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Japan's Export Regulations and Korea's Investment Attraction Strategy: Focusing on the Parts and Materials Industry

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Abstract

Purpose – In this paper, we provide recommendations for Korea's long-term direction and strategic measures to attract inward foreign direct investment (FDI) in response to Japan's export regulations. In doing so, we analyze the current situation and characteristics of trade between Korea and Japan, focusing on the parts and materials industry, which is particularly affected by Japan's trade regulations.

Design/methodology – Based on the analysis of five successful inward FDI cases (e.g. Toray, IGK, Delkor, GlobalWafers, DuPont) and statistic trend review in the parts and materials industry, we consider various factors pertaining to successful inward FDI in Korea and propose valuable investment attraction strategies.

Findings – For a successful investment attraction strategy, we studied some statistical trends in the internal and external environments of the parts and materials industry and successful investment attraction cases in Korea. We have found that in order to increase the probability of success in attracting investment, we need a mid-to long-term strategy considering multiple factors such as "Production-oriented, Demand-linked, Global Value Chain (VGC) linked, and Policy-linked investment attraction."

Originality/value – We suggest several specific measures and important strategic implications for the Korean government and firm's managers to attract inward FDI successfully.

Keywords: Industry, Investment Attraction Strategy, Inward FDI (Foreign Direct Investment), Japan's Export Regulations, Parts and Materials

JEL Classifications: F14, F21, F23

1. Introduction

The recent global economic downturn and the proliferation of protectionism has increased the uncertainty in the Korean economy (Park Sung-Hoon et al., 2017). Therefore, the focus of industrial policy is on preparing innovation plans for sustainable growth in Korea. Japan's export restrictions are especially triggered by the Korea-Japan conflict which has raised the voice of innovation to improve the weakness of Korea's industrial structure (Kim Jang-Yeop, Han Jae-Hyun and Jeong Suk-Jae, 2019; Kim Wan-Joong, 2019).

The Japanese government announced measures to strengthen export controls on Korea on

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July 1, 2019, for reasons such as undermining trust and inadequate issues. As a result, the Japanese government has regulated exports of three items (hydrogen fluoride, photoresist and polyimide), which are key materials for semiconductor and display manufacturing. In addition, the Japanese government took measures to exclude Korea from the white country (namely, preferred country for strategic goods export management). Such measures of Japan are in conflict with the maintenance and development of a rules-based multilateral trading system (as insisted by Japan at multilateral forums such as the WTO, G20 and APEC). In addition, retaliation measures restricted by international norms[1] such as the WTO and GATT can remain a bad precedent that threatens the multilateral trading system (Song Jung-Hyun, 2019). As a result, the Japanese government's delay in the examination of export items and uncertainty about permits are adversely affecting the global supply chain as well as trade losses between the two countries (Kim Wan-Joong, 2019; Yeo In-Man, 2019).

On the other hand, while the Korean government plans to use Japan's export regulations as an opportunity to improve its industrial structure, it is not easy to localize Japan's export-controlled materials and parts sectors in a short period of time. It takes a lot of time and money to spend. Therefore, it is more important for the government to prepare a strategy to minimize supply disruptions and enhance industrial competitiveness in the medium and long-term by diversifying import lines and attracting investment from related foreign companies. However, most existing studies up to this point have analyzed production and input structures for Northeast Asia and East Asia, including Korea and Japan, as seen in Kim Chang-Nam and Kim Kwang-Hee (2009), Lee Hong-Bae (2018a) and Lee Hong-Bae and Han Ki-Jo (2006). These studies are also concentrated on topics that empirically analyze "dependency" or "relationship" (Lee Hong-Bae 2011).

This study examines the current status and characteristics of trade between Korea and Japan and suggests Korea's investment attraction direction and strategy[2] by focusing on the material and parts industry, which is emerging as the core of Japanese trade regulation. Japan is Korea's main trading partner and largest deficit, with Korea-Japan diplomatic relations having been established in 1965, and by 2018, the trade deficit of Korea has amounted to approximately US $ 644.6 billion. Although there are some differences in trade items by period, looking at the trade situation in the past three years, 90% of the trade deficits are in the materials, parts, and equipment industries. Therefore, if Korea does not resolve its dependence on Japan in the materials, parts, and equipment industries, it will have a limit not only in Japan's additional sanctions, but also in Korea's sustainable development.

Therefore, many scholars analyzed the dependency structure between countries and industries. First, research using international industry association tables includes Ko Hee-Chae (2015), Lee Hong-Bae (2011/2017) and Lee Woo-Ki, Lee In-Gue and Hong Young-Eun (2013). These time-series studies analyze the interdependence structure between industries and countries between regions, such as the United States, the EU, and East Asia including the three countries (e.g., Korea-China-Japan).

Their prior study suggests that inter-industry relationships are especially deepening as changes in interdependence between countries affect changes in the global value chain. For example, Miller (1986) and Miyazawa (1976) analyze interdependence through the inter-regional Leontief multiplier, presenting features of the inter-trade dependency structure. These studies mainly estimate the relationship between economic development and global value chains in developing countries.

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[1] Article 1 of the WTO and GATT does not discriminate in trade with all Member States, and Article 11 of the WTO and GATT prohibits all import and export restrictions except tariffs, tax and charges.

[2] Inward FDI (foreign direct investment) strategy.

Meanwhile, research related to the parts and materials industry can include Kim Kwang-Hee (2013/2015). These studies focus on the parts and materials industry, although the research methodologies vary, and demonstrate and analyze the interdependence and competitive changes in the bilateral or multilateral industries.

