Knowledge Sharing Program

2014 Modularization of Korea's Development Experience:

Korea's Automotive Industry

2014

MINISTRY OF STRATEGY AND FINANCE

KIET Korea Institute for Industrial Economics & Trade

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Preface

The study of Korea's economic and social transformation offers a unique window of opportunity to better understand the factors that drive development. Within about one generation, Korea transformed itself from an aid-recipient basket-case to a donor country with fast-paced, sustained economic growth. What makes Korea's experience even more remarkable is that the fruits of Korea's rapid growth were relatively widely shared.

In 2004, the Korean Ministry of Strategy and Finance (MOSF) and the Korea Development Institute (KDI) launched the Knowledge Sharing Program (KSP) to assist partner countries in the developing world by sharing Korea's development experience. To provide a rigorous foundation for the knowledge exchange engagements, the KDI School has accumulated case studies through the KSP Modularization Program since 2010. During the first four years, the Modularization Program has amassed 119 case studies, carefully documenting noteworthy innovations in policy and implementation in a wide range of areas including economic policy, admistration·ICT, agricultural policy, health and medicine, industrial development, human resources, land development, and environment.Individually, the case studies convey practical knowhow and insights in an easily accessible format; collectively, they illustrate how Korea was able to kick-start and sustain economic growth for shared prosperity.

Building on the success during the past four years, we are pleased to present an additional installment of 19 new case studies completed through the 2014 Modularization Program. As an economy develops, new challenges arise. Technological innovations create a wealth of new opportunities and risks. Environmental degradation and climate change pose serious threats to the global economy, especially to the citizens of the countries most vulnerable to the impacts of climate change. The new case studies continue the tradition in the Modularization Program by illustrating how different agents in the Korean society including the government, the corporations, and the civil society organizations, worked together to find creative solutions to challenges to shared prosperity. The efforts delineated include overcoming barriers between government agencies; taking advantage of new opportunities opened up through ICT; government investment in infrastructure; creative collaboration between the government and civil society; and painstaking efforts to optimize

management of public programs and their operation. A notable innovation this year is the development of two "teaching cases", optimized for interactive classroom use: Localizing E-Government in Korea and Korea's Volume-based Waste Fee System.

I would like to express my gratitude to all those involved in the project this year. First and foremost, I would like to thank the Ministry of Strategy and Finance for the continued support for the Modularization Program. Heartfelt appreciation is due to the contributing researchers and their institutions for their dedication in research, to the former public officials and senior practitioners for their keen insight and wisdom they so graciously shared as advisors and reviewers, and also to the KSP Executive Committee for their expert oversight over the program. Last but not least, I am thankful to each and every member of the Development Research Team for the sincere efforts to bring the research to successful fruition, and to Professor Taejong Kim for his stewardship.

As always, the views and opinions expressed by the authors in the body of work presented here do not necessarily represent those of the KDI School of Public Policy and Management.

December 2014

Joon-Kyung Kim

President

KDI School of Public Policy and Management

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Summary

After World War II, many developing countries tried fostering an automobile industry for its positive spillover effect on other related industries. But South Korea alone successfully fostered an automobile industry. For that reason, many developing countries have shown great interest in the Korean automobile industry. Currently undertaking KSP and ODA projects also aim mainly for sharing Korea's experience and forming cooperation within the automobile industry. Therefore, it is helpful to modularize Korea's experience on developing an automobile industry to provide a systemic response to the demands of developing countries.

Korea's first automobile, 'Sibal', was manufactured in 1955, and a modern assembly line was first implemented in 1962, as the 'Saenara' was manufactured. The Saenara Corp. imported parts of the Japanese Nissan 'Blue Bird' and assembled the "Saenara" using the KD method. This KD assembly method was continued until the independent domestic production of the 'Pony' in 1976. With the implementation of modern assembly line, the Korean Government began to push forward an automobile industry fostering policy. Initially, the Korean automobile industry fostering policy's essential goal was the implementation of modern automobile production lines and the domestic production of parts. However, automobile production solely dependent on the Korean domestic market could not expand its business further. KD production and reassembling imported parts also delayed the domestic production of automobile components. Domestic production of automobile components was in place after the Korean model 'Pony' was first introduced. In order to produce a car that was not produced in other countries, the Korean automobile industry had to domestically produce automobile parts on its own. The development and production of Korea's own automobile model played a crucial role in the implementation of

domestic production of automobile parts and in the advancement of the Korean automobile industry.

Even though foreign technology was adopted for the Korean model, domestic technology was used when Pony Excel was developed. Korea became an independent developer of engines and transmissions, which are core to the automotive industry in 90's. In 1970 and early 1980 the automotive industry was affected by the oil shock and the resulting political anxiety drove the adoption of regulatory measures. The Pony Excel model manufactured for export was developed and programmed for export to developed countries by targeting the U.S. market. From the end of 1980, export to the U.S. was challenging because of product quality problems, but a rapid increase in the domestic market after the Seoul Olympics was the main reason of measurably fast growth of the Korean automotive industry through the middle of 1990's.

However, entry of Samsung Automotive and the expansion of production capacity of the existing automotive companies caused oversupply. In addition, the East Asia financial crisis was getting worse. With this bad situation the Korean automotive industry was restructured. Hyundai and Kia were united as an automotive group and the other companies were taken over by foreign firms. In addition to company restructuring, improvement of internal quality measures were realized in the 2000's. Improvement of product quality was made centrally by the Hyundai group and the gentrification of technology and functionality improvement became an ongoing process. Both the vehicle manufacturing companies and the automotive parts companies participated in product and technology improvement, highly enhancing the competitiveness of Korean automotive industry.

Eco-friendly cars such as hybrid cars, electric cars and fuel battery cars were one of positive results despite not having modern technology. Policy support was enhanced to improve quality of the automotive industry. First, legislation was aimed at providing low priced materials for parts and promoted centrally organized technology development, reliability improvement and enhanced export with the purpose of having a global supply base. Secondly, technology development of the automotive industry was focused on the next generation car and government support emphasized not only the car system but also parts development. The most important policy for Korean automotive industry was developing a Korean car model and the promotion of auto parts. The basis behind independent development of a Korean car was the 'long term automotive industry promotion plan' adopted in May 1974. The guideline of the plan was delivered to companies and with it the company's independent development plan was established. The government's guideline and plan explained everything from detailed specifications to the style of the car.

The initial task to promote auto parts availability was localization of components. The government not only promoted localization of components to auto companies, but also pushed ahead horizontal systematization for other companies in and out of the auto parts industry. Also, an approval system was adopted for restricting imports of auto parts produced domestically. Accordingly, localization of components was improved making the response of parts companies to the needs of finished vehicle companies, the next task. Vertical systematization was adopted, thereby improving cooperation between parts companies and finished vehicle companies. The policy of cooperative relationships is successful and continues to be promoted. In 2000, the government played a crucial role to foster the auto parts industry. For instance, to improve production quality, the government established technology development funds and reliability improvement infrastructure. Development of the Korean automotive industry should be a good case for developing countries, but would be difficult to apply such as it is. There are developing countries where global companies settle, are in charge of production and have partial success. There are not many countries that could apply Koreas car model development case.

Most developing countries hope to develop an independent automotive industry however, currently they are more interested in attracting a global automotive company and fostering of an auto parts industry. Accordingly, the policy related to auto parts of the Korean automotive industry development experience would be meaningful for developing countries. The system that regulates the relationship between finished car companies along with their growth would be a crucial policy to foster automotive parts industry of developing countries. Also, the support for improvement of the auto parts industry and technology level that Korea was promoting from the 1990's was an applicable policy example to developing countries. The policy of independent model development would be a good example of government's promotion of local automotive industry growth even though independent companies may not.

Chapter 1

Introduction

1. Necessity of Study
2. Purpose of Study

Introduction

1. Necessity of Study

The auto industry, with its large upstream and downstream spillover effects, is a very important engine of industrial and economic development. The automobile uses various materials such as steel, non-iron metals, glass, chemicals, rubber and fiber. The automobile also requires machinery, electronics, and electrical components to function. The development of the auto industry creates demand for such industries. Also, industrial development sometimes leads technological progress through use of cutting edge technology such as new materials and information technology. Because of the large spillover effects of the auto industry on the manufacturing industry in general, many emerging markets that seek industrial and economic development are highly interested in fostering an auto industry. The demand for knowledge transfer regarding the auto industry is high in many KSP programs.

In general, growth models for auto industries in developing countries could be categorized into the following: knockdown production by indigenous firms of auto models developed in advanced countries (Iran, Uzbekistan, Korea during 1962~1974), knockdown production by foreign firms (Thailand, Brazil, Spain, Mexico), and indigenous production by indigenous firms of indigenous models. Knockdown production of foreign models has certain advantages, but also have limitations with respect to developing a materials industry and obtaining technology. Thailand manufactures 2.5 million vehicles per year, and is the tenth largest automobile manufacturer in the world. However, the Thai auto industry is far from independent, as Japanese firms are responsible for production. China is growing quickly, aided by its huge domestic market, but Korea stands as the only case that has achieved success in developing an independent auto industry, despite entering the market

late (latecomer). Therefore, many latecomer countries that seek to develop an auto industry are looking to Korea for transfer of experience. In this regard, modularizing the Korean auto industry development model is very much needed.

2. Purpose of Study

This research project aims to clearly present the history of the Korean auto industry, and offer an analysis of growth factors in each development stage. Especially, the research will aim to identify the key policies that led to the auto industry's growth, and analyze their effects. First, important policies that have affected the auto industry will be analyzed by their intended function. Then, the effect of innovative entrepreneurs, high-quality labor, structural factors of the market and the willpower of government (leaders) on the auto industry will be analyzed.

We seek to draw lessons for the development of auto industries in latecomer countries, and offer measures that these countries can use, drawing on the successes and failures of the Korean auto industry's development experience. Policies and their environmental circumstances will be compared to those of latecomer countries, and lessons will be drawn. Also, if the Korean model cannot be applied, as is, to other countries, measures aimed at autonomous parts industry development, technological development, or the development of a technical workforce will be offered.

Also, many developing countries want the development of an auto industry as a vehicle for economic growth. Through this research, we aim to offer data for various knowledge sharing programs, and other educational programs directed at transferring the Korean auto industry's development experience to other countries.

Chapter 2

History of the Korean Automotive Industry's Development and Key Policies in the Individual Development Stages

1. Overall History of the Korean Automotive Industry's Development
2. Process of Korean Automotive Industry's Development for Individual Periods and Major Policies
3. Factors behind the Growth of the Korean Automotive Industry

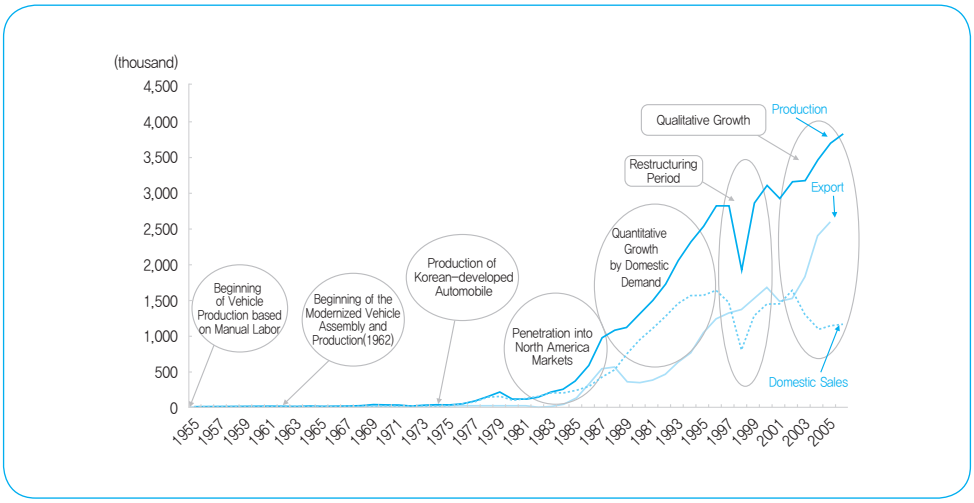
History of the Korean Automotive Industry's Development and Key Policies in the Individual Development Stages

1. Overall History of the Korean Automotive Industry's Development

Since the first production of the vehicle 'Sibal' using manual labor in 1955, the Korean automotive industry has developed dramatically, leading Korea to become the 5th largest vehicle producer in the world. Although Korea began its first modernized vehicle assembly and production in 1962, it used knockdown (KD) kit assembly methods, and revealed many limitations in developing automobile related industries.

The Korean automotive industry was fully on track for growth once Korea developed and produced its own vehicle in 1975. As the economy underwent difficulties in the early 1980s due to the political unrest and the oil shock, the Korean automotive industry went through restructuring and regulation. However, thanks to efforts such as the development of vehicles for export, the Korean automotive industry made inroads into North American markets in earnests in the mid 1980s. Although the industry was confronted with difficulties resulting from quality issues of exported cars, the automotive industry, nevertheless, enjoyed significant growth led by sharply increased domestic demand since the 1988 Seoul Olympics.

Figure 2-1 | Process of the Korean Automotive Industry's Development



Source: The First Joint Workshop on the Industrial Cooperation between Korea and Indonesia.

Amidst the intensified competition in the Korean automotive market in the late 1990s caused by the massive facility investment and the penetration of new automotive enterprises into the market, the Asian financial crisis and the IMF bailout erupted, leading major Korean automotive enterprises to be in financial difficulties. As a result, the Korean automotive industry went through massive restructuring as Hyundai Motor Company took over KIA Motors and Daewoo, Ssangyong and Samsung Motors were sold to foreign enterprises. As the industry reacted to the limitation of its quantitative growth after the restructuring, the Korean automotive industry began to pursue its qualitative growth, focusing on improving the quality of its vehicles in the 2000s. Eventually, the Korean automotive industry developed vehicles equipped with the highest quality in the world, and secured core technologies related to internal combustion engines and transmissions. In addition, it acquired the capability to develop vehicle technologies such as eco-friendly cars including hybrid, electric and fuel cell vehicles.

Korea emerged as the fifth largest vehicle producer in the world in 2000 supplying 3.12 million units that year. Although it fell to 6th place between 2002 and 2004 due to the rise of China, it has maintained 5th place for 9 consecutive years, since overtaking France in 2005. However, as the Korean automotive industry expanded its overseas production recently, domestic production has stalled, lowering its share of the automotive industry in global automobile production.

