

Global Production Network and Coupling Strategy of IT Industrial Clusters in Dongguan, China

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중국 동관 IT 산업 클러스터의 글로벌 생산 네트워크 및 커플링 전략

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요약 Dongguan City of Guangdong province, one of the core areas of the Pearl River Delta, has also pursued economic development through the geographical advantage close to Hong Kong. In the early 1980s, small and medium-sized multinational corporations related to home appliances industry from Hong Kong invested to the Dongguan area and set up a production factory. In the mid-1990s, as Taiwanese PC manufacturers invested, local industrial clusters have developed in Dongguan with core of the IT, PC components and electronic industries. The case of the IT industrial cluster in Dongguan is a typical example of the development of Chinese manufacturing industry after the reform of China. This paper focused on the coupling strategy case of Dongguan City industrial cluster in Guangdong province, and theoretically compared the endogenous growth factor analysis(NMID) of regional industrial development with the regional differentiation of industry based on external linkage with global production network(GPN).

• Key Words : Global Production Network, IT Industrial Cluster, Coupling Strategy, Dongguan, China

Abstract 중국 경제성장에 핵심적 역할을 해왔던 광둥성(廣東省) 동관시(東莞市)는 지리적으로 근접해 있는 홍콩을 이용하여 지속적인 경제발전을 추구해 왔다. 1980년대 초반은 홍콩으로부터 가진산업 관련 중소 다국적 기업이 동관지역에 진출하여 생산 공장을 세우고, 그 후 1990년 중반에는 대만의 PC제조업체의 진출이 잇따르면서 현재 동관에는 정보통신산업과 PC부품 및 전자산업 중심으로 지역 산업클러스터가 발전해 왔다. 동관시 산업클러스터 사례는 개혁개방 이후 중국 제조업 산업의 발전뿐만 아니라, 글로벌 시대에 해외직접투자자와 아시아지역에서의 지역경제의 성장 및 산업발전과정의 연구에 대한 이론적 시사점을 줄 수 있는 지역적 사례 중의 하나다. 본 연구는 광둥성 동관시 지역산업클러스터의 사례를 중심으로 이론적으로는 지역산업발전의 내생적 성장요인 분석(NMID) 혹은 글로벌 생산네트워크와의 외부적 연계성을 기초로 하는 산업의 지역적 분화(GPN)에 대한 이 두 관점을 상호 비교하고, 글로벌 융합전략을 설명하였다.

• 주제어 : 글로벌 생산네트워크, IT산업 클러스터, 커플링 전략, 동관, 중국

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1. Introduction

Since M. Porter[11] derived the concept of clusters from studies of national competitive advantage in 1990, industrial clusters formed in specific regions have been recognized as the primary means of promoting regional economic development. These perspectives suggest that the organizational relationships of geographical space-firm-industry are advantageous to microeconomic conditions that strengthen individual firms' competitive advantages in the situation where firms are agglomerated in a specific region. Recently, local industrial clusters have been attracting attention as core competencies for strengthening economic development and industrial competitiveness. As a late industrial country, the issue of how to effectively cultivate regional industrial clusters among East Asian countries has become one of the major policy concerns.

Indeed, the concept of an industrial cluster developed in the light of agglomeration of economy means the geographical agglomeration of homogeneous or heterogeneous firms and of the supporting organizations associated with these industrial firms in a particular field[12]. The New Marshallian Industrial Districts(NMID), following the Marshallian tradition, found that the effects of collective learning, geographical proximity, and socio-cultural community among the firms so as to promote local economic growth as 'endogenous growth factors'. As a result of the theoretical development of new industrial district theory, the analysis of this endogenous growth factor is concentrated mainly by researchers who emphasize the importance of Regional Innovation System(RIS). However, another recent trend of scholarly work emphasizes the analysis of external linkages between regional industrial clusters and the global economy as core elements of regional economic development in addition to the analysis of endogenous factors. In other words, they explained the interaction between the global production networks and local industries is a more important growth factor, when we look at the importance of regional industrial clusters in the global

production chains that emerged in the Asian region through the entering by the multinational corporations.

Recent research trends focusing on globalization and technology innovation analyze the regional differentiation process of Global Production Networks(GPN) through Foreign Direct Investment(FDI), International Production, and the gradual evolution in the form of Regional Innovation Systems[14]. For example, as in other developing countries in Asia, the core industrial clusters initially developed in several regions of China have emerged from the 1980s with the regional differentiation of FDI and international production. In addition, after the joining of WTO, local industries have become more closely related with global production chains in every region of China.

