obtain comparative advantages through the effect of "the whole is greater than the part", so as to enhance the division of labor of manufacturing industry in the GVCs.

4.3 Quality Effect

The import of high-quality intermediate products can, on the one hand, promote enterprises to produce other parts with higher quality to match them, and on the other hand, they can more closely match the core parts developed by enterprises, which can promote the virtuous circle within enterprises, improve the quality of final products, and promote enterprises to realize product upgrading.

5. Influence Mechanism of Independent Innovation on GVCs Upgrading of Manufacturing Industry

A large number of studies have shown that the key factor for industrial value chains upgrading is the technological innovation ability of enterprises in the industry. In essence, industrial value chains upgrading is a process of product transformation from low technology content and low added value to high technology content and high added value. From the perspective of GVCs, Humphery and Schmitz (2002) transformed and upgraded the global manufacturing industry from low to high, which can be divided into four dimensions: Process Upgrading, Product Upgrading, Functional Upgrading and Chains Upgrading. Humphery and John (2002) argues that the four stages in the first two stages upgrade controller was not influenced by the GVCs, when rising to the functional upgrades and chains, because involves the enterprise the core technology of developed countries, it will restrict the flow of GVCs of internal knowledge to hinder the late-development countries to realize the value chains upgrade.

At present, China's manufacturing industry is still in the low-end value chains of process upgrading and product upgrading, and the trade mode is mainly processing, assembly and OEM production. How to realize the GVCs upgrading of manufacturing industry through independent innovation is the main problem of this section.

5.1 The Role of Independent Innovation in Various Stages of GVCs Upgrading in the Manufacturing Industry

As can be seen from the smile curve, the high-level link of the GVCs upgrading of the manufacturing industry is to realize the chains transition. The chains transition should be based on the function transition, product transition and process transition, so that the manufacturing industry can achieve breakthroughs in R&D, design and sales. Combined with the three forms of value chains transition, this section will focus on the analysis of the direct impact of independent innovation on the GVCs upgrading of the manufacturing industry.

5.1.1. Independent Innovation Promotes the Upgrading of Manufacturing Process

In the early stage of process upgrading, it depends on the imitative demonstration effect and technology spillover effect of intermediate product import and new technology introduction. In order to achieve technological process breakthrough, enterprises need to combine the imported technology with their own market demand for improvement and innovation, achieve technological upgrading through independent innovation, break production technology barriers, further improve labor productivity, and promote the rise of the value chains.

5.1.2. Independent Innovation Promotes the Upgrading of Manufacturing Products

The improvement of final product quality in manufacturing industry will be influenced by the quality effect of intermediate product import and the upgrading of process flow. On this basis, manufacturing enterprises should combine scientific and technological innovation with market demand, develop high-tech products that match market demand, enhance added value of products and promote the upgrading of value chains.

5.1.3. Independent Innovation Promotes the Upgrading of Manufacturing Functions

After product upgrading in the manufacturing industry, it is necessary to further combine modern information technology means to realize the effective integration of multiple functions of products, cooperate with modern marketing strategies, and enhance brand awareness. With the continuous development of E-commerce, big data, supply chains, demand oriented pull supply chains expansion of independent innovation should be guided by the demands of users, brand design, combined with product consumer characteristics, the function integration of product precision, increase brand awareness, promote the improving of the GVCs of the manufacturing industry.

5.1.4. Independent Innovation Promotes the Upgrading of the Manufacturing Chains

The chains upgrading of the manufacturing industry is a kind of leap-forward upgrading under the global governance environment. The upgrading in this stage is mainly reflected in the research and development and design of new products, which is an important factor to maintain the long-term attractiveness of the brand and directly depends on the independent innovation ability of enterprises. The impact of independent innovation on the upgrading of the manufacturing chains is also reflected in the optimization of the industrial structure. The continuous innovation of cloud computing, data mining and other new technologies promotes the continuous optimization of the specialized division of labor in the manufacturing industry, changes the structural system of the manufacturing industry, and drives the upgrading of the industrial chains.

5.2 Mechanism of Independent Innovation on GVCs Upgrading of Manufacturing Industry

Developed countries under the background of GVCs governance, has advantage of technology monopoly. It will be in the knowledge of the value chains link and the core technology industry at home, the low efficiency, extensive and universal industry where it is transferred, has the resources and labor comparative advantage of developing countries, such as form, at the center of the core products in the assembly processing decomposition to the periphery of the vertical division of labor pattern. In order to upgrade the manufacturing industry in developing countries, to the high end of the value chains, the added value of products must be increased through process innovation, R&D innovation, brand innovation and service innovation. Based on the GVCs governance model and the independent innovation capability of the manufacturing industry, this paper divides the transformation of the manufacturing industry into horizontal expansion stage, vertical penetration stage, and transition upgrade stage based on GVCs governance.

