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Detecting Dynamic Changes in Hyundai Motor's Parts Supply System as an Industry Latecomer: The Quasi-Vertical Integration of Internal and External Networks

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This article uses the concept of quasi-vertical integration to attempt to explain the inter-firm relationships of parts sourcing that allowed Hyundai Motor to attain its high level of growth. This involved the integration of Hyundai Motor Group's affiliated and non-affiliated parts suppliers across the boundaries of the firm. This study shows that the formation, systematization, and expansion of Hyundai Motor's quasi-vertical integration did not develop under a consistent long-term plan, but rather evolved in response to environmental changes. Hyundai Motor's quasi-vertically integrated supply chain formed in the 1980s with the creation of a captive subcontracting system backed by the government. As the modularization of production and quality management began to gain traction in the 2000s, the system became more refined and spread overseas as Hyundai Motors expanded its global production. The system has several theoretical implications. First, Hyundai Motor's inter-firm relationships with vertical modularization go beyond conventional modularization that presupposes a horizontal relationship. Second, as an extension of MacDuffie (2013)'s concept of quasi-vertical integration that applies within the boundaries of Korea's chaebol, this includes not only affiliates but also non-affiliates with no equity relationships across the boundaries of the firm. Finally, Hyundai Motor's quasi-vertically integrated supply network differs from a Japanese keiretsu, a close network of mutual obligations between companies. Unlike in the Japanese automobile industry, where modular production in the 2000s weakened the keiretsu system, Hyundai Motor's system became even more quasi-vertically consolidated through the advent of modular production.

Keywords: *Hyundai Motor, inter-firm relationship, quasi-vertical integration, modularization, affiliated and non-affiliated parts suppliers*

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Introduction

Hyundai's growth in the 2000s was remarkable. Since the Asian financial crisis in the late 1990s, Korea's rapid economic growth had ground to a halt. However, Hyundai Motor, one of the largest companies that led Korea's industrialization and fast follower model, continued to grow expeditiously in the 2000s. Hyundai Motor developed into one of the top five global automobile makers by the mid-2000s, as the company has rapidly expanded its production scale through modularization of production, quality management, and aggressive global expansion.

What are the main factors behind Hyundai Motor's rapid growth? With regard to this question, we have focused on Hyundai Motor's own production system, which is distinct from other global automakers and is characterized by engineer-led innovation and skill-saving practices (Jo, Jeong and Kim 2016). Hyundai Motor has pursued innovation and problem solving in the pre-production stage by improving the preceding processes, especially pilot production led by engineers, while building a production system that saves worker skills by simplifying the mass production process as much as possible. However, the production system is not limited to the work structure and production process within the company. In a broad sense, the production system encompasses the whole value chain that comprises internal and external processes, from procurement of raw materials to production and sales of final products. Therefore, Hyundai Motor's own production system should be recognized as including the entire value chain structure.

This study aims to examine the characteristics of Hyundai Motor's supply chain and how the external processes of its own production system led to the rapid growth of the company, a latecomer in the automobile industry. The competitiveness of automakers depends on not only their internal structure, but also their external relationships, including how efficiently the company is able to arrange their business relationships with a number of parts suppliers. Hyundai Motor has a supply chain that is very different from other automakers, which this article conceptualizes as 'quasi-vertical integration.' We argue that the main factors behind Hyundai Motor's rapid growth in the 2000s were quasi-vertically integrated inter-firm relationships combined with engineer-led innovation and skill-saving production systems. This study analyzes the characteristics of the formation and development of Hyundai Motor's quasi-vertically integrated inter-firm relationships and discusses the system's future prospects.

Theoretical Background and Research Methodology

Typology of Inter-Firm Relationships

The nature of inter-firm business relationships has typically been explained by the dichotomy of markets and hierarchy in terms of transaction costs (Coase 1937; Williamson 1975). Corporations leading the golden age of capitalism in the 20th century have directly produced significant amounts of intermediate goods and final goods through vertical integration (Chandler 1990; Taylor 1999), and intermediate goods not internally produced have been outsourced through market transactions. Transactions between companies in the market are characterized by equal exchange relationships between many unspecified persons, and open trading relationships where any party is free to enter or exit the market.

On the other hand, in East Asian countries such as Japan and South Korea, the practice of 'subcontracting,' or outsourcing a large number of intermediate goods, has remained commonplace. The relationship between contractors and subcontractors as parties to a transaction is neither a vertically integrated hierarchy nor an open market that involves equal transactions between mutually independent entities. Accordingly, it cannot be explained by the theory regarding the dichotomy of markets and hierarchy (Powell 1990). Since the 1980s, the high performance of Japanese companies has attracted international attention, and the unique business relationships between companies in East Asia have been conceptualized as 'networks.' These network-based transactions have been implicitly assumed to be long-term partnerships based on mutual trust (Dyer 1996; Powell 1990).

The discussion of global value chains (GVCs) is noteworthy as a typology of inter-firm business relationships referred to as networks. Gereffi, Humphrey and Sturgeon (2005) categorize the business relationships between a leading firm and key suppliers in GVCs into three types: modular, relational, and captive (see Figure 1). In modular relationships, the unique technological capabilities of the module supplier develop in stride with the progress of modularization, and therefore, it is assumed that the leading company and the module suppliers form an independent and equal trading relationship based on their respective technological capabilities.

However, this typology shows the limitations of mechanically linking the attributes of inter-firm relationships to specific production technologies. Even with similar production technologies, the attributes of a supplier

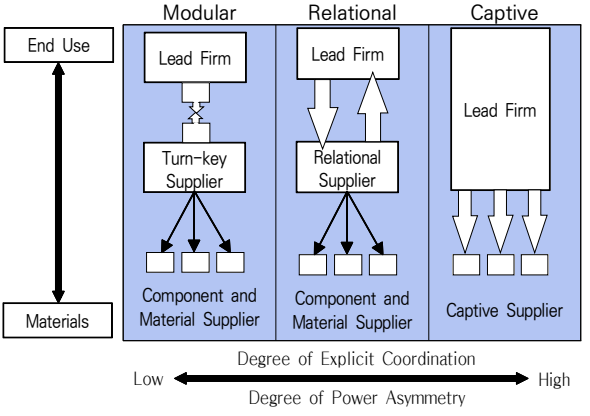

Fig. 1.—Typology of Inter-firm Relationships in the GVC

Source: Gereffi et al. (2005, p. 89).

relationship may differ depending on inter-firm management strategies and practices. Hyundai Motor was able to build modular relationships by simplifying its transactions with modular parts suppliers and increasing the proportion of coded information exchanges during the 2000s (Jo and Kim 2013),[1] but contrary to the assumptions accompanying this modular type, these were not equal business relationships based on the functional division of labor between independent entities. As a *chaebol*, Hyundai Motor and its affiliates have taken control of producing finished cars and modular and key parts, forging close interdependence between affiliates and a unique supply chain that excludes non-affiliated companies from entering the modular parts supply business (Kim, Jo and Jeong 2011). This could be conceptualized as a 'closed modular' supply chain (Jo and Kim 2013).

Quasi-Vertically Integrated Inter-Firm Relationships

In a study on modularization in the global automotive industry, MacDuffie (2013) conceptualizes Hyundai Motor's modular supply chain as a quasi-vertically integrated relationship. Hyundai Motor has advanced modularization in production, while Hyundai Mobis, a key affiliate in the Hyundai Motor Group, has gradually evolved from a simple provider of modular parts

[1] In this regard, Hyundai Motor's inter-firm relationships are different from Japanese inter-firm relationships, which Gereffi et al. (2005) classifies as a relational type.

into a key supplier in charge of designing modular parts. Hyundai Mobis does not independently take charge of designing modular components, but rather performs modular part design in a closely interdependent relationship with Hyundai Motor. The relationship between Hyundai Motor and Hyundai Mobis is not a trading relationship between independent companies, but a closely interdependent relationship between affiliates of the same group, which can be called quasi-vertical integration.