Table 2-1 | Global Top 10 Automobile Producers

	2013			2011			2005		
	Nation	Thousand Units	%	Nation	Thousand Units	%	Nation	Thousand Units	%
1	China	22,117	25.3	China	18,419	22.9	The U.S.	11,947	17.8
2	The U.S.	11,046	12.6	The U.S.	8,646	10.7	Japan	10,800	16.1
3	Japan	9,630	11.0	Japan	8,399	10.4	Germany	5,758	8.6
4	Germany	5,865	6.7	Germany	6,304	7.8	China	5,701	8.5
5	Korea	4,521	5.2	Korea	4,658	5.8	Korea	3,699	5.5
6	India	3,896	4.5	India	3,940	4.9	France	3,549	5.3
7	Brazil	3,740	4.3	Brazil	3,406	4.2	Spain	2,764	4.1
8	Mexico	3,052	3.5	Mexico	2,680	3.3	Canada	2,688	4.0
9	Thailand	2,457	2.8	Spain	2,354	2.9	Brazil	2,528	3.8
10	Canada	2,380	2.7	France	2,278	2.8	The U.K.	1,803	2.7
Global Total	-	87,377	100	-	80,524	100	-	67,204	100

Source: Korea Automobile Manufacturing Association.

68% of the vehicles produced by the Korean automotive industry are produced for export, as the size of the Korean domestic market remains at merely 1.6 million units. Because the domestic car market of Korea was extremely small in the initial stage of the auto industry's development, Korea had to put forward export-oriented industrial policies and strategies. It was an inevitable choice for the country with such a small domestic market to pursue an export-oriented policy in order to promote an automotive industry that needs a feature of economy of scale.

The Korean automotive enterprises are growing at a rapid pace. For instance, Hyundai Motor Group ranks 5th in terms of global automobile sales owing to the expanded overseas production. Its global market share is 8.7%, almost reaching the level of Renault Group.

Table 2-2 | Supply and Demand of the Korean Automotive Industry (2013)

(Unit: thousand)

Production	Export	Domestic Sales	Import	Proportion of Export (%)
4,521	3,089	1,383	191	68.3

Source: Korea Automobile Manufacturing Association.

Table 2-3 | Global Vehicle Sales of Major Automotive Manufacturers

	2008		2010		2012	
	Thousand	Share (%)	Thousand	Share (%)	Thousand	Share (%)
Toyota	8,568	12.7	8,126	11.0	9,396	11.6
GM	8,094	12.0	8,102	10.9	9,108	11.2
Volkswagen	6,296	9.3	7,270	9.8	9,015	11.1
Renault/Nissan/Avtovaz	6,426	9.5	6,760	9.1	7,349	9.1
Hyundai	4,491	6.7	6,030	8.1	7,020	8.7
Ford	4,903	7.3	4,985	6.7	5,398	6.7
Fiat/Chrysler	4,433	6.6	3,853	5.2	4,263	5.3
Honda	3,776	5.6	3,560	4.8	3,818	4.7
Peugeot Citroen	3,295	4.9	3,563	4.8	2,974	3.7
Suzuki	2,275	3.4	2,518	3.4	2,586	3.2
Dimaler	1,871	2.8	1,684	2.3	1,942	2.4

Source: Fourin Global Automotive Monthly Statistics.

2. Process of Korean Automotive Industry's Development for Individual Periods and Major Policies

2.1. Embryonic Stage of Korean Automotive Industry

2.1.1. Establishment of the Initial Bases for Automotive Parts Industry

Korea experienced the beginning of automobile-related industries such as transportation, sales and maintenance under Japanese colonial rule, and started to manufacture simple automotive parts in the late 1930s, although the range of the manufacturing was limited. During that process, Korea acquired technologies like vehicle body manufacturing,

molding and automotive parts processing and automotive maintenance. The experience and technologies Korea gained since its liberation from Japan, as well as the involvement of Korean workers in the automotive industry, have become important physical assets and human resources in forming the initial Korean automotive industry.

While the oil reserves from Japanese military storage sites, in the late period of the Japanese colonial rule, were distributed, the number of vehicles sold by the U.S. military increased due to the deployment of the U.S. military in Korea. Consequently, automotive parts, gasoline or smuggled goods coming from the U.S. military were widely available. As a result, the business of renovating used cars began booming. There were businesses such as restoring carbide cars or wood fuel vehicles into gasoline cars or renovating worn out Japanese military vehicles by replacing their major functional equipment such as engines, transmissions and axles with those from vehicles sold by the U.S. military.

Table 2-4 | Major Korean Automotive Parts Producers

Name of Company	CEO	Production Items
DongYang Piston	Lee, Myungkyu	Piston
Kyungsung Spring	Oh, Munhwan	Spring
Daebon Manufacturing. Inc	Yoon, Sungsul, Yoon, Taesul	Piston pin
Samhwa Gasket	Cha, Dongho, Yoon, Byungeui	Gasket
Shin Kyuhee Manufacturing .Inc	Shin, Kyuhee	Light Socket, Reflector, Brake hose, Clutch, Steel Plate
Geumgang Manufacturing. Inc	Lee, HGeungkwang	Brake Drum, Inner Ring, Sub Inner Ring
Hankook Eeyeon Company	Kim Jewon, Kim Changwon	Piston Ring
Kooksan Automobile. Inc	Kim Yongjoo, Kim Yongsung	Spring
Chosun Optical Glass	-	Light Lens
Chosun Cork Company	-	Cork Board
Daehan Steel	Huh, Jooyeol, Huh, Songyeol	Spring
Samhwa Junggong	Yoon, Junmo	Piston Pin, Gear, Joint, Bearing, etc.

Source: Korea Auto Industries Coop. Association, 30 Year-History of the Korean Automobile Association, 1992.

As significant demand for used vehicle renovation and restoration increased, there were active efforts to supply automotive parts domestically to meet the demand. Automotive parts enterprises in Seoul established the Chosun Automotive Parts Measure Committee and the Chosun Automotive Industry Association on December 1st, 1945. Some of the workers, who were involved in the maintenance or machinery industries, began to produce automotive parts. Thirteen (13) domestic automotive parts items were selected to be promoted by the Commerce, National Defense and Transportation Ministries on March 29, 1950, and were supplied to the Korean military. This is the first example of government policy for the Korean automotive industry. A list of these 13 items, designated as domestic automotive parts, is in <Table 2-5>.

In addition to these items, there were other undesignated items such as engine valves, U-bolts, hub bolts and drum and brake oil. Later, the Korea Automotive Industry Association was officially approved by the Minister of the Commerce and became the only automotive industry organization to represent almost all member companies nationwide.

Table 2-5 | Domestic Automotive Parts Promoted by Transportation, Commerce and National Defense Ministries

1. Piston, 2. Piston Ring, 3. Piston Pin, 4. Inner Ring of Piston Ring 5. Sleeve, 6. Brake Lining, 7. Gasket, .8. Spring, 9. Light Lens, 10. Cork Board, 11. Hub Inner Ring, 12. Fan Belt, 13. Light Socket and Reflector

Source: Korea Auto Industries Coop. Association, 30 Year-History of the Korean Automobile Association, 1992.

Due to the Korean War, the automotive industry grew. The increased number of used military vehicles and the distribution of military goods and war booty led to the rise in the number of car restoration and repair factories. They produced buses, vans and trucks by appropriately renovating trucks and jeeps without using any particular specification. As regenerating engines was essential for the restoration and repair market, the production of parts was sharply increased. This led to the development of engine and vehicle body manufacturing technologies that in turn led to production of the first domestic vehicle "Sibal".

As vehicle restoration work was actively carried out in the private sector but also in the military, vehicle restoration centers were established within the Korean Army, Navy and Air Force to repair vehicles destroyed during the war. Once broken cars were transported to the centers, the centers dismantled the cars and cleaned their parts. Then, the engine blocks were

bored and honed. The centers replaced engine parts such as pistons, piston rings and piston pins with new ones and ground crankshafts and piston rods. Metal bearings were replaced with new ones, while grinding and replacing valves. This indicates that the repaired engines were almost similar to new ones. Other parts such as transmissions, axles, gear and steering systems, were replaced or repaired in the same way. In addition, electronic parts including starter motors and generators, and consumable parts such as batteries, tires and headlights were also replaced with new parts. With the exception of those badly damaged, most car bodies were repaired through sheet metal work. The vehicles that were reassembled through the process above were inspected after coating work. The cars were released only when they passed the test drive. That is to say, cars went through all the processes of vehicle assembly and even received additional work such as disassembly, grinding and repair. For this reason, the sizes of the military vehicle restoration centers were very large in terms of human resources or facilities. As a consequence, workers at the centers later became important human resources for the development of the Korean automotive industry. As more and more parts used in the vehicle restoration centers were supplied to the Korean military from 1953, a large number of automotive parts production factories were established. Some of the current enterprises that now produce core automotive parts such as Yoosung Enterprises and Daewon Global, were established during that period.

Korea's experience with the car renovation business and automotive parts industry, which began before the liberation of Korea, is a feature of the Korean automotive industry distinguished from other countries. In particular, the vehicle restoration business that had formed during the Korean War, played a decisive role in nurturing automotive industry-related human resources and promoting an automotive parts industry. Most other countries which began automotive industries, had no experience in the automotive parts or vehicle assembly sectors, so multinational automotive enterprises from advanced countries penetrated markets in these countries and conducted knockdown production. However, Korea already had a certain extent of an automotive parts industry before it introduced the modernized vehicle assembly line, and also gained experience on vehicle assembly through the car restoration business. Such experiences and production bases paved the way for the Korean automotive industry to grow independently by developing its own model.

2.1.2. Production of First Korean-Made Vehicle, 'Sibal'

Based on the vehicle restoration and renovation businesses, Sibal Automotive Enterprises manufactured a 4-cylinder engine in October 1955, and produced jeep vehicles equipped with the engine in September. The company began its factory operation under a tent less

than a tenth the size of Kia Enterprise's bicycle factory. Sibal is considered to be the first Korean-made vehicle as it was built with domestically produced engines and car bodies. The engine was based on the jeeps used by the U.S. military with core engine parts such as cylinder blocks, cylinder heads and crankshafts manufactured by the Sibal Enterprise itself. Pistons and piston rings were purchased from Seoul Piston Inc and Yoosung Enterprises, respectively. In addition to the engine parts, other parts were produced domestically. Spring and hub wheels were supplied from Daehan Steel Inc and the Ha Dongwhan Manufacturing Company. However, some parts including engine carburetors, transmissions and axles were not domestically manufactured. The Sibal Company utilized mainly used parts for parts that could not be produced domestically, which is why it is considered that the Sibal is assembled with used parts. However, now, many parts of the vehicle are domestically manufactured.

Because there was no press equipment, the car body of the Sibal was manufactured by hand. Sibal Automotive Enterprises made plates for the vehicle by cutting and unfolding steel drum cans, as there had been neither production nor export of steel plates. After producing 7 Sibal vehicles in 1955, the company produced 81 units and 459 units in 1956 and 1957, respectively. However, along with the lack of foreign currency and the decline in gasoline supplied from foreign countries that dealt a serious blow to the Korean automotive industry, the company's excessive investment and the emergence of Saenara Motor Company, which assembled a knockdown version of Nissan's Bluebird, led the company's bankruptcy in 1964.

2.2. Development of Knockdown (KD) Assembly in Korea

Knockdown (KD) assembly and production begun by the Saenara Motor Company has great significance, as it was the first example of modern vehicle production. Since then, the Korean government established comprehensive automotive industry promotion plans and enacted relevant laws. For this reason, many view that this was the period the Korean automotive industry started in earnest. Although KD assembly and production, which began in 1962, performed only marginally until the mid 1960s due to the currency and materials crises and the consequent bankruptcy of the Saenara Motor Company, production based on KD assembly was fully on track from 1966.

However, KD assembly revealed internal limitations in the domestic production of automotive parts, which in turn caused the Korean automotive industry to pursue its own independent development. The production of vehicles based on KD assembly came to an end with the emergence of the Pony, a Korean-developed vehicle, and the establishment of a comprehensive vehicle production plant.

2.2.1. Establishment of Saenara Motor Company

In 1962, for the first time, the Korean automotive industry introduced modernized vehicle assembly methods based on assembly lines, which were a departure from the existing manual labor-based production. In addition, the Korean government began to fully implement plans for the promotion of the Korean automotive industry. In April 1962, the government introduced the 'Automotive Industry 5-Year Plan' as a part of the '5-Year Development Plan.' This plan aimed to prevent establishment of too many automotive assembly plants, and realize the smooth supply of vehicles by achieving full domestic manufacturing of various vehicles.

The main purpose of the 'Automotive Industry 5-Year Plan' was to construct one diesel engine production plant in addition to individual plants that could annually produce 3,000 units of cars (compact car), buses and trucks (heavy duty vehicle), respectively. The plan was to initially introduce KD parts for vehicle assembly from modern foreign enterprises, which were the source of foreign loans, and within 5 years, realize the full domestic production of all automotive parts by gradually creating local sources. In accordance with the plan, the Saenara Motor Company established a compact car assembly plant while Sibal Automotive Enterprise and Chosen Machinery Manufacturing Company (name was later changed to 'Hankook Machinery") constructed a heavy-duty vehicle plant and diesel engine plant, respectively.

To support this plan, the Korean government proclaimed the 'Automotive Industry Protection Act,' a law that would expire after 5 years. This act prevented the establishment of an excessive number of vehicle assembly enterprises by regulating the authorization for automobile assembly companies and protected authorized vehicle producers by prohibiting the import of finished vehicles. In addition, in the early stages of production and for a certain period of time, the government exempted the enterprises from duties for parts and finished units, and reduced automobile and vehicle acquisition taxes.

With the support of the Korean government, the Seanara Motor Company Plant was constructed in October 1962. The Saenara Motor Company established the loaned facility and technological alliance agreements with Nissan. The company introduced the Bluebird from Nissan, and named it the Saenara to sell the vehicle in the domestic market. Most of the 1,710 units and 1,063 units the company assembled in 1963 and 1963, respectively, were semi-knockdown forms in which all parts for the vehicle were imported and then assembled. As a result, Saenara Motor Company spent $3.194 million on importing parts in one year. This was a significant amount of money given the then reserve of foreign currency in Korea. The imported automotive parts were exempt from duty in accordance with the

'Automotive Industry Protection Act.' The Saenara vehicles that went on sale were exempt from automobile and acquisition taxes. However, due to the worsened foreign currency reserve of the Korean government, Saenara suspended production in July 1963, after less than a year in production.

The Saenara Motor Company encountered many problems, but nevertheless achieved great significance in that it introduced the modernized production system. The company spent $2 million on importing finished vehicles and the automotive parts for semi knockdown units, not on the introduction of the facilities for domestic manufacturing, which wasted foreign currency and contributed to the deterioration of the Korean automotive parts industry.