To sum up these studies, in order to lead the 4th Industrial Revolution, it is essential to secure competitiveness the in materials, parts, and equipment industries, which are the sources of lightweight, digitalization, and smartization.[3] Therefore, Korea should fundamentally improve its industrial structure by developing core technologies and securing stable supply capacity.

The progress of this study is as follows. First, we will examine the current export regulations of Japan and examine the status of trade and investment attraction (or inward FDI) between the two countries. Next, based on the in-depth analysis of the parts and materials industry, we will derive successful investment attraction factors in Korea. Lastly, we would like to suggest some foreign investment attraction policies and strategic implications for policy makers and firm's managers.

2. The Status of Japan's Export Regulations, Korea-Japan Trade and Investment Attraction

2.1. Japanese Export Regulations

On July 1, 2019, Japan announced measures to strengthen export controls on three items: hydrogen fluoride, resist, and polyimide. The reason is that after the Korean Supreme Court's ruling on Japan's forced deportation, there has been an inadequate issue in Korea regarding the compromise of trust between the two countries and the management of safe materials. Of course, this is Japan's own claim. Subsequently, Japan held a Cabinet meeting to decide on an amendment to the Export Trade Control Ordinance, which excludes South Korea from the list of white countries (preferred countries for strategic export control). In consideration of the sensitivity of each item and the export area, the decision on the content of the differential application was promulgated with individual permit, comprehensive permit and catchall permit. This designates 1,120 items as strategic items that reflect the items agreed in the four international export control systems. In addition, non-strategic material is notified to the Japanese government for permission. If it is recognized by the exporting company for use in weapons of mass destruction, it is subject to control. As a result, Table 1 shows Korea's shift from a comprehensive permit (multiple export licenses) to individual permits (per export licenses) for strategic materials, with a validity period (usually three years to six months) and a processing period (within one week → within 90 days) and permission application documents (2 types including permission application → 3 types normally (up to 9 items per item) have been changed.

[3] Smartization means intelligent automation that enables the most efficient and effective operation of production processes and business models based on advanced information and communication technologies such as AI, IoT, and 5G.

Table 1. Status of Designation of Strategic Goods due to Export Control of Japan

Division		Number of Items	Description
Strategic items	Sensitive items	263	Items directly related to the weapon (e.g. missiles, viruses, uranium, nuclear reactors, military vehicles)
	Non-sensitive items	857	Items not directly related to weapons (e.g. machine tool, integrated circuit, communication equipment, laser)
Non-strategic items	HS No. 25~40, No. 54~59, No. 63, No.68~93, No. 95 Critical monitoring target 74 units (Conventional weapons 34 units, WMD 40 units)		Large generators, vacuum pumps, centrifuges, freeze dryers, gyroscopes, etc., that fall short of strategic item control specifications.

Sources: Description of Main Contents on Japanese Export Control (2019) and Korea Strategic Trade Institute (2019).

According to the amendment of "the Export and Trade Management Decree", Korea requires the export permit of the Ministry of Economy, Trade and Industry of Japan regardless of the destination. Table 2 illustrates as follows. If the destination is a white country or if the exporter is an ICP company[4], a large number of export cases can be comprehensively approved by the comprehensive permit system. In other words, if the exporter is an ICP company, the general permission is granted for strategic materials other than three special action items (hydrogen fluoride, resist, polyimide), so that most strategic materials can be supplied as quickly as before. In addition, non-strategic items will be subject to catch-all control, and if there is a risk that the exporter will be able to use them for concerns (weapons of mass destruction, missiles, conventional weapons, etc.), permission from the Ministry of Economy, Trade and Industry should be required.

Table 2. Japan's Export Control System

Import Items		White Country	General Country
Strategic items	Sensitive items	Individual permission	Individual permission
	Non-sensitive items	General comprehensive permission	Individual permission Special general comprehensive permit (ICP companies only)
Non-strategic items		No permission required	Catchall permission (Limited to control requirements)

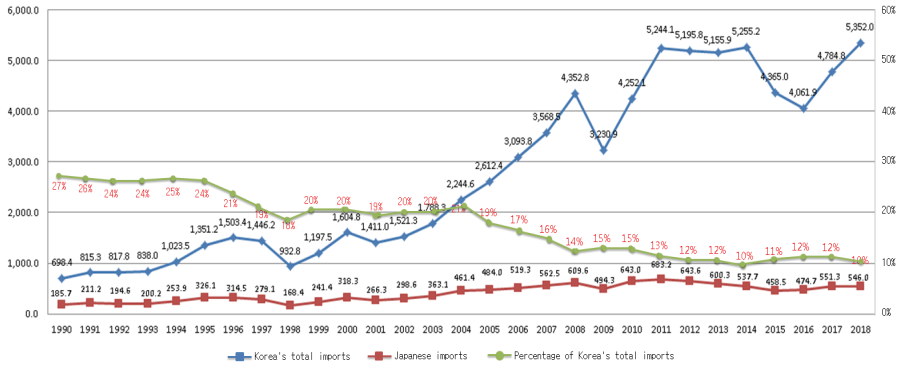
Sources: Description of Main Contents on Japanese Export Control (2019) and Korea Strategic Trade Institute (2019).

[4] ICP company refers to a company that has received a certificate of receipt by submitting an Internal Compliance Program to the Ministry of Economy, Trade and Industry for strategic material export management. There are about 1300 ICP companies in Japan, and 632 ICP companies are listed on the Ministry of Economy, Trade and Industry.

