

**Transformation Towards Overseas-Oriented
Expansion: The Evolution of Hyundai Motor Group's
Production Structure***

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Abstract. In this paper, we analyze the Hyundai Motor Group's newly evolved-production structure to illustrate the evolution of a corporate system. Specifically, we explore why Hyundai Motor Group's domestic-oriented production structure could be maintained until the more recent history of Korea's domestic automobile market. Our findings show that since 2012, the Hyundai Motor Group's production structure—which has been affected by internal and external factors in the automobile market—has transformed from a domestic-oriented production structure to an overseas-oriented production structure. Our findings further demonstrate that both technical factors embedded in the Hyundai Motor Group's production system and non-technical factors that strive to equate the production conditions in the Group's foreign and domestic facilities support the smooth operation of the overseas-oriented production structure.

Keywords. Corporate system, Production structure, Automobile industry, Hyundai Motor Group, Evolutionary transformation.

JEL. F23, L 11, L62, M21.

1. Introduction

Since the 1960s, the Korean government has implemented and enforced political strategies to promote the growth of the automobile industry in Korea. In that time, Korean automakers have sought to accept the strategy proposed by the government, thereby facilitating the prosperity and growth of the automobile industry. As a function of this prosperity and growth, in 2007, Korean automakers produced over four million vehicles for the first time. Since then, annual output of Korean automobiles has continued to increase despite a slump in the global automobile market. Owing to its sustained growth, Korea is in the process of solidifying its position as a major automobile-producing country within the global automobile market. As of 2013, Korea ranked fifth in terms of automobile production output, following China, the United States, Japan, and Germany. Of the various automakers within the Korean automobile industry, the Hyundai Motor Group (hereafter, the HM Group) has played a particularly integral role as a driving force of the industry's global strength.

The evolution of diverse forms of capitalism, coupled with environmental changes, have resulted in the emergence of a wide variety of corporate systems. In

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seminal research that adopted an evolutionary framework to evaluate a specific automobile company, Fujimoto (1997a; 1999) explored the intrinsic evolutionary factors that contribute to the establishment, maintenance, and improvement of production systems within Toyota Motor Corporation. The main purpose of this paper is to explore the evolution of corporate production structures. To do so, we perform a case analysis on the HM Group as a proxy representative of Korea's automobile industry. Specifically, we explore how HM Group's production structure has evolved, why it has evolved into its current form, and how the newly evolved production structure can be maintained. Because HM Group's production structure has undergone a complete transformation since 2012, an analysis thereof would provide a more comprehensive understanding of the HM Group's corporate system, and by extension, the corporate systems of other Korean car manufacturers.

This paper consists of three parts. In the first part, we examine how the HM Group's domestic-oriented production structure (hereafter, DPS) could be maintained until 2011 and identify the factors that have historically affected the corporation's production structure. The second part of the paper explores how the HM Group's production structure could transform into its overseas-oriented production structure (hereafter, OPS). To do so, we investigate the corporation's global strategy, as well the markets it has targeted. Finally, the third part of this paper highlights the technical and non-technical factors that make HM Group's OPS (i.e., its newly evolved-production structure) operate smoothly.

2. The evolution of production structure in the HM Group

The HM Group,ⁱ an international automobile-specialized group in Korea, has produced the largest number of automobiles each year among the Korean companies. In 2012, the HM Group recorded its highest level of domestic output of automobiles since its foundation, with 3,490,946 vehicles. The Hyundai Motor Company (hereafter, HMC) produced roughly 54.6% of these nearly 3.5 million vehicles; Kia Motors Corporation (hereafter, KMC) produced the other 45.4%.ⁱⁱ In total, the HM Group accounted for 76.5% of the total domestic output of all automobiles produced by Korean automakers. Until a few years ago, HM Group's production practices maintained a set structure, supplying automobiles to both domestic and overseas markets with automobiles produced domestically rather than in foreign facilities. This structure, however, proved untenable as a result of the influence of various factors. Ultimately, this caused the production structure to gradually evolve. Because corporations' production structures evolve into a number of different forms in accordance with changes to the surrounding environment, evaluating the evolution of the HM Group's production structure may lead to a more comprehensive understanding of its current production structure.

2.1. Changes in the production structure specialization index

Use of the production structure specialization index (hereafter, PSSI)ⁱⁱⁱ can reveal the types of production structures that the HM Group has maintained. PSSI score that is closer to 1.000 indicates a stronger the DPS, while a score closer to -1.000 indicates a stronger the OPS. Using the PSSI is a methodological necessity to satisfactorily describe the evolution of production structures within the HM Group. Changes in HM Group's PSSI scores clearly indicate that the Group's production structure has evolved from a DPS to an OPS (see Figure 1). Delineating the process of HM Group's evolution with regard to production structure (using PSSI scores) reveals that the evolution consists of three distinct periods.

2.1.1. Maintaining the DPS

The first period, which consists of HM Group's history prior to 2005, was characterized by the corporation's maintenance of a DPS. During this period, the

number of automobiles produced in domestic production facilities substantially exceeded the number of automobiles produced in production facilities located overseas. As a result, the HM Group’s PSSI score during this period remained between 0.500 and 1.000. Although HM Group’s PSSI score stayed between 0.500 and 1.000 in this time frame, it did change over time. Specifically, the score gradually decreased from 0.920 in 2001 to 0.579 in 2005.

2.1.2. Escaping the DPS

In 2006, the HM Group’s PSSI score dropped below 0.500 for the first time. This continuous decline caused the HM Group to enter into the second phase of its production structure evolution—the “escape period from the DPS.” During this period, which lasted from 2006 through 2011, the HM Group’s PSSI score stayed between 0.000 and 0.500. Using the PSSI framework to define the evolutionary phase in which the HM Group operated in this time period, it is clear that although HM Group’s PSSI score was declining, it nevertheless maintained a positive score over these six years. As a consequence, it is fair to claim that the HM Group continued to employ the DPS lasted over this time period. However, this time period is distinct from the “maintaining” period of the DPS (i.e., 2005 and earlier) given the rapid and continuous decrease in PSSI score. Between 2006 and 2011, the HM Group experienced an annual average increase in domestic output of automobiles of 4.7%. Average annual growth in overseas output was markedly higher, reaching 25.5%. The extent of this gap between foreign and domestic output indicates that the transformation of the HM Group’s production structure occurred quickly in the years following this period.

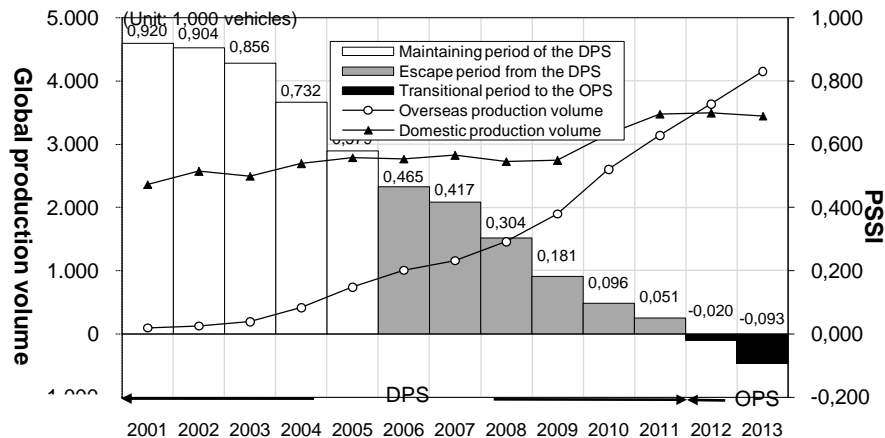


FIGURE 1: The HM Group: Global automobile output, PSSI

Note: 1. The annual domestic and overseas annual production volume of automobiles is equal to the sum of HMC’s and KMC’s, respective production volumes (including passenger and commercial vehicles). 2. PSSI score is based on these data.

Source: Korea Automobile Manufacturers Association, *Korean Automobile Industry*, Hyundai Motor Company, *Sustainability Report, Annual Report*, Kia Motors Corporation, *Kia Motors Sustainability Magazine, Annual Report*.

2.1.3. Transitioning to the OPS

After the “escape period,” the PSSI score continuously decreased until it finally transformed from a positive value to a negative value in 2012. In 2012, the annual output of automobiles produced in overseas production facilities exceeded the number produced in domestic production facilities. As such, in 2012, the HM Group can be said to have transitioned from the DPS to the OPS. As of 2013, the HM Group has maintained the OPS, with the PSSI score of – 0.093.

2.2. The specificity of Korea’s domestic automobile market

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Although historic PSSI scores illustrate the evolution of the HM Group's production structure numerically, accurate interpretation of these scores requires a nuanced understanding of Korea's domestic automobile market. Further, by developing an understanding of the structural features of Korea's domestic automobile market, it is possible to determine why the HM Group's transformation to the OPS experienced such delay.

In the early 1960s, the Korean government identified the country's automobile industry as a driving force the Korean economy and bolstered it through political strategy. As part of the strategy, the Korean government enforced import restrictions on foreign brand automobiles to protect the Korean automobile industry. These import restrictions were enforced until the end of 1986. However, as automakers in advanced countries requested the liberalization of Korean imports to facilitate their entrance into the Korean automobile industry, the Korean government eased regulations on importing foreign automobiles imports in January of 1987. Ultimately, this led to the opening of the Korean market to foreign automakers for large (2.0 liter engines) and small (1.0 liter engines and smaller) automobiles on a preferential basis. In April of 1988, the Korean government lifted import restrictions on all types of foreign brand automobiles (regardless of engine displacements). As a result, the market for foreign brand automobiles in Korea was fully opened at that time.