The Pearl River Delta region, which is located in the southern part of China and concentrated on foreign direct investment since the beginning of the reform and opening policy, are the factories of the world as known that regional differentiation has been made in the global production chains. In particular, the Pearl River Delta region, which includes Hong Kong and Macao, as well as Shenzhen, Zhuhai, and Dongguan in Guangdong province has been a significant part of FDI from overseas Chinese capital of Hong Kong and Taiwan. Their FDI began in the early 1980s centered on the economic zone of Guangdong province that was designated as part of the reform and opening policy. Based on this reform, the region of the Pearl River Delta respectively developed an export-oriented labor-intensive manufacturing sector such as PC manufacturing, textiles, apparel, footwear and furniture through the 'three-plus-one trading-mix(三來一補: custom manufacturing with materials, designs or samples supplied and compensation trade)'. In the 1990s, FDI by Hong Kong and Taiwan's multinational corporations has spreaded to the geographically adjacent Pearl River Delta and its surrounding areas, which had a profound effect on the formation of industrial clusters.

Dongguan City of Guangdong province, one of the

core areas of the Pearl River Delta, has also pursued economic development through the geographical advantages close to Hong Kong. In the early 1980s, small and medium-sized multinational corporations related to home appliances industry from Hong Kong have invested to the Dongguan area and set up a production factory. In the mid-1990s, as Taiwanese PC manufacturer joined the investment into this area, local industrial clusters developed in Dongguan with core of IT industry, PC components and electronic industries[24]. The case of the industrial cluster in Dongguan is a typical example of the development of Chinese manufacturing industry after the reform of China. The industrial cluster in Dongguan is also one of the local cases that can give the theoretical implications for the study of the industrial development process in the Asian region.

Therefore, this study will firstly focus on the case of Dongguan City industrial cluster in Guangdong province, and tries to theoretically compare the endogenous growth factor analysis(NMID) of local industrial development with the regional differentiation of industry based on external linkage with global production networks(GPN). Second, we will proceed on our conceptual discussion within the literatures of global value chains analysis to provide a theoretical framework of the case study and dealt with regional industrial evolution from the economic geography. Finally, this study will try to explain the coupling strategy and role of industrial clusters in Dongguan City area that are spatially in the global production networks.

2. Theoretical Framework

2.1 Global Production Networks and Institutional Thickness

Since A. Marshall's conception of industrial districts in 1920, Marshall's agglomeration economic model based on industrial clusters has been influenced by three factors: the development of skilled labor markets,

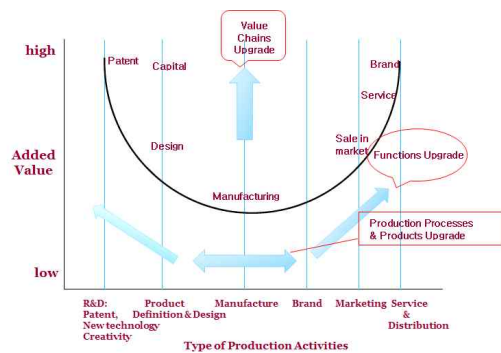
trade and productive suppliers, and the sharing of information within the inter-corporate community[17]. Here, the industrial districts mentioned by Marshall refers to the field that many small and medium enterprises(SMEs) are concentrated in a specific geographical area. Compared with the regions that existing large enterprises are very rigid as a remnant of the Fordist production method, the industrial districts have the rich atmosphere of innovation, competitive cooperations among SMEs, and a flexible production network system. Marshall found that collaborative production of SMEs within geographically embedded areas can outweigh the economies of scale of large enterprises. For example, the northeastern region of Italy achieved stable economic growth during the global economic downturn in the late 1970s and early 1980s, because they well developed locally characterized industries, network and division of SMEs such as the prototype of Marshall's industrial district.¹⁾

The orthodox studies on the industrial district emphasized the regional assets and the endogenous growth capacity in the regional economic growth, leading to the theoretical development of the 'new industrial districts'. The new industrial districts are distinguished by various concepts such as specialized flexible production systems and agglomeration economies, locally specialized industries, alliances among small enterprises, close regional networks as well as regional innovation and learning[15,1,2]. And technological innovation also is promoted not by an individual actor such as entrepreneur or inventor, but

1) The researchers named the region as the 'New Industrial Districts' not only in the northeastern region called the third Italy, but also in the region that achieves economic growth through a localized economy like Silicon Valley in the United States. The reason for the economic effect of localization is that the production factors such as professional function, skilled workforce and specialized machine are jointly used and the transaction cost is reduced according to proximity with suppliers and customers. See Marco Bellandi (2009), "Perspective in mature Marshallian industrial districts," Working Paper, http://www.disei.unifi.it/upload/sub/pubblicazioni/repec/pdf/wp15_2009.pdf(Search date: February 10, 2016).