2.2. The Status of Korea-Japan Trade

Japan was Korea's largest importer until the mid-2000s, but as its share gradually diminished, it fell to about 10% of total imports in 2018. It is shown in Fig. 1. The trade deficit with Japan, which amounted to US $ 24.3 billion in 2010, also decreased to US $ 15.1 billion in 2018. Looking at the trade structure between Korea and Japan, Korea's imports to Japan account for 90% of the total imports of capital goods and intermediate goods. By item, electrical and electronics, chemical products, general machinery and primary metals accounted for a high proportion. In addition, Korea's trade deficit with Japan is the largest in the field of materials, parts and equipment. The parts and materials industry is a representative intermediate goods industry and refers to an industry that produces unprocessed or primarily processed goods to make parts or other materials (Chung Do-Chul and Kim Byung-Keun, 2018; Kim Sun-Bae and Park Sung-Jong, 2018). In other words, the parts and materials industry is a part that constitutes a finished product or is used for a specific part. It is an industry that produces materials and parts that cannot function independently but can function by assembling them with other parts (Chung Do-Chul and Kim Byung-Keun, 2018; Lee Yang-Ho and Bae Jun-Young, 2016). This means that much of the intermediary and capital goods needed to manufacture a significant number of products, such as electronics, automobiles and machinery, which are Korea's major exports, depend on Japan.

Fig. 1. The Ratio of Japanese Imports and Korea's Total Imports



Source: Author's reconfiguration using K-stat data (n.d.).

The parts and materials industry not only affects performance by determining the quality and price competitiveness of finished products, but also plays an important role in the balanced development of industry. It also contributes to the growth of the overall economy by increasing the efficiency of division of labor between industries (Chung Do-Chul and Kim Byung-Keun, 2018; Rodriguez-Clare, 1996). Therefore, in order to foster the parts and materials industry, Korea enacted the Special Parts and Materials Act in 2001, and invested about 5.4 trillion won in R&D to improve industrial competitiveness. As a result, the trade deficit with Japan, which amounted to US $ 10.5 billion in 2001, increased to US $ 24.3 billion in 2010, but then began to gradually decrease, with the deficit falling to US $ 11.5 billion in 2018. This change in trade structure between Korea and Japan shows that, unlike in the past, the trade relationship between the two countries has shifted from a one-way dependency structure to a two-way structure, and subsequent various studies have been conducted (Han

Ki-Jo and Lee Hong-Bae, 2016; Lee Hong-Bae, 2018a/2018b).

First, Han Ki-Jo and Lee Hong-Bae (2016) calculated the trade competitiveness of Korea's parts and materials industry in Korea, including China, the United States, Japan, the EU, and ASEAN, from 2000 to 2014. As a result of examining the quantitative and qualitative changes in trade competitiveness, the competitiveness of the Korean parts and materials industry was weak in trade with Japan. However, trade competitiveness with Japan has been continuously improving since 2010. Lee Hong-Bae (2017) also analyzed the dependence structure of the parts and materials industry between Korea and Japan. As a result, Korea's dependence on imports to Japan showed a tendency to decrease gradually. He also argued that the technical gap between Korea and Japan decreased from about 20 times in 1985 to about 13 times in 2000, and about 3.8 times in 2015; this trend is attributed to improved production technology and lower imports of intermediate goods (Lee Hong-Bae, 2018b).

Considering the results of the research, Korea needs policy efforts to consistently narrow the production technology gap between Korea and Japan, based on the importance of stable exchange rate management, steady expansion of R&D investment, and inward FDI and outward FDI of Korea. Therefore, if Korea's parts and materials industry continues to improve its production and technological competitiveness and thereby strengthen its domestic procurement, Korea's external risks by Japan will be reduced rapidly.

2.3. The Status of Inward FDI in Korea

Since 2015, inward FDI in Korea has continued to rise by more than US $ 20 billion, based on the declared value. In particular, inward FDI in key industries, such as semiconductors, machinery, and petrochemicals, continue to increase. Recently, investments in new industries related to the Fourth Industrial Revolution, such as bio, autonomous sensors, e-commerce, and sharing economy, are increasing, and are expanding to new fields such as clean and renewable energy, and marine leisure. Table 3 shows the status of inward FDI in the manufacturing industry of Korea since 2010. There is a slight change, but China's FDI in Korea is increasing while Japan's FDI in Korea continues to decrease. In addition, based on Table 4, about 30 percent of manufacturing investment is seen as investments in the parts and materials industry.

Table 3. Korea's Inward FDI from Major Countries

(Unit: Mil. US$)

Division	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total	13,073	13,673	16,286	14,545	19,000	20,910	21,296	22,948	26,901
	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)
U.S.	1,975	2,372	3,674	3,525	3,606	5,479	3,873	4,710	5,879
	(15%)	(17%)	(23%)	(24%)	(19%)	(26%)	(18%)	(21%)	(22%)
China	414	651	727	481	1,189	1,978	2,049	809	2,743
	(3%)	(5%)	(4%)	(3%)	(6%)	(9%)	(10%)	(4%)	(10%)
Japan	2,084	2,289	4,542	2,690	2,488	1,665	1,246	1,842	1,301
	(16%)	(17%)	(28%)	(18%)	(13%)	(8%)	(6%)	(8%)	(5%)
EU	3,196	5,192	2,714	4,799	6,504	2,495	7,396	7,030	8,921
	(24%)	(38%)	(17%)	(33%)	(34%)	(12%)	(35%)	(31%)	(33%)

Source: Author's reconfiguration using Ministry of Trade, Industry and Energy (2019).