Figure 2 illustrates the domestic market share of brand-new passenger vehicles in Korea. Specifically, we calculated the total annual sales volume of brand-new, foreign-brand automobiles (hereafter, BFA) and brand-new, Korean-brand automobiles (hereafter, BKA). Although, BFA held only a 0.004% market share in the Korean automobile market in 1987, this figure grew to 12.1% by 2013 as a result of the eased restrictions on the import of foreign brand automobiles. Although BFAs have claimed an increasingly large portion of the market share in the Korean automobile market since 1987, this share is still far lower than that of BKAs. As of 2013, the HM Group's annual sales volume of passenger vehicles in Korea's domestic automobile market was 882,654 vehicles, reflecting 68.2% of the Korean automobile market. The high market share retained by the HM Group demonstrates that despite steps to open the Korean automobile market to foreign automakers, the market remains to be most heavily populated by domestic automakers.

The Korean domestic automobile market has been dominated by Korean automakers is related to the Korean government's active support of and strategic policies toward domestic automakers, as well as the imposition of high tariffs on BFA. Before 1987, there was no influx of BFA into Korea's domestic automobile market; therefore, the market could be occupied entirely by domestic automakers. Although there has been a steady influx of BFA into the Korean automobile market since 1987, the price competitiveness of domestic automakers has been artificially strengthened as a result of the aforementioned tariffs on BFA, thereby allowing domestic automakers to retain the majority of the market.

The Korean government's policies facilitated domestic automakers' domination of the domestic automobile market in Korea. Owing to the influence of the institutional factors outlined above, HMC and KMC_P^{iv}—which had a higher production capacity than other domestic automakers—could be in a key position to capture the majority of the domestic automobile market. This also afforded HMC and KMC_P the opportunity to focus its energy and resources on Korea's domestic market for a long time. As a result, the transformation of their production structure into the OPS was delayed.

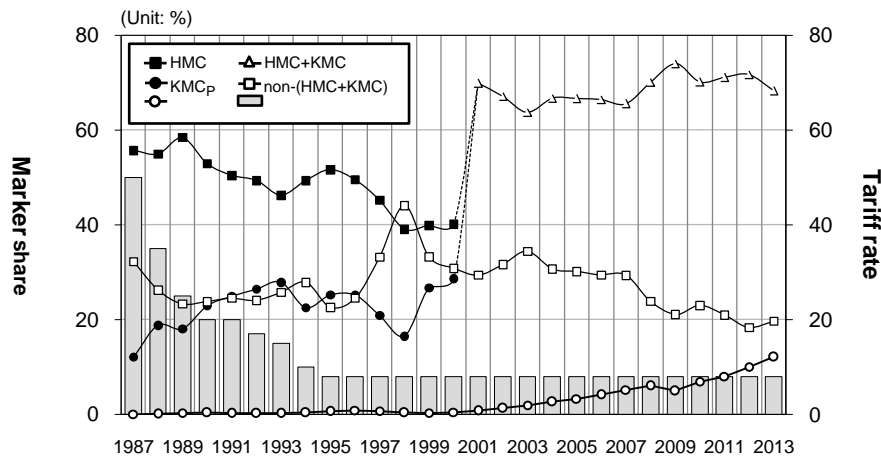


FIGURE 2: Domestic market share for brand new passenger vehicles, tariff rate

Note: 1. Sales of recreational vehicles are included in this figure. 2. Sales volume of Hyundai Precision Industry Co. Ltd., which belonged to Hyundai Group through HMC, is included in the HMC data from 1987 through 2000. Sales volume of Asia Motors Co. Ltd., which was merged with KMC, is included in the KMC data from 1987 through 2000. 3. From 2001 onward (when the HM Group was founded), total sales volume is equal to the sum of HMC and KMC's respective sales volumes. 4. The tariff rate on BFA in January of 1988 was 40%; the tariff rate on BFA in March of 1988 was 30%. Therefore, we calculated the tariff rate in 1988 to be 35%. 5. HMC's and KMC's respective market shares were calculated by the author.

Source: Korea Automobile Importers and Distributors Association (2015), Korea Customs Service, Korea Automobile Manufacturers Association (2005), Hyundai Motor Company, *Sustainability Report, Annual Report*, Kia Motors Corporation, *Kia Motors Sustainability Magazine, Annual Report*.

2.3. A delay in reaching maturity of the diffusion of the passenger vehicle

The rapid development of the Korean economy in the 1980s and 1990s contributed to a rise in the gross national income within Korea. This, in turn, resulted in the growth of Koreans' purchasing power, allowing them to more easily purchase passenger vehicles. As a result, there was an increase in the diffusion of passenger vehicles in Korea. In Korea, the 1980s and 1990s were characterized by a gradual increase in demand for passenger vehicles, contrary to business fluctuations. As such, this period can be defined as the stage just before the diffusion of the passenger vehicle achieved maturity in Korea. Therefore, by retaining the majority share of Korea's domestic automobile market during this period, HMC and KMC_p could secure a reliable source demand for their automobiles in the long-run.

Figure 3 shows that as Korean GNI per capita gradually increased into the mid-1990s, HMC and KMC_p's domestic sales of brand new passenger vehicles also increased. The rapid increase in sales volume is largely attributable to a rise in the gross national income, which supported a continuous increase in demand for brand new passenger vehicles. This means that the diffusion of the passenger vehicle could not reach maturity in Korea before 1996. This is in stark contrast to the case of Japan, where diffusion of the passenger vehicle reached maturity as early as 1990.^v The delayed growth in GNI explains why relative to Japan's Toyota Group, the HM Group was delayed in transforming to the OPS. From the perspective of HMC and KMC_p management, there was no incentive to abandon the DPS before Korea entered the maturity stage of the diffusion of the passenger vehicle. In other words, HMC and KMC_p had no incentive to dedicate resources to secure new purchasing demand or cultivate overseas markets, as a large increase in demand for passenger vehicles within Korea's domestic automobile market had occurred by 1996. Given these conditions, HMC and KMC_p found Korea's domestic automobile

market to be more attractive than foreign markets.

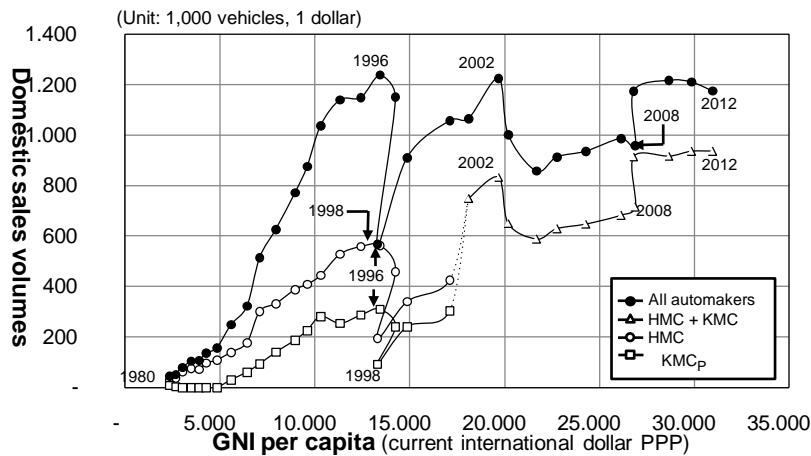


FIGURE 3: Total annual sales volume of passenger vehicles in Korea's domestic market, Korea's GNI per capita

Note: The annual sales volume of BFA is not included in the total annual sales volume of passenger vehicles.

Source: The World Bank, *International Comparison Program database*, Korea Automobile Importers and Distributors Association (2015), Korea Automobile Manufacturers Association (2003; 2005), Korea Automobile Manufacturers Association, *Korean Automobile Industry*.

2.4. Saturation of demand for brand new Korean passenger vehicles in Korea's domestic automobile market

Figure 3 demonstrates that diffusion of passenger vehicles within Korea's domestic automobile market has been in a stage of maturity since 1996. Since the early 1990s, the sales volume of brand-new, Korean-brand passenger vehicles (hereafter, BKP) in Korea's domestic automobile market had been increasing exponentially. This ultimately led to a peak sales volume of 1,238,940 vehicles in 1996. Although the pre-1996 increase in sales volume was largely impervious to business fluctuations, after hitting its peak in 1996, sales volume became sensitive to the fluctuations to which it had previously been immune.

To illustrate, Figure 3 shows that there was a rapid decline in demand for BKP in Korea's domestic automobile market after 1996. This decline is most directly attributable to the economic recession related to the 1997 IMF Financial Crisis in 1997. Another driver of this decline was reduced consumer confidence relate to Korea's 2003 Credit Card Crisis, as well as uncertainty in the international economy resulting from increases in the price for oil (which itself was linked to the Iraq War). During periods of economic stagnation, durable goods (a category of which passenger vehicles are a part) are more drastically affected than other types of goods. Therefore, as a result of these factors, the total annual sales volume of BKP in Korea's domestic automobile market decreased by 50.7% from 1997 to 1998, and 14.4% from 2003 to 2004.

Given this, it may be argued that Korea's domestic automobile market has already reached maturity in terms of passenger vehicle saturation. This claim is validated by the fact that although there were two periods of economic recovery in Korea since 1996, demand for BKP has not increased more than a certain level during either of these periods. This indicates that despite economic recovery, demand for BKP in Korea's domestic automobile market has a specific upward limit. Still, demand for BKP has not exceeded roughly 1.23 million vehicles in the past 16 years.

It is clear from the above that a saturation of demand for BKP has exerted a

strong effect on the change in the HM Group's transformation of production structure to the OPS. By acknowledging that demand for BKP in Korea's domestic automobile market has little potential for increase, the HM Group has realized its domestic production facilities are capable of handling Korean demand for BKP. Therefore, the HM Group began to increase investments in overseas production facilities to cultivate an overseas market.