The relationship between Hyundai Motor and Hyundai Mobis which MacDuffie (2013) calls quasi-vertical integration is in fact an affiliate relationship within a *chaebol* group, a network closely linked to equity ownership. However, the supply chain is not simply limited to relationships between affiliates within the group (see Figure 2). Each of the individual affiliates is interconnected with not only each other, but also non-affiliates and external entities to form a 'network with networks' (Dicken 2015, p. 130). Accordingly, the nature of the supply chain cannot be understood solely by looking at the group's internal network.

In this study, Hyundai Motor's supply chain is conceptualized as 'quasi-vertical integration' in that it represents a closely linked network that resembles vertical integration within the firm combined with a network of legally independent firms, irrespective of whether they are affiliated or not. However, contrary to the assumption of MacDuffie (2013), quasi-vertical

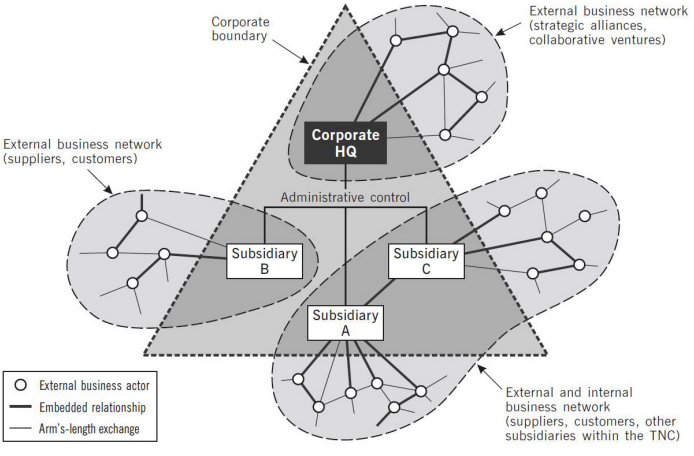

Fig. 2.—Typology of Inter-firm Relationships in the GVC

Source: Dicken (2015, p. 131).

integration includes not only Hyundai Motor's legally separated affiliates within the *chaebol* group, such as Hyundai Mobis, but also legally independent and non-affiliated suppliers outside the group. A vertical hierarchy similar to the hierarchy within the firm also exists in the external network through relationships between non-affiliates outside the group. Accordingly, in this article, the concept of quasi-vertical integration is extended to networks outside the group to include relationships with non-affiliates.

A Comparison between Japanese Keiretsu and Hyundai Motor's Supply Network

As mentioned above, subcontracting systems in East Asia have received attention as network-type transaction relationships that cannot be explained by the market or hierarchy. Similar to Korea's subcontracting relationships, firms in the supply chain in Japan form a closely interdependent network that is known as a vertical *keiretsu* and includes firms ranging from automakers to parts makers.

The Japanese *keiretsu* is characterized by a highly structured formal relationship between companies (Dicken 2015). Inter-firm relationships are based on mutual obligations and are long-term and stable. Companies are connected through cross-shareholdings and personnel exchanges (Miyamoto 2004).[2] However, after the introduction of module production in the late 1990s, the *keiretsu* relationship in the Japanese automobile industry has gradually weakened. As automakers started receiving more parts as standardized modules to reduce costs, they became more likely to resolve their mutual shareholding relationships with affiliated parts makers and promote free competition among independent parts makers (Lincoln and Shimotani 2009).[3]

On the other hand, when Hyundai Motor began to ramp up module production, the quasi-vertical integration structure actually became stronger rather than weaker. By placing the group's affiliates at key points in module production and other external parts makers as their subordinates, Hyundai Motor made full use of the advantages of quasi-vertical integration in module

[2] The Japanese *keiretsu* can be divided into a horizontal form with a banking-mediated business group, and a vertical form where there are closely linked parts supply relationships in the manufacturing industry.

[3] The Nissan Group is a typical case that exemplifies the disintegration of *keiretsu*. On the other hand, while the Toyota Group maintains more of a *keiretsu* relationship than Nissan, it is true that the nature of this relationship as a closely interdependent network has gradually weakened.

production. This contrasts with the case of Japanese *keiretsu*, which saw vertical integration weaken in response to the shift towards module production.

Research Questions and Methodology

This study seeks to answer the following questions. First, how was the quasi-vertical integration system formed in Hyundai Motor? How was it possible to exercise vertical control power equivalent to that of an affiliate without links to equity ownership? Second, what are the strengths and weaknesses of Hyundai Motor's quasi-vertical integration? How did such an arrangement help Hyundai Motor catch up to other automakers, and how will it fare moving forward?

In order to examine these two research questions, this article conducts a historical analysis on the formation and development of Hyundai Motor's inter-firm relationships. To this end, this study employed both analysis of published data and qualitative research based on interviews.

First, we conducted interviews with former and current employees of non-affiliated parts makers along with staff from Hyundai Motor, Kia Motors, and Hyundai Motor Group's affiliates, including Hyundai Mobis, a core parts maker. In addition, extensive interviews and discussions were conducted with government policymakers in the automobile industry and Korean car industry researchers affiliated with universities and research institutes, as well as trade union activists.

Any unfilled gaps that could not be filled through interviews were remedied through analysis of data published by automakers and the Korea Automobile Industry Cooperative Association, as well as reviews of government policy documents. In addition, a range of secondary research data on the development of the Korean automobile industry was reviewed and used for analysis.

Figure 3 shows the sales trends of Hyundai Motor, demonstrating that sales grew rapidly starting in the mid-1980s, but plunged in the wake of the 1997 financial crisis in Korea. In the 2000s, sales once again increased at a rapid pace despite a short period of temporary stagnation in the middle of the decade. However, in the 2010s, growth has stagnated for a long time, which can be seen as a crisis for Hyundai Motor. This study explains the development of Hyundai Motor's quasi-vertical integration by dividing it into three main periods based on these changes in the company's sales growth trajectory.

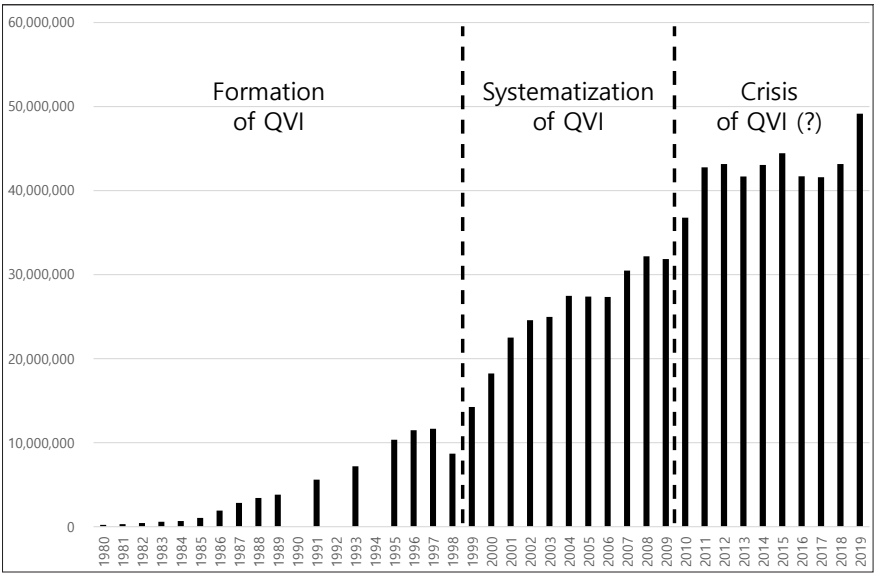

Fig. 3.— Annual Sales Trends of Hyundai and Kia Motors (unit: millions of KRW)

Note: QVI is an abbreviation of quasi-vertical integration.
Sources: Hyundai Motor's Annual Reports.

The first period lasted from the 1980s to the late 1990s, when Hyundai Motor grew rapidly as mass production kicked in. During this period, Hyundai Motor incorporated parts providers into its subcontracting system and established a captive relationship with them, achieving quasi-vertical integration. The second period was rapid growth in the 2000s after the 1997 Asian financial crisis. In the wake of Korea's financial crisis, restructuring and market reforms took place in the Korean auto industry, and Hyundai Motor built upon its modular supply chain system in the 2000s and rapidly increased overseas production, making quasi-vertical integration more systematic. The final period is the 2010s, when Hyundai Motor experienced stagnant growth. Amid the restructuring of the global auto industry and the industry's changing paradigm, Hyundai Motor's crisis has laid bare the weakness of its quasi-vertical integration model.