Table 4. The Ratio of Parts and Materials Industry and Total Manufacturing in Inward FDI

(Unit: Mil. US$)

Division	2012	2013	2014	2015	2016	2017	2018
Investment amount in total manufacturing (A)	16,286	14,545	19,000	20,910	21,296	22,948	26,901
Investment in parts and materials industry (B)	5,569	3,959	7,300	4,173	4,461	6,553	9,654
No. of reported investment in total manufacturing (C)	2,865	2,607	2,462	2,697	2,987	2,774	2,669
No. of reported investments in parts and materials industry (D)	474	400	436	463	422	465	446
Ratio of parts and materials industry (B/A)	34%	27%	38%	20%	21%	29%	36%
(Amount, compared to the total manufacturing industry)							
Ratio of parts and materials industry (D/C)	17%	15%	18%	17%	14%	17%	17%
(No., compared to the total manufacturing industry)							

Source: Author's reconfiguration using Ministry of Trade, Industry and Energy (2019).

Table 5 shows the proportion of the parts and materials industry as a percentage of the manufacturing in inward FDI. First, in the case of the United States, the analysis was 41% in 2012, 14% in 2014, 22% in 2016, and 20% in 2018. In China, the figure was 100% in 2012, 96% in 2014, 95% in 2016, and 80% in 2018. The EU was 89% in 2012, 98% in 2014, 80% in 2016 and 99% in 2018. This suggests that China and the EU's entry into Korea focuses on investments in the parts and materials industry to supply to Korean final assembly companies, rather than investments in final assembly.

Meanwhile, Japanese companies' outward FDI continued to increase after Abenomics (or the Japanese prime minister Abe's economic countermeasures) in 2013, recording US $ 136.4 billion in 2015 and $ 169.8 billion in 2016, while outward FDI to Korea was $ 24.9 billion in 2014 after $ 44.4 billion in 2012. In 2016, the figure continued to decline to $ 125 million. The proportion of the parts and materials industry in manufacturing FDI accounts for 97% in 2012, 99% in 2014, 87% in 2016 and 87% in 2018. By industry, outward FDI in chemical, electrical, electronics and non-metallic mineral products was high.

Table 5. Trends in the Ratio of Parts and Materials Industry and Total Manufacturing Industries in Inward FDI of Korea Compared to the US, China, EU, and Japan

Division		2012	2013	2014	2015	2016	2017	2018
US	Investment amount in total manufacturing (A)	3,674	3,525	3,606	5,479	3,873	4,710	5,879
	Investment in parts and materials industry (B)	1,504	1,035	502	727	862	1,286	1,718
	Ratio of parts and materials industry (B/A)	41%	29%	14%	13%	22%	27%	29%
	(Amount, compared to the total manufacturing industry)							
China	Investment amount in total manufacturing (A)	167	45	133	234	816	226	867
	Investment in parts and materials industry (B)	167	31	128	205	774	186	697
	Ratio of parts and materials industry (B/A)	100%	68%	96%	87%	95%	82%	80%
	(Amount, compared to the tatal manufacturing industry)							
EU	Investment amount in total manufacturing (A)	1,288	1,525	4,514	694	1,329	3,855	3,722
	Investment in parts and materials industry (B)	1,141	1,183	4,416	612	1,058	3,425	3,675
	Ratio of parts and materials industry (B/A)	89%	78%	98%	88%	80%	89%	99%
	(Amount, compared to the total manufacturing industry)							
Japan	Investment amount in total manufacturing (A)	2,120	1,310	1,234	749	663	996	662
	Investment in parts and materials industry (B)	2,063	1,258	1,222	646	574	880	576
	Ratio of parts and materials industry (B/A)	97%	96%	99%	86%	87%	88%	87%
	(Amount, compared to the total manufacturing industry)							

Note: The amount of investment in the parts and materials industry is based on the 'textiles, fabrics and clothing', 'chemical engineering', 'metal and metal processing products', 'non-metallic mineral products', 'mechanical equipment and medical precision', 'electricity and electronics', 'Transportation Machine' classification.

Source: Author's reconfiguration using Ministry of Trade, Industry and Energy (2019).

3. Successful Inward FDI Cases in Korea's Parts and Materials Industry

3.1. Toray

Toray is a global high-tech material and chemical company that produces a wide range of industrial materials, from basic materials to high value-added and high-tech materials. IT materials, films, nonwovens, yarns and resins are being promoted as its core businesses. Toray is the most active investor in Korea. In 1963, the company transferred nylon manufacturing technology to Hankook Nylon Co., Ltd., and made extensive investments in Korea from textiles, films and resins to carbon fiber and water treatment membranes (Kwon Young-Chul and Lee Wee-Beom, 2011).