2.5. Emerging economies: the rapid growth of the automobile market

Unlike Korea's passenger vehicle market, which reached its upper limit in terms of demand in the mid-1990s, the respective markets for passenger vehicles in China, India, Brazil and RSCT (Russia, Slovakia, the Czech Republic, and Turkey), which constitute emerging economies (hereafter, EEs), have expanded rapidly since the early 2000s. This expansion is the result of increased income, which accompanied economic growth in those countries (which had yet to reach the maturity stage of passenger vehicle diffusion). This trend illustrates that the diffusion of passenger vehicles attributable to economic growth in EEs is rapidly increasing. This rapid increase has motivated the HM Group to expand its business and establish new production facilities in EEs, where there is a large demand for new automobiles. This incursion into foreign markets also served as a catalyst for transforming the HM Group's production structure into the OPS.

3. The transformation to the OPS

Automakers attempt to boost overseas production through the development and use of production facilities on foreign soil as a result of the unique features of the automobile industry itself. Unlike electronic goods, which cost less to import, automobiles are characterized by high logistic costs owing to extensive supply chains. To mitigate these costs, it is advisable for automakers to build production facilities that are geographically near the markets in which the automobiles will be sold. In addition, because the automobile industry (relative to other industries) has a substantial effect on employment, it is often protected by government policies (e.g., tariffs), thereby limiting the growth of automakers without accompanying overseas production facilities. Moreover, cultural, historical, environmental, and institutional factors have effectively diversified consumer preferences for automobiles. Therefore, it is critical to locate production facilities near the automobile markets they serve to accommodate these unique preferences.

3.1. Business strategy for glocalization: changes in automobile supply route to overseas market

As of 2013, the total number of automobiles produced in the HM Group's global production facilities was 7,602,445 vehicles. About 6.46 million (85%) of these vehicles were supplied to overseas markets. Of the 7.6 million vehicles produced by the HM Group, about 2.3 million vehicles in domestic production facilities were directly exported to overseas markets. Nearly 4.2 million vehicles were produced in the HM Group's overseas facilities and were supplied to various countries. These figures reveal that the HM Group's supply of automobiles to foreign markets is accommodated by both exports from the Group's Korean facilities as well as its international production facilities.

It is essential to understand the current state of the HM Group's automobile supply routes. However, how the HM Group's supply routes have evolved is no less important. Therefore, it is important to note the ratio of automobiles produced for direct export from Korea to automobiles produced in international facilities has changed in the last 13 years.

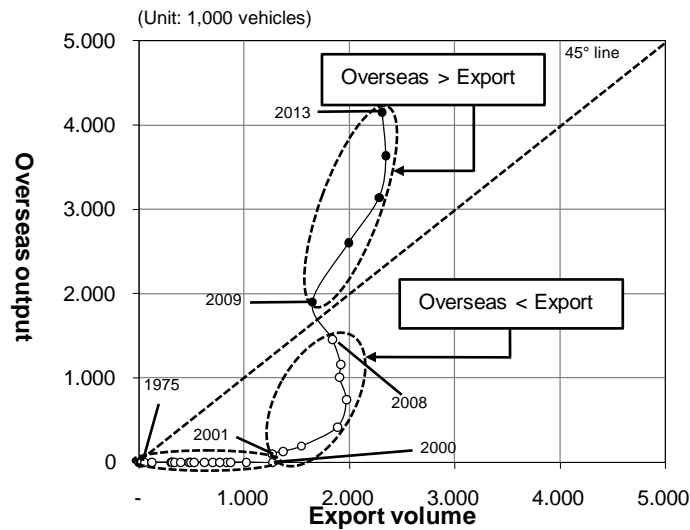


FIGURE 4: *HM Group's automobile supply route to the overseas market*

Note: 1. Export volume of Asia Motors Co. Ltd., which was merged into KMC, is included in the KMC data from 1980 to 1999. 2. Both overseas output and export volume consist of the sum of passenger and commercial vehicles; the number of knockdown vehicles is excluded from export volume.

Source: Korea Automobile Manufacturers Association (2005), Korea Automobile Manufacturers Association, *Korean Automobile Industry*, Korea Automotive Research Institute, *Korean Automotive Industry*, Hyundai Motor Company, *Sustainability Report, Annual Report*, Kia Motors Corporation, *Kia Motors Sustainability Magazine, Annual Report*.

Figure 4 depicts the stage-by-stage process through which the HM Group's automobile supply route to overseas markets has evolved. This figure shows that the supply route has evolved such that it consists of three historical stages. First, from 1975 to 2000, HMC and KMC_P supplied their domestically built automobiles to overseas markets through direct export only, as the HM Group had yet to develop overseas production facilities to this point. Since 2001, however, when HMC and KMC_P merged into the HM Group, the companies have simultaneously exported domestically built automobiles and produced vehicles at its overseas production facilities. This change marked a business strategy referred to as "glocalization" which the HM Group had sought to implement since its establishment.^{vi} As part of the HM Group's glocalization strategy, the corporation founded the Beijing Hyundai Motor Company and Dongfeng Yueda Kia Motor Company, Ltd. in 2002. It was when these two companies were founded that automobile production at China's production facilities began in earnest. Between 2001 and 2008, the HM Group increased production of automobiles in their Korean facilities. These vehicles were intended to be exported to overseas markets; production of exported automobiles increased an average of 5.5% over this period. Nevertheless, production of automobiles for overseas markets increased more rapidly in overseas production facilities, where the average annual production increase was 46.9%. Despite outpacing the annual growth of Korean production of exported automobiles by such a substantial margin, the number of automobiles produced at overseas production facilities did not exceed the number of automobiles exported to foreign markets from HM Group's Korean production facilities. Notwithstanding, the HM Group continued its gradual expansion of investment in overseas production facilities. As a result, the corporation founded several global business sites since the mid-2000s. An increase in direct investment to overseas production facilities allowed those facilities to produce a greater number of automobiles. As a result, by 2009 (and beyond), the output of HM

Group's overseas production facilities had exceeded the output of the Group's Korean facilities. Given this, it is clear that in 2009, the HM Group's automobile supply route changed drastically.

3.2. Evolution into a multinational corporation

As evidenced by changes in HM Group's activities leading up to 2009, the Group's automobile supply route to overseas markets evolved from a direct export-oriented route to a hybrid route characterized by a combination of direct exports from Korea and the production of automobiles in overseas facilities. One salient characteristic of the HM Group's automobile supply route is its gradually decreasing ratio of automobiles produced for direct export from Korea to its vehicles produced in overseas production facilities. This changing ratio indicates that by increasing investment in overseas production facilities, the HM Group has been evolving into a multinational corporation.

Although there is no clear consensus definition of a multinational corporation, multiple researchers have defined and operationalized its components.^{vii} Using the work of these researchers as a guide, a multinational corporation can be defined as a corporation that owns or controls overseas-affiliated companies that engage in production activities at global manufacturing bases located outside the borders of the corporation's home country. Generally, multinational corporations utilize overseas direct investment to partake in production and marketing activities on a global scale. To successfully execute such a strategy, multinational corporations establish global business sites in various countries that possess their stocks or actual assets.

From this perspective, a gradual expansion of global business sites through overseas direct investment indicates a firm's gradual evolution into a multinational corporation. Therefore, because the HM Group has continued overseas direct investment to establish and maintain various global business sites, it appears as though it is undergoing the gradual process of evolving into a multinational corporation. According to HMC's 2013 *sustainability reports* and *Kia Motors Sustainability Magazine 2013*, HMC's operations in six countries (excluding Korea) included six production facilities, three production-sales corporations, 16 sales corporations, six R&D centers, nine regional headquarters and two special facilities. KMC's operations in three countries (excluding Korea) included three production facilities, 18 sales corporations, nine R&D and design centers, and four regional headquarters.

TABLE 1. Number of workers employed at HMC's and KMC's global business sites

(Unit: 1 person, %)

	2010	2011	2012	2013	CAGR
HMC					
India	5,511	5,795	8,816	8,893	17.3%
China	7,443	9,625	13,768	15,631	28.1%
U.S	5,005	5,149	6,211	6,873	11.2%
Europe	3,974	6,499	5,991	6,031	14.9%
Others	1,791	2,057	3,532	4,410	35.0%
Total	23,724	29,125	38,318	41,838	20.8%
KMC					
China	5,003	5,097	6,095	6,327	8.1%
U.S	2,389	3,355	3,174	3,177	10.0%
Europe	3,853	4,167	4,794	4,731	7.1%
Others	110	137	120	273	35.4%

Total	11,355	12,756	14,183	14,553	8.6%
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Notes: CAGR is compound annual growth rate.

Source: Hyundai Motor Company, *Sustainability Report, Annual Report*, Kia Motors Corporation, *Kia Motors Sustainability Magazine, Annual Report*.

In addition to the increased output associated with overseas production facilities, increasing direct overseas investment on the part of HM Group is also evidenced by the growing number of workers employed at these global business sites. In 2013, HMC’s global business sites employed almost 42,000 workers, which was a 9.2% increase relative to the previous year. In that same year, KMC’s global business sites employed about 14,500 workers, which was 2.6% higher than in 2012 (See Table 1). Although the growth of each site’s workforce varies from region to region, there has been a marked increase in the number of workers employed at HMC and KMC’s overseas facilities since 2010. From 2010 to 2013, the average increase in the number of workers at the HM Group’s Chinese and Indian facilities has been higher than in the United States and Europe. This serves as further evidence that HM Group has focused on these EEs since 2010.

The HM Group’s active investment in overseas production facilities has resulted in increased output from those facilities. Most notably, between 2011 and 2013, the HM Group dedicated its largest investments to Hyundai Motor India (HMI), followed by Hyundai Motor Brasil (HMB) (See Table 2). As a result of this, HMI has increased by its output by over 13,000 vehicles between 2011 and 2013. Similarly, HMB increased its output by nearly 140,000 vehicles between 2012 and 2013.^{viii}

Overall, it appears that the HM Group’s glocalization strategy features an emphasis on overseas direct investment. This emphasis has yielded an expansion of overseas production facilities and an increase in not only the number of automobiles produced, but also the number of workers employed. As a consequence of these steps, the HM Group evolved into a multinational corporation in a short period of time. As a result of its transformation, the HM Group engages in production and marketing activities through global manufacturing bases in various countries. The HM Group’s evolution into a multinational corporation further indicates that its production structure has similarly evolved into the OPS.