Formation of Quasi-Vertical Integration: Before the 1997 Financial Crisis

Formation of Subcontracting System

After the Korean War, the Korean automobile industry started out as a number of used car refurbishment or assembly companies based on used military vehicles, disposed vehicles, and used parts. In the 1960s, disassembled parts from automobile companies in developed countries were assembled into so-called 'knocked-down' vehicles. The industry first reached the stage of developing its own model passenger cars in the 1970s. In the late 1970s, Hyundai Motor began to pursuing an export strategy through restructuring due to overinvestment, and in the 1980s, the company established a mass production system and started exporting to the United States.

In the course of this rapid development, the Korean automobile industry developed a wide range of industrial links through the procurement of parts. The development of Korean parts makers was largely driven by the developmental state's industrial policy. In May 1974, the Korean government established the Long-Term Automobile Industry Promotion Plan with the goals of developing domestic automobile models and improving the localization rate of parts, separating finished vehicle assembly from parts and components plants, and promoting a policy of specialization whereby each manufacturer would focus on one part or component. As a result, parts makers began to separate from automakers. Subsequently, the Small and Medium Business Subcontracting Promotion Act enacted in 1975 (and slightly revised in 1978) introduced the 'designated subcontracting' scheme. Under this act, if the government designated a parts item for local specialization, it was mandatory to form a subcontracting relationship between the parent company and the parts maker. Government tax and financial support was provided to contractors and subcontractors that formed a subcontracting relationship.

In a major amendment to the Small and Medium Business Vertical Integration Promotion Act in 1982, a policy shift was made towards promoting private-led subcontracting systems, making it mandatory for each automaker to form a suppliers' council. As a result, each automaker formed their own suppliers' council starting in 1984, and first tier suppliers then formed their own council of suppliers. As of December 1991, there were a

total of 17 suppliers' councils with automakers and first tier suppliers as parent companies (see Table 1).

Table 1
Suppliers' Council Membership by Parent Company (as of 1991)

Name of Parent Company	Date of Establishment	No. of Membership Companies
Kia Motors	1977.11.18	168
Daewoo Motors	1984.3.15	182
Hyundai Motor	1984.4.12	238
Ssangyong Motors	1984.3.30	38
Asia Motors	1985.10.11	149
Daewoo Heavy Industry	1984.3.30	188
Hyundai Motor Services	1984.4.12	40
Daelim Motors	1984.11.29	97
Hyosung Machinery Industry	1985.11.22	95
Kia Machinery Industry	1985.12.26	78
Korea Spicer Industry	1986.12.20	36
Seil Heavy Industry	1987.6.1	37
Mando Machinery	1987.12.28	74
KIA Precision Machinery	1988.3.29	57
Daewoo Precision Industry	1987.12.2	24
Poongseong Electric	1989.12.20	27
Daewoo Components Industry	1990.5.9	27

Source: Korea Auto Industries Coop. Association (KAICA). 1992. Automobile Industry Handbook. p. 84.

Hyundai Motor formed the Hyundai Cooperative as a suppliers' council in 1984, which had 238 parts makers as active members as of the end of 1991. In particular, compared to the suppliers' councils of other automakers, the Hyundai Cooperative had strong leadership from its parent company. Only companies with a high degree of dependence on Hyundai Motor could become members due to the strict membership qualifications which required more than two years of transactions with Hyundai Motor and more than 40%

of the supplier's total sales. In addition, Hyundai Motor paid almost all the expenses of the cooperative's meetings, and the secretariat office established within Hyundai Motor was in charge of all operations such as planning, execution, and accounting. In this regard, the cooperative can be said to be more akin to a management council of Hyundai Motor's parts makers rather than an independent council (Jeong 1994, p. 31).

Under Hyundai Motor's strong leadership, Hyundai Cooperative's member parts makers formed a captive business relationship with Hyundai Motor. With the launch of the council of suppliers, a vertical subcontracting system was established in which Hyundai Motor had strong authority to manage affiliated and non-affiliated parts makers.

Captive Relationship and Paternalistic Control

With the formation of the Hyundai Cooperative, Hyundai Motor took the lead in supporting parts makers. Through the establishment of the subcontracting system, Hyundai Motor provided stable demand to parts makers by taking responsibility for supply such that parts makers belonging to the cooperative did not go bankrupt. In addition, Hyundai Motor supported the stability and growth of parts makers by providing technical and management guidance and financial support (Jo and Kim 2013).

Hyundai Motor arranged for technical alliances with advanced parts makers and training for technicians in order to develop their technological capabilities. For example, Hanil-Ewha, which was the chair of the cooperative at the time, was able to import door trim and headlining technology from Japan's Ikeda Corporation, Kasai Industries, and Tenryu Industries through an arrangement made by Hyundai Motor. Second, Hyundai Motor helped parts suppliers enhance their productivity by improving plant layouts and processes. For example, by rearranging equipment into a straight line, the distance between processes was reduced. This made processes more efficient and uniform, thereby reducing the inventory and staff required.

Hyundai Motor also focused its efforts on preventing quality problems at parts makers by conducting intensive guidance on quality assurance. To this end, guidance from overseas experts was carried out regularly, including visits from Hyundai Motor's Japanese senior adviser Mr. Arai. Finally, Hyundai Motor pushed to eliminate bottlenecks and reduce defects by providing technical guidance on automation and labor saving. This was intended to improve productivity, enhance quality, and reduce costs. In addition, Hyundai Motor helped parts makers develop technology

capabilities in fields such as joint purchasing of raw materials and support for new product development (Hyundai Motor Company, 1987, pp. 477-480, pp. 607-608).

This support further entrenched the captive business relationships with the parent company. As mentioned above, in order to become a member of the Hyundai Cooperative and receive support from Hyundai Motor, it was necessary to maintain a long-term and captive business relationship with the company. Table 2 shows that out of the total of 1,079 first tier parts companies registered with the Korea Automobile Manufacturers Association in 1997, 619 parts companies (57.4%) supplied only one finished carmaker and 236 (21.3%) supplied two vehicle makers, of which half supplied two carmakers in the same *chaebol* group.

Table 2
Number of Parent Companies for First Tier Parts Supplier (as of 1997)

No. of Parent Companies	1	2	3+	Total
No. of Suppliers	619	236	224	1,079
(%)	(57.4)	(21.3)	(20.8)	(100.0)

Source: Korea Auto Industries Coop. Association (KAICA). 1998. Automobile Industry Handbook.

Paternalistic control by the parent company took place under a captive relationship in which suppliers were completely dependent on a single automaker. The head of the finished car group and the finished car company exercised arbitrary power from a patriarchal position, even over non-affiliated parts makers that were not linked to equity ownership. Parts makers had to reliably provide parts below market price to meet the needs of finished carmakers. These captive trading relationships and regular and irregular price cuts severely limited the independent growth of parts makers.

Systematization and Global Expansion of Quasi-Vertical Integration in the 2000s

After growing rapidly through the implementation of quasi-vertical integration, the Korean automobile industry went through the Asian financial crisis in the late 1990s and experienced rapid industrial restructuring. In the

2000s, Hyundai Motor grew into one of the world's top five automakers, returning to rapid growth by exploiting its modular parts supply chain system, improving quality management, and expanding overseas production. During this process, the quasi-vertical integration covering the group's internal and external networks became more systematic and expanded overseas.

Restructuring of the Automobile Industry and Monopolization of the Domestic Market

The Korean automobile industry experienced rapid restructuring both before and after the Asian financial crisis. During this period, major incidents such as the bankruptcy of Kia Motors and Daewoo Motors, the sale of Samsung Motors to overseas interests, layoffs and restructuring at Hyundai Motors, and GM's acquisition of Daewoo Motors greatly changed the landscape of the Korean automobile industry. In the midst of this rapid restructuring, Hyundai Motor also experienced important changes, which had a great influence on the development of the company's own production system. In this regard, the late 1990s can be viewed as an important turning point for Hyundai Motor.