The achievements of the Saenara Motor Company became a precious experience in Korea's modernized vehicle assembly and production. Then technicians made machining process tables, processing machine selection tables, specifications for automotive tools and machine layout drawings. Such experience greatly contributed to constructing automotive plants later. Not only that, nurtured technicians and engineers were also important achievements. Workers at the Saenara Motor Company, who received training from Nissan as a part of technology alliance partnership, were so passionate about the training that they would acquire vital automotive drawings or technology-related data required in Korea. The workers were allowed to take pictures of the plants located at Nissan headquarters or parts plants in the local regions. When too much documentation and data migrated to Korea, an executive meeting of Nissan decided to prohibit the technology-related data from flowing to Korean workers. At the time, 28 technicians and engineers were receiving technology training as the Saenara Motor Company was in a crisis. In spite of that, they were not shaken by the situation and returned to Korea after completing the training and worked as important technicians and engineers for the Korean automotive industry.

2.2.2. Formation of Competition Among Three Automotive Enterprises

As the suspension of vehicle production by Saenara Motor Company caused trouble in implementing the 'Automotive Industry 5-Year Plan,' the Ministry of Commerce in Korea announced the 'Automotive Industry Integration Measure' in December 1963. This measure planned to increase the domestic manufacturing of automotive parts by integrating and unifying the Saenara Motor Company, Sibal Automotive Enterprise, eight provisional assembly factories and Asia Motor, mainly into the Korea Machinery Enterprises Inc. However, this measure was scrapped in October 1964 due to the problems with the revocation of the already authorized and integrating existing assembly factories.

Once the measure was scrapped, the Korean government prepared the 'Master Plan on Automotive Industry Promotion (Integration Measure)' in October 1964. In January 1965, the government established the 'Localization 5–Year Plan,' which aimed to realize full domestic production of automotive parts by 1969. The measure was to integrate all of the existing automotive parts producers (the 75 member enterprises of the Korea Auto Industries Coop Association) into the vehicle manufacturing plants that were in operation at that time.

In accordance with the integration measure, Shinjin Automotive Corporation was designated as the parent company. The Shinjin Automotive Corporation once tried to produce standardized microbuses and succeeded in manufacturing the Shinsungho car, the second Korean-made vehicle. The company was authorized to construct a compact car manufacturing plant in May 1964, thanks to its technological base. However, the localization of automotive parts achieved by Shinjin did not meet expectations, despite the expanded demand for automotive parts between 1967 and 1968 caused by the increased demand for automobiles. Although the integration measure's intended purpose was improving domestic production of automotive parts, Shinjin Automotive Corporation, which had been designated as a parent company, focused only on importing knockdown parts by leveraging its monopoly. In spite of the increased vehicle production by Shinjin Automotive Corporation since 1966, automotive parts localization saw little growth.

To tackle the negative effect of such a monopoly, the Korean government approved Hyundai Motor' plan to establish an automobile manufacturing plant on the condition that the manufacturing plant met the criteria of the authorization. As a result, the Korean automotive industry was restructured into the three automotive enterprises: Hyundai Motor, Shinjin Automotive Corporation and Asia Motor. Asia Motor established a contract with SERI in France to bring in capital goods worth $ 12.5 million and introduce new technology. The enterprise secured the site of about 100km^2 and began the construction of automobile plants that could produce 8,000 units per year. Hyundai Motor established a technological alliance and assembly agreement with Ford in 1968, and produced the 'Cortina' in November 1968.

The domestic passenger vehicle market which had been led by the big three automakers Hyundai, Shinjin and Asia, was temporarily converted into the market led by the big four automakers as Kia entered into the 4-wheel drive vehicle industry. The market returned to the three-way structure as Kia Motor took over Asia Motor. As a result, Korea's vehicle industry represented by Hyundai, Kia and Daewoo (formerly the Shinjin Automotive Corporation) was formed in the early 1970s.

As the localization of automotive parts made slow progress, the Korean President directed a plan be established for the full domestic manufacturing of automotive parts, which led the Korean government to fully reconsider the existing localization and integration plans. The 'Basic Automotive Industry Promotion Plan (3-Year Localization Plan)' was created in December 1969. This plan set up a mass production system through the standardization of vehicle models to avoid the small quantity batch production which had been pointed out as the biggest hurdle hampering the full domestic manufacturing of automotive parts. By doing so, the government could expect the rapid rise in the rate of automotive parts localization. However, despite the Korean government's strong will and aggressive policies, there were few apparent outcomes in the integration and localization until the early 1970s.

Nevertheless, the Korean automotive industry gained assembly line experience with the mass production of automobiles and acquired automobile-related technologies and a nurtured workforce through the introduction of technologies from foreign countries. Furthermore, the competition structure among the big three enterprises enabled productive competition, thus the Korean automotive market developed in a sustainable manner.

2.3. Development of a Fully Korean-made Vehicle

On January 12, 1973, the Korean President released the 'Heavy Chemical Industrial Policy,' proclaiming the plan to produce a half million vehicles by the early 1980s. After that, the Korean government announced the 'Automotive Industry Promotion Plan' on January 18th. In June, it prepared the 'Long-term Automotive Industry Promotion Plan' to foster the Korean automotive industry in a more systematic way, and later, the Korean Prime Minister directed to revise the plan. On July 20th the Korean government ordered the four automotive enterprises to submit their business plans based on that plan. On September 6th, the President directed to develop the Korean automotive industry, stating his strong will for the promotion of the automotive industry. Through these directives and processes, the Korean government completed the draft of the 'Long-term Automotive Industry Promotion Plan' on January 16, 1974 and the plan was finalized on May 7th of the same year. The 'Long-term Automotive Industry Promotion Plan' aimed to develop a fully Korean-made model so that Korea could dramatically improve the domestic production of automotive parts and develop the Korean automotive industry, which had remained at the stage of KD assembly, into an export industry faster.

The Korean automotive industry also aggressively pushed ahead with plans for the mass production of a fully Korean-developed vehicle. Hyundai Motor produced the first Korean-developed vehicle, the 'Pony' in 1975, and completed the construction of a comprehensive

automobile plant that could produce 50,000 units per year. As a result, the Korean automotive industry built the first batch production plant equipped with independently developed technology. About 1,8000 units, of the Korea-developed model 'Pony', were exported within less than 3 years of its release. This became a turning point for the Korean automotive industry to grow into an export industry and away from a knockdown assembly-based industry. Moreover, the continuing double-digit growth of the Korean economy during that time resulted in a sharp increase in the domestic demand for automobiles, which consequently accelerated the success of Pony.

Within 2 years of completing construction of the Yangsan Automobile Plant, Hyundai Motor expanded the automobile plants in 1977 and 1979, aiming to build a system to produce 100,000 units per year. The company exported only five units of the Pony to Ecuador the first time in 1976, but then exported 1,019 units to four countries in South America, the Middle East and Africa and selling a total of 7,427 units to 30 countries in 1977. In 1978, as it exported 18,317 units to 42 countries around the world, including Europe, the company achieved the goals of the mass production plan it had established.

2.4. Realization of Export-oriented Korean Automotive Industry

2.4.1. Establishment of Development Bases for the Korean Automotive Industry through the Regulation Measures

In June, 1976, the Korean government, encouraged by the improved production and export performances that the Korean automotive industry achieved through the production of a Korea-developed automobile model, announced the production plan to produce 1 million units by 1981 and 2 million units by 1986. The announcement was to induce Korean automobile manufacturers to expand their production facilities. In January 1979, the government included the automotive industry in the '10 Strategic Industries Promotion Plan' in order to build up the mass production system through support from various sources. In October, the government released the measures for the production of mid and full size cars, which initially were to set up the bases for the diversification of exported cars in order to export large quantities of automobiles. The contents of the measure were to develop a fully Korean-made full-size car under 2,000cc by 1982 and raise the rate of automotive parts localization to 90%. In 1982, the government also prohibited the import of locally available automotive parts, while it suspended the production of existing mid and full-size cars introduced from foreign countries.

However, the political situation and the oil shocks in the late 1970s and the early 1980s in addition to the measures implemented by the government between 1979 and 1980 to curb the demand, sharply contracted the overheating domestic demand for automobiles. Because of the sharp contraction, the Korean automotive industry was confronted with extremely serious financial difficulties caused by the sluggish sales of automobiles, declined production capacity utilization rates, the accumulation of automobile inventories and the consequent financial constraints. Moreover, the Korean automotive enterprises witnessed their financial difficulties grow even worse due to the rising financial cost resulting from the expansion of production facilities in the late 1970s. The slowdown in the automotive industry led to the bankruptcy of automotive parts producers. The production of finished vehicles that had hovered over 200 thousand units in 1979, plunged to 120 thousand units in 1980 and failed to reach 130 thousand units in 1981, resulting in a long-term recession.

On October 20th the Korean government released an automotive industry regulation measure to prevent the insolvency of automobile manufacturer' and the bankruptcy of automotive parts producers. The reasons the government took this measure, was that too many automobile manufacturers were competing with one another in the small domestic market while their production capacity utilization rates were low and the international competitiveness of the Korean automotive industry could not help but be weak because its production volume failed to reach 300 thousand units. To tackle such problems, the government implemented the policy establishing a production system that individual enterprises specialize in the production of a particular type of automobile. Such a production system is similar to the integration measures implemented in the early 1960s. While discussing various measures, however, a regulation measure was finalized to allow Kia Motors to monopolize the production of 1.5-ton buses and trucks instead of excluding the company in the production of passenger vehicles.

Hyundai Motor, whose regulation measure had been confirmed earlier, created a capital joint venture with Mitsubishi with the conditions that the venture should not hamper the independence of the company's management and strengthen technological collaboration. Hyundai Motor constructed the plant that could produce 300 thousand units of front-wheel-drive vehicles per year instead of the production of the existing rear-wheel-drive automobile. Daewoo Motor, which had taken 50% of the shares of Saehan Motor Company owned by the Korea Development Bank, took over the management of Saehan Motor Company from GM, and changed the company name to Daewoo Motor. Having been excluded from the production of passenger vehicles in the automotive industry regulation measure, Kia Motor, which had ranked 2nd in the passenger vehicle market until the end of the 1970s,

pushed forward management innovation by introducing a professional management system in October 1981, separating its capital and management. Kia Motor established the capital joint venture with Toyokogyo, (the current Mazda), and pushed ahead with the plan to develop an automobile for export jointly with Mazda. Despite the exclusion of the company in the production of passenger vehicles, Kia Motors was preparing the production of passenger vehicle for the future.

In July 1986, based on the 'Industry Development Act,' the Korean government again designated the automobile manufacturing industry as the regulated sector until June 1989, but later, the government lifted the measure, which had been executed in 1982 to limit the production of individual vehicles. Although the 'Industry Promotion Act' had a principle that, under the industrial policy stance focusing on private sector-led market economy, providing support to specific industries should be converted to offering support based on the function of individual industries. The act allowed an industry that required restructuring and the improvement of its competitiveness, be designated as a regulated sector.

2.4.2. Korean Automotive Industry's Full-scale Penetration into North American Market

After a long preparation, Hyundai Motor' began its first historical export to the United States. In the first year of its penetration into the U.S. market, Hyundai Motor' exported three hundred thousand units, creating the foundation for the company's quantitative growth in export and production.

As the Olive Ace, the carrier that shipped the Pony Excel, Hyundai Motor' strategic vehicle model for export, arrived at the Port of Jacksonville in the U.S., the Korean automotive industry began its inroads into the U.S. market, the home of automobile. The company, which sold 10,432 units of the Pony Excel in March 1986, the first month of its penetration into the market, exported 12,282 units, 13,963 units and 14,131 units in April, May and June, respectively. As the number of exported units exceeded 20,000 in August, Hyundai Motor' sold 168,882 units in the first year of its penetration. Annual sales of the Pony Excel ranked 3rd behind only the Nissan Sentra and the Honda Civic Honda in the first year although the sales had begun in March. In 1987, Hyundai Motor' sold 263,610 units of its Pony Excel, a 56% increase compared to the previous year, accounting for 2.6% of the automobile demand in the U.S. and representing 7% and 11% in the imported vehicle and the compact car markets, respectively. Pony Excel became the bestselling vehicle in the U.S. compact car market.

From the moment Hyundai began to develop Pony, the first Korean-developed model, the U.S. was targeted as the company's export destination. Although the design of the vehicle received favorable notice due to Hyundai Motor' selecting an Italian Design Company to create an western-style design, the more pressing problem was whether the vehicle would meet the Federal Vehicle Safety and Emission Standard. In early 1978, Hyundai Motor established a technology adoption contract with Olson of the U.S., Sekei of Japan and Calspan of the U.S. for the vehicle emission, internal combustion engine and car body of the Pony, respectively. However, the self-test of the vehicle conducted in April 1979, confirmed some technical problems with the car, and even if Pony met the standards, the vehicle could not help but be out-of-date. Hyundai Motor had no choice but to postpone its penetration into the U.S. market until it developed the next model. Nonetheless, the effort of the company became a valuable lesson that eventually enabled the Pony Excel to meet the federal standards, using only Hyundai's own technology, thus helping with the company' inroads into the U.S. market.

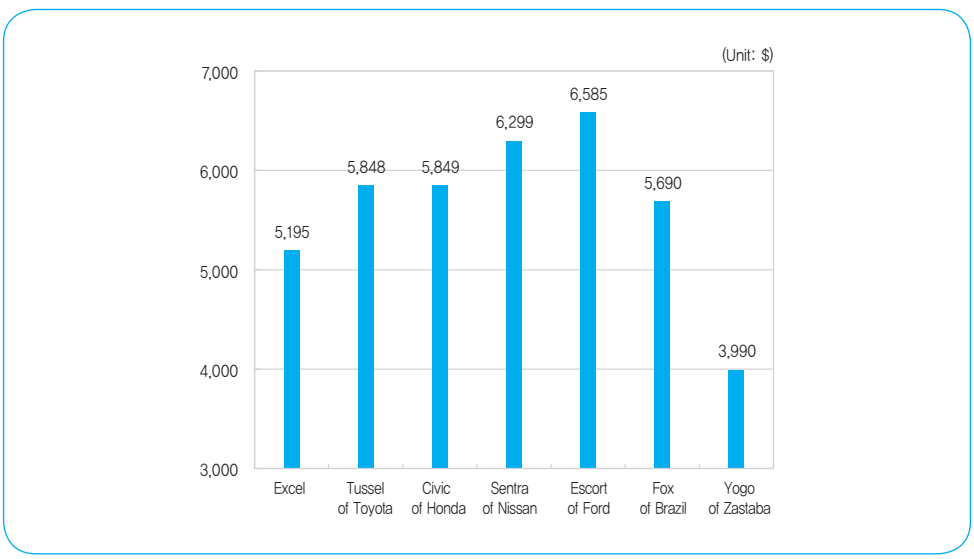
For this reason, Hyundai Motor targeted the Canadian market in which it was easier to meet vehicle standards than in the U.S. Through extensive advertisement and the establishment of a local sales network, the company sold 25,123 units of the Pony in the first year of its export. Hyundai Motor then exported the full-size car Stellar, selling 79,092 units, becoming 1st in sales of imported vehicles in the Canadian market, beating out Japanese automobile manufacturers like Honda, Toyota and Nissan.