TABLE 2. *Investment in overseas production facilities* (Unit: 100 million KRW)

		2011	2012	2013	2011-2013
America					
	HMMA	1,527	947	1,281	3,755
	KMMG	2,399	1,902	956	5,257
	HMB	2,321	2,402	1,237	5,960
Europe					
	HMMR	1,376	107	161	1,644
	KMS	2,585	1,446	754	4,785
	HMMC	1,693	1,304	377	3,374
	HAOS	91	999	1,023	2,113
Asia					
	HMI	1,912	2,997	2,493	7,402
Total		13,904	12,104	8,282	34,290

Notes: These data are based on the cost of investments in plants and equipment; research and development costs are not included.

Source: Hyundai Motor Company, *Sustainability Report, Annual Report*, Kia Motors Corporation, *Kia Motors Sustainability Magazine, Annual Report*.

3.3. Concentration on emerging economies

As the markets for passenger vehicles have expanded in EEs, so too have the HM Group's automobile production rates (or output) in its overseas production facilities (see Figure 5). The following subsections detail the nature of those expansions.

3.3.1. China

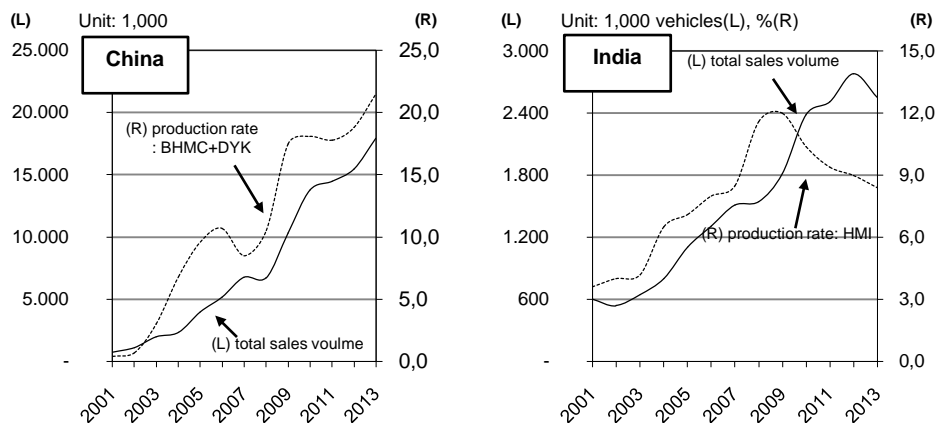
In China, the domestic market for passenger vehicles has expanded for much of the last 12 years. As a result of this expansion, China represents the largest domestic market for passenger vehicles among all EEs. In 2001, the total annual sales volume of brand new passenger vehicles in China's domestic market was only about 721,000 vehicles. By 2013, however, this figure had increased by almost 25 times to nearly 18 million vehicles. In addition, the automobile production rate of HM Group's Chinese production facilities has increased from 0.4% in 2001 to 21.5% in 2013.

3.3.2. India

Similar to China, the Indian domestic market for passenger vehicles has expanded drastically in the last decade. As of 2013, the total annual sales volume of new passenger vehicles in India's domestic market was over 2.5 million vehicles. This represents a more than four-fold increase from the annual sales volume in 2001. The rate at which India's facilities produce automobiles has increased as well. In 2001, HM Group's Indian production facility's production rate was 3.6%. By 2013, this figure had grown to 8.4%.

3.3.3. RSCT

By 2008, the sales volume of passenger vehicles in RSCT had experienced significant growth. However, in 2009, sales volumes decreased sharply as Russia was significantly impacted by the global financial crisis of 2008. Other than this anomaly, however, it is apparent that the domestic market for passenger vehicles in the RSCT has generally undergone (and continues to undergo) expansion. The total annual sales volume for RSCT in 2013 was 3,493,111 vehicles. This is more than double the amount of vehicles sold in RSCT in 2001. In addition, the automobile production rate in the HM Group's RSCT production facilities has increased from 1.7% in 2005 to 12.5% in 2013.



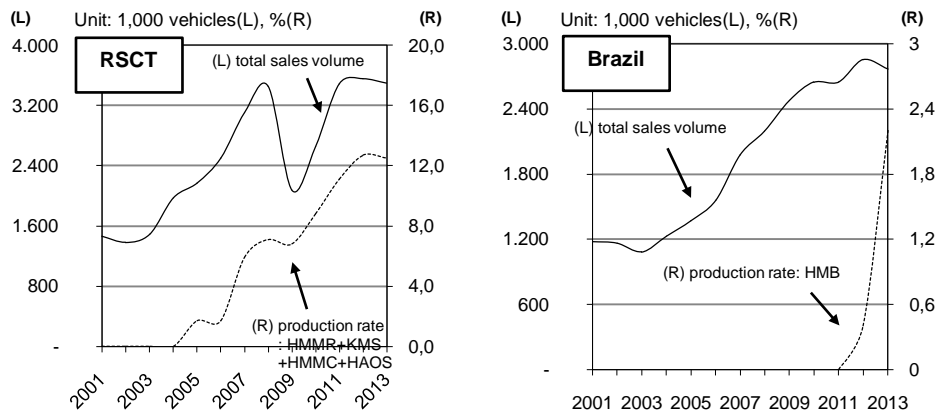


FIGURE 5: Total annual sales volume of brand new passenger vehicles in EEs, production rates in HM Group’s production facilities by regional groups

Source: FOURIN, Inc. (2013), OICA (2014a; 2014b)Hyundai Motor Company, *Sustainability Report, Annual Report*, Kia Motors Corporation, *Kia Motors Sustainability Magazine, Annual Report*.

3.3.4. Brazil

Consistent with the other EEs described above, the passenger vehicle market is expanding in Brazil as well. In 2013, the total annual sales volume of brand new passenger vehicles in the Brazilian domestic market nearly 2.8 million vehicles, representing a 2.3-fold increase from the recorded sales volume in 2001. HM Group’s Brazilian production facility, which produced its first automobile in 2012, produced 0.4% of the HM Group’s total output in that year. In 2013, however, this rate increased to 2.2%.

3.3.5. Features of EEs

The EEs described above share three common attributes. First, each of these countries is characterized by an increasing GNI per capita. Second, each of their respective domestic markets for passenger vehicles is expanding. Third, the HM Group’s production facilities in these EEs has undergone (and continues to undergo) an increase in the rate at which they produce automobiles. These attributes exist as parts of a causal system, which can be defined as follows. Increases in EEs’ GNI per capita generate an increase in purchasing demand for brand new passenger vehicles. This increased demand has caused the domestic market for passenger vehicles to expand within EEs, thereby prompting the HM Group to increase the rate at which its overseas production facilities produce vehicles. As a result, the HM Group’s PSSI score has sharply decreased since the mid-2000s. These features of EEs have had an enduring effect on HM Group’s production strategies. Specifically, they have induced the HM Group to address new purchasing demands in EEs rather than exclusively focus on a Korean market that had reached saturation of demand for BKP.

3.4. External features of the automobile market in EEs

Although the automobile markets in the EEs share some commonalities, they also have unique features that distinguish them. Most notably, the production facilities can be delineated on the basis of the number of automobiles they supply to their own domestic markets. On the basis of this standard, the EEs’ markets can be classified as being one of three types: “the third world market-supplying type,” “the domestic market-centralized type,” or “the third world market-dependent type.” How the markets are classified indirectly demonstrates the role automakers’ production facilities play in EEs (e.g., production bases for third-world domestic market or their own domestic market). Figure 6 shows how OICA statistics guide the calculation of the Supply Concentration Index (hereafter, SCI)^{ix}. Specifically,

the external feature of each country’s respective automobile market is quantified by calculating an SCI score, which falls between –1.000 and 1.000. SCI scores closer to –1.000 indicate that a tendency towards a third-world, market-dependent type. A score close to 0 indicates a tendency towards a domestic market-centralized type. Finally, an SCI score that is close to 1.000 indicates a tendency towards the third world market-supplying type.

3.4.1. Slovakia, the Czech Republic

The calculation of SCI scores indicated that the automobile markets in Slovakia and the Czech Republic are of the third-world, market-supplying type. As of 2013, Slovakia’s SCI was 0.857, the highest score among EEs. The Czech Republic recorded the second-highest score (0.719). Slovakia’s SCI score has consistently been over 0.448, and the Czech Republic’s SCI score has consistently been higher than 0.548. Taken together, these figures indicate that automakers’ production facilities in both countries serve as production bases for third-world domestic markets rather than their own domestic markets.

3.4.2. Turkey

In 2013, Turkey recorded an SCI score of 0.115, identifying the Turkish market as being the third-world, market-supplying type. Given that Turkey has maintained an SCI score higher than 0.103 for a significant period of time, it appears that automakers’ production facilities in Turkey serve as production bases for third-world domestic markets as well. However, Turkey’s SCI score has never exceed 0.400, suggesting that Turkish automakers do not supply vehicles to third-world domestic markets to the same degree as Slovakia or the Czech Republic’s automakers.

3.4.3. India, China

On the basis of their SCI scores, India and China can be categorized as being of the domestic market-centralized type. Specifically, India and China had SCI scores of 0.090 and 0.003, respectively. Between 2005 and 2013, India’s SCI score remained between 0.064 and 0.090; China’s score remained between –0.004 and 0.006, thereby indicating that most automobiles produced in India and China are consumed in their own domestic markets.