Looking at Toray's investment in Korea, in 1972, in cooperation with Samsung Group, which aims to strengthen the textile business, it established "Jeil Synthetics" to produce polyester fibers and provided basic technology and production facilities as well as fund investment. Since then, when Jeil Synthetics [later become Toray Chemical Korea Inc.], which was separated from Samsung Group, suffered financial difficulties in 1999 due to the foreign exchange crisis, Toray invested in Saehan and established Toray Saehan. In 2008, Toray acquired additional shares from Saehan Group and became a wholly-owned subsidiary. In 2011, Akhiro Nikkaku, President of Toray, announced a plan to build a carbon fiber production plant in Korea and signed a memorandum of understanding on the establishment and operation of a global R&D center between "Toray Advanced Materials Korea Inc." and the Seoul Metropolitan Government. The Toray Global R&D Center, to be built at the DMC Advanced Industrial Center in Sangam-dong, will conduct research on future strategic business sectors such as carbon composite materials, IT materials, fuel cells, bio and water treatment, and plans to invest a total of 143.8 billion won by 2020. As a result, the Seoul Metropolitan Government expects to secure the city's green growth engine through the development of technologies in eco-friendly materials businesses such as carbon fiber and water treatment, and expand the R&D base of renewable energy through the transfer of technologies in the secondary solar battery material sector. In addition, Toray invested 200 billion won in Saemangeum by 2018 to set up a PPS resin production plant, which is the raw material for Superplastic, and recently announced plans to invest another 100 billion won to expand the plant by 2021.

Regarding the expansion, Akihiro Nikkaku explained the reasons for the expansion of the investment, saying, "We judged that Korea's labor costs are still advantageous compared to Japan, talented people, and that many global companies will process materials such as Samsung, Hyundai-Kia Motors and SK." In addition, Chairman Lee Young-kwan of Hankook-Ray argued, "There are a lot of incentives for foreign investment complexes based in Saemangeum and Gumi, and even with 50 years of land lease, corporate tax reduction, local tax relief, and tariff reduction, Toray can make enough profit in Korea."

Toray Advanced Materials Korea Inc. recently merged with Toray Chemical Korea Inc. to become one company after being separated for 20 years from Jeil Synthetics [the company's name become Toray Advanced Materials Korea Inc.], hoping for a positive synergy effect.

3.2. IBIDEN Graphite Korea Co., Ltd. (IGK)

IBIDEN Graphite Korea (IGK) opened a new plant of 10,475 square meters in Pohang Materials & Parts Complex in 2013 with its parent company, IBIDEN Group, investing 15 billion yen (about KRW 200 billion). In January 2014, graphite production began in earnest.

Until IBIDEN's Pohang plant was operational, Korea could not produce graphite due to lack of technology and depended on imports for about 2,000 tons of domestic consumption per year.

Carbon materials, commonly called dream materials, are one-fourth the weight of aluminum and are more than ten times stronger than iron. Carbon materials are increasingly being used as core materials for automobiles, aircraft, solar cells, wind power generators, shipbuilding, construction, and civil engineering. With the rise of environmental issues in the future, the company is establishing itself as Korea's first business company to manufacture and sell isotropic graphite, which is a key material for solar panels and high-performance high-density semiconductor manufacturing processes, from materials to processed products. On the other hand, regarding the decision to invest in Pohang (Korea), Iwata Yoshifumi IBIDEN, Chairman of the Group, said, Pohang has excellent location and industrial infrastructure, but believes in the more passionate investment attraction activities than anywhere else in Korea.

On the other hand, in Pohang, where IGK is located, it was a little difficult for Japanese companies to easily find a Japanese-speaking graphite-related professional engineer. However, IGK rated it as a city with high living standards under the influence of POSCO, POSTECH, and Handong University, and with the advantage of not experiencing any inconveniences geographically through the opening of KTX. Recently, IGK invested about KRW 12 billion to expand the graphite product processing facility and process isotropic graphite secondary to produce high value-added products. These activities are contributing to the vitalization of the local and national economy, such as the effect of import substitution and the employment of about 20 new workers.

3.3. Delkor Co. Ltd.

Delkor, a company that produces batteries for automobiles, invested 58.8 billion won in Gumi Material and Parts Complex in the North Gyeongsang Province to sign an investment MOU (Memorandum of Understanding) to produce batteries for industrial and agricultural machinery and telecommunications. Delkor, which signed a joint venture deal with the U.S. in May 1985 and established a factory in October, the same year at the second complex in Gumi, is supplying batteries to Korean carmakers such as Hyundai, Kia, Daewoo and Ssangyong as well as Japanese carmakers such as Toyota, Honda and Nissan. In particular, Delco has secured the best technology in the field of batteries, such as obtaining a defect rate "0" PPM (Parts Per Million) certificate in the defect rate inspection of Japanese automakers.

Delkor had initially considered Indonesia and other Southeast Asian countries as the site for its second plant, but confirmed its investment in Gumi after the Gyeongsangbuk-do Province accepted its proposal to the government to allow the company's profit reserves to be recognized as FDI (foreign direct investment). This will allow Delkor to receive various incentives, including free lease and tax breaks, for the site of its second plant.

For this reason, Delco invested a total of KRW 588 billion (FDI 10 million USD) for two years from 2011 to 2012 to build a car battery (secondary battery) production facility on the site of Gumi's parts and a materials exclusive industrial complex. As a result, it has contributed to the vitalization of the local economy by the effect of inducing employment of about 200 people.

3.4. GlobalWafers Co., Ltd.

GlobalWafers, the world's third-largest manufacturer of semiconductor wafers, invested a total of 480 billion won, including US $200 million in foreign direct investment, in 2018 to

expand its silicon wafer production plant for semiconductors on the site of MEMC Korea Company (9550 square meters). The company plans to invest an additional US $30 million by 2023 to expand its 1,580-square-meter plant and production facilities on the site of the plant currently under construction. GlobalWafers, which controls about 20 percent of the global semiconductor wafer market, is said to have decided to invest in Korea because of the lack of supply due to Cheonan City's proposed welfare conditions, low-wage labor, incentives and increased demand for silicon wafers for semiconductors worldwide, and the strong demand for semiconductor wafers from global manufacturers such as Samsung Electronics and SK Hynix.