Hyundai Motor started the development of next model that would replace the Pony (the X Car Project). The development of a new vehicle which targeted the U.S. market required much more time and cost than targeting only the domestic market. Not only that, the development of this new model fully reflected the following product concepts in the design of vehicle for the purpose of targeting the U.S. market: full dynamic styling which used front-wheel-drive (FF car), reduced weight, improved fuel efficiency, convenience and minimized noise and vibration. Along with the development of the Pony Excel, Hyundai Motor decided to expand the production line for the new model to produce 300 thousand units per year. In that the company sold only 50,000 units of the vehicle in the domestic market in 1981 and its sales reached a mere 130,000 units in the market even in 1985, the company's plan seemed reckless.

The success of the Pony Excel was somewhat attributable to external conditions such as the booming purchases of small cars in the U.S. market and the voluntary restraint agreement that limited the export of Japanese cars to the U.S. Even in the U.S. automobile market where full-size cars accounted for a high share, U.S. consumers began to prefer

fuel-efficient small cars due to the Second Oil Shock in 1979. However, the big three automotive enterprises, General Motors, Ford and Chrysler, failed to quickly respond this market change. As a result, Japanese small cars were sharply taking a bite out of the U.S. automobile market. However, the U.S., having a sense of crisis, limited the number of Japanese vehicles imported to the U.S., to 2.3 million units beginning in 1985, in accordance with the Voluntary Export Regulation. The Japanese automotive enterprises, whose volume of export had been limited, were moving to increase the sales of medium and full size cars with high value added. The Korean automotive industry took advantage of this opportunity. As the Korean automobiles had basic quality despite its low cost, they could fill the gap from the limited export of Japanese vehicles. As Hyundai entered the U.S market, Business Week reported that the 1986 Pony Excel is of higher quality than Nissan Sentra, Honda Civic, Suzuki Sprinter, Mitsubishi Colt and the Zastaba Yogo. In 1987, the Consumer Report said that the price of Pony Excel is $5,195 (basic unit price), which is lower than the same class vehicles, for example, the Toyota Russel ($5,845) and Honda Civic ($5,849), by 12.6%, and much lower than Nissan Sentra by 21.3% ($6,299).

Figure 2-2 | Price Competitiveness of the Pony Excel in the Early Stage of Its Penetration into the U.S. Market



Source: Hyundai Motor Company, "History of Hyundai Motor Group", 1992; Feb.

As the yen exchange rate depreciated in 1989, the Korean automotive industry, which had been in competition with Japanese automobile manufacturers, was hit hard. As the export of Korean vehicles had been more dependent on price competitiveness, the industry was sensitive to the fluctuation in the exchange rate of competitor countries. To make matters worse, simultaneously, U.S. consumers began to perceive the quality problems of Korean vehicles exported to the U.S. market between 1986 and 1988, which led to the sharp decrease in the export of Korean vehicles to the U.S., which fell into a long-term sharp slowdown until 1992.

2.5. Limitations Resulting from Korean Automotive Industry's Establishment of Mass Production System and its Development

As Korea's per capita income surpassed $2,000 in 1984, the automobile increased in popularity throughout the late 1980s, when, domestic demand complemented sluggish export, leading the growth of the Korean automotive industry. In particular, domestic sales of vehicles skyrocketed by about 40% around the 1988 Seoul Olympics. Due to the rise in domestic demand in addition to export increases, the number of domestically produced vehicles surpassed 1 million units for the first time in 1988. Within only 8 years since the production of 100 thousand units in 1980, Korea established a 1 million vehicle production system.

In the late 1980s, the Korean automotive industry made efforts to build up a mass production system and modernize automobile production methods. The industry expanded the outsourcing of automotive parts, introduced timely supply and procurement methods, and set up a flexible manufacturing system which featured an integrated production system with mixed model production.

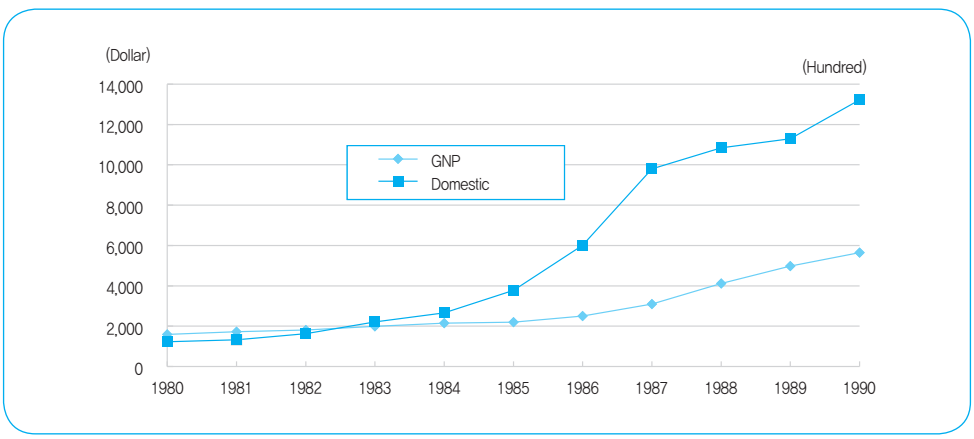
As labor disputes erupted in the late 1980s, in line with the democratization in the entire Korean society, automotive enterprises became the workplace where the labor-management conflict was more intense than elsewhere. Before that period, the Korean automotive enterprises could focus just on production and sales as the government led labor-management relations in the automotive industry. However, as the government lost control, the enterprises had no choice but to create sound labor-management relationships on their own. To promote the widespread use of the automobile, the Korean government came up with measures to increase demand for vehicles. It regulated automobile-related tax credits such as the special consumption tax reduction, established the automobile distribution system and strengthened consumer protection policies.

As the government fully withdrew the designation of the automotive industry as a sector for regulation, the full-scale growth of the Korean automotive industry began as it expanded the vehicle types and models and new enterprises entered the market. The existing companies like Asia Motors and Ssangyong Motors expanded their vehicle types and models and began producing the civil jeep model in 1990 and light truck in 2002. Subsidiaries of the existing automotive enterprises such as Daewoo Shipbuilding and Hyundai Precision entered the market and new companies, not related to the previous automotive enterprises, Samsung Heavy Industries and Halla Heavy Industries, also entered the market.

2.5.1. Emergence of Motorization and Consequent Problems

The widespread use of automobiles in Korea generally began from the time the country's per capita income reached $2,000. Per capita income of Korea, which had been merely $1,587 in 1980, surpassed $2,000 for the first time in 1984. Four years later, Korea recorded per capita income of $4,112, doubling that of 1984. It was then that domestic demand for the automobile grew more rapidly than per capita GDP.

Figure 2-3 | Trend of Korea's Per Capita Income and Demand for Automobiles



Source: Korean Automobile Manufacturers Association.

As Kia Motors entered the car market in 1988, domestic automobile sales increased. After regulation measures for the automotive industry were lifted, the existing competition structure between Hyundai Motor and Daewoo Motor moved toward competition among the big three enterprises. This intense competition fueled the dramatic growth of vehicle sales. In the compact car market, Excel of Hyundai Motor, the Daewoo Lemans and the

Kia Pride competed with one another. Even in the mid and full size car market, where the Hyundai Sonata and the Daewoo Royale were already set, the Kia Concord entered the market. This large variety of choices stimulated the desire of consumers to purchase automobiles.

Stabilized oil prices and the decline in car prices also contributed to the increased popularity of the automobile. Gasoline prices, which had been 740 won in 1982, decreased to 477 won in 1990. Not only that, the price of a Pony, which had reached to almost the price of a small apartment in the early 1980s, fell to less than a tenth of the price of an apartment. The special consumption tax, cut for vehicles by the government also attributed to decreasing the automobile' price, with the government cutting the consumption tax in a gradual manner. The tax was decreased for vehicles under 1,500 cc from 15% to 10% in 1987 and for vehicles between 1,500cc and 2,000cc from 20% to 15%. As demand for automobiles grew drastically, the number of registered vehicles increased from 530,000 to 2.66 million in 1989, and the level of vehicle ownership (vehicles per 1000 population) rose from 9.9 to 55.9 during the same period.

With the increasing vehicle ownership, Korea began to undergo traffic problems and air pollution. In 1988, extended roads within Korea were a total of 55,788km, which was only an 18% increase from 46,951km in 1980. However, the level of vehicle ownership rose 5 times. In 1988, a study revealed that vehicles emitted 82.5% of the NOx and 69% of the hydrocarbons in the atmosphere of Seoul.

Table 2-6 | Air Pollution Caused by Vehicle (Seoul Metropolitan City: 1988)

(Unit: ppm, %)

	Air Pollution	Contribution of Vehicle
Hydrocarbon	2.6	69.0
Carbon Monoxide	2.7	21.8
Nitrogen Oxide	0.029	82.5

Source: Ministry of Commerce, [Current Status of Vehicle Emission Reduction and Future Measure], 1989, May.

2.5.2. Occurrence of Large Scale Labor Disputes

Labor disputes, which had been strongly controlled by the Korean government, grew dramatically from the summer of 1987 due to the effect of the political democratization trends like the June 29th Declaration. The automotive industry had a great impact on the national economy, therefore the government was placing much attention on the industry. Labor groups were also paying a great deal of attention to the sector due to the large size of its workplace. As a result, labor disputes in the Korean automotive industry arose before the eruption of nationwide labor-management conflicts. The first labor dispute in the automotive industry occurred at the Daewoo Motor Company due to the issue of employment by deceptive means for the purpose of a labor movement. The labor-management conflict in the Ulsan Hyundai Motor took place because of disputes not just between labor and management, but also between internal labor groups over the issue of labor union establishment. The Daewoo Motor Company, which already had undergone a 19–day strike in April 1987, was embroiled in a labor dispute again in the early October. During the same period, Asia Motor also had a labor dispute. This all indicates that, with the exception of Kia Motor, most of the Korean automobile manufacturers went through labor-management conflicts.

The troubles in the production of automobiles were affected more by labor disputes in the automotive parts and materials producers than by the disputes within the automobile manufacturers. Related companies, which had undergone labor disputes include Tongil Corporation in Changwon City, which had gone through a long-term strike, as well as Hyundai Precision, Daerim Motor Company, Coryo Chemicals and Daewoo Heavy Industries. Such labor disputes caused the vicious circle in which the labor-management conflicts in the automobile manufacturers led to the suspension of the related companies' operations while the labor dispute in the related enterprises resulted in the interruption of the automobile manufactures' operation. Even Kia Motors, which had no labor dispute in 1987, witnessed the short-term strike for 18 hours in October 1988. Although the labor-management conflicts significantly decreased overall in the mid 1990s, labor strikes in automobile industries, remained dramatically higher compared to other industries. The labor-management relationships deteriorated from those years and the Asian financial crisis made such a deterioration worse. Rigid labor-management relations have recently been pointed out as the biggest hurdle for the development of the Korean automotive industry.

Table 2-7 | Occurrence of Labor Dispute

(Unit: Number of Cases)

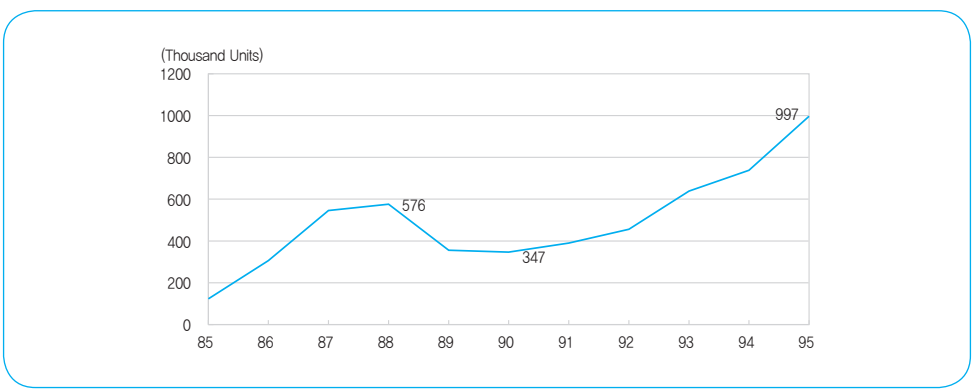
	Number of Disputes				Average Dispute Days		
	All Industries	Automotive Industry			All Industries	Automotive Industry	
		Automobile Manufacturers	Automotive Parts Producers	Total		Automobile Manufacturers	Automotive Parts Producers
1987	3,749	4	131	135	3.5	19.0	8.0
1988	1,873	5	36	41	10.0	34.0	25.0
1989	1,616	3	113	116	19.2	21.0	22.0
1990	322	3	66	69	18.2	11.7	19.0
1991	234	5	65	70	17.8	23.4	20.6
1992	235	1	47	48	20.1	26.0	24.0
1993	144	2	18	20	19.9	33.0	18.0
1994	121	5	14	19	12.3	17.0	-
1995	88	5	5	10	4.5	10.0	18.0

Source: Ministry of Labor, Korean Automobile Manufacturers Association.

2.5.3. Realization of 1 Million Vehicles Export

1995 was the year Korea recorded the export of 1 million vehicles for the first time, as exports exceeded 1.08 million units including knockdown automobiles. This indicated that Korea became only the 8th country, which achieved the export of 1 million vehicles in the twenty-five years since Hyundai Motor exported six units of 'Pony' to Ecuador in 1979. Canada, Belgium and Spain, which realized the export of 1 million vehicles, exported most of their automobiles within their geographical regions and focused on OEM support. The significance of the Korea's achievement is distinguished from that of those countries.

Figure 2-4 | Trend of Korean Automotive Industry's Export



Source: Korean Automobile Manufacturers Association.

2.5.4. Opening of Korean Automobile Market and Increase in the Sales of Imported Vehicles

Korea liberalized the import of all types and models of vehicles with the exception of small cars under 2,000cc in 1987 and one year later, it permitted even the import of compact cars. The Korean government reduced the duty on imported vehicles from 30% in 1988, to 20% in 1990, to 17% in 1991, to 15% in 1993, and finally to 10% in 1994. The government additionally reduced the duty on imported vehicles from 10% to 8% through the Korea-U.S. Automobile Negotiation in 1994. For the opening of the Korean automotive market, the Korean government eliminated the 15% double tax imposed on imported cars with high prices, liberalized the advertisement of imported cars, opened the Korean automobile distribution market and gradually improved approval procedures for vehicle types. In 1995, Korea and the U.S. mutually agreed on the following: the relief of the differentiated tax imposed on vehicles based on their emissions; the elimination of the fixed advertisement system; practical abolishment of the vehicle type approval system; and the full liberalization of the establishment of financial corporations for foreign consumers.

Thanks to such strengthened measures for the opening of the domestic market, the sales of imported car in Korea soared since 1994. The number of imported vehicles sold in Korea was 4,165 units in 1994, which rose 99% compared to the previous year, increasing to 7,811 units in 1995, 87.5% more than in the previous year.