First, major changes were implemented in the governance structure of Hyundai Motor and the Hyundai group during this period. In 1998, the top management of Hyundai Motors was replaced, and in the process of internal conflict over the succession of power across the entire group, Hyundai Motor was separated from the Hyundai Group and launched anew as Hyundai Motor Group. With such a profound change in corporate governance, Hyundai Motor set the ambitious goal of becoming the world's fifth largest automaker by 2010. To achieve this, Hyundai Motor pursued an aggressive management strategy of quality assurance and actively expanding overseas production.

Second, Hyundai Motor took over the bankrupt Kia Motors, leading to a substantial monopoly in the domestic finished car market. The market transformed from an oligopolistic structure centered around Hyundai, Kia, and Daewoo Motors into a monopoly with Hyundai Motor Group accounting for 70-80% of the domestic market. This monopoly has made it virtually impossible for parts makers to diversify their supply lines or reduce their reliance on Hyundai Motor. Accordingly, this was an important step towards Hyundai Motor solidifying a quasi-vertical integration system that includes non-affiliated companies due to their greater reliance on Hyundai

Motor.

Establishment of Modular Parts Supply Chain and Systematization of Quasi-Vertical Integration

In the wake of the major changes in the auto industry and corporate governance as described above, Hyundai Motor actively built up its modular parts supply chain by implementing aggressive management strategies in the 2000s. In the automotive industry, modularization of production refers to a production system in which a plurality of parts are assembled to create larger and more complex component units, called modules, which are then added to the final assembly line (Kim 2011, p. 74). With advances in modularization, Hyundai Motor chose not to procure modular parts from external suppliers, but rather to directly develop internal affiliates into key suppliers of modular parts. To this end, Hyundai Motor established a new auto parts affiliate called Hyundai Mobis in 2000, starting with the auto parts division of Hyundai Precision Industries, which was a subsidiary of the Hyundai Group. The goal of this move was to transform Hyundai Mobis into a core parts maker that supplied modular components to Hyundai Motor (Kim et al. 2011).

In order to promote the growth of Hyundai Mobis, the Hyundai Motor Group concentrated its orders for core modular parts on Hyundai Mobis.[4] In the early days of the modular parts business, Hyundai Mobis carried out aggressive mergers and acquisitions and quickly absorbed the modular parts businesses of external parts companies that had already invested in modular parts (see Table 3). Based on this, Hyundai Mobis has come to hold a virtual monopoly over the supply of key modular components to Hyundai Motor Group.

[4] In reality, Hyundai Motor placed orders for the development and delivery of individual modular parts with multiple modular components suppliers. This appears to be a combination of technology improvement and reducing the risk associated with entrusting everything to one supplier, as well as a policy consideration at the regional level (Hyundai Mobis Manager interview, 2008 and 2010). However, there is a significant difference in the degree of information sharing between Hyundai Mobis and other external modular parts suppliers (Hyundai Mobis Manager interview, 2010). In addition, measures such as ordering modular parts with low added value from non-affiliated modular component suppliers or reducing the rate of orders from non-affiliated companies have been carried out (Interview with manager at Deokyang Industry, a non-affiliated modular parts supplier, 2008).

Table 3
Hyundai Mobis' M&As for Modular Parts Business

Plant	Products	M&As
Asan modular parts	chassis, driving seats, front end	Mando Youngin plant (Aug. 2002)
Ewha modular parts	complete chassis, driving seats	Seojin Industry Ewha plant (Feb. 2002)
Poseung modular parts	chassis	Mando Poseung plant (Aug. 2002)
Cheonan ABS, Airbags	ABS, airbags	Bosch Korea Cheonan plant (Apr. 2002)
Cheonan IP	instrument panels (IP)	Kasco Cheonan plant (Nov. 2000)
Asan Plastics	bumpers, carrier head lamp	Jinyoung Industry (Jun. 2004)
Changwon	brake system, steering system	Kasco (Jun. 2007)
Hanam	brake system	Kasco (Jun. 2007)
IHL	head lamp, rear lamp	IHL (Apr. 2004)

Source: Kim et al. (2011, p. 373).

Hyundai Motor's modular parts supply chain is characterized by close interdependence and cooperation between the automaker and its affiliated modular parts suppliers through an internal network (Kim et al. 2011; MacDuffie 2013). This is different from the modular supply network in the United States or Europe, in which the automaker and the modular parts suppliers form an independent external network by either separating the modular parts sector as an independent supplier or utilizing independent external modular components suppliers that already existed. Hyundai Mobis has gradually evolved to be in charge of designing modular parts based on the unconditional trust relationship that flows from being in the same *chaebol* group (MacDuffie 2013). Hyundai Mobis has not independently taken charge of modular part design, but rather designed modular parts in close consultation with Hyundai Motor (Kim et al. 2011).

As the modular parts supply network began to take off and Hyundai Mobis virtually monopolized Hyundai Motor's supply of major modular

parts, the overall supply structure of parts became stratified. In addition to Hyundai Mobis, Hyundai Motor developed other affiliates into core parts makers and offered them the majority of orders for modular parts and key components. Many of the first tier parts manufacturers that used to supply parts directly to Hyundai Motor have been reformed into second tier parts manufacturers that supply components to key parts suppliers, including Hyundai Mobis and other affiliates.

As a result of this, a new form of vertical hierarchy has formed in the quasi-vertically integrated parts supply network between Hyundai Mobis, affiliated core parts suppliers, and external suppliers of other parts. In addition, Hyundai Mobis and affiliated core parts suppliers have acted as a supply chain management company responsible for supplying parts to Hyundai Motor while overseeing production by sub-parts makers.

Prior to the 2000s, Hyundai Motor's quasi-vertically integrated parts supply network mainly consisted of a single-tier parts supply structure, where Hyundai Motor exerted direct control over all parts manufacturers registered with the suppliers' council. However, as the modularization of production took off in the 2000s, a multi-layered and vertical supply chain management system emerged in which Hyundai centrally manages affiliated key parts suppliers, who in turn oversee the sub-parts makers. The network thus transformed into a more sophisticated entity as a result of advances in the modularization of production.

The number of first parts makers for Hyundai Motors has decreased in line with the systemization of the quasi-vertical integration system (see Figure 4). From the early 1990s to the 2000s, the number of first tier parts fell from 400 to approximately 300.[5] Moreover, the proportion of first tier suppliers decreased in the 2000s while that of second and third makers increased, although this was limited to small and medium-sized enterprises (see Figure 5).

[5] In Figure 4, many of the 300 first tier parts makers in the 2000s are actually '1.5 tier' parts makers that simultaneously supply to modular parts makers and automakers such as Hyundai Mobis and Hyundai Motor. On the other hand, the sharp decline in the number of first tier parts makers in 1998 is believed to be due to the Asian financial crisis.

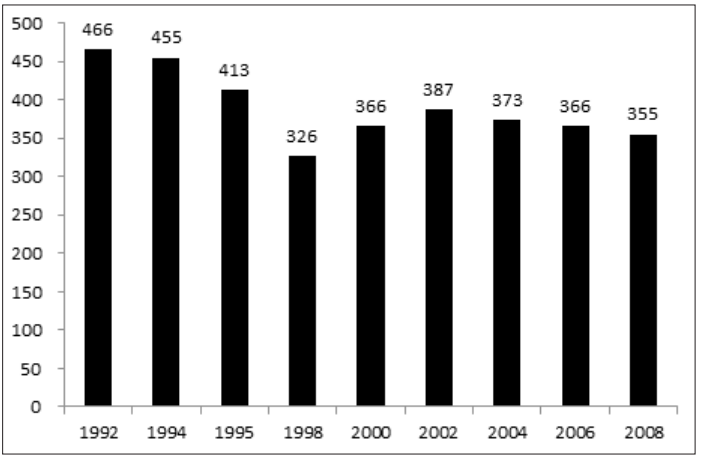

Fig. 4.—Number of First Tier Parts Makers for Hyundai Motor

Sources: Korea Auto Industries Coop. Association (KAICA), *Automobile Industry Handbook*, Each Year.