rather a wider regional innovation system such as ‘innovation cluster’ or ‘technology system’. Recently, however, this new industrial districts theory and regional innovation system theory did not consider the effect of multinational corporations in the phenomenon of globalization accelerated by information and digitization. It was also criticized for its emphasis on endogenous growth factors with too much focus on regional institutions, innovation systems and networks. In particular, Coe and Yeung[8], dealing with the development of Asian emerging economies, concerned with the characteristics, regional differentiations, and regional coupling strategies of the global production networks formed by the global management activities of multinational corporations.²⁾ And this GPN framework is based on the international political economy’s interpretation of Gereffi[3]’s global commodity chains or global value chains.

Gereffi[3] proposed a global commodity chains(GCC) approach that classified the types of product chains into producer-driven commodity chains and buyer-driven commodity chains. The producer-driven commodity chains appears in the capital and technology-intensive industries such as aviation, automobiles, computers, semiconductors, medicine, and machinery. These industries are building global production structures that are mainly controlled by large multinational corporations. Large multinational corporations form a vertical integration of labor division system for economies of scale and expand market demand through technological advantages. The buyer-driven commodity chains appears in the labor-intensive industries such as clothing, shoes, and toys. In the buyer-driven commodity chains, large-scale retailers and distributors organize overseas orders, OEMs, and other forms to form a broad market demand through brand power.



Source: Zhang Hui(2004), pp.38-46.

Fig. 1] Global Value Chains Upgrade

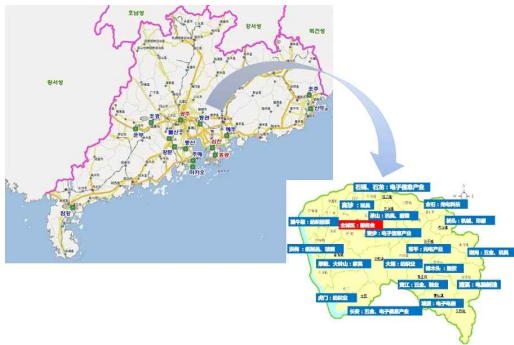
This distinction has evolved into the concept of global value chains(GVC) as shown in Fig.1. Coe and Yeung’s global production networks(GPN) combines the concepts of institutional environment, social network, and governance formed by the dynamics of corporate internal and external activities based on this value chains. Focused on this concept, they explained how global production networks are organized and interact with local industries[8].

However, the perspective of the global production networks is often over-emphasizing the competitiveness of regional industries and the capability to negotiate with multinational corporations[10]. If the region is heavily dependent on low-value-added production industries, the development of local industries can be stalled by external networks controlled by powerful multinational corporations. In addition, it is unlikely that multinational corporations will lead to major product investment activities or local embeddedness to improve the quality of industry related to upgrading of local industry. In particular, the dynamics of innovative activities of firms are often influenced by the industrial structure[6] and institutions[15] and regional culture[13]. In order to explain the case of Dongguan City in this study, it is necessary to consider the theoretical approach based on the concept of ‘globally organized nexus’ defined in the global production networks and ‘institutional thickness’ in the co-evolutionary process of region-industry-space).

2) See Neil Coe and Henry Yeung(2015), *Global Production Networks: An Interconnected World*, Oxford: Oxford University Press.

2.2 Dongguan City

Dongguan City is located in the south-central part of Guangdong province, on the northeastern coast of the Pearl River Delta. The distance is 50km from Dongguan to the northwest Guangzhou, 90km to the southeast Shenzhen, and 131km to Hong Kong which is located below south of Shenzhen. Dongguan City is the hometown of 'Overseas Chinese'; over one million people living in Hong Kong, Macao and other foreign countries have Dongguan as their native place[4]. Dongguan is one of the four prefectural-level cities not establishing county in the whole city of China, but Dongguan is a hub of transportation in Guangdong province between Guangzhou and Shenzhen and acts as a foreign trade port(See Fig.2). Due to this geographical location, Dongguan City has become the most preferred area for foreign companies in the Pearl River Delta from the beginning of the reform and opening policy. As a result, Dongguan City has rapidly developed into the world's factories of 'Made in China'.³⁾



Source: Map of Dongguan City,
<http://blog.naver.com/cjstkenfahdl/70172726873>(Search date: February 10, 2016).