2.5.5. Expansion of Korea's Automotive Industry's Penetration into Overseas Market

The Korean automotive industry began its penetration into overseas markets by setting up foreign sales corporations. The initial foreign sales corporations were established mainly in advanced countries. This establishment reflected the fact that the major export destinations initially were developed countries, and was closely related to the creation of after-service networks for the improvement of Korea's low quality product image. Hyundai Motor, which was aggressively pushing forward overseas sales, established Hyundai Motor Holland in the Netherlands in 1978, which was a first for any Korean automobile manufacturer. Later, the company built foreign sales corporations in Canada, the U.S. and Germany in 1983, 1985 and 1990, respectively. Kia created their foreign sales corporations, Kia Japan Co. and Kia Motor America, in 1992. Daewoo Motor Company lagged behind the other Korean automobile manufacturers in establishing foreign sales corporations as the company had been limited in exporting its vehicles to Western Europe and North America due to its joint venture agreement with GM, which prohibited the sales of the company's vehicles

in some markets. As the joint venture with GM ended in 1994, Daewoo Motor Company aggressively established an overseas sales network mainly in the European market.

As the development of fully Korean-made models, R&D and overseas sales became important elements for the automobile manufacturers, the Korean enterprises started to increase their research activities in foreign countries. Hyundai Motor constructed the Hyundai America Technical Center in California, in 1985, which conducted research on emissions, fuel-efficiency, safety and engineering. The enterprise built the Hyundai Design Center in Orange County, California, in 1990. It was to develop vehicle design. In 1994, the company established the Europe Technology Research Center in Frankfurt, Germany, to develop the technology and vehicles to fit the European market. Hyundai Motor also built the research institute in Japan to develop vehicles and designs to fit the Japanese market. As a result, the company created a global R&D network that connected the U.S., Europe and Japan. In the U.S., Kia built the Kia Detroit Research Institute and the Kia Design Studio in 1989 and 1991, respectively, and later, constructed the Kia Japan Research Center and Kia Europe Research Center in 1994 and 1995, respectively. These efforts realized the global R&D network for Kia. Daewoo Motor Company took over IDA, a globally prominent British corporation specializing in vehicle design and engineering and operated the company as the Daewoo Worthing Technical Center beginning in 1994. In 1992, Daewoo Motor built and operated the German Technical Center.

Table 2-8 | Foreign Research Institutes of the Korean Automobile Manufactures

Company	Institute Name	Country	Year of Establishment	Contents
Hyundai Motor	Hyundai America Technical Center	U.S.	1985	Research of Vehicle Emissions, Safety and Engineering
	Hyundai Design Center	U.S.	1990	Design Research
	Europe Technology Research Institute	Germany	1994	Development of Technology and Vehicles Fitting European Market
	Japan Technology Research Institute	Japan	1994	Development of Vehicles and Design Fitting Japanese Market

Company	Institute Name	Country	Year of Establishment	Contents
Kia Motors	Kia Detroit Research Institute	U.S.	1989	Development of New Technology and Automotive Parts, Local Vehicle Testing Design Research and Information Collection
	Kia Design Studio	U.S.	1991	Development of Next-generation Automobile, New Materials and Crucial Automotive Parts Such as Engine, Response to the Vehicle Certification of Europe and After Service, Development of Automotive Parts, Research of Cutting Edge Technology
	Kia Japanese Research Institute	Japan	1994	
	Kia European Research Institute	Europe	1995	
Daewoo Motor Company	Daewoo Worthing Technical Center	U.K.	1991	Product Design, Styling, Chassis, Manufacturing of Test Vehicle Development of Next-generation Cars, Cutting Edge Technology, Major Automotive Parts Such as Engine and Transmission
	German Technical Center	Germany	1992	

Source: Korea Auto Industries Coop. Association (2008), 10 Year-History of the Korean Automobile Association.

From the 1990s, Korean automobile manufacturers had already strengthened their overseas production systems in response to the expansion of regionalism and the intensifying competition in the global market. The enterprises constructed local automobile assembly plants in Asia, Eastern Europe and South America as bases for KD assembly and production. The first foreign production plant was Hyundai Bromont built by Hyundai in Quebec, Canada in 1989. Since the 1990s, Korean automotive enterprises expanded their penetration into Southeast Asia and Africa by strengthening the strategy to target developing countries. Kia Motors began KD assembly and production in Taiwan and expanded its overseas assembly into the Philippines, Venezuela, Vietnam and Iran.

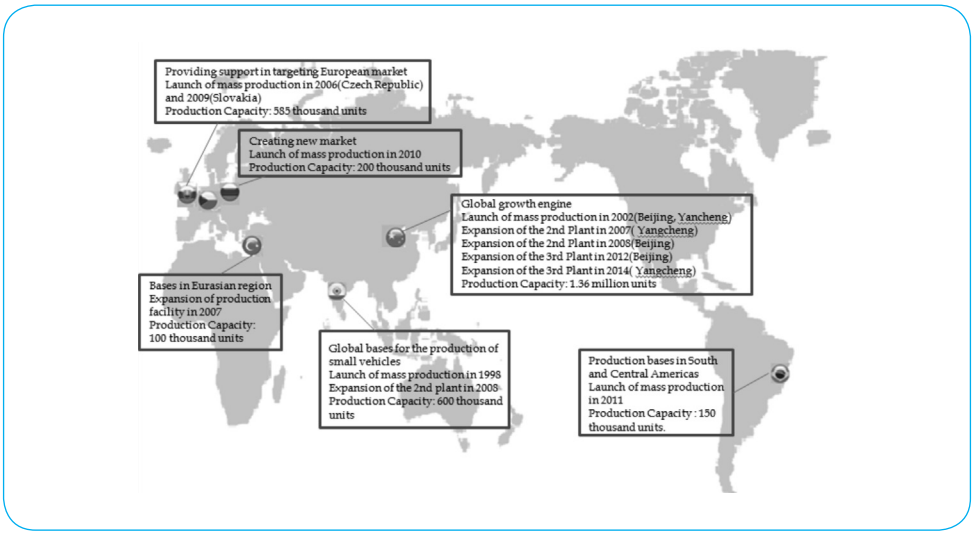
Daewoo Motor Company, which had been reluctant to target overseas markets due to the joint venture with GM, was engaged in overseas production more actively than other manufacturers. In 1994, the Daewoo Motor Company took over the 51% of ACSC, a national company in Romania and created Rodae Automobile S.A. In 1995, Daewoo Motor Company took over Abiasa of the Czech Republic and FSO & FSL of Poland by

taking 50.2% and 61% of their shares, respectively. At that time, Daewoo operated eleven joint automobile production plants in ten countries such as Uzbekistan, India, Iran, the Philippines, Vietnam, Indonesia, China, Poland, Romania and the Czech Republic.

During that time, the sharply growing number of the Korean automotive parts producers entered overseas markets in conjunction with the Korean automobile manufacturers'. Since Gonghwa Company established Chance Trading Co., Ltd, the local corporation in Japan in 1987 to improve the capacity to sell automotive parts in foreign markets, 25 enterprises set up their local corporations in 9 countries for the sales of automotive parts in foreign market (eleven in the U.S., three in Japan, three in HongKong and in China). The overseas production of the Korean automotive parts producers also increased significantly. Since 1994, foreign automobile parts production plants were constructed mainly in China and Southeast Asian countries. By the end of June, 1995, there were 103 cases of investment made by 98 Korean automotive parts producers in 16 countries including 57 enterprises in China, 16 in the Philippines, 6 in Malaysia and 6 in Indonesia.

After the Korean automotive industry went through industrial restructuring due to the Asian currency crisis, the industry entered foreign markets in earnest. The overseas production of the Korean automobile manufacturers, which had exceeded 100,000 units in 2002, dramatically rose to 1.88 million units in 2009. For the rapidly growing Chinese automobile market, the Korean automobile manufacturers established the local capacity to produce about 1 million units annually and focused on localizing their operation as automotive parts locally supplied to the Korean Automotive manufacturers increased, all while the local corporations of the Korean manufacturers developed a new model in China by changing the production model that was developed in Korea. The Korean automotive industry also established production plants in the U.S., which have been operating since 2005, and have the capacity to produce 600 thousand units on an annual basis. The industry is planning to expand its capacity in a gradual manner, supply automotive parts locally and build technology and design research centers. These plans raise the expectation that the industry would create a more sophisticated globalization strategy rather than implementing the existing strategy focusing merely on the establishment of production facilities. In addition, the Korean automotive industry is planning to utilize India as a global production base for small cars while using Turkey and Slovakia as bases to target European markets. The industry also would expand its overseas production mainly in the developing countries such as Russia and Brazil.

Figure 2-5 | Overseas Production Facilities of the Korean Automotive Industry



Source: Internal Data of Hyundai.

2.6. Large-scale Restructuring and Qualitative Growth of the Korean Automotive Industry

Although the Korean automotive industry achieved quantitative growth in the 1990s, thanks to the massively expanded production capacity of the existing automotive enterprises and new automotive companies' entry into the market, the industry experienced many problems such as overinvestment. When the Asian financial crisis erupted in East Asia, most of the Korean automotive companies fell into financial difficulties, forcing them to go through large-scale restructuring. However, the Korean automotive industry improved the fundamentals of its management practices and concentrated on enhancing product quality and relevant technologies through the restructuring, which became an opportunity to realize its qualitative growth.

2.6.1. Restructuring of the Korean Automotive Industry

As Kia Motors was confronted with financial difficulties, the Korean automotive industry entered a large-scale restructuring process. The Korean government took the control of the restructuring through the financial sector that would provide financing to the industry. Throughout the financial crisis, the automotive enterprises that had been combined into large-scale business groups, had to pursue ways to stand alone as they witnessed their group broken up or as they became independent from the groups.

Kia Motor Group, an automotive business group, which had seen the number of their subsidiaries increase from sixteen in 1996 to twenty-eight in 1997, was broken up in the same year due to its bankruptcy resulting from the financial crisis. In 2000, Hyundai Motor and other automotive enterprises including Kia Motors, which had been taken over by Hyundai Motor in 1999, was separated from the Hyundai Group, and became an independent automotive group. Ssangyong Motor Company, which had been taken over from Ssangyong Group by Daewoo Group, was separated from the group and purchased by SAIC Group, a Chinese automobile group, and later, was purchased by Mhindra of India. In the case of Daewoo Motor Company, GM purchased the Daewoo Passenger Vehicle Company while Tata Motor of India and Youngan Inc took over Daewoo Commercial Vehicle Company and Daewoo Bus, respectively. In 2000, Renault Group bought the Samsung Motor Company, while Samsung Commercial Vehicles was put into liquidation as the enterprise became insolvent and abandoned by the Samsung Group. Consequently, the Korean automotive industry was restructured into one large Korean automobile group where Hyundai Motor and Kia Motors are combined and the giant foreign automobile enterprises that bought the Korean companies.

The Korean automotive industry improved its internal competitiveness through restructuring after the Asian financial crisis. It strived to achieve sustainable growth by substituting domestic demand, which had been in a slump since the early 2000s, by expanding its export destinations. Then, it focused on increasing its global market share through local production. To access the rapidly growing Chinese market, the Korean automotive industry constructed local production facilities not just in China, to avoid the barriers to entry such as high tariff, but also in the U.S. and Western Europe, to respond to the demand in advanced countries. This indicated that the industry prepared the basis to raise the market share of Korean vehicles in those markets. The industry also made efforts to diversify the export markets which had been limited to advanced countries like the U.S. and Western Europe, into emerging countries such as India, Eastern Europe, Central and South Americas and the Middle-East which were expected to have growing demand in the future.

Due to the crisis in the global automotive industry stirred by the global financial meltdown from the second half of 2008, the Korean automotive industry was confronted with another crisis resulting from the reduced production caused by the sharp decline in demand and the financially troubled foreign automobile manufacturers. However, the urgent liquidity issues of the industry in the early stage of the crisis, were somewhat alleviated, thanks to the government's financial support, the governmental measures to boost domestic demand and the domestic automobile manufactures' aggressive marketing aimed at overseas

markets. In addition, the Korean automobile manufacturers and automotive parts producers were increasing their global market share, thanks to the weakened competitiveness of the automobile enterprises in the U.S. and Europe which stirred the crisis of the global automotive industry,

Table 2-9 | Change in Korean Automotive Industry's Development for the Individual Development Stages

	Between the late 1990s and the mid 2000s	From the mid 2000s to Present
Development Stage	- Restructuring resulting from the Asian financial crisis - Expansion of the Korean automotive industry's global market share	- Continuing qualitative growth - Securing leading position in the global market
Type of Development	- Contracted facility investment - Beginning of overseas investment in earnest - Development of new models and the improvement of production process	- Expanding R&D on eco-friendly vehicle - Increasing foreign investment

Source: KIET(2011), Sustainable development condition and assignment of global leading industry .

The Korean automobile manufacturers are currently producing more than 4 million units annually as the enterprises responded appropriately to the change in domestic demand and export after having strengthened their competitiveness through the immediate restructuring after the Asian financial crisis. As domestic demand grew rapidly until the early 2000s, the Korean automotive industry made efforts to increase the domestic market. Then, when the domestic market fell into a slump in 2002, the industry raised production by successfully targeting overseas markets. In 2010, Korean automobile manufacturers produced 4.2 million units in total, which was an all time high. It was also the second time production exceeded 4 million units since 2007. This is an increase of more than 1 million units within a decade since Korea produced 3.11 million vehicles and shows Korean production as 5th among countries in the global automotive industry, behind only China, Japan, the U.S. and Germany.

Table 2-10 | Change in the Global Production Share of the Korean Automotive Industry

(Unit: thousand, %)

	1975	1980	1985	1990	1995	2000	2005	2010
Global	32,998	38,514	44,812	48,346	50,077	58,942	66,310	77,015
Korea	37	123	378	1,322	2,526	3,115	3,699	4,271
Production Share	0.1	0.3	0.8	2.7	5.0	5.3	5.6	5.5

Source: KAMA.

2.6.2. Automotive Industry-related Policies in the Period of Korean Automotive Industry's Qualitative Growth (Technology and Quality)

The Korean automotive industry achieved remarkable qualitative growth since the 2000s, and through that achievement, is more actively penetrating overseas markets. What was improved most significantly in the short-term was vehicle quality. The 2004 JD Power Initial Quality Index Survey showed that vehicles made by Hyundai Motor, have quality comparable to that of Toyota automobiles, joining the ranks of the best quality vehicles in the world. Not only that, Hyundai Motor improved the technology level of its internal combustion engine and transmission, which are assessed to be world class. Even for eco-friendly vehicles like hybrids, electric and fuel cell vehicles, Hyundai Motor reached a significant technology level and is rapidly developing more relevant technologies although it has not yet reached a world-class level.