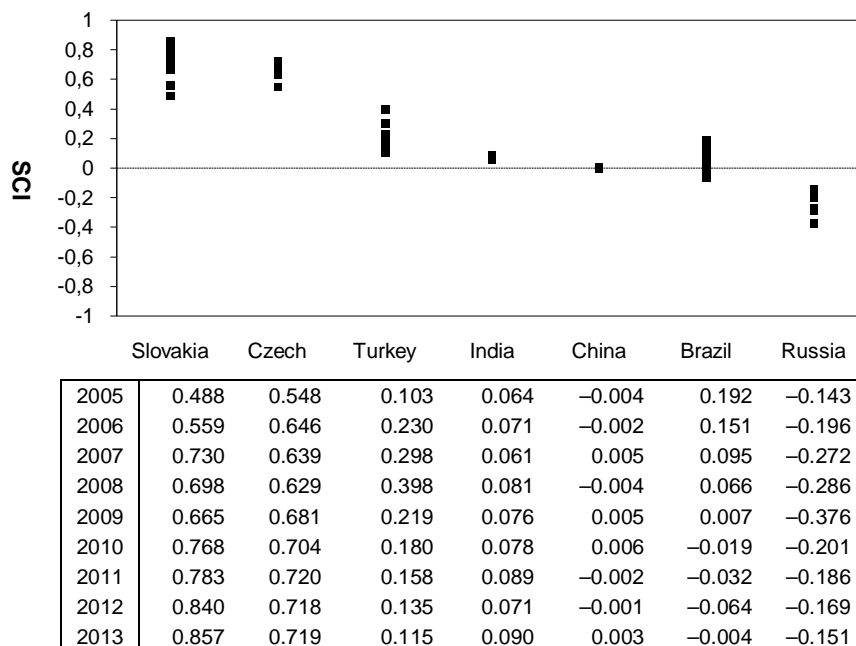


FIGURE 6: Changes in supply concentration index in EEs

Source: Computed by the author by using the data from OICA (2013a; 2013b).

3.4.4. Brazil

Brazil's SCI score has steadily decreased from 0.192 in 2005 to -0.004 in 2013. As the only country to experience a shift from positive to negative SCI, Brazil has transformed from a third-world, market-supplying type to a third world market-dependent type. As the total sales volume of automobiles in Brazil's domestic market began to exceed its production facilities' output (in 2010), the lack of automobile supplies has forced Brazilian automakers to rely more heavily on the third-world market.

3.4.5. Russia

Finally, Russia's automobile market is of the third-world, market-dependent type. Russia recorded the lowest SCI score among the EEs mentioned above. Specifically, Russia's SCI score decreased to -0.376 in 2009, but increased to -0.151 by 2013. Relative to the other EEs, the Russian case is notable because of the country's consistently negative SCI scores from 2005 to 2013. This indicates that Russian production facilities are unable to satisfy demand for automobiles in their own domestic market. As a result, unsatisfied demand for automobiles is often addressed by suppliers from third-world nations.

3.5. The HM Group's strategy in EEs' automobile markets

Although the SCI helps to quantify the external features of EEs' automobile markets, there is a limit to the extent to which the intrinsic features of a market can be understood by looking exclusively at external characteristics. Therefore, it is necessary to also explore the internal features of automobile markets.

Unlike their external features, the internal features of EEs' automobile markets can be defined in terms of consumer purchasing patterns within their own domestic markets. To this end, the most popular (i.e., best-selling) segment of automobiles in each market serves to illustrate the markets' internal features.^x Automakers make decisions about the segments of the automobile market on which they wish to dedicate sources for production and sales strategies based on the market's internal features.

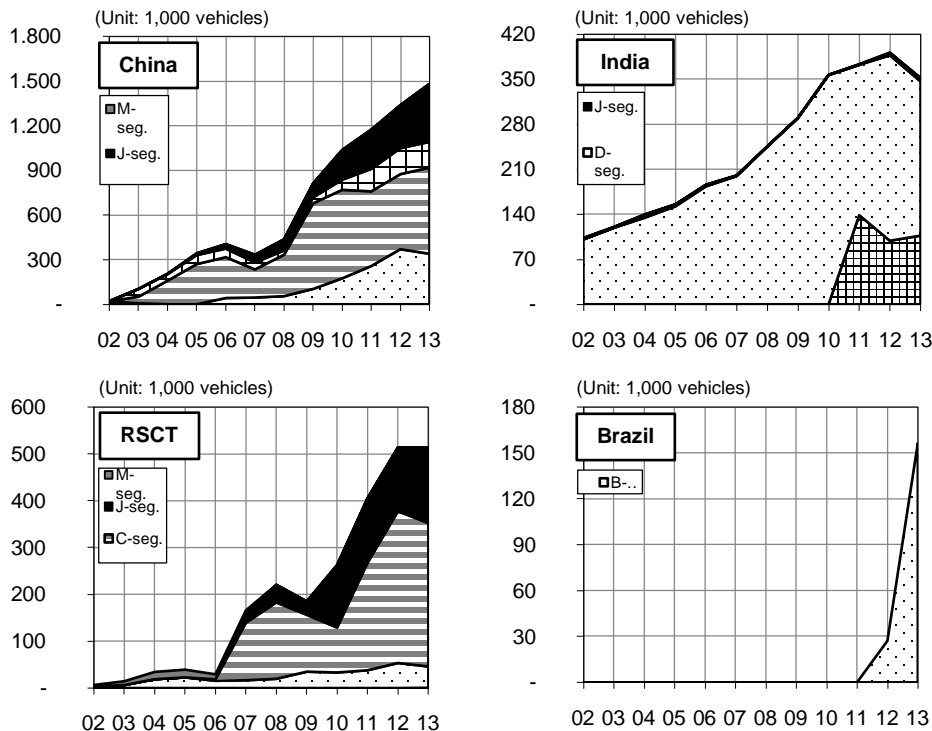


FIGURE 7: HM Group's global plant sales in EEs' domestic markets

Source: Hyundai Motor Company (2014), Kia Motors Corporation (2014).

3.5.1. China

In 2012, 80.6% (about 15.5 million vehicles) of all automobile sales in China's domestic market were passenger vehicles.^{xi} The C-segment represented the highest proportion of sales (29.6%), followed by M-segment (15.2%), B-segment (11.8%), D-segment (11.0%), J-segment (10.5%), and A-segment (2.5%). Within China's domestic automobile market, consumer purchasing patterns are generally spread out over multiple segments. However, customer purchases were largely centralized within the small- and medium-sized vehicle segment. The HM Group has attempted to increase its market share in various segments by diversifying automobile-production models and focusing on the production and sales of B- and C-segment automobiles. Moreover, in response to the sudden rise in demand for automobiles in China, the HM Group uses its Chinese production facilities to supply vehicles to consumers there.

3.5.2. India

In 2012, 77.2% (nearly 2.8 million vehicles) of all automobile sales in India were passenger vehicles.^{xii} Further, in the Indian automobile market, A- and B-segment automobiles accounted for the highest proportion of sales (47.2%), followed by J-segment (14.3%), C- and D-segment (13.5%), and M-segment (6.7%). The most notable characteristic of India's domestic automobile market is the marked tendency for consumers to gravitate towards vehicles in the mini- and small-sized vehicle segment. Although there economic growth in India has given rise to its national income, its national income remains relatively low in comparison to other advanced countries. As a result, demand for cheaper mini- and small-sized vehicles more pronounced than demand for mid- and large-sized vehicles. Through HMI, the HM Group has developed and implemented a strategy of producing and selling mini- and small-sized vehicles as a means to target India's domestic automobile market. Given the high demand for mini- and small-sized vehicles in India, HMI produces these vehicles in its production facility.

3.5.3. Brazil

In 2012, 75.0% (about 2.85 million) of all automobile sales in Brazil's domestic market were attributed to passenger vehicles.^{xiii} The sales of passenger vehicles with engine displacements of more than 1,000cc and less than 2,000cc, which are equivalent to the aforementioned B- and C-segment automobiles, accounted for the highest percentage (43.2%) of Brazilian automobile sales. Vehicles with engine displacements of less than 1,000cc (equivalent to A-segment vehicles) were the second-most popular automobile in terms of sales (31.2% of all sales). Brazil's automobile market is largely characterized by two features. First, consumers largely prefer small and medium-sized vehicles of the B and C-segment. Second, Brazilian consumers purchase a large number of vehicles that run on Flex Fuel. Of the 3.64 million passenger and light commercial vehicles sold in Brazil in 2012, 3.16 million (about 87%) were Flex Fuel vehicles. The HM Group's Brazilian production facility (HMB) began producing vehicles in 2012, and now produces only one automobile model to address consumer demands in Brazil—the B-Segment Flex Fuel-powered vehicle.

3.5.4. RSCT

In 2012, 87.1% (nearly 3.73 million vehicles) of all automobile sales in RSCT were passenger vehicles.^{xiv} Within RCST, consumer purchasing patterns are generally spread across various vehicle segments. However, much like some of the other EEs mentioned above, RCST consumers tend to concentrate their purchasing behaviors on small- and medium-sized vehicles of the B- and C-segments. Within RSCT, the top 25 best-selling automobiles in each market captured between 48.7% and 57.8% of total automobile sales.^{xv} More than half of these 25 models are B- and C-segment automobiles, which account for between 30.6% and 41.2% of total

automobile sales. Given these unique features of the RSCT market, the HM Group has made a concentrated effort to produce and sell the highly demanded B-, C-, and J-segment automobiles.

4. The operation of the OPS

The HM Group's global business strategy is based the optimal use of its overseas facilities as bases from which to supply automobiles to foreign markets. By structuring its production facilities in this fashion, the HM Group is capable of immediately coping with purchasing demands not only in the countries in which its facilities are located, but in the neighboring countries as well (Jung 2011). The HM Group has undergone continuous growth in terms of production volume and sales since 2000. As a result, it has simultaneously increased its global market share as well as the number of automobiles it produces in its overseas facilities. The persistent increase in production at its overseas facilities indicates that the transformation of the HM Group's automobile-production structure has transformed with relative ease; to date, the OPS is operating smoothly. Although various factors contribute to the smooth operation of the OPS, the HM Group's unique production system is the most integral.