[Fig. 2] Map of Dongguan City, Guangdong Province, China

3) In 1985, Dongguan was approved by the State Council as the economic development zone of the Pearl River Delta. It was established as county-level Dongguan City in Dongguan County, and was promoted to prefectural-level city in 1988. As of 2012, the population of Dongguan City is 188.93 million, and at the end of 2012, the resident population of Dongguan City was 83.166 million. See Encyclopedia, http://baike.baidu.com/link?url=gknnbf_meDGLcJMrS94FUJs9wdkdSNU-NAXgxvjxJpRnftLAdeqcRdP0vocdSual0B6koxrtcJMSMJpmmrhJBjR2w7gpFP0bK0BvYwa1XD4i(Search date: February 10, 2016).

Hong Kong and Taiwan's investment in the 1980s and 1990s has a symbolic meaning of a political and economic alliance with the Dongguan social community dependent on the so-called 'Guanxi Networks', which is characterized by the ties of regional kinship[16]. During the middle and late 1990s, more than 95% of the components required for PC assembly were supplied from Dongguan. As a result, Dongguan's IT and electronics industry has grown steadily, benefiting from its business partnership with Hong Kong and the investment of Taiwanese corporations. In addition, textile and clothing, toys and furniture, as well as clusters of IT and electronics industries have developed in specific regions.

The Dongguan City, like other cities in the eastern coastal area of China, is characterized by the development of specific industries along the boundary of the village and township administrative division.

3. Competitiveness of Dongguan IT Industrial Cluster

In Dongguan Industrial Cluster, foreign corporations usually sought development through overseas sales methods, so that all of core technology developments such as design and R&D were carried out by parent corporations. But on the other hand, since the mutual relationship between foreign corporations and local firms focused on a very simple labor division in production chain, Dongguan has not been able to go far beyond the aspect of 'assembly worker' for a long time. Even though local firms have the capacity to invest in technology development, their private investment has mainly been done in tertiary industries such as real estate, hotels, and logistics[4]. The IT industrial clusters in Dongguan, which was promoted by the investment of Taiwan corporations, did not change the basic characteristics of Dongguan as a manufacturing and production base due to its birth process and its relation with Taiwanese corporations.

However, the IT industrial clusters in Dongguan

also had clear factors for the growth of local industry in the following. First, it has grown into an international manufacturing base showing a clear process of regional differentiation and regional interaction of global production network through FDI and OEMs. Second, as the IT industry has become the core industry of Dongguan, it started as a low value-added production type activity among the production value chain, but also started to order and produce common orders through the co-location of large corporations and SMEs[3]. Third, because of the investment of multinational corporations not only has established vertical division of labor system with these corporations but also regional industrial cluster system based on the production value chain, it promoted its fast economic growth.

Actually Taiwan's IT corporations typically featured a cluster-based manufacturing system based on geographical integration as a subcontractor of global corporations. As a result, the entry of Taiwan's third-tier suppliers such as power switches, keyboards, and motherboards into the Dongguan area has led to the entry of fourth-tier suppliers such as resistors and inductors since 1990s[16]. In the course of this process, the entry of Taiwanese enterprises has also led Dongguan to become a major production base for PCs and peripheral devices around the world. Therefore Dongguan's IT industry accounted for 20% to 40% of IT-related products in the global market[5].

The competitiveness of local firms and industries in Dongguan can be explained as follows: First, because the source of technology and the sales network are all derived from outside, Dongguan IT industry clusters typically show the type of investor-driven industrial clusters. Second, the IT industrial cluster has grown from the global production network to the international manufacturing base, but due to this role for a long time, it has been lacking of full development of local related core industry. Third, Dongguan revealed the weakness of economy because of lacks of universities and research institutes to foster technology, and human

resources has also dependent on the outside.

4. Conclusion

As is the case of the IT industry clusters in Dongguan City, multinational corporations can be an important constituent of regional industrial clusters. However, it is not easy for multinational corporations to embed into regional innovation system with local firms. Without an organic form between leading multinational corporation and local assets—for example, industrial structure, local culture, government support policy and innovation system, it is difficult to expect the upgrade or sustainable dynamic growth of local industry. Therefore, Dongguan has been constantly faced with the problem of upgrading the industrial structure that can improve technological development and independent innovation capability of the city.

For this reason, Dongguan began to find changes in Dongguan's industrial innovation from the OEMs industry to advanced manufacturing industry developing of science and technology ever since 2006. Institutionalized condition of Dongguan City also changed coupling strategy of local firms with global production networks such as vertical disintegration and flexible specialization. In conclusion, the growth process of IT industrial clusters can contribute to the growth of local firms to some degree with the multinational corporation in the production and division of labor system. However, if local firms lack innovation capability, local industries show that it is difficult to upgrade from the bottom of the global production value chain.

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