The government is implementing automotive industry-related policies focused on improving the quality and technology of vehicles. The Korean government enacted the 'Automotive Parts and Materials Industry Special Act (February 2001)' to nurture the parts and materials industry, which is a core sector for vehicle quality, and implemented the Product Liability Act (July 2002) to encourage enterprises to enhance vehicle quality.

In addition, the government selected future vehicles as one of the ten next-generation growth engine sectors, showing interest in the development of next generation vehicles and eco-friendly automobiles. The Korean government enacted the 'Act on Development and Promotion of Eco-friendly Vehicles (October 2004),' revised the acts related to the tax imposed on eco-friendly vehicles (December 2008), announced the 'Green Car Development Roadmap (December 2010),' and effectuated tax credits for electric vehicles (January 2012).

2.6.3. Korean Automobile Manufacturers' Effort for the Improvement of Automobile Quality

The efforts made by Hyundai Motor to improve vehicle quality, provides many implications for developing countries. The Korean automotive industry realized a large growth in a short period of time, expanding global market share by selling low priced vehicles with marginal quality. However, Korea's image as a low-priced vehicle producer revealed a clear limitation in developing its automotive industry.

Korean-made vehicles successfully entered the U.S. market in the mid 1980s thanks to their price competitiveness. However, problems with vehicle quality arose, leading to a slowdown in sales in the U.S. market starting in the mid 1990s. Hyundai Motor fell into a crisis due to the poor quality of its vehicle. For more than five years, the company's vehicles ranked lowest in the vehicle quality evaluation survey conducted in the U.S. market. It was even rumored that Hyundai Motor would be expelled from the market.

Table 2-11 | Strength and Weakness of Korean Automotive Industry's Quality Competitiveness

	Strength	Weakness
Internal Factor	- Support for quality improvement, delivery date achievement system, Designation of CQO and top quality certification - Enterprises made much efforts to improve the quality of vehicle	- Ratio of education and training, reflection of change in market demand and ratio of human resource for development - Weakened product quality caused by the deteriorated competitiveness of the Korean automotive parts producers
External Factor	- Awarded the prizes related to customer satisfaction and quality - ISO 14001 acquisition rate - Significantly improved the evaluation of Korean-made vehicles in the U.S. market whose demand for automotive market is largest in the world	- Repurchase rate, brand awareness, customer growth rate - Brand awareness of Korean vehicles is low compared to their production and sales

Source: Internal Data of Hyundai.

Product quality is one of the most important elements providing reliability of products to consumers, while also being a basic means for enterprises to improve their cost structure. When any defect occurs in products, the input of human resources and parts enterprises overlap, decreasing productivity, increasing claim cost and decreasing credibility with customers. As consumers are very conservative about durable goods, like vehicles, losing consumers' trust becomes a great threat to enterprises.

At the end of 1990s, Hyundai Motor Group (Hyundai and Kia) concluded its restructuring and began full-scale quality management. Hyundai Motor Group improved management continuously based on the principle that providing perfect automobiles to customers is the most basic responsibility of Hyundai Motor. In 2002, the quality management system of Hyundai Motor Group, initiated in 1999, was reorganized into the Hyundai-Kia Quality Management Department, which combined the quality management departments at Hyundai and Kia Motors and placed them under the chairman's direct control. This department is the outpost that checks on vehicle quality problems occurring around the world on a real-time basis, and provides education and training on quality to employees and the staffs of subcontractors. In 2003, Hyundai Motor Group established a new organization responsible for vehicle quality in North American and other foreign markets and integrated the quality management and maintenance departments. In March 2003, the company set up the Technical Hot Line Center, which can respond to any quality problem immediately.

Hyundai Motor Group pushed forward with quality management in all stages. It operated the Quality Pass System in which a process can only move to the next stage when the objective of product quality in the prior stage is achieved. That is to say, the group implemented quality-related operations not just in the R&D centers, which are responsible for technology development and the intensive management of automotive parts, but also in the plants that carry out intermediate assembly and final production.

The Quality Pass System implemented by Hyundai and Kia Motors was also applied to automotive parts suppliers. If a defect that occurs in the parts provided by subcontractors, leads to problems in finished vehicles, Hyundai Motor Group made efforts to improve the quality of products provided by the suppliers.

Hyundai Motor Group introduced the quality evaluation system referred to as "Five Stars System," to improve the quality of automotive parts. The system awards stars based on the evaluation of quality, technology and productivity. Only subcontractors earning a certain number of stars can supply their products to the Group. Suppliers earning more than four stars can participate in the development of new automotive parts while producers earning

three stars can take part in development, but in a limited way. However, subcontractors acquiring only two stars are excluded in development and enter the process of being excluded in the trade relationship while the suppliers acquiring only one star are excluded from both development and the trade relationship. The Five Star System is a tool to motivate subcontractors to develop technology and improve product quality and reflects the Group's will to realize quality management.

Another measure for the improvement of product quality is the Six Sigma Campaign launched in November 1999. Hyundai Motor Group implemented the campaign across all sectors within the enterprise by selecting the primary tasks for each individual sector.

As for the main tasks of the Group's individual sectors for the Six Sigma Campaign, the R&D sector pushed the enhancement in the quality of newly developed automobiles while material suppliers /subcontractors strived to improve the quality of automotive parts. The production sector sought to increase the efficiency of production systems and produce perfect vehicles without any defects. Indirect departments pushed the establishment of an advanced financial accounting system and a strategic management process. By establishing the quality management academy, Hyundai Motor Group provided all employees with various training programs such as improving quality perception, encouraging the participation in quality innovation, establishing the education system for quality management and nurturing experts on quality. The Group also provided training and guidance programs not just to the CEOs of subcontractors but also to experts to expand the Six Sigma Campaign.

To signal the Group's confidence on the quality of its vehicles globally and secure the sense of responsibility for product quality, Hyundai Motor Group implemented the groundbreaking 100,000 mile / 10 year warranty for repair and replacement, primarily in the North American market. Although the prevailing view was that such a measure would place significant burdens on the Group, it is assessed as a successful strategy because few problems occurred in the quality of vehicles.

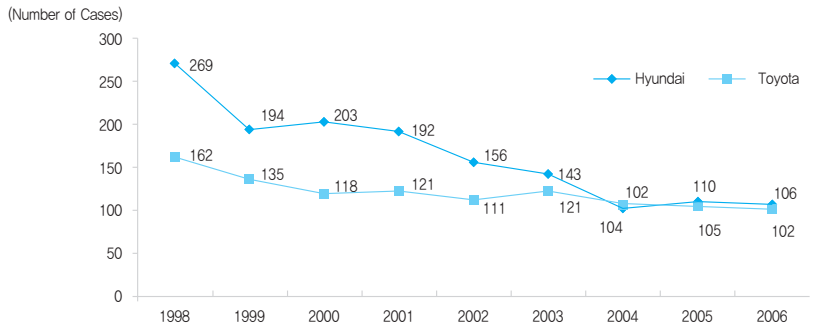
The second Pilot Plant constructed in the Namyang Research Center in 2005, conducted product and process engineering simultaneously for the development of new vehicles. Through the plant, the company was seeking to improve the quality of vehicles by strengthening the function of information systems to verify data related to the development and production of new vehicles such as testing the function of new vehicle, verifying the production method of new vehicle, checking the production facility and equipment and reinforcing workers practices through their pre-participation. In addition, the company's information technology was fundamentally transforming not just vehicle products but also

the production process. Robots are a good example. Utilizing a robot that examines all the welded parts of vehicle and a robot that automatically measures and calibrates the tightness of bolts, enables the identification of mistakes or inconsistencies made by workers to be immediately corrected so that the company can ensure a consistent quality of vehicles. Not only that, the improvement of vehicle quality was also attributable to the utilization of the information system that could automatically record and measure the causes of defects by recording the quality of individual processes.

Meanwhile, the Korean automotive parts industry was identified as one of the weaknesses in improving the quality competitiveness of the Korean automotive industry. This was due to the automotive parts industry's insufficient capability to develop technology independently, as well as lack of an expansion-minded global Korean automotive producer. Korean automotive parts producers have neither developed into large corporations, not specialized in parts, made little investment in technology development, failed to secure professional technicians, nor established a system for the joint technology development or collaboration with the automobile makers. For these reasons, Hyundai Motor Group shared their quality objectives with the automotive parts enterprises and supports them in establishing their own quality management systems. Only the automotive parts producers that acquired a certain level of performance were allowed to trade with the group. In addition, Hyundai Motor introduced the Supplier Quality System to secondary subcontractors.

Thanks to the effort to enhance vehicle quality, the image of Korean vehicles has improved remarkably. The small, medium and full size cars as well as small SUVs produced by Korean automobile manufacturers are assessed to have world-class competitiveness in terms of quality. J.D. Power, a customer satisfaction research company, indicated in both the Initial Quality Study (IQS) and the Vehicle Dependability Study (VDS) that Korean vehicles have higher results than the industrial average.

Figure 2-6 | Change in the Initial Quality Study of Hyundai and Toyota Automobiles



Hyundai pulls off a head-spinning U-turn

By David Kiley, USA TODAY

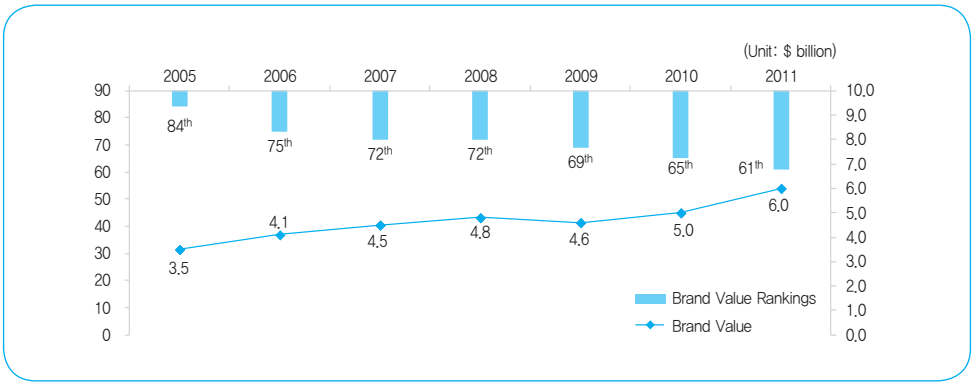
DETROIT- Five years ago, a joke making the rounds in the auto industry and among car buyers was: How do you double the value of a Hyundai? Fill the gas tank. That punch line no longer works. The South Korean automaker has turned its quality problems around and is working on burnishing its reputation. Helping is a string of improved rankings in influential quality surveys and reports. The J.D. Power and Associates Initial Quality Survey (IQS) out Wednesday showed Hyundai leaped up in the brand rankings. The automaker shocked the auto industry by scoring a vitrual dead-heat with quality leaders Honda and Toyota, tying Honda with 102 problems per 100 vehicles and just one point behind Toyota(4/28/2004)

Source: Detroit.

Comparing the situations in 1998 when Hyundai Motor began to implement enterprise-wide quality improvement measures, to the circumstance in 2006, the IQS of Hyundai vehicles improved from 266 in 1998 to 102 in 2006, an impressive 62%. It was two times higher than the average improvement rate of all vehicle models. Even the APEAL Index showed that the rank of Hyundai vehicles jumped to 22d among 28 models from 35th out of 37 models in 1998, which indicates that, the so-called “Hyundai Speed” is taking effect in the pace of vehicle quality improvement.

Hyundai Motor Group ranked 84th among the global top 100 brands released by Interbrand in 2005. But thanks to improvement in vehicle quality and its growing global market share, that ranking is rising every year. The ranking of Hyundai Motor Group rose from 72nd in 2008, to 69th in 2009, to 65th in 2010, and finally took the 61st place in 2011. Even the value of the Group grew from $3.5 billion in 2005 to $6 billion in 2011.

Figure 2-7 | Change in the Brand Value and the Ranking of Korean Automobile Manufacturers



Source: Interbrand.

Based on such a quality evaluation, the Korean automotive industry is establishing the basis for the following virtuous circle: quality improvement → rise in consumer confidence → brand value enhancement → price rise → profitability increase → expansion of the investment in technology → industrial competitiveness improvement.

2.6.4. Groundbreaking Improvements of Automobile-related Technologies and Functions

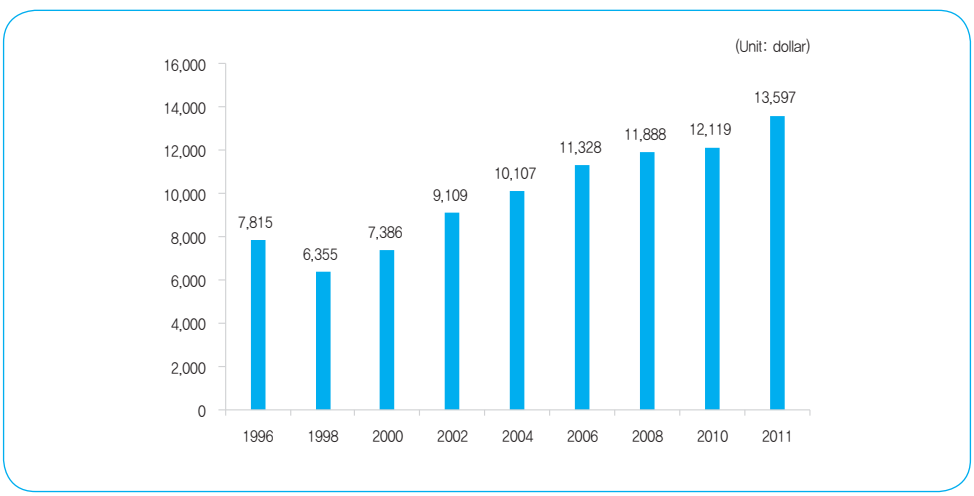
As the Korean automobile manufacturers saw their development capability greatly improve since the 2000s, the companies released Korean-developed vehicles like small and medium-size cars, SUVs, CDVs and full size sedans. In addition, since the mid 2000s, Hyundai Motor secured twelve types of independently developed engines including seven types of combustion engines and five types of diesel engines, already having reached world-class level with their gasoline engine. The company was even selling its independently developed engine technology and products to Mitsubishi and Chrysler. GM, which took over the Daweoo Motor Company in 2002, recognized the superiority of Korean automobile technology so much so that the enterprise is now using GM Korea as a main base for the company's global compact car development system in addition to merely utilizing its production facilities.

The Korean automotive industry also has been aggressively seeking to apply new IT technologies to automobiles. In February 2009, Equus and Genesis of Hyundai Motor were listed in the top 10 vehicles equipped with the best new high-tech electric technologies

including telemetries, navigation, digital entertainment and safety, among the 35 new technologies (selected by iSuppli, a market research corporation). Equus ranked 4th by applying twenty-six new technologies while Genesis took the 2d place by using twenty-five new technologies. Such rankings indicates that the Korean automotive industry is responding to the vehicle's IT utilization appropriately and preemptively.