4.1. Non-technical factors (I): an exclusive supply relationship between an automaker and a module maker

The HM Group's production system, which can be regarded as a "keiretsu-based Integrated Production System" (hereafter, keiretsu-based IPS), facilitates not only the production of basic automobile frames and core auto-components, but also the assembly of automobiles within the Group (Kim 2014a). Specifically, the HM Group's production system is comprised of most assembly processes; the Group's automobile-related affiliates supply the core auto-components. Automakers and module makers can play crucial roles in the keiretsu-based IPS (Kim 2014b). In this vein, HMC and KMC are in charge of the production and general assembly of automobiles, and Hyundai Mobis (hereafter, MOBIS) and Hyundai Wia Corporation (hereafter, WIA) are responsible for the development and production of core modules.

The automakers and module makers maintain an "exclusive supply relationship" within the HM Group. Based on this relationship, MOBIS and WIA are fully responsible for supplying core modules to HMC and KMC. The exclusivity of the relationship between MOBIS and WIA and the constituent companies of the HM Group is the result of the increased importance of modules as automotive components. As such, module makers have become more important within the HM Group, as the need for modules has increased. Moreover, automobile-related affiliates of the HM Group work as a single unit in the framework of the keiretsu-based IPS, thereby strengthening the supply relationship between automakers and module makers.

Figure 8 illustrates the nature of an exclusive supply relationship between the HM Group's automakers' global business sites and the HM Group's module makers. HMC maintains nine business sites in eight countries. All of these business sites, with the exception of the Sichuan Hyundai Motor Company (CHMC)^{xvi} in China, are in exclusive supply relationships with MOBIS's global business sites. Moreover, three of the four of KMC's business sites are in similar exclusive supply relationships with MOBIS. In general, HMC and KMC's global business sites have set structures whereby they are supplied with core modules by MOBIS's global business sites.

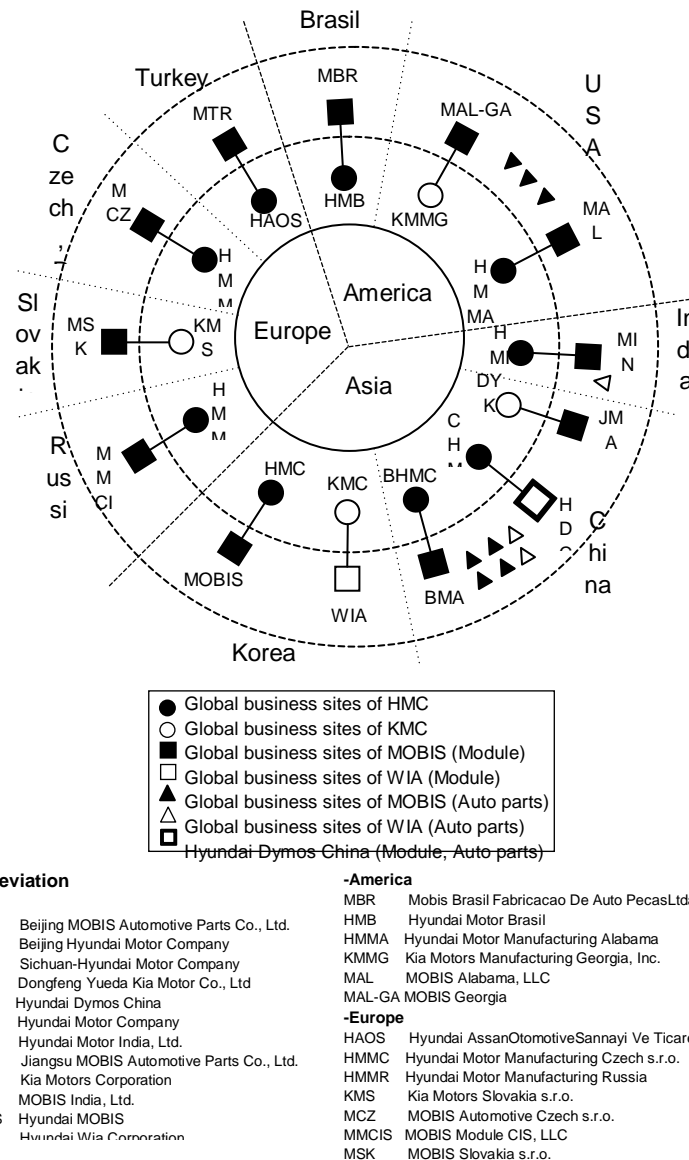


FIGURE 8: An exclusive supply relationship between an automaker and a module maker in the HM Group

Source: Constructed by the author.

Given this, an exclusive supply relationship relates to the association between automakers and module makers within the HM Group. This exclusivity is characteristic not only of the relationship between the Korean sites of HMC and KMC and MOBIS and WIA, but also in the respective relationships between their global business sites. By providing modules to HMC and KMC at both their domestic and overseas sites, MOBIS and WIA facilitate a reliable module supply route to ease operation of the OPS.

4.2. Non-technical factors (II): joint advances into overseas markets with the HM Group's parts suppliers

Although securing the appropriate modules is a critical component of successful automobile production and assembly, the HM Group's acquisition of other, equally important auto-components is no less critical. This issue is integral not only for the HM Group, but for other automakers (e.g., Toyota Motor Corporation [TMC] and General Motors [GM]) as well. To enter the global market more aggressively and

to increase their global production capacities, automakers sought to expand their overseas production facilities. Specifically, when these automakers established their global production networks, they built them in such a way to minimize differences in the production conditions of their domestic and overseas production facilities.^{xvii} For example, GM established its global production networks through alliances, mergers, and/or acquisitions of existing companies and their production facilities in local countries (Bordenave & Lung, 2003). Unlike GM, TMC constructed and developed its overseas production facilities, and receives essential auto-components for the overseas production of its automobiles from local parts makers as a means to minimize costs (Park, 2013).

TABLE 3: The number of Korean auto parts makers in eight countries in 2013

(Unit: 1 company)

	No. of companies								Total
	China	India	Brazil	Russia	Slovakia	Czech	Turkey	U.S	
[A]	333	63	11	8	19	13	7	52	506
[B]	28	6	1	1	1	–	1	3	41
[C]	42	7	3	1	1	4	1	10	69
[D]	14	–	–	–	–	–	–	2	16
[E]	5	2	–	–	–	–	–	2	9
[F]	17	–	–	–	–	–	–	–	17
Total	439	78	15	10	21	17	9	69	658

Notes: [A]: manufacture of parts and accessories for motor vehicles and engines; [B]: manufacture of parts and accessories for motor engines; [C]: manufacture of parts and accessories for motor vehicle body; [D]: manufacture of power transmission for motor vehicles; [E]: manufacture of engines for motor vehicles; [F]: manufacture of electrical equipment for motor vehicles.

Source: The Export-Import Bank of Korea, *Foreign Investment Statistics*.

The HM Group has implemented its global production networks in a manner similar to TMC’s strategy in some respects, but its procurement of autocomponents for its overseas production facilities is quite different in other ways. The HM Group has established its overseas production facilities itself, rather than through mergers and/or acquisitions. Moreover, HM Group’s production facilities in local countries are supplied not by local parts makers, but by Korean auto parts makers who have also advanced into overseas markets (Park, 2013). Table 3 illustrates the number of Korean auto parts makers who have moved into the eight countries in which the HM Group’s overseas production facilities are located. As of 2013, there are 658 Korean auto parts makers in these countries, the largest proportion of which has moved into China.

According to HMC’s 2014 *Sustainability Report*, the number of auto parts suppliers that provide components to HMC and KMC’s global production facilities has gradually increased over time. The number of first-tier suppliers has increased from 17 in 1997 to 239 in 2013; the number of second-tier suppliers has increased from 17 in 1997 to 360 in 2013. One motivation for the HM Group’s advancement into overseas markets with auto parts makers is the stabilization of the automobile-production process. The HM Group has historically lacked the organizational capacity to make use of the local resources in the overseas markets into which it moved. Joint advancement into overseas markets with parts makers assuages the

effects of this issue. In addition, joint advancement into overseas markets reduces HM Group’s production costs by lowering the price of parts (Jung, 2011). As a result of the HM Group’s global business strategy, parts suppliers that provide core auto-components to the HM Group have gradually advanced into many parts of the world where the HM Group has business sites.

4.3. Technical factors (I): the HM Group’s automobile-production method

The HM Group’s production structure, which involves roughly 25,000 components supplied by various auto parts makers, is not a static one. Instead, the HM Group’s assembly and production practices are based on two methods: the “module-based assembly method” and the “platform sharing-based assembly method.”

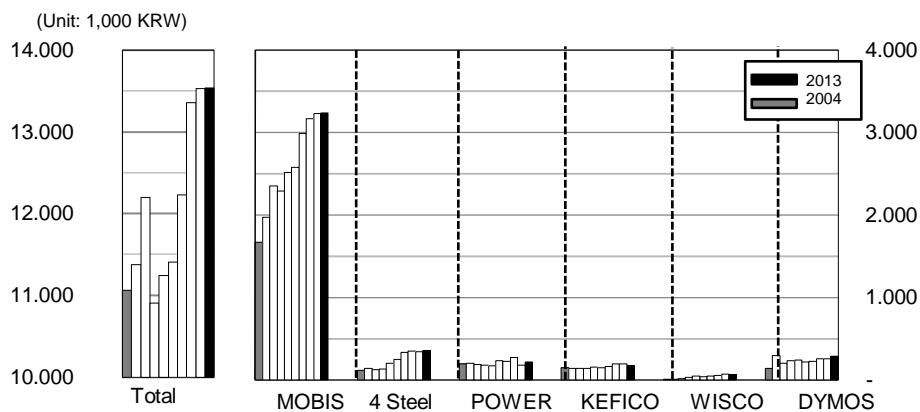


FIGURE 9: HMC’s and KMC’s amount of raw materials purchased per vehicle
Notes: 1. $RAWPV_t = (\sum HMC's\ RAW_t + \sum KMC's\ RAW_t) / (\sum HMC's\ DP_t + \sum KMC's\ DP_t)$ ($t = 2004, \dots, 2013$) where, $RAWPV_t$: amount of raw materials purchased per vehicle in the year t , RAW_t : amount of raw materials purchased in the year t , DP_t : domestic production in the year t . 2. “4Steel makers” is comprised of Hyundai Steel, Hyundai Hysco, Hyundai BNG Steel, and Samwoo. 3. Total raw materials purchased includes materials purchased from both affiliates and non-affiliates.
Source: Computed by the author by using the data from each company, Auditor’s Report, Annual Report.