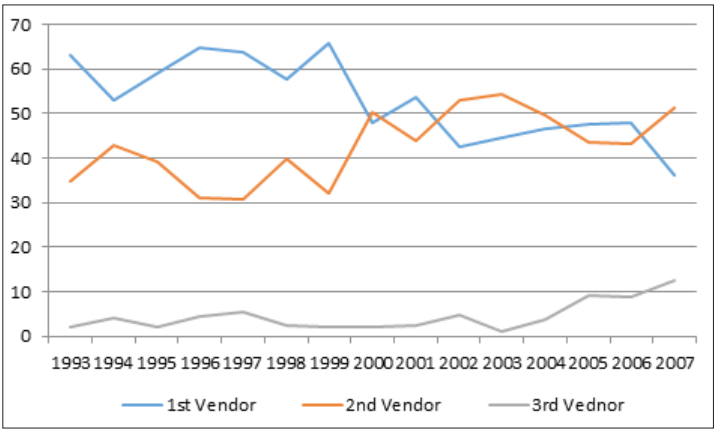

Fig. 5.—Trend in Proportion of Automobile Parts SMEs in Each Transaction Layer

Sources: Korea Federation of SMEs (KBIZ), *SMEs Survey*, Each Year.

There is also a significant revenue gap between affiliates and non-affiliates. As Hyundai Motor Group's affiliates occupy key areas of component production, the profit gap has become entrenched due to the establishment of a multilayered hierarchy that separates affiliates from non-affiliates (see Table 4).

Table 4
Trends in Operating Profit Margins of Hyundai Motor's Parts Suppliers (%)

	2001	2003	2005	2007	2009	2011
Hyundai Mobis	12.1	11.4	10.4	9.7	13.4	13.5
Affiliated parts suppliers (average)	6.6	8.3	5.3	3.7	7.6	5.6
Affiliated parts suppliers excluding Hyundai Mobis (average)	5.7	7.8	4.4	2.9	6.8	4.7
Non-affiliated parts suppliers (average)	4.1	-18.3	2.9	1.9	2.1	2.8

Notes: Hyundai Motor's suppliers are based on the list of parts manufacturers in the Korea Auto Industries Cooperative Association as of 2011. Among these selected companies, analysis was conducted on companies for which financial data could be obtained from Kis-Value. A total of 231 companies are included in the analysis (9 Hyundai Motor affiliates and 222 non-affiliated parts makers).
Source: Jo and Kim (2013, p. 178).

In the 2000s, Hyundai Motor established its own production system with a modular supply chain while also standardizing quasi-vertical integration in supply chain management across internal and external networks. However, it is difficult to say that this was achieved through careful preparation under a long-term plan. Instead, it appears that Hyundai Motor implemented and upgraded its quasi-vertical integration model in a somewhat accidental and ad hoc manner.

In the 1990s, Hyundai Motor made an attempt to introduce some elements of the Japanese production method. In particular, in order to reduce waste and improve efficiency in the workplace, a policy known as *kaizen* was implemented to upgrade the skills of shop-floor workers. In the early 1990s, the Skills Qualification System was introduced to promote skill education and training for production workers, and a system that linked this with promotions was also tested (Jo and Lee 2008). However, due to distrust between

labor and management, the introduction of these systems eventually failed. Since then, rather than trying to build shop-floor skills, Hyundai Motor has sought to implement its own production system that saves such skills. The modularization of production that emerged and spread from Europe in the 1990s was suitable for the needs of Hyundai Motor at the time, which led the company to go down this path.

On the other hand, the development of Hyundai Mobis as a core modular supplier and the reorganization of the parts supply system was borne out of an attempt to ensure Hyundai Mobis' survival rather than based a plan made in advance. Hyundai Mobis was launched in 2000 with Hyundai Precision Industries as its parent. As the finished vehicle business division of Hyundai Precision Industries was integrated into Hyundai Motor, Hyundai Mobis needed to develop a new business to survive, and therefore, put forward the proposal of supplying modular parts to Hyundai Motor, an avenue that at that point had not been explored (Hyundai Mobis manager interview 2010). This proposal was in line with Hyundai Motor's need to build a modular supply chain. Hyundai Mobis therefore started out as a major modular parts supplier for Hyundai Motor, with the production of modular parts as its main business. Although Hyundai Mobis started out by taking advantage of a chance opportunity, it quickly became the center of modular parts production thanks to intensive support from the group as a whole. With the reorganization of the parts supply structure centered around Hyundai Mobis, the stratified supply structure has continued to grow, and quasi-vertical integration has become more systematic.

Quality Management and Systematic and Bureaucratic Control

The systemization of the quasi-vertically integrated supply network with the establishment of a new form of hierarchy among parts suppliers is key to Hyundai Motor Group's strategy to arrange its closed parts supply structure by placing its affiliates at key points in the value chain (Jo and Kim 2013).

This restructuring was also carried out through an evaluation system for component suppliers. Hyundai Motor began to emphasize quality in the late 1990s as top executives were replaced in the process of changing its governance structure. By then, Hyundai Motor's image was associated with low quality cars, so it was on the verge of being kicked out of the US market, which accounted for the majority of Hyundai Motor's exports. Under these circumstances, the new management team began to make a drive to improve quality by advocating quality assurance. To this end, Hyundai Motor and Kia

Motors merged their quality headquarters in 2002 to establish a joint quality headquarters under direct management. The Quality Management Headquarters played a role in overseeing quality control across Hyundai Motor and Kia Motors throughout the entire process of R&D, purchasing, production, and after-sales service. The number of staff at the Quality Management Headquarters increased from 200 in 2002 to 850 in 2006 (Hyun 2008).

As for the quality of parts, a quality evaluation system was introduced for parts suppliers under the supervision of the Quality Management Headquarters. The first system introduced was Hyundai Motor's own quality certification system called the Hyundai Quality System (HQS). This was on top of the QS9000, the criteria by which the top three US automakers select suppliers. Based on the results of HQS reviews, Hyundai Motor gave each parts maker a grade, and expanded support for those selected as superior companies by reducing the payment period. Second, the 5 STAR certification system was implemented as a quality evaluation system for first tier parts suppliers. This involves a comprehensive evaluation of the parts quality, technology, and delivery of first tier parts makers in the early stages of new car development, and gives each company a star rating. Companies that receive a 5 STAR certification receive payment in cash as soon as the parts are delivered, and also get priority invitations to various events organized by Hyundai Motor. Finally, the Supplier Quality Mark system was introduced for the second tier parts suppliers. This system selects specialized sub-sectors that have a major impact on parts quality, and conducts on-site quality control and inspections.

The quality evaluation system for parts manufacturers implies that standards have become an important mechanism for coordinating and controlling the parts supply chain. The setting of standards in itself has a significant impact on value chain governance. According to work on standards and GVC governance structure, the firms at the top of the value chain define the rules and conditions of participation by setting standards or norms. This provides a framework for systematically including and/or excluding actors from participating in the value chain (Gibbon, Bair, and Ponte 2008). The establishment of actor participation rules becomes a key operating mechanism for value chain governance (Ponte and Gibbon 2005). By setting standards for parts suppliers through the quality evaluation system, codifying such standards, and establishing certification procedures, Hyundai Motor has obtained greater control over parts manufacturers and is able to treat them differentially based on the system.

In fact, Hyundai Motor divided its parts makers into the three classes of 'champion,' 'partner,' and 'candidate' based on their technological capabilities. 'Champion' parts makers are companies that have the research and design capabilities to independently perform detailed part design in line with the basic specifications provided by Hyundai Motor. These are key parts makers managed by Hyundai Motor. 'Partner' parts have a captive relationship with Hyundai Motor and supply dedicated parts. Many of the SMEs in Hyundai Motor's quasi-vertically integrated parts supply network fall into this class. Finally, 'candidate' parts suppliers are mainly general-purpose parts suppliers that often have a low level of technology and are excluded from support and protection within Hyundai Motor's supply network.

Prior to the 2000s, Hyundai Motor arbitrarily exercised its power over parts makers from a patriarchal position. This practice still remained in the 2000s, but at the same time, a management structure based on quality and standards was established under which hierarchical and differential management of parts makers took place through evaluations. This can be viewed as a form of systematic and bureaucratic control in that it is based on rules and procedures set by the carmaker.