As the Korean automotive industry improved its product quality and technology levels in the 2000s, the export of Korean vehicles had sharp qualitative and quantitative growth. Although the domestic automobile market underwent the slowdown since the Asian currency crisis, the export of Korean automobiles increased significantly thanks to the enhanced competitiveness of the industry. The number of exported vehicles, which had been 1.21 million units in 1996, increased to 1.68 million units in 2000, and even rose to 2.38 million units in 2004, while the quality of vehicles improved remarkably. The number was 38% increase compared to the previous year. Despite the slowdown in export growth due to growing overseas production of the Korean automakers and the global financial crisis, Korean automobile manufacturers exported 2.72 million units. The export price per unit was merely $7,815, in 1996 when the Korean won was dramatically appreciated, and fell to $6,599 in 1998 when the won was depreciated radically. However, in 2004, the export price per unit increased to over $10,000 for the first time. The price of exported vehicles grew gradually since then, reaching $13,596 in 2011.

Figure 2-8 | Change in the Export Price per One Unit of Korean Vehicle



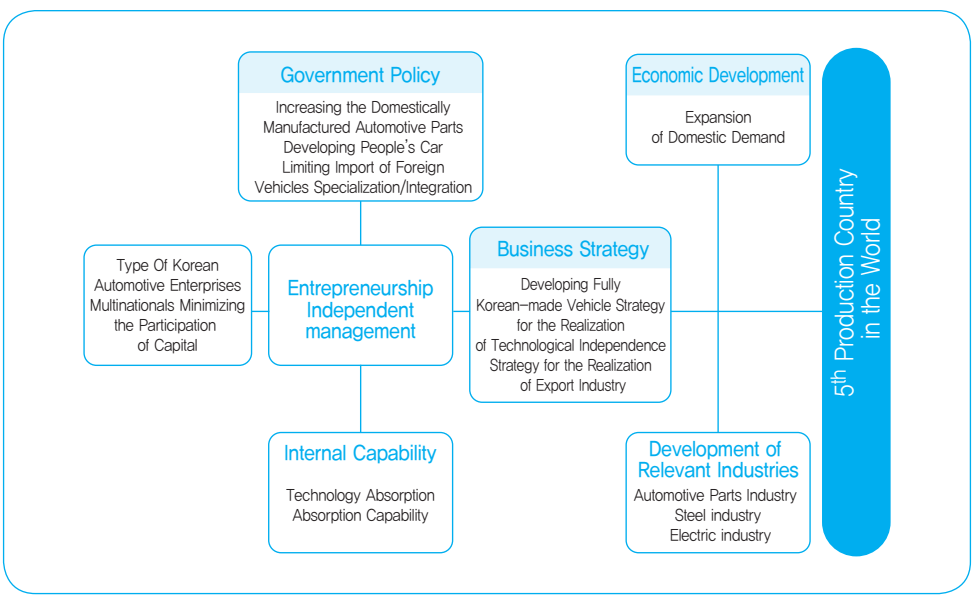
Source: Korean Automobile Manufacturer Association, Automobile Monthly Statistics, Individual Volumes.

3. Factors behind the Growth of the Korean Automotive Industry

The mass production of Korean-developed vehicles was a groundbreaking turning point for Korean automobile manufacturers, and was a man-made outcome rather than a natural development process. The natural development stages of assembly industries are generally as follows: knockdown assembly–domestic manufacturing of parts-development of a fully Korean-made model-realization of export industry. During this sequential process, the development of an independent model generally occurs when independently developed technology and market condition mature.

When the Korean automotive industry developed its own model, however, neither the technology nor the market conditions were mature enough. The bodies that led such a unique, man-made, development were a venturous entrepreneur, positive visions, the Korean government's momentum and passionate engineers.

Figure 2-9 | Development Mechanism of the Korean Automotive Industry



Source: Hyun Youngsu, "Speed Management of Hyundai Motor", Korea Lean Management Research Institute, 2013.

3.1. Innovative Entrepreneur

If it were not for Chung Juyoung, an innovative entrepreneur, it would have been impossible to establish the mass production system for the first Korean-developed model, 'Pony' in 1976. In 1973, the Korean automotive industry had no independent technological bases as it had focused on the simple knockdown assembly of foreign vehicles. In particular, the then number of vehicles produced in Korea was 12,000 units annually, of which Hyundai Motor produced only about 5,000 units. It had seemed so natural to simply continue knockdown assembly given the then technological perspective and market conditions. Under such circumstances, it was a gamble to realize the mass production of a Korean-developed vehicle.

Table 2-12 | Number of Assembled Vehicles in Korea in the Period of Establishment of the Mass Production System for a Korean-developed Vehicle

(Unit: Number of cars)

	1970	1971	1972
Shinjin	15,782	9,590	5,823
Hyundai	4,360	3,546	4,130
Asia	1,737	3,037	1,888
Kia	6,121	5,912	5,672
Shinjin Jeep	819	917	1,135
Total	28,819	23,002	18,648

Source: Korea Auto Industries Coop. Association (1983), 20 Year-History of the Korean Automobile Association.

Hyundai Motor had 1.7 billion won on hand, though the plan for the mass production of a Korean-developed vehicle required the investment of about 40 billion won. Among the domestic automobile manufacturers, it was GM Korea which first abandoned the plan and later, Kia Motors suspended investment on developing a fully Korean-made vehicle. This indicates that, if it were not for one innovative entrepreneur with an independent mind, the Korean automotive industry would become nothing but a base for subcontract automobile production. The Entrepreneurship traits like 'pioneering, creation and strong will' became the foundations for the present Hyundai Motor Group and eventually, the current Korean automotive industry.

Chung Juyoung, then chairman of Hyundai Motor, had a strong belief that the competitiveness of the developed countries such as the U.S. and Japan, would decline in

accordance with the product cycle of vehicles, leading the comparative advantage in the automotive industry to be shifted toward developing countries like Korea. For this reason, when Hyundai Motor outsourced the design of the Pony to ItalDesign, the automaker ordered the design company to create a western–styled automobile. As the Yangsan automobile plant construction aimed to build an economically sixed plant, Hyundai Motor was considering that the enterprise should realize both the construction of the Yangsan Plant and development of an export—oriented automobile manufacturing sector. The development of Pony Excel for penetration into the North American market and the construction of automobile plants were bold investments equivalent to the development of the first Korean automobile, Pony. Without such bold moves, Hyundai Motor would not have been a great success later.

The innovative activity of the company became a turning point and an example for other competitors to develop their own model and create export markets.

〈The Memoire of the Chairman, Chung Juyoung〉

"The automobile industry can only survive when it is equipped with a globally large scale mass production system. However, the mass production system should aim to export vehicles to overseas markets since mass production cannot be sustained only for the small domestic market. For export, it is a prerequisite to produce a Korean-developed vehicle."

"Multinationals would neither open the path for Korea to export vehicles, nor really help the development of the Korean automotive industry"

3.2. Automotive Industry Promotion Policy of the Korean Government

In the initial stages of the development, the President of Korea and the policy authority had a particular interest in the automotive industry. The development of a Korean vehicle and the promotion of an automotive parts industry, which led the Korean automotive industry to be able to compete in the global market, began with the 'Long-term Korean Automotive Industry Promotion Act' in 1973. 1973 was also the year that heavy chemical industrialization was declared in Korea. The Korean automotive industry received material and non-material support from the government. As the President of Korea had a strong will to promote the industry, a positive vision for the future of the Korean automotive industry was established.

From the initial stage of the industry to the late 1980s, the Korean government restricted the import of foreign vehicles and protected the vehicle assembly sector from foreign capital, which was the time the basis for mass production and export was established. Thanks to the government's effort, Korea became the only developing country that realized the independent growth of an automotive industry. Although the industry underwent restructuring due to the Asian currency crisis in the late 1990s, a competitive structure among the big three Korean automakers, which had been ongoing for a long-time, was the outcome of government policies that focused on 'economy of size' and 'effective competition' in a consistent manner.

The Korean government implemented the integration of the automotive assembly and parts enterprises, which is one of the strengths of the Korean automotive industry. Not only that, but the government controlled the collective labor-management relations until the mid 1980s, so that the Korean automotive enterprises could focus on production, sales and technology development.

3.2.1. Heavy Chemical Industrialization and the Promotion of the Korean Automotive Industry

Promotion of the Korean Automotive Industry is in the same context with the industrialization of Korea, and furthermore, the country's heavy chemical industrialization. The promotion of the Korean machinery industry, notably the Korean automotive industry, began in earnest, when the Korean government in 1973 declared heavy chemical industrialization. 92.8% of the financial support and the 93.6% of the corporate tax cuts provided to the Korean manufacturing industries in 1978 were concentrated on the heavy chemical industry. Even within the heavy chemical sectors, the machinery industry, including the Korean automotive industry, received 55.7% of the total financial support for the Korean manufacturing industry. This heavy chemical industry promotion policy, notably, the promotion of the machinery industry, was maintained until 1986 when the 'Individual Industries Promotion Act' was repealed and the 'Industry Development Act' was enacted.

The aggressive nurturing of the Korean machinery industry, in accordance with the heavy chemical industry-first policy, promoted the construction of the Yangsan automobile manufacturing plant, the development of a Korean vehicle and the realization of the export-oriented automotive industry. Realization of the export industry through the establishment of mass production of a Korean-developed vehicle is consistent with the then basic principle of the Korean heavy chemical industry promotion.

Heavy chemical industrialization had not only a direct effect on the development of the Korean automotive industry, but also an indirect effect on the growth of other relevant industries. In particular, the Korean steel industry, which saw drastic development mainly led by Posco, supplied 76% of the steel materials that account for 76% of the total vehicle materials.

3.2.2. Domestic Automobile Market Protection Policies

The policies protecting domestic markets from foreign countries, were largely import restriction policies such as tariff and non-tariff barriers and the restriction on foreign direct investment. The Korean government's restriction on the import of foreign automobiles stems from the 'Automotive Industry Protection Act' enacted together with the 'Automotive Industry 5-Year Plan' in 1962. As the first Korean-developed vehicle began production in the mid 1970s, the import of finished foreign vehicles was fully prohibited.

After that, the government implemented import liberalization measures in a gradual manner by explaining the policies in advance. The 'Foreign Vehicle Import Liberalization Measure' announced by the government in November 1983, was to relieve the restriction on the import of foreign vehicles starting in 1986, and eliminate all the restrictions on the import by 1989. However, the government revised the original measure, permitting the import of foreign vehicles above 2,000cc in 1987 and the import of vehicles under 2,000cc in 1989.

Even after the liberalization of foreign vehicle import, the Korean automotive industry was protected by the high tariffs for a certain period of time. When the liberalization of foreign vehicle imports was partially implemented in 1987, the duty for imported vehicles was 50%, and even when the import of vehicles under 2,000cc was liberalized in 1988, the duty only dropped to 30%. The duty imposed on imported vehicles was more than 20% even until 1990 when the Korean automotive industry established the mass production system that could manufacture 1 million units per year. Since then, the duty rate declined gradually from 17% in 1991, to 13% in 1993, to 10% in 1994 and finally to 8% in 1995. The government restricted import for Japanese vehicles with strong competitiveness, until the late 1990s, by designating it as one of the import diversification items.

Through prior notification, the Korean government bought some time for the Korean automotive industry to respond to the opening of the Korean automobile market, and induced the enterprises to be more competitive. Even when lifting the designation of Japanese vehicles as import diversification items, the government carried out the opening gradually by giving prior notice to the Korean automotive industry.

In the early stage of the Korean automotive industry's development, the Korean government strived to achieve independent development of the Korean automotive industry by restricting direct foreign investment in the finished vehicle sector. Although Shinjin Automotive Corporation and GM established GMK in 1972, in which each company owned 50%, such an equal ratio stemmed from strong urging by the Korean government. After that, foreigners participated in the ownership of Hyundai and Kia Motors. However, foreign ownership remained at such a negligible level that it did not affect the management.

The policies that protected the domestic automotive market through the restriction on the import of foreign vehicles and on foreign direct investment by foreign enterprises played a significant role in securing a stable demand for the Korean enterprises. Through the policies, however, the Korean government perceived that unconditional protection of the domestic automobile market hampers competition, thus becoming a hurdle for the development of the Korean automotive industry in a long-term. For this reason, the government emphasized that the measures were not to unconditionally restrict the competition in the market but to give prior notice to the Korean enterprises about the market opening, that is to say, notify that there are potential competitors coming from foreign countries.

3.2.3. Internal Competition Policy

The full-scale launch of the automotive industry-related policies in 1962, the Korean government's initial policies on the finished vehicle industry, guaranteed efficient production size for the automobile assembly companies. The 'Automotive Industry 5-Year Plan' and the 'Automotive Industry Protection Act,' implemented in 1962, prevented the establishment of an excessive number of finished vehicle manufacturing companies by stipulating the authorization of automobile assembly enterprises.

Initially, the government implemented the integration of the existing passenger car assembly companies. To realize both the effect of an economy of size for the automotive industry, and the development of the Korea automotive industry through internal competition, the government decreased the number of automobile assembly enterprises. Although the government reduced the number of the enterprises through their integration, the measure brought about the negative effect of creating monopolies. Once securing monopolistic status in the market, the Saenara Motor Company and Asia Motor chose the easiest way for their growth by focusing on importing automotive parts and producing knockdown vehicles, while neglecting the localization of the automotive sector the government had aimed to achieve.

For the purpose of localizing automotive parts, the Korean government permitted Hyundai Motor and Asia Motor to produce passenger vehicles in 1967. Then, Kia Motor entered the domestic passenger vehicle market and took over Asia Motor, which created competition among Hyundai, Kia and Daewoo. The competition among the big three established by the government's policies, is assessed to have boosted the high growth of the Korean automotive industry by maintaining harmony between an economy of size and effective competition.

Due to the economic recession after the death of President Park Junghee in 1979, the government made efforts to decrease the number of the automobile manufacturers by integrating automakers through the industrial restructuring in 1980, and enacted the 'Industry Promotion Act' in 1985 to continue such efforts. The government strictly restricted the entry of new enterprises to the domestic automobile market, notably the passenger vehicle market. Since then, as the 'Industry Development Act' mentioned above expired, Samngsung Group and Mando Corporation entered the passenger vehicle market. Since the IMF crisis in 1997, Kia, Daewoo, Samsung and Ssangyong were taken over by Hyundai, GM, Renault and Shanghi Motor Companies, respectively, resulting in the current competitive structure.