The module-based automobile assembly method is based on the notion that some automobile parts are assembled by complex modules. Automakers in the HM Group assemble complex, module-type components into each part of its automobiles (Kim 2014a; 2014b). It is difficult to comprehend the HM Group’s ratio of modules per automobile, but it seems that the process of assembling vehicles through a module-based process is increasing in popularity. The basis for this assumption hinges on the fact that HMC and KMC have increased the amount they spend on parts supplied by MOBIS and WIA relative to parts supplied by other auto parts affiliates. Figure 9 clearly illustrates two issues. First, the changing patterns of HM Group’s purchasing behavior with respect to raw materials per vehicle are very similar to HMC’s and KMC’s purchasing behavior (from MOBIS and WIA). Second, HMC and KMC are purchasing more material per vehicle from MOBIS and WIA every year; this is not the case for the material they purchase from other parts suppliers. Taken together, these two issues indicate that HMC and KMC are utilizing modules to assemble automobiles to a greater degree each year. In addition, the size of the purchases that HMC and KMC make from other parts affiliates tends to be smaller than the purchases they make from MOBIS and WIA. This further suggests that there has been a gradual increase in the use of modules to assemble automobiles.

The platform sharing-based automobile assembly method is one in which a

large number of automobile models are produced by a small number of automobile platforms. In 2002, HMC and KMC produced 28 different models of automobiles with 22 platforms; there were no integrated platforms at this time. By 2013, however, the HM Group was using only six integrated platforms to produce 40 models of automobile. From 2002 to 2013, the HM Group reduced the number of platforms it used by 16, but increased the number of models it could produce by 12 (See Table 4). By enabling production of various automobile models through the use of a small number of integrated-platforms, the HM Group has been able to diversify its automobile models to address new trends in a quickly changing global market.

TABLE 4: *The number of platforms and integrated-platforms in the HM Group*

(Unit: 1 EA, 1 model, 1 vehicle)

	2002	2009	2011	2013	2002–2013
No. of platforms					
Integrated-Platforms	0	6	6	6	+6
Platforms	22	12	5	0	-22
Total	22	18	11	6	-16
No. of models					
Total	28	32	36	40	12
Production volume					
Domestic	2,574,039	2,744,055	3,476,175	3,449,590	+875,551
Overseas	129,439	1,901,721	3,140,683	4,152,855	+4,023,416
Total	2,703,478	4,645,776	6,616,858	7,602,445	+4,898,967

Source: Hyundai Motor Company (2012), Korea Automobile Manufacturers Association, Inc. *Korean Automobile Industry*, Hyundai Motor Company, *Sustainability Report, Annual Report*, Kia Motors Corporation, *Kia Motors Sustainability Magazine, Annual Report*.

4.4. Technical factors (II): Just-in-Sequence production system in MOBIS

According to MOBIS’s 2014 *Annual Report*, the company has the Just-in-Sequence (JIS) production system to supply three major modules to HMC and KMC. The JIS production system is a module-supply system in which automobiles and their necessary modules are simultaneously produced by their respective companies, thereby allowing module makers to address automakers needs immediately.

Figure 10 illustrates MOBIS’s JIS production system in cooperation with HMC’s Korean production facility (Asan Plant). When an automobile production order is entered into the computer system at HMC’s Asan Plant, the module production process on MOBIS’s production line is immediately synchronized with the automobile assembly process on HMC’s production line. The total time required for MOBIS to produce, assemble, load, and transport the cockpit module is 90 minutes. During this time, separate assembly processes are occurring on HMC’s production lines. The finished cockpit module is fitted to HMC’s automobile, which is in production at that time. In total, it takes 101 minutes for HMC to issue an order for a module, have the module delivered, and include the module in the assembly process.

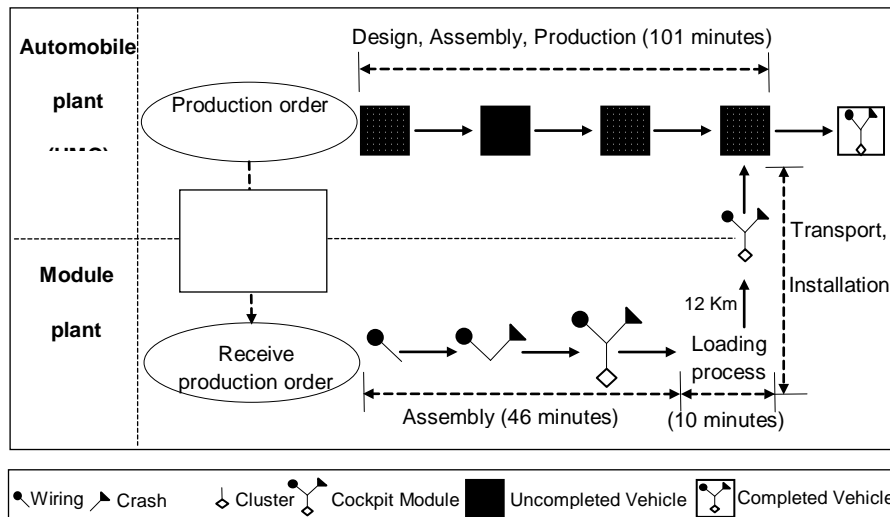


FIGURE 10: *The JIS production system in MOBIS: the case of the cockpit module*
Source: Reconstructed by the author by using the figure from Jung (2008).

Though similar at first blush, MOBIS’s JIS system differs from TMC’s Just-in-Time (JIT) production system. The key feature of this difference relates to whether MOBIS maintains its module stock. The JIT production system, which primarily seeks to minimize costs associated with carrying inventory, facilitates the reception of parts exactly when they are needed (Monden, 2012). To facilitate the smooth operation of the JIT production system, parts suppliers must maintain a fixed quantity of stock to supply components to automakers exactly when those components are needed and not before. This minimizes the degree to which automakers are forced to maintain inventory of those components in their plants.

In contrast, MOBIS is able to maintain low levels of stock through the JIS system because when automobile assembly begins on automaker’s production line, module production for a corresponding automobile model simultaneously begins on module maker’s production line (Jung, 2008). When an automobile production order is made, the order information is simultaneously offered to both MOBIS (who supplies *module A*) and HMC (or KMC). Therefore, *module A* is produced while HMC (or KMC) assembles the automobile of which it will be a part. Because *module A* is delivered to HMC (or KMC) immediately after it is completed (and when it is needed), stock of *module A* is reduced or eliminated outright.

For MOBIS’s JIS production system to work effectively, it is important for MOBIS’s production plants and automaker production plants to be geographically proximal. Proximity facilitates the timely delivery of the module. That MOBIS established its production plants near HMC’s (or KMC’s) production plants indicates MOBIS’s dedication to the effective operation of the JIS production system. MOBIS’s decision to locate its facilities near those of HMC and KMC are driven by the fact that HMC and KMC purchases most core modules from MOBIS. The nature of this supply chain can be explained by the HM Group’s unique production system, the keiretsu-based IPS. Moreover, geographic proximity between MOBIS’s production plants and HMC’s (or KMC’s) production plants occurs not only in Korea, but in overseas markets as well. Specifically, none of the HM Group’s global facilities are more than 51 km away from MOBIS plants. As a result of this geographic proximity, the JIS production system is equally effective both within Korea and among the HM Group’s overseas facilities.

4.5. *Minimizing difference in automobile-production conditions*

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To ensure the smooth operation of the OPS in the HM Group's facilities, differences in production systems in the corporation's Korean and overseas production facilities should be minimized. Although region-specific factors make the complete similarity of production systems in Korean and overseas production facilities impossible, the HM Group has attempted to mitigate the effects of the inherent differences.

Both non-technical and technical factors are important for minimizing the differences inherent to the production conditions of domestic and foreign facilities within the HM Group's newly evolved-production structure. The HM Group has secured two key supply routes to minimize differences in global production facilities. The first is module-supply route based on an exclusive supply relationship in the keiretsu-based IPS. The second is a parts-supply route secured through joint advancement into overseas markets with auto parts suppliers. By securing each of these supply routes, global HMC and KMC production sites can receive essential auto-components and modules for automobile production from overseas facilities.

In addition, the HM Group is now producing automobiles at its various global business sites, adopting both module-based automobile assembly and platform sharing-based automobile assembly methods, based on the JIS production system. As these assembly methods have simplified the automobile assembly process, HMC and KMC have been able to produce their automobiles at their overseas sites in a manner similar to their production of automobiles at their Korean sites.

In sum, by minimizing the differences in production conditions among the global business sites of the HM Group, production and assembly of automobiles at those sites can move forward smoothly. As a result, the HM Group is capable of evolving such that it effectively adopts the OPS, which allows it to directly supply its automobiles to overseas markets through various overseas business sites.

5. Conclusion

This paper has attempted to describe the HM Group's newly evolved-production structure and reveal the effect of various factors on the structure's evolution. In doing so, we have highlighted the specificity of Korea's domestic automobile market, which is aggressively occupied by two Korean automakers—HMC and KMC. In addition, we have explained that the delay in the widespread diffusion of the passenger vehicle caused the HM Group to maintain the DPS until only recently. Through the use of PSSI scores, we also showed that the HM Group's production structure transformed to the OPS in 2012.