5.2.1. Horizontal Expansion Stage Based on GVCs Governance

Most developing countries are at the low end of the value chains and have insufficient innovation capacity. In order to obtain higher profits, they should improve the original production efficiency and increase the added value of products by improving production factors such as technological methods and equipment. Second, through the recombination of production factors, innovation of production ideas, to ensure that the original input on the basis of increased output, to enhance the added value of products; Third, through the import of intermediate products, FDI, OFDI, etc., technology spillover

effect and quality effect are obtained to realize technological innovation and increase the added value of products.

At the same time, the more the added value of products increases, the higher the innovation efficiency becomes, and the more it can promote the industrial value chains upgrading. Improvements in the process method and process flow, mainly through the introduction of advanced technology and equipment, on the one hand, can be directly put into use to improve product production efficiency, and on the other hand can obtain the technology overflow of advanced equipment to master new technology, new methods, new ideas, improve the innovation ability, further production of new products, improve the competitiveness of enterprises. At this time, the production of commodities or on the basis of the original products, to improve the production is efficiency, the competitiveness of new products is not enough. So, it is difficult to achieve independent brand management.

The import of intermediate products, FDI and OFDI can improve the innovation strength of enterprises from the aspects of saving enterprise cost, for improving the quality of final products and bringing technology spillover. Both the introduction of new technologies and the import of intermediate products belong to the horizontal expansion of the value chains upgrading. In this stage, the manufacturing industry improves the manufacturing system, optimizes the process flow, gradually realizes the mastery of some core technologies and the possession of high value-added links, and realizes the process upgrading, as well as product upgrading in the value chains.

5.2.2. Vertical Penetration Based on GVCs Governance

After the completion of process upgrading and product upgrading, the enterprise has the production strength, facing the complex and changeable domestic market demand. Through innovation, brand advantage is established, brand value is enhanced, product competitiveness is enhanced, more value is gained in the value chains, and value chains function is upgraded. At this stage, enterprises need to have strong independent innovation strength, can respond quickly to changes in market demand, carry out research and development innovation of new products, expand market share through new products, and increase the added value of products.

This is called the vertical penetration stage of the enterprise value chains by establishing its own brand, reconstructing the value chains system and realizing the value chains upgrading. In this state, the enterprise upgrades refers to manufacturing enterprises to upgrade the structure of the product function innovation, means that the enterprise R&D, logistics, brand, marketing and after-sales service elements become the core competitiveness, the lack of China's industrial enterprise database service output data, combined with the non-operating income if refers to through the channel such as brand, marketing and after-sales service income, therefore, this article uses the non-operating income of service enterprise output said (revenue minus the main income) function to upgrade.

5.2.3. Leapfrog Upgrading Based on GVCs Governance

After the function upgrading of the value chains, the company has achieved a certain level of independent R&D and innovation strength. To achieve further transition, it needs to rely on breakthrough technological progress to break the "core technology lock" of developed countries. Breakthrough technological progress not only requires enterprises to have the sense of independent innovation, but also further requires the government's sense of reform and innovation. At this time, research and development has gone beyond enterprises and the industry, and has been extended to the industry. The government should encourage innovation in the policy system, science and technology system reform system and the perfect combination of production-teaching-research combination innovation property right trading platform, through the optimization of resource allocation and lower operating costs, a external impact on manufacturing, driven by R&D and innovation, industrial production processes, product features, brand upgrade, related services innovation, realize the transition of value chains upgrade.

At the same time, the global value network improves the international trading environment, reduces trade friction, reduces transaction costs among countries, reduces the loss of added value of manufacturing industry affected by trade, and improves the overall added value. In turn, GVCs

governance pushes developing countries to realize value chains transition and upgrading. In the face of external policy opportunities and competitive challenges, the manufacturing industry improves the internal innovation strength of the industry. The added value of products rise low added value to high added value. This paper refers to the relevant studies of Bernard et al. (2011), Liu Bin et al. (2015), Yi Jingtao et al. (2017), and uses the export conversion rate of general trade industries across industries and sectors to represent chains upgrading.