3.2.4. Automotive Parts Localization Policy

What the Korean government was interested in most when promoting the Korean automotive industry was to increase domestically manufactured automotive parts. Any significant change in the government's policies for the automotive industry always stemmed mainly from the localization of the parts. The 'Master Plan on Automotive Industry Promotion' that had followed the 'Automotive Industry 5-Year Plan' in 1962, whose main goal was to localize automotive parts, was a measure to integrate the Korean automotive parts industry. In January 1965, the government set up the 'Automotive Parts Localization 5-Year Plan,' which was to realize the full domestic production of all automotive parts by 1969. When such a localization plan failed, the Korean government released the 'Basic Automotive Industry Promotion Plan (Automotive Parts Localization 3-Year Plan),' and set yearly localization goals for individual parts such as axles, wheels, steering systems, clutches, engines and vehicle bodies. In 1974, the government specified the automotive parts localization plans through the 'Long-Term Automobile Promotion Plan' that included the enlargement and the specialization of the automotive parts enterprises in accordance with the detailed individual part items within the individual automotive parts.

In the 1980's, as the government's industrial support was converted from policies based on the promotion of individual industries to measures focusing on the individual functions

of industries, there was no policy specifying the Korean automotive parts industry. However, the Korean government induced the localization and the promotion of the Korean automotive parts sector through the SME policies or the machinery and automotive parts localization policies. The representative machinery parts policies related to the promotion of automotive parts, were the 'Parts and Materials Industry Facility Modernization Measure', the 'Machinery and Parts Localization Rate Improvement Measure,' the 'Machinery, Parts and Materials Localization 5-Year Plan' and the 'Capital Goods Industry Promotion Measure.' While the Korean government provided various support for SMEs, only companies with no more than 1000 employees were eligible for the support. The government continued supporting the Korean automotive industry into the 2000s by establishing the 'Act on the Special Measure for Automotive Parts and Materials (enacted in February 2001),' in addition to the relevant basic plans.

Even the government's import policies played an important role in promoting the Korean automotive parts industry. The 'Automotive Industry Protection Act' enacted in 1962, included the article to restrict the import of automotive parts that were produced domestically. It was in 1975 that the policy restricting the import of the parts became effective as the first Korean vehicle was developed that year. In the same year, the government handed over the authority to review the permission of import to the Korea Auto Industries Coop. Association, which resulted in little import of the parts that were produced domestically.

3.2.5. The Government's Will for the Development of a Korean Vehicle

Although it was Hyundai Motor which decided to produce its Korean-developed vehicle based on its managements policy, the policy was specified through the Korean-Developed Small Car Mass Production Business Plan which the government had demanded the company to submit on July, 12th 1973 and that is be based on the Long-term Automobile Promotion Plan. The submitted plan specified the details of the vehicle that would be newly developed as follows: "the type of the vehicle is one with a new design which has never been produced or sold in foreign markets, the production cost per unit shall be $2,000 and the engine cylinder capacity shall be under 1,500 cc. Its knockdown assembly is not permitted and 95% of the vehicle's parts shall be domestically manufactured. The annual production shall be over 50,000 units. The launch of production will be achieved by 1975." In practice, almost all the requirements were met in the development of Pony. The Korean vehicle development plan was finalized as the "Long-term Automotive Industry Promotion Plan" in May 1974. In the process of finalizing the development plan, the Prime Minister directed to revise the plan reflecting the following: "to boldly pursue the full localization of

the vehicle that does not require any repeated change in type or model." The President sent the official document of instruction to the enterprises to localize all the automotive parts by 1975. Such a strong will of the Korean President and the government had a great effect on focusing the enterprises on the development of a fully Korea-made model, given the fact that the government had a strong control over the Korean industries since the October Restoration (October Yunshin).

Goals like creating the export-oriented automotive sector and pursuing the independent growth of the automotive industry induced the development of a fully Korean-made vehicle rather than continue the knockdown assembly of foreign cars. Although the production of foreign vehicles based on knockdown assembly, would reduce the cost in a short-term and expand the export of vehicle, the export destinations were limited to regions where the same model of foreign car was not produced, which made it impractical to compete in the global export-oriented automotive sector. A concern was that if Korea exported only a small number of vehicles while providing the domestic market and labor force for the knockdown assembly, that it would only solidify the global oligopolistic status of multinational automakers.

3.2.6. Stable Labor-Management Relations

Labor-management relations are crucial in the automotive industry. One of the factors behind the success of the Japanese automotive industry is the cooperative labor-management relations. However, the stable labor-management relations in the Japanese automotive industry resulted from the great efforts and experience of both labor and management rather than from the intervention of the government.

In case of Korea, however, the Korean government was fully in charge of the labor-management relations in the development process of the Korean automotive industry. For this reason, there had never existed any labor union within Hyundai Motor, the largest automaker in Korea from 1968 when the company was established, to 1987. Even for other automotive enterprises, which had labor unions within their company, there was no room for labor disputes due to governmental control. As a result, the automotive enterprises bore no burden in the labor-management relationships. This is well illustrated by the fact that there was not a single government department dedicated to labor-management relations until the late 1980s. When Kia Motor was in a financial difficulty, the labor union cooperated with the management as the union members returned their bonuses to the company and put off demands to raise wages. This indicates that the enterprise could focus on production and sales while not spending effort or cost on labor-management.

Although labor-management relations in Korea were converted into the system where the government could no longer intervene, the government's policies that had stabilized the relationships played a significant role in preparing the basis for the development of the Korean automotive industry.

3.3. Supply of Quality Labor Force

The automotive industry is similar to the equipment industry as both represent an assembly industry. But at the same time, it has a feature of a labor-intensive industry in that a vehicle is composed of 20,000 parts. The abundant low-wage and high quality labor force played a leading role in the growth of the Korean automotive industry in the initial stage of the Korean automotive industry's development.

The economically active population in Korea, which had been merely 8 million in the early 1960s, increased to over 10 million in 1970, and exceeded 15 million in the mid 1980s. The economically active population rose to over 20 million in 1994, which indicates that the supply of labor has been steadily on the rise. As the automotive sector was a more promising and higher-wage industry than other industries, the automotive industry was provided with a smooth and steady labor force.

Employment in the automotive sector also sharply increased in line with the development of the industry. The number of employees involved in the automotive sector was 17,000 in 1970 and rose to 210,000 in 1994. The smooth supply of a low wage labor force led the growth of the Korean automotive industry in the early stage of its development. Although wage is related to productivity, the wage of Korean automotive workers in 1980 was only a fifth of a Japanese workers' wage, on a nominal income basis, and despite narrowing the gap reached only a third of a Japanese workers' wage in 1995.

The quality of the labor force supplied to the Korean automotive industry was very high. Automotive industry workers are required to have an education level greater than secondary education. As Korea had a high level of education unlike other developing countries, more than 80% of the employees in the automotive industry had a level of middle school education and above in 1995, while more than 60% of the employed had high school diplomas.

In practice, the technicians involved in the automotive enterprises had a middle school education and above in the late 1980s, and when the automotive industry was growing sharply, had a greater than middle school education. In addition, about 80% of the workers involved in the industry had high school diplomas with the exception of workers in Daewoo Motor. In addition, Korea already had a partially experienced workforce before

the introduction of modern vehicle production system, which was different than other developing countries. The production of automotive parts was partially done during the period of Japanese colonial rule and other automotive parts were being produced before the beginning of the modernized vehicle assembly in 1962.

The workers, who had been involved in the automotive parts companies, could be used as technicians for the assembly enterprises. The workforce experienced with vehicle assembly, also was nurtured through the vehicle restoration works and the maintenance or disassembly of military vehicles.

Chapter 3

Analysis and Modularization of Major Policy Sub-Section

1. Korean Vehicle Development Policy
2. Automotive Parts Localization Policy

Analysis and Modularization of Major Policy Sub-Section

1. Korean Vehicle Development Policy

1.1. Goals and Outcome

1.1.1. Goals

The policy that signaled the development of the first Korean vehicle, was the 'Long-term Automotive Industry Promotion Plan,' finalized in May 1972. The core of this plan was to develop and produce a Korean compact vehicle, and thus included the details on the mass production of a Korean small car. The plan specified that the Korean-developed small car be an economic vehicle that does not require any model change in a long-term, shall be a newly designed car that has never been produced or sold in foreign countries and should have the engine cylinder capacity under 1,500cc. In particular, the plan emphasized that it shall be a small car because it was adequate for the then circumstances in Korea from the standpoint of demand. It was also necessary for Korea to avoid developing mid and full size sedans in which advanced countries had a competitive edge. A small car was also the right choice in order to realize an export-oriented automotive industry.

1.1.2. Outcomes of the First Korean Vehicle Development

a. Establishment of Technological Bases

The development of a fully Korean-made vehicle became an opportunity for the Korean automotive industry to develop its own technological bases. Since knockdown assembly imported and assembled parts and materials for vehicles being produced in foreign

countries, it was impossible to accumulate the various technologies related to production of a new car such as die & mold, casting, forging, pressing and testing, as well as other design and planning technologies. Not only that, there was a limitation in building the technologies related to automotive parts as imported parts were in predominant use up to that time.

As for Pony, the independently developed vehicle model of Hyundai Motor, domestic workers participated in the development of the vehicle's design and the planning. As a result, the workers would gain experience on the technologies related to detailed vehicle design and planning and accumulate production-related technologies. Although the practical designing and planning of the vehicle were mainly outsourced to a design company, the professional workers at Hyundai Motor were sent to the design company to gain experience. Hyundai Motor sent about 200 professional workers to receive technology training as a part of technological alliance while sending another 2,000 technicians to receive technology training related to production in accordance with individual production stages and individual positions. The technologies and functions that were gained became the foundation for the Korean automotive industry to design and produce its own vehicle.

Through such achievements, Hyundai Motor could continuously release the follow-up models of the Pony. It continued active development of its own models as it developed Stellar, a semi-medium sized car and the Sonata, a medium-size car in 1982 and 1985, respectively. Hyundai Motor is currently developing a full-size sedan and acquired the global technological capability on the engine and transmission.

b. Creating an Export Market

The development of a fully Korean-made vehicle signaled the new emergence of the Korean automotive industry in the global automobile market, and later, had a great impact on the export of Korean vehicles. The prototypes of Pony and Pony-Coupe were released in the Torino Motor Show and received much attention from major countries. During the show, foreign sellers from fourteen countries including the U.K., Netherlands, Greece and Zambia had business talks regarding sales of the vehicles.

Although no Korean automobile manufacturers had exported a vehicle before, for the first time in 1976, Hyundai Motor exported 1,243 units of the vehicle and increased the number of exported units to a whopping 31,486 in 1979.

While the leading export model was Pony Excel, the follow-up model of Pony, it's safe to say that the Korean automotive industry developed into an export industry because of Pony. From the development stage, Hyundai Motor created the design of Pony for the

purpose of exporting the vehicle, planning a vehicle equipped with the specifications in which various parts and functions could be exported later. While Pony was the first Korean-made vehicle exported to foreign countries, Pony Excel was the model that was successful for the first time in the largest U.S market. The fact that Korean vehicles emerged as one of the country's main export items, many people wonder whether the Korean government implemented any special policies to support the export of the Korean automotive industry. However, there has been no policy focusing only on the export of automobiles, although the government pursued general export-oriented policies for all industries. Nonetheless, the export of a Korean vehicle was a great success, which stems from the fact that from the early stage of development, the Korean automotive industry aimed to export a fully Korean-made vehicle.

c. Korean Automotive Industry's Market Dominance in the Domestic Market

The production of a Korean-developed vehicle signaled the emergence of the Korean automotive industry in the global market and opened the path for the industry to export automobiles internationally. Kia produced the 'Brisa' in its automobile plant although it was not a Korean-developed model. The Kia vehicle accounted for 55.5% of the total automobile production. With the emergence of the Hyundai Pony, however, Hyundai Motor began to take a lead in the domestic passenger vehicle market. When the production of the Pony was initiated in 1976, the share of Hyundai vehicles in the market, increased to 55.5%, and rose to 62.4% in 1977. Since then, Hyundai Motor has secured a solid position by maintaining more than 60% of the domestic production.

This solid performance of Hyundai Motor stemmed mainly from the sales of Pony. Pony represented a domestic market share of 43.6%, 54.1%, 53.3% and 52.2% in 1976, 1977, 1978 and 1979, respectively. In contrast, the market share of the vehicles produced by GM Korea (formerly Shinjin Motor) which once had a monopolistic position in the market, decreased to 9.7% in 1977, producing the lowest number of automobiles among the major big three passenger vehicle producers. The enterprise that developed the fully Korean-made model, secured a dominant position in the market whereas the company which did not, lost its monopolistic status.

Table 3-1 | Change in the Automobile Production of Individual Automakers in the 1970s

(Unit: number of vehicles, %)

	1973	1974	1975	1976	1977	1978	1979
Kia+Asia	489	685	10,202	6,991	10,548	16,477	22,140
	(3.8)	(7.1)	(55.5)	(26.2)	(24.0)	(19.0)	(19.5)
GMK	6,696	1,565	2,559	3,788	4,270	12,162	18,430
(Saehan)	(52.5)	(17.0)	(13.9)	(14.2)	(9.7)	(14.0)	(16.2)
Hyundai	5,426	6,846	4,722	14,826	27,466	57,054	71,744
	(42.6)	(74.2)	(25.7)	(55.5)	(62.4)	(65.7)	(63.2)
Shinjin Jeep	140	161	915	1,096	1,697	1,130	1,250
	(1.1)	(1.7)	(4.9)	(4.1)	(3.9)	(1.3)	(1.1)
Total	12,751	9,230	18,398	26,701	43,981	86,823	113,564
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Source: Oh, Wonchol. [Korean Economic Construction Model], Kia Economic Research Institute, 1996. 5.20.

d. Improvement of Automotive Parts Localization

Hyundai Motor succeeded in manufacturing 85% of Pony's parts domestically in 1975 and raised the parts localization rate to 90% in 1976 when the production of Pony began in earnest. The Kia Brisa, which had been based on a foreign vehicle model, realized merely 26% of the parts localization rate in 1974. The rate rose to just 63% in 1975. The groundbreaking increase in parts localization achieved by Hyundai Motor resulted from the company's effort in finding adequate automotive parts producers while in the process of developing a vehicle. The then automotive parts industry had been underdeveloped, however, Hyundai Motor strived to find parts producers and encouraged them to produce relevant parts. While it is highly likely that the automobile manufacturer planned and designed the Korean-developed vehicle and constructed relevant assembly plants, it was a miraculous achievement to realize the high level of parts localization by finding automotive parts producers.

Such a radical improvement in automotive parts localization through the development of the Pony, had a positive impact on the increase in the automotive parts localization of other enterprises. BrisaII, the follow-up model of Brisa, realized a 86% automotive parts localization rate in 1975 and increased the rate to 90% in 1977. GM Korea (changed to Saehan later) had undergone difficulties in production due to changes in management and its relationship with GM, was able to produce Chevrolets with a 72% parts localization rate in 1975, and later, the company produced Gemini with a 70% parts localization rate, which rose to over 80% in 1979.

Table 3-2 | Parts Localization Rate of Passenger Vehicles

(Unit: %)

Company	Model	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Kia	Brisa	63	78