Global Expansion of Quasi-Vertically Integrated Supply Chain

In the 2000s, Hyundai Motor grew into a global player by rapidly expanding overseas production. The quasi-vertical integration model gained global reach with Hyundai Motor's expansion into overseas markets. Since establishing local production subsidiaries in Turkey in 1997 and India in 1998, Hyundai Motor Group has continued to expand its overseas production. Overseas production ramped up in the 2000s with the establishment of local production plants in China (Hyundai and Kia) in 2002, the United States (Hyundai) in 2005, Slovakia (Kia) in 2006, China (Kia) and India (Hyundai) in 2007, and the Czech Republic (Hyundai) in 2008. As of 2021, Hyundai Motor Group's two carmakers, Hyundai Motor and Kia Motors, own 13 production plants in ten countries around the world, including Korea.

There is a certain pattern in the development of Hyundai Motor Group's overseas production. First, Hyundai Motor Group has adopted a strategy of establishing local subsidiaries in unoccupied areas where there are no existing industrial facilities. This is very different from Japanese and German automakers, which have located themselves in existing industrial areas through mergers and acquisitions or joint ventures (Jo and Jeong 2016; Kim 2018). Rather than using local parts makers in an industrial zone, Hyundai

Motor has tried to clone the parts supply network it formed in Korea.

The Hyundai Motor Group has adopted the practice of co-entry to develop overseas production through component manufacturers included in the quasi-vertically integrated supply network. In fact, co-entry with core suppliers is a common practice found in many Japanese automakers that entered the overseas market before Korea. However, the overseas expansion of Hyundai Motor and its parts suppliers not only occurred in close chronological succession compared to Japanese companies, but also took place in a way that almost reproduces the unique characteristics of the company's parts supply network in Korea (Kim and Oh 2017). Outside of production in Turkey in the early days, whenever Hyundai Motor has established a local production plant, core affiliated suppliers have launched alongside it. This typically involves Hyundai Mobis managing the production of key modular parts and supply chain management, Hyundai Steel producing iron plates, a major raw material, and Hyundai Glovis overseeing logistics. Some of these affiliated parts suppliers have even been located within the Hyundai Motor and Kia Motors plants. In addition, non-affiliated parts makers have entered at the same time to supply parts locally to the automakers and affiliated parts suppliers, thereby reproducing the quasi-vertically integrated supply chain.

Table 5
Proportion of Parts Procurement and Delivery Transactions by Korean Parts Suppliers in Central and Eastern Europe (based on transaction amount)

Parts Procurement	Local subsidiary of Korean parts suppliers	Foreign parts suppliers	Knock-down import from Korea	Other	Total
	24.0%	21.5%	51.1%	3.4%	100.0%
Delivery Transactions	Hyundai Motor and Kia Motors	Local subsidiary of Korean parts suppliers	Local foreign parts suppliers	Export	Total
	70.8%	24.4%	2.4%	0.4%	100.0%

Source: Kim and Oh (2017, p. 140, p. 144).

As of 2015, about ten years after Hyundai and Kia Motors established local production subsidiaries in Slovakia and the Czech Republic, 51.3% of all parts procured were imported in KD format from Korea. In addition, more than half of local procurement components are sourced from Korean parts makers that entered the market together. Taken together, parts procurement from Korean companies accounts for 75% of the total. From the perspective of parts makers that entered foreign markets alongside these automakers, almost all transactions have been concentrated on Hyundai and Kia Motors or other Korean subsidiaries, with only 2.4% of parts supplied to foreign automakers or parts manufacturers (see Table 5)

Factors in the Formation of the Quasi -Vertically Integrated Supply Chain

How were parts makers able to respond to Hyundai Motor's quasi-vertically integrated supply chain? Furthermore, how did non-affiliated parts makers that are not linked by equity ownership become so absolutely committed to Hyundai Motor? How was it possible to build up the quasi-vertically integrated supply chain across non-affiliates?

Firstly, the formation of oligopolies and/or monopolies in the Korean market by a small number of automakers can be cited as one of the explanations. When it comes to the development of an automobile industry, the more competitive the automobile market, the more equal the transaction relationships between automakers and parts suppliers tend to be. The inverse is also true, where the more monopolistic the automobile market, the more likely that captive relationships are to develop (Hong, 1997). Unlike in Japan, where a competitive market was formed among ten or so carmakers, Korea has maintained an oligopoly system in which three automakers, Hyundai, Kia, and Daewoo, have dominated the domestic market since the early days. The oligopolistic structure of the final automobile market implies a monopsony in the intermediate parts market. With parts demand monopolized by the three automakers, parts suppliers had no choice but to rely entirely on a small number of finished car makers.

Since the turn of the millennium, the monopolistic market structure of the Korean automobile market has intensified. As mentioned above, when Hyundai Motor acquired Kia Motors in the late 1990s, the domestic automobile market transformed from an oligopoly between Hyundai, Kia, and Daewoo into a monopoly with the Hyundai Motor Group dominating

70-80% of the total market. Therefore, it was impossible for parts makers to seek independent survival outside of the Hyundai Motor Group. Even though they were not linked to Hyundai Motor through an equity relationship, non-affiliated parts makers had no choice but to rely on Hyundai Motor. There was no alternative but to adapt to Hyundai Mobis' monopoly on the production of modular parts in the 2000s, the reorganization of the parts supply structure, and the hierarchical and differential control stemming from the quality evaluation system. This situation created the conditions for Hyundai Motor to control the opportunistic behavior of parts makers in inter-firm business relationships.

Second, the nature of Korea's economic development path through assembly and industrialization, and the resulting low technological level of parts makers, also became an important factor that allowed quasi-vertical integration to become established. The industrialization of Korea, which began in the 1960s, developed from final assembly processes that are downstream in the value chain, rather than upstream processes such as materials and parts (Hattori 2007). In Korea, automakers were created first with the powerful support of the developmental state, while parts companies were formed later. Automakers mainly imported core materials and parts from overseas until the 1970s, and developed limited domestic links at the level of procuring only residual parts from small and medium-sized enterprises. However, after the economic crisis in the late 1970s, there was an urgent need to procure parts at a low cost and keep them domestically sourced in a stable manner without relying on foreign parts makers. By incorporating non-affiliated independent parts suppliers with low technology capacity into the subcontracting system through the council of suppliers, automakers such as Hyundai Motor were able to build a quasi-vertically integrated supply network where non-affiliated parts makers were supported through technological and managerial guidance.

For parts makers, becoming incorporated into the quasi-vertically integrated supply network meant securing support and protection. Becoming a captive parts supplier for an automakers at least guaranteed a minimum number of orders on which companies could survive, even though this meant they had to supply parts at below market prices. They were also able obtain technology, management guidance, and funding from the automakers.[6] On

[6] Hyundai Motor still maintains a unique practice of 'directed sourcing' to support parts makers. This means that Hyundai Motor purchases raw materials that are difficult to procure in batches on behalf of small and medium-sized parts makers, and the SMEs process and deliver them back to Hyundai Motor. This practice has been one factor that intensifies the dependence of parts makers on

the other hand, by directly fostering their own parts makers, automakers were able to overcome the huge cost burden and sourcing instability caused by importing foreign parts. From these parts makers, Hyundai Motor was able to procure necessary parts below market price, thus saving on transaction costs. However, parts makers have been exploited through the process of reducing costs and securing flexibility for Hyundai Motor.

Finally, the mutual interest between Hyundai Motor and non-affiliated parts suppliers allowed for the quasi-vertically integrated supply network to form even though it was not linked to equity ownership. This alignment of mutual interests is possible as long as automobile makers continue to grow and take responsibility for the survival of parts suppliers to ensure the stable and timely provision of reliable parts. Therefore, the quasi-vertically integrated supply chain, including non-affiliates, presupposes continued expansion and growth in production and sales.