This investment attraction is meaningful as an example that led to the early completion of a factory of a foreign-invested company by close cooperation between related ministries, local governments, and related organizations. In fact, the government has been working with local governments to actively engage in investment promotion activities through investment incentives such as cash support (e.g., cash grant) and tax reductions for inward FDI. For example, a public-private joint establishment of a response support center for supply and demand of material parts (July 2019) and application of fast track to licenses of chemicals handling facilities in the second factory (Ministry of Environment, 30 days from the OTC impact assessment statutory period → 14 Within days) and expedited processing of the process safety report review by the Industrial Health and Safety Act (Ministry of Employment). In addition, in order to become self-reliant in materials, parts, and equipment, all of them have been promoting the stability of early supply of major items, establishing a cooperative ecosystem between demand-supplying materials, parts, and equipment, and expanding domestic investment by global companies such as attracting foreign investment. They established a countermeasure to strengthen the competitiveness of materials, parts, and equipment, initiated amendments to the Special Measures Act (September 2019), and launched the 'Materials, Parts, and Equipment Competitiveness Committee' (October 2019) to complete the response system. Subsequently, through the establishment of special accounting, the government's budget for the next year was significantly expanded to KRW 2.1 trillion.

This investment is expected to further strengthen the competitiveness of the industry in the front-to-back connected industries, as well as the stable supply of core semiconductor materials in Korea. Additionally, due to the increase in production volume, it is expected that the replacement effect of 9% point (p) will be achieved for silicon wafers, which are currently importing about 50% from Japan. GlobalWafers expects economic effects such as sales of 150 billion won, production induction of 550 billion won, and import replacement of 145 billion won over the next five years.

3.5. DuPont

In January 2020, DuPont, a U.S. chemical and material company, decided to invest US $28 million by 2021 to build a photoregist production plant in Korea for Extreme Ultraviolet (EUV). Photoregist for EUV is an export-regulated item announced by Japan against South Korea and has relied on Japanese imports for more than 90 percent of the total volume. Recently, Japan has eased its regulatory measures by changing the photoregist export review method for Korea from individual screening to a specific comprehensive license, but diversification of suppliers was a critical situation for Korea's sustainable development in the future.

Meanwhile, DuPont's investment is thought to have been a major factor in the Korean government's offer of incentives such as the designation of foreign investment zones and rent

reduction for DuPont, which was seeking to establish factories in East Asian countries. The investment is the result of a combination of DuPont's interest in actively responding to global photoregist market growth for EUV and South Korea's need to diversify suppliers of materials, components and equipment after Japan's export regulations.

In the end, the DuPont investment is expected to have a positive effect on the Korean industry. In other words, procurement in Korea is more advantageous in terms of cost than import, so it is expected to increase the localization rate of semiconductor materials, which is currently 25~30%.

4. Investment Attraction Strategies in the Parts and Materials Industry

South Korea's dependence on Japan continues to decline, but rather than a decrease in the amount of money, Korea's economic size is growing, and its share is decreasing. The decreasing trend of Korea's dependence on Japan is mixed with the following advantages and disadvantages. First, a decrease in Korea's dependence on Japan is absolutely necessary in terms of countermeasures against exports to Japan. However, it may be nonsensical to think that a small proportion of Japanese parts and materials' imports, or a declining trend, will have little impact on the company or industries. In other words, if a part is necessary for the final product and there is no special alternative except for a Japanese manufacturer, the effect is never small even though the portion of the total final product is small. For example, in the auto industry, the proportion of self-procurement is relatively high at 66%, but if the core parts have no alternatives other than Japanese products, the impact will be minimal.

Next, Japan's export restrictions may be an opportunity for Korean foreign-invested companies other than those from Japan. It can be a good opportunity to expand the Korean market for potential foreign-invested companies which were difficult to supply to Korean semiconductor manufacturing companies such as Samsung Electronics and SK Hynix due to a Japanese monopoly. Meanwhile, among Japanese companies such as Toray, there is a movement to increase investment into Korea, unlike the Japanese government's regulatory policy. As such, the overall likelihood of successful investment attraction increases when "a variety of factors" meet rather than one or two factors. In other words, the strategy of attracting investment needs to be approached in various aspects based on the internal and external environmental changes of the parts and materials industry and successful inward FDI cases.

The purpose of this study is to suggest the following strategies through the in-depth analysis of the parts and materials industry and case studies of successful investment attraction in Korea. First, it is a production-oriented investment attraction strategy that takes advantage of the rich experience and high technology in global production. Korea has low industrial electricity rates and technicians are extremely skilled. For example, it has world-class technology in metals, molds and castings, and has outstanding manufacturing robot production (4th in the world) and high manufacturing robot density (1st in the world). In the case of Toray, IBIDEN Graphite Korea, etc., which were examined through the above examples, these competitive factors played a major role in determining Korean investment.

Second, it is a demand-linked investment attraction strategy that seeks to attract investments in related companies and areas in the investment target area, considering domestic and foreign demand for the parts and materials industry. Korea has a domestic market through strong demand from global companies such as Samsung Electronics, LG Electronics and Hyundai and Kia Motors, and is geographically close to China, the world's largest export

market. In this case, Toray, IBIDEN Graphite Korea, Delco, Global Wafers, and DuPont have decided to carry out FDI in connection with the demand of large Korean companies.