Through our analysis, we have found that the leading factor which drove the HM Group to transform to the OPS was the complementary growth of automobile markets in EEs and demand saturation for brand-new, Korean-brand passenger vehicles within Korea's domestic automobile market. Moreover, the smooth operation of the HM Group's newly evolved-production structure is largely dependent on minimizing the differences in production conditions inherent to the Group's domestic and overseas production facilities. Factors that affect the minimization of these differences include both non-technical (i.e., securing module-supply routes based on exclusive supply relationships, securing auto parts-supply routes through joint advancement into overseas markets), and technical (i.e., module-based automobile assembly, platform-sharing-based automobile assembly method, the JIS production system) factors.

Despite these findings, this study suffers from some limitations. To address these limitations, further study of the socio-technical components associated with the transformation of production systems is needed. As Fujimoto argued, "while

virtually all the assembly plants in Europe and America are adopting some versions of Japanese lean production system, the very company which created the lean system concept, Toyota, is now adopting socio-technical components into its lean system, whether intentionally or unintentionally” (Fujimoto, 2000; p. 303).

In addition, although our discussion is relatively extensive in this paper, we have not explicated the “escape period from the DPS” at great length. Future research in this domain should attend to this period when discussing the evolution of the HM Group’s production process. To do so, it is necessary to compare the Korean automakers with other countries’ automakers. Looking at the production structure transformation process through a comparative analysis involving the Toyota Group, it may be possible to conclude that the companies’ respective evolution processes are relatively similar.^{xviii} Despite these potential similarities, however, the period of escape from the DPS differs in two key ways.

The first difference relates to timing. The HM Group entered the period later than the Toyota Group (2006 vs. 1995; see Table 5). On one hand, this indicates that the HM Group maintained a DPS longer than the Toyota Group. Although this may be perceived as a positive, it also indicates that the transition to the OPS was delayed for the HM Group. Korean government policies intended to promote the automobile industry, coupled with the imposition of high tariffs on BFA, provided the HM Group with conditions that made the Group’s long-term focus on the domestic market advantageous.

The second difference between the HM Group and the Toyota Group relates to the length of time they stayed in the “escape period from the DPS.” Whereas the HM Group was in the escape period for only six years, the Toyota Group remained in the escape period for 14 years (see Table 5). Because the HM Group was in the escape period for a shorter period of time than the Toyota Group, it can be concluded that the HM Group’s production structure transformation was faster than the Toyota Group. The speed of the HM Group’s transformation may be attributable to the streamlined production processes practiced by all entities within its production system (based on the keiretsu-based IPS). In this way, the HM Group has not only established stable conditions for producing its automobiles at overseas production facilities in a short period of time, it has also shortened the time required for expanding its production facilities. As a result of these changes, the transformation of the HM Group’s production structure was a relatively quick endeavor.

The HM Group’s production structure has gradually evolved over time, and is likely to continue to evolve in response to a dynamic global automobile market. Given its capacity to evolve, the HM Group’s corporate system is well-equipped to effectively and strategically with changes in factors that affect manufacturing, employment, and corporate governance structure. In this way, the HM Group has created its own unique corporate system that is distinct from the systems used by other companies.

TABLE 5: Global output of automobiles, PSSSI: the HM Group vs. the Toyota Group
(Unit: 1 vehicle)

	Hyundai Motor Group				Toyota Group			
	Overseas output	Domestic output	PSSSI	Period	Overseas output	Domestic output	PSSSI	Period
1985	–	–	–	–	136,307	4,313,622	0.939	○
1986	–	–	–	–	152,524	4,317,800	0.932	○
1987	–	–	–	–	192,260	4,301,651	0.914	○
1988	–	–	–	–	244,371	4,693,144	0.901	○
1989	–	–	–	–	471,581	4,732,581	0.819	○
1990	–	–	–	–	677,655	4,949,239	0.759	○
1991	–	–	–	–	669,917	4,845,831	0.757	○
1992	–	–	–	–	764,466	4,620,865	0.716	○
1993	–	–	–	–	888,714	4,192,992	0.650	○
1994	–	–	–	–	1,051,292	4,066,070	0.589	○
1995	–	–	–	–	1,253,424	3,731,368	0.497	△
1996	–	–	–	–	1,346,033	4,023,973	0.499	△
1997	–	–	–	–	1,390,071	4,129,471	0.496	△
1998	–	–	–	–	1,467,565	3,761,727	0.439	△
1999	–	–	–	–	1,611,195	3,819,355	0.407	△
2000	–	–	–	–	1,751,442	4,156,570	0.407	△
2001	98,908	2,365,089	0.920	○	1,801,059	4,046,746	0.384	△
2002	129,439	2,574,039	0.904	○	2,175,135	4,138,879	0.311	△
2003	193,856	2,498,648	0.856	○	2,581,499	4,244,375	0.244	△
2004	415,959	2,693,469	0.732	○	3,094,336	4,454,268	0.180	△
2005	743,116	2,788,930	0.579	○	3,620,924	4,611,076	0.120	△
2006	1,009,754	2,768,557	0.465	△	3,932,186	5,085,601	0.128	△
2007	1,161,958	2,825,441	0.417	△	4,378,123	5,119,631	0.078	△
2008	1,457,268	2,728,732	0.304	△	4,313,375	4,911,861	0.065	△
2009	1,901,721	2,744,055	0.181	△	3,691,240	3,543,199	–0.020	×
2010	2,604,762	3,160,056	0.096	△	4,510,008	4,047,343	–0.054	×
2011	3,140,683	3,476,175	0.051	△	4,374,627	3,483,464	–0.113	×
2012	3,635,467	3,490,946	–0.020	×	5,489,282	4,420,158	–0.108	×
2013	4,152,855	3,449,590	–0.093	×	5,826,622	4,290,652	–0.152	×

Notes: 1. If $1 \geq \text{PSSSI} \geq 0.5$: ○ (maintaining period of the DPS); if $0.5 > \text{PSSSI} \geq 0$: △ (escape period from the DPS); if $0 > \text{PSSSI}$: × (transitional period to the OPS). 2. Data for the Hyundai Motor Group are comprised of constituent data from the Hyundai Motor Company and Kia Motors Corporation. Data for the Toyota Group are comprised of constituent data from the Toyota Motor Corporation, Daihatsu Motor Co., Ltd, and Hino Motors, Ltd.

Source: Korea Automobile Manufacturers Association, *Korean Automobile Industry*, Hyundai Motor Company, *Sustainability Report, Annual Report*, Kia Motors Corporation *Kia Motors Sustainability Magazine, Annual Report*, Japan Automobile Manufacturers Association, Inc., *Motor Vehicle Statistics of Japan, Monthly report on the Japanese automobile industry*, Toyota Motor Corporation (1988), Toyota Motor Corporation (2012).

Notes

ⁱ The HM Group owns two automakers. One is Hyundai Motor Company, which separated from Hyundai Group in September of 2009. The other is Kia Motors Corporation, which was acquired by HMC in October of 1998.

ⁱⁱ These data are taken from Hyundai Motor Company, *Annual Report*, Kia Motors Corporation, *Annual Report*.

- ⁱⁱⁱ $PSSI_t = (\sum DP_t - \sum OP_t) / (\sum DP_t + \sum OP_t)$ where DP_t is domestic production in the year t and OP_t is overseas production in the year t
- ^{iv} KMC_P means previous KMC that was not merged into the HM Group.
- ^v See Kim (forthcoming).
- ^{vi} The president of the HM Group, Mong-Koo Chung, presented four global strategies in 2001. These strategies were collectively referred to as glocalization.
- ^{vii} “Multinational corporations are normally considered as giant firms engaged in productive activities of corporate nature with headquarters located in one definite country and having variety of business operation in different countries in broad-based manner” (quoted in Saleem 2006; 414). “A multinational or transnational enterprise is an enterprise that engages in foreign direct investment (FDI) and owns or, in some way, controls value-added activities in more than one country” (quoted in Dunning & Lundan, 2008; 3). “A multinational firm sends abroad a package of capital, technology, managerial talent, and marketing skills to carry out production in foreign countries” (quoted in Spero & Hart 2003; 462-63).
- ^{viii} These data are taken from Hyundai Motor Company, *Annual Report*.
- ^{ix} $SCI_t = (\sum Production_t - \sum Sales_t) / (\sum Production_t + \sum Sales_t)$ where $Production_t$ is domestic production in the year t and $Sales_t$ is sales in the domestic market in the year t
- ^x In general, vehicles are grouped into various categories according to their use, size, and engine displacement. Among various classification standards, the “segment” classifies vehicles according to their size and price. Segment-based classification is common in the United States and Europe. In Europe, segments are defined by the length of the vehicle. These segments are called: A-segment (less than 3,500mm); B-segment (less than 3,850mm); C-segment (less than 4,300mm); D-segment (less than 4,700mm); E-segment (less than 5,000mm); F-segment (more than 5,000mm); S-segment (sport coupes); M-segment (multi-purpose vehicles); and J-segment (sport utility vehicles).
- ^{xi} These data are taken from FOURIN, Inc. (2013).
- ^{xii} These data are taken from FOURIN, Inc. (2013).
- ^{xiii} These data are taken from Associação Nacional dos Fabricantes de Veículos Automotores (2014).
- ^{xiv} These data are taken from FOURIN, Inc. (2013).
- ^{xv} Computed by the author using the data from focus2move.com
- ^{xvi} Sichuan Hyundai Motor Company is an HMC global business site that primarily produces commercial vehicles. Established in 2013, CHMC is in an exclusive supply relationship with Hyundai Dymos China.
- ^{xvii} Fujimoto (1997b) presents various hypotheses and analytic frameworks to explain why differences in production patterns have emerged among firms that utilize the Lean Production System paradigm.
- ^{xviii} See Kim (forthcoming).

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