Hyundai Motor has continued its rapid growth since the 1980s by establishing a mass-production system and starting to export. This can be seen in the rapid sales growth from the mid-1980s until the 1997 Asian financial crisis (see Figure 3). Following the crisis, Hyundai Motor achieved high growth once again through its exploitation of the modular parts supply chain and quality assurance, which served as the economic foundation for maintaining and systematizing the quasi-vertically integrated supply chain in the 2000s. Hyundai Motor's overseas production led to the co-entry of parts suppliers included in the quasi-vertically integrated supply network. As Hyundai Motor continues to expand its overseas production, parts makers' overseas production and exports have also expanded. Hyundai Motor's rapid growth and expansion into overseas production allowed parts makers to expand their own businesses and sales, which also helped offset the pressure of flexibility and costs reduction from Hyundai.

Growth Stagnation in the 2010s: A Crisis in the Quasi-Vertically Integrated Supply Chain?

Stagnation of Hyundai Motor's High Growth in the 2010s

In the 2010s, the environment of the global automobile industry has rapidly changed. For example, the industry has been shaken by major incidents,

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Hyundai Motor and maintains the captive relationships.

including the 2008 global financial crisis, Toyota's massive recall that began in 2009, the Great East Japan Earthquake of 2011, and the Volkswagen emissions scandal in 2015, as well as the recent emergence of electric and self-driving vehicles. Despite these rapid market changes, the global automobile industry continued to expand in the 2010s. After experiencing a sharp decline in scale due to the global financial crisis in 2008, global car production continued to increase for about ten years subsequently. However, as the effects of changes in the automotive industry begin to emerge, production appears to have entered a new phase of decline starting towards the end of the 2010s (see Figure 6).

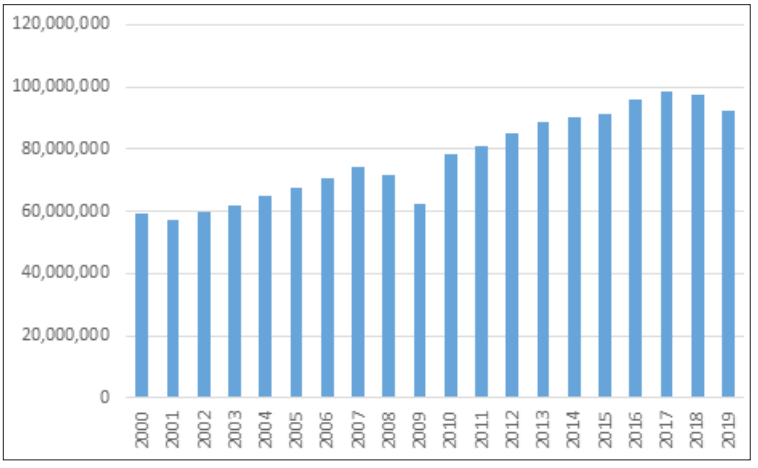

Fig. 6.—Trends in World Motor Vehicle Production

Sources: Korea Automobile Manufacturers Association (KAMA), *World Motor Vehicle Statistics*, Each Year.

In contrast to the global automobile industry, Hyundai Motor's growth stagnated in the 2010s. Figure 7 shows the number of cars produced by the Hyundai Motor Group per year, including Hyundai Motor and Kia Motors. According to this, the number of cars produced continued to increase as overseas production expanded rapidly in the 2000s. Even during the 2008 global financial crisis when the global automobile industry experienced a sharp downturn, the Hyundai Motor Group continued to expand its production without much impact. However, in the 2010s, production began to stagnate, and has been on the decline since 2016. This stagnant production for nearly

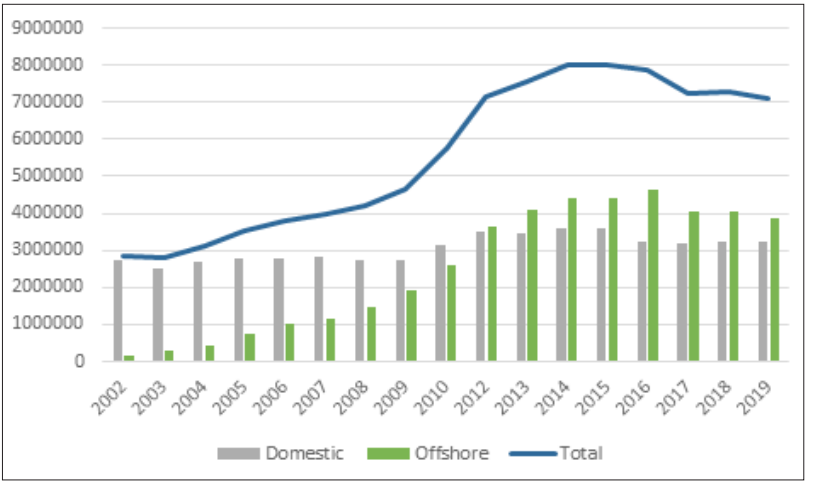

Fig. 7.—Trends in Hyundai Motor Group's Number of Vehicles Produced

Sources: Hyundai Motor and Kia Motors' Annual Reports and Internal Documents.

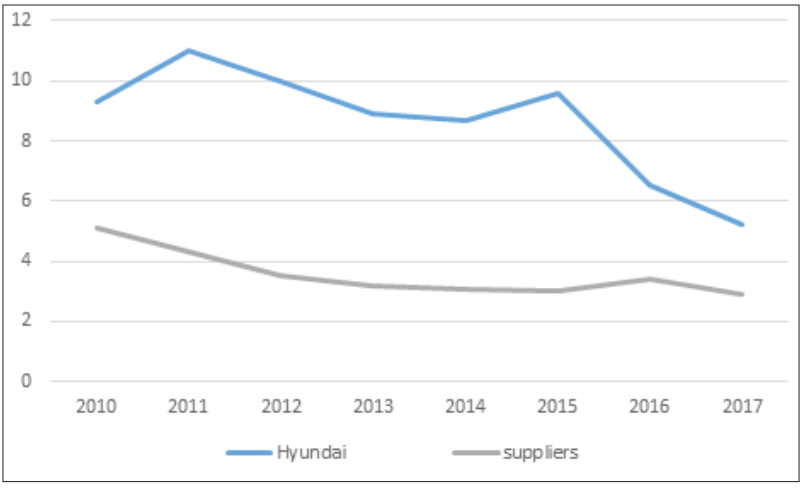

Fig. 8.—Trends in Operating Margins of Hyundai Motor and Parts Makers (%)

Note: Suppliers indicate 100 largest non-affiliated suppliers of Hyundai Motor.
Sources: Hyundai Motor's Annual reports and Korea Institute for Industrial Economics and Trade (KIET)'s internal analysis data.

a decade is an unusually long slump that Hyundai Motor has never experienced before.

As the scale of Hyundai Motor's production stagnated, its profitability also declined. In the 2010s, Hyundai Motor's operating margin reached a peak of 11.0% in 2011 and then continued to decline, reaching only 5.2% in 2017 (see Figure 8). Falling profitability in turn led to a decline in the profitability of parts makers included in the quasi-vertically integrated supply network. The operating profit margins of the 100 largest parts makers in Hyundai Motor's quasi-vertically integrated supply network fell from 5.9% in 2010 and 4.3% in 2011 to just 2.9% in 2017.

Effects and Limitations of the Quasi-Vertically Integrated Supply Network

Excluding the financial crisis in the late 1990s, it is noteworthy that Hyundai Motor began to stagnate in the 2010s after experiencing decades of rapid growth. This long-term slump of nearly a decade was unprecedented for the company. Hyundai Motor's sluggishness is also evident in the fact that the global auto industry was continually expanding in the 2010s.

The downturn in the 2010s reveals the limitations of Hyundai Motor's quasi-vertically integrated supply network model. As a finished car maker, the rise and fall of Hyundai Motor has the potential to determine the prospects of not only affiliated but also non-affiliated parts makers. Given this situation, Hyundai Motor was able to mobilize tremendous commitment from parts makers, even placing unreasonable demands on them. Leapfrogging on the growth of parts suppliers served as an important driving force for Hyundai Motor to quickly catch up to more technologically advanced companies as it began to exploit modularization and expand production overseas (Hyundai Motor manager interview, 2015).[7]

Parts makers had to make an unlimited commitment to fulfill demand while absorbing the pressures and burdens placed on them by Hyundai Motor, eliminating any possibility of independent growth. However, as Hyundai Motor continued its rapid growth, parts makers were able to expand their businesses and sales, thereby offsetting the pressure of cost reductions. In the wake of the 2008 global financial crisis and subsequent events, global automakers have undergone significant restructuring and adjustments. For

[7] Most of the persons from Hyundai Motor, affiliates and parts makers interviewed for this study commonly acknowledged that the "tremendous commitment of parts makers made a huge contribution to Hyundai Motor's rapid growth and development into a global player."