5.3 Path for Independent Innovation to Promote the Upgrading of GVCs in the Manufacturing Industry

Gereffi (1999) divided the industrial value chains into producer-driven value chains dominated by manufacturer-oriented capital-intensive industries that realize vertical division of GVCs through investment and producer-driven value chains dominated by subrogation and labor-intensive industries that realize profit through brand or channel driven by purchasers. With the expansion of trade, the situation of relying only on a single driving force has been broken, global competition is increasingly intensified, and enterprises at the high end of the GVCs begin to optimize and arrange related activities in the whole chains, so as to realize the global governance of the value chains and ensure the maximization of their interests.

How to transform the manufacturing industry from external source to internal source and realize its transition in the GVCs under the condition of GVCs governance by innovation is the main consideration in this section.

5.3.1. Embed the Outsourcing Upgrading Path of the Manufacturing Industry Dominated by GVCs

The exogenous upgrading path mainly combines embedded GVCs and technological innovation to construct the primary innovation chains of the manufacturing industry. On the one hand, through manufacturing enterprises may import products, the introduction of advanced technology, foreign direct investment activities so as to obtain technical spillover, while absorbing technology to reduce the "dependent effect" and the "low-end locking" risk, at the same time with imitation innovation, process innovation, digestion and innovation, integrated innovation and stronger foundation form of manufacturing, production of the global market recognition products, make the "made in China" brand effect, raise the proportion of manufacturing industry in the GVCs, primary innovation chains form, the value chains to achieve a preliminary transition. Manufacturing enterprises need to combine industry, on the other hand, the external environment, make full use of the new era of information technology advantages, promote the development of intelligent manufacturing service terminal integration industry, thereby building a new intelligent industrial chains, which actively integrate into the GVCs network, and realize the market innovation and organizational innovation, drive the manufacturing industry transformation and upgrading of the GVCs.

The primary innovation chains can guarantee the orderly supply of products, can provide a platform for the transformation of old and new production capacity in the manufacturing industry, and support the transformation and upgrading of the manufacturing industry. The strength of its competitiveness determines the development momentum of the subsequent endogenous path, which needs to be restrained by institutional innovation to prevent it from falling into "low-end path dependence".

5.3.2. Build an Endogenous Upgrading Path for the Manufacturing Industry Based on the GVCs

Endogenous upgrading mainly relies on independent innovation of enterprises, which is driven by endogenous culture, policy and market demand. Faced with the strong market demand in China, China's strong learning ability, strain ability and population advantage are the inexhaustible driving force of manufacturing innovation. Manufacturing innovation has begun to transform from the past imitation and follow innovation to the independent innovation facing the market demand. Compared with exogenous upgrading, endogenous upgrading mainly focuses on product research and development and design. It is in the higher value chains, with high added value of products, and enterprises in the leading position of GVCs. It is the most ideal path for value chains upgrading to

realize the transition of value chains from primary innovation chains to advanced innovation chains. With China's strong support for innovative research and development, the innovation capacity of the manufacturing industry is also constantly improving. Combining intelligent production with green production, China is constantly insisting on innovation-driven production, combining intelligent manufacturing with production, and paying attention to the green development of the manufacturing industry.

6. Finding and Conclusion

In the context of GVCs governance, in order to upgrade the value chains, China's manufacturing industry needs to realize the process upgrading, product upgrading, function upgrading and chains upgrading of the value chains from both external and internal sources, so as to achieve the overall transition of the value chains. Process upgrading and product upgrading belong to the horizontal expansion stage of the value chains, while function upgrading belongs to the vertical penetration stage of the value chains, and chains upgrading belongs to the transition upgrade of the value chains. In this process, the external source is mainly affected by the import of intermediate products, the introduction of advanced technology, foreign direct investment and other activities, while the internal source is mainly affected by the enterprise's independent innovation capacity, absorption capacity. This article mainly embarks from the affect one of exogenous intermediates imports, analyzes how import products by imitating demonstration effect, competition effect, quality effect and technology spillover effect for upgrading industrial innovation ability raising enterprise value chains, at the same time it also by squeezing effect, relying on effect and substitution effect inhibiting industry innovation, this paper analyzes the different nature of the enterprise's innovation ability can produce different reaction to products' import. In addition to affecting the value chains upgrade through independent innovation, the cost effect, category effect and Quality effect of intermediate products import will form a comparative advantage and directly contribute to the value chains upgrade.

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