As the technological change caused by the 4th Industrial Revolution has recently emerged, the management environment of a company is changing from competition between individual companies to competition among ecosystems. Therefore, it is important to establish an open platform[5] that can lead the 4th industrial revolution, and for this, it is essential to establish an open platform that enables cooperation in knowledge sharing and technology transfer. In particular, many potential companies, including Japanese-invested companies, are paying attention to Korea's fourth industrial revolution technology and infrastructure. Therefore, it is necessary to improve the infrastructure and institutions that can bring new innovative companies such as big data and sensors to Korea.

Third, the Global Value Chain (GVC) linked investment attraction strategy aimed at attracting investment from front-to-back connected companies linked to the industrial value chain. In Korea, the front-to-back connected industries developed in terms of procurement of raw materials and supply of products required to produce parts and materials. Therefore, the success stories of attracting inward FDI using them are increasing. For example, the domestic auto industry has recently increased M&As (e.g., Samsung's acquisition of Harman) to expand its influence in the autonomous vehicle market. In addition, investments in connection with the value chain, such as new businesses (e.g., the creation of SK Hynix Automotive Team), are actively underway. On the other hand, FDI to Korea, using the US-China trade conflict, the Korea-Japan trade conflict and FTA, has been increasing recently. For example, due to trade conflicts with the United States, China is hoping to merge and acquire Korean companies with excellent technology.

In particular, in the case of the parts and materials industry, it is expected that it will take a lot of time to develop technology for commercialization, so it is necessary to promote various strategies such as technical cooperation with advanced countries in parts and materials technology, licensing, introduction of original technology (e.g., A&D, Acquisition & Development) and investment attraction. Rather than simply developing technology, it can be an important strategy to acquire a stake in a Japanese-based parts and materials companies such as M&A to promote rapid competitive advantages. In other words, among the core items in the domestic value chain, such as strategic materials, where it is difficult to secure technology, M&A can promote rapid technology acquisition.

Fourth, the policy-linked investment attraction strategy is related to government policies such as administrative support, tax reduction and incentives for parts and materials companies. DuPont's recent FDI to Korea is a strategy to target and attract relevant companies by utilizing incentives and regions (e.g., clusters, industrial complexes) designated by the government and attracting investment (or inward FDI). Meanwhile, due to deterioration of the Korea-Japan relationship such as export regulations of Japan, strategies for diversifying investment attraction, and diversification of exports and imports with countries other than Japan are critical. Japanese investment to Korea is gradually shrinking from Abenomics. There are various reasons, such as political and economic, but it is difficult to reverse the trend in the present situation. Therefore, in general, promoting Korea's globalization strategy more aggressively, lowering its dependence on one country like Japan, and strengthening cooperation and networks with various countries around the world, can contribute to Korea's national competitiveness in the long term. In other words, the Korean

[5] An open platform is a platform that allows the supply and demand to form an ecosystem voluntarily, and various business models can be created as users expand. For example, GE is taking the lead in global standards by building a huge industrial platform by opening software that connects power turbines, oil plants, medical devices, aircraft engines, etc., based on the Internet of Things (IoT).

government should aggressively attract investment into Korea for leading foreign-invested companies related to materials, parts, and equipment as well as differentiation strategies by country and industry. For example, ① exceptional incentives (cash grant, location support, long-term supply contracts of demanding companies (Samsung, SK, etc.)), ② application of temporary discrimination measures such as system improvement, etc. These investment promotion strategies are summarized in Table 6.

Table 6. Investment Attraction Strategy for Korea's Parts and Materials Industry

Competitive Perspectives	Main Content	Investment Attraction Strategy
Production Perspective	・Low industrial electricity rates in Korea ・Excellent competency of Korean engineers	・Production-oriented investment attraction: Experience of world-class production technology (e.g.) World-class metal, mold and casting technology; outstanding manufacturing robot production (world's fourth); and high manufacturing robot density (world's No. 1)
Demand Perspective	・Securing the domestic market through solid demand companies with global companies Samsung Electronics, LG Electronics and Hyundai and Kia Motors ・Having the world's largest export market among neighboring trading partners (e.g., China and Japan)	・Demand-linked investment attraction: To attract investment from relevant companies and integrated regions in the areas subject to investment, considering the sources of demand for the parts and materials industry at home and abroad. (e.g.) To attract investment in connection with demand for expansion of facilities by domestic conglomerates
Related and Supporting Perspective	・South Korea has developed front-to-back connected industries in terms of procurement of raw materials and supply of products needed to produce parts, materials, components and others. ・Using the US-China Trade Conflict, the Korea-Japan Trade Conflict and FTA	・Global Value Chain (GVC) linked investment attraction: Investing in front-to-back connected companies linked to the industrial value chain (e.g.) Recently, the Korean auto industry attracted investment by linking M&A (the acquisition of Harman by Samsung Electronics) and new business (the establishment of SK Hynix's Automotive Team) in order to expand its influence in the self-driving car market. ・Conflict-defying investment attraction: Promotion of investment from companies outside of conflict zones such as China and Taiwan (e.g.) China hopes to acquire Korean companies with excellent parts production technology and commercialization technology.
Government Policy Perspective	・Utilize government-designated areas (clusters, industrial complexes, etc.) and incentives.	・Policy-linked investment attraction: Target related companies in connection with government policies such as administrative support for parts and materials companies, tax reduction and incentives (e.g.) Attract investment by utilizing the investment incentives for parts and materials firms designated by the government.