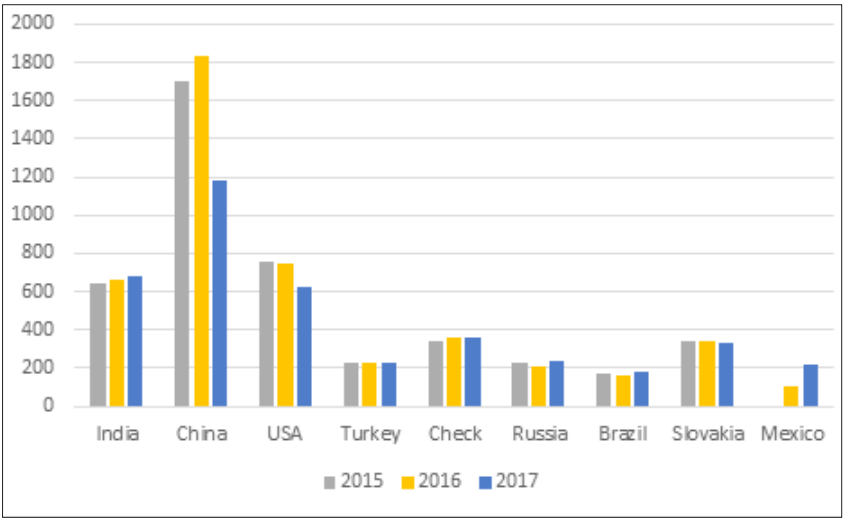

Fig. 9.—Overseas Production by Hyundai-Kia Motors (unit: number of vehicles produced)

Sources: Korea Automobile Manufacturers Association (KAMA), *World Motor Vehicle Statistics*, Each Year.

example, Toyota Motor had to reconsider its excessive global expansion after experiencing a massive recall of defective parts in 2010 and the subsequent Great East Japan Earthquake in 2011. On the contrary, Hyundai Motor continued to expand overseas even during the global financial crisis, which was a requirement for sustaining the quasi-vertically integrated model. The slowdown in high growth and deterioration in profitability in the 2010s seems to signal that the company has come up against the limits of the external expansion-centered quasi-vertically integrated model.

Hyundai Motor's local production in China illustrates the limitations of a model focused on external market expansion. Hyundai Motor's slow growth in the 2010s was largely attributed to the sluggishness of its Chinese production plant (see Figure 9). As global competition to occupy the huge Chinese market intensifies, Hyundai Motor has also rapidly expanded its production capacity in China. However, due to the rapid catch-up of local Chinese companies and the delayed deployment of appropriate vehicle models to cope with this, local production in China had drastically fallen by 2017 (Hyundai Motor manager interview, 2018). As a result, parts makers that made their way into China alongside Hyundai Motor faced a serious crisis as

they were entirely reliant on the company. The turmoil with local production in China clearly revealed the dangers of quasi-vertically integration.

Concluding Remarks: Path Dependency or Path Breaking?

This article has attempted to explain the inter-firm relationships that enabled Hyundai Motor to grow rapidly. This model is characterized as a parts supply system based on the concept of a 'quasi-vertically integrated supply network.' Hyundai Motor initially established the quasi-vertically integrated supply chain by encompassing not only affiliated but also non-affiliated parts suppliers in its subcontracting system in the 1980s thanks to government support. This was then expanded on through Hyundai Mobis' advances in modularization and bureaucratic quality assurance, and spread globally through joint overseas expansions in the 2000s. However, this parts supply system faced a crisis in the 2010s as Hyundai Motor has not responded properly to oversupply in the global automobile industry, which has caused its high growth rate to stagnate. Hyundai Motor is now coming under pressure to revamp its quasi-vertically integrated supply network.

What we have tried to emphasize in this study is that Hyundai Motor's parts supply system did not evolve according to a consistent long-term plan, but rather in an ad hoc manner as the company responded to environmental changes. Although Hyundai Motor tried to introduce a Japanese lean production system as a latecomer to the industry, it had no choice but to rely on the skill-saving of production workers in confrontational labor-management relations. Since the 2000s, this production system resulted in progress towards modularization that reduces the interface of parts and saves costs through outsourcing. The quasi-vertically integrated supply system became systematized on the basis of modularization and expanded through overseas production in line with the interests of Hyundai Mobis, a key affiliate of Hyundai Motor Group.

Hyundai Motor's inter-firm relationships of quasi-vertical integration have the following theoretical implications. First, Hyundai Motor's inter-firm relationships can be categorized as the modular type (Gereffi et al, 2005). The relationship is modular in that it reduces interfacing, makes transactions simpler, and focuses on standardized and coded information exchanges. However, it is more vertical than horizontal. This is a distinctive modular relationship in the sense that parts makers continue to depend on the leading company despite making progress in modularization.

Second, Hyundai Motor's inter-firm relationships extend the concept of quasi-vertical integration (MacDuffie, 2013) by encompassing not only affiliated parts makers but also non-affiliated parts suppliers. MacDuffie (2013) fails to explain this relationship with non-affiliated parts suppliers since his analysis is confined to the relationship between parent companies and their affiliates. This article goes beyond MacDuffie's (2013) work in that it explains how Hyundai Motor has been able to build up its own quasi-vertically integrated supply network, including non-affiliated parts makers, despite not having an equity relationship with them.

Finally, Hyundai Motor's quasi-vertically integrated supply network differs from the Japanese *keiretsu* model. Unlike in the Japanese automobile industry, where modular production in the 2000s weakened the *keiretsu* network of mutual obligations between companies, Hyundai Motor's system actually became even more consolidated through the advent of modular production. In short, Hyundai Motor's quasi-vertically integrated supply network goes beyond the existing organizational theories that explain inter-firm relationships. We hope this study will contribute to the development of organizational theory by attempting to explain and theorize the inter-firm relationships of Korean *chaebol* using Hyundai Motor as a case study.

With the recent intensification of the climate crisis and the Volkswagen emissions scandal, automobile environmental regulations have become stronger and a number of new technologies have been developed, leading to a change in the automotive industry paradigm. Four major changes, described as CASE (connectivity, autonomy, sharing, and electrification), are creating this new paradigm for the automobile industry. The industry is changing as new players enter in areas such as electronics, IT, software, and telecommunications, as well as mechanical parts. On the other hand, the share of mechanical technology in the production of vehicles is decreasing. This implies a crisis for parts makers that are focused on mechanical components. Moreover, the risk to Hyundai Motor's non-affiliated parts suppliers may be even more serious since they have had limited opportunities to build their own capacity due to their heavy reliance on Hyundai Motor under the quasi-vertically integrated supply network.[8]

The closed nature of the quasi-vertically integrated supply network could also lead to limitations. The automotive industry needs to innovate,

[8] Non-affiliated parts makers are expected to face a bigger crisis than affiliated ones. Affiliate parts suppliers will be able to respond more quickly to changes based on the capabilities of Hyundai Motor. However, non-affiliate parts providers are more likely to fail in response to the changes and remain exposed to competition for survival of the fittest.

and this requires an open structure in which competent companies can collaborate in their respective areas. However, it is not easy to establish such a flexible and open arena for collaboration in Hyundai Motor's closed component supply system that makes full use of the capabilities of both affiliated and non-affiliated suppliers and restricts outside entry.

In the face of this paradigm shift, Hyundai Motor is being called on to change. The company stands at a crossroads between path-dependency and forging a new path. The former is finding a way to cope with the paradigm shift while maintaining and amplifying the merits of the existing quasi-vertically integrated system, while the latter means pursuing innovation through an open relationship while remedying the limitations of the current system. The path that will be taken ultimately depends on Hyundai Motor's strategic choice.

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