The proposals to support investment attraction of foreign-invested companies are as follows. First, comprehensive efforts at the national level of central and local governments are needed. Above all, "government policies and strategies" were important factors in attracting investment, and "characteristics of the Korean market (e.g., competitiveness of Korean manufacturers, development of related infrastructure)" are also very helpful in attracting investment. In addition, the government, companies, and research institutes need to change the way they collaborate with the Fourth Industrial Revolution and our growth strategy. Specifically, we will select ICT-based promising industries that have strengths in Korea as strategic industries, draw out platform characteristics suitable for such strategic industries, build infrastructures, and operate them to be used by small and medium-sized venture companies as well as big companies.

Second, "substantial support policy" and "incentive expansion" are needed for potential foreign companies seeking to enter into Korea. For example, for early operation of new and expanded factories of parts and materials companies such as fluoride and resist, related licenses such as process safety inspection should be promoted promptly. In addition, it is necessary to prepare various support measures such as rapid support for facility investment funds and expansion of the cash support ratio (30% → 40%), including the expansion of loan limits for new plant expansion and introduction of new equipment, free lease of up to 50 years, matching investment demand between domestic and foreign companies, and long-term supply contracts in cooperation with demand companies (Samsung, SK, etc.).

Third, there is a need for reforming the rigid labor market and finding and improving regulations that hinder inward FDI. For example, after the introduction of the Chemicals Control Act and the Chemicals Registration and Evaluation Act, regulations that foreign-invested companies feel are unreasonable continue. Efforts should be made to ensure that there are no withdrawals or withdrawals of investment due to domestic regulations through consultation on related laws and holding briefing sessions.

Lastly, it is necessary to provide M&A incentives such as new M&A tax support for overseas companies and expansion of M&A support targets for technology innovation. It is also necessary to consider the method of deducting corporate tax when acquiring a specialized overseas parts, material, and equipment company, such as strategic items, which lacks the domestic industrial base and technology.

On the other hand, the Ministry of Economy, Trade and Industry of Japan recently announced some amendments to the comprehensive permission handling guidelines for changing the photoresist, which was subject to export restrictions, to specific comprehensive permits, and eased some of the export restrictions on semiconductor-related items to Korea. However, Korea's dependence on Japan must be steadily reduced for the healthy growth of the Korean economy, and comprehensive efforts such as market diversification and globalization will be needed.

5. Conclusion and Implications

The U.S. strives to protect its industries and businesses by providing incentives such as corporate tax reductions and exemptions to companies that have invested abroad and are returning to the U.S., in addition to imposing high tariffs on companies that want to export to the United States. Korea should understand this global trend of protectionism, that the United States has adopted, and develop FDI attraction strategy in addition to trade strategy. The parts and materials industry is regarded as the basis of the national economy in that they have a great effect on the industries and greatly influence the competitiveness of the entire

manufacturing industry (Kim Kang-Ho, 2008; Kim Sun-Min, 2016). Therefore, in order to leap as an advanced country, it is difficult to lead the future competitive environment without the development of the parts and materials industry (Kim Kang-Ho, 2008).

This study examines the current status and characteristics of trade between Korea and Japan to prepare for countermeasures in accordance with Japan's export regulations, and focuses on the parts and materials industry emerging as the core of Japan's trade regulations, and focuses on Korea's investment attraction strategy.

First, the status and characteristics of trade between the two countries are summarized as follows. Japan is Korea's major trading partner and the largest trade deficit, with some differences in trade items by period, but 90% of the recent trade deficit is in the field of the materials, parts and equipment industries. On the other hand, Korea's dependence on Japan continues to decrease, but rather than a decrease in terms of size, the overall proportion of Korea's economy is growing and therefore, its share becomes relatively smaller. Therefore, for sustainable development in Korea, it is more critical to prepare a strategy to minimize supply disruptions by diversifying import lines and attracting investment from related foreign companies and improving industrial competitiveness from a mid-to long-term perspective.

In this situation, this study explored Korea's investment attraction factors of foreign-invested firms based on an in-depth analysis of successful Inward FDI cases, literature research and derived four practical investment attraction strategies.

The first is a "production-oriented investment attraction strategy" that promotes investment by utilizing the rich experience of demand-based industries and possessing world-class production technology. The second is the "demand-linked investment attraction strategy," which promotes investment promotion to related companies and integrated areas in the investment target field, considering domestic and foreign parts and materials' demand. The third is "the GVC (Global Value Chain) linked investment attraction strategy," which promotes investment for front-to-back connected companies linked to the industrial value chain. Finally, the fourth is the "policy-linked investment promotion strategy," which is linked to government policies such as administrative support, tax reduction, and incentives for parts and materials related companies.

In order to establish such a successful strategy, the probability of success in attracting investment increases when "various comprehensive factors" meet rather than one or two factors. In the end, the establishment of an investment attraction strategy needs to be approached from various aspects based on domestic and foreign environmental changes in the parts and materials industry and successful investment cases.

The limitations of this study are as follows, which may be used as a follow-up study in future studies. First, since this study is a deductive study through cases, it has some limitations in methodology, and can be supplemented through related empirical studies in the future. In addition, if there are many related cases in the future for establishing investment attraction strategies in the parts and materials industry, it will be possible to derive other successful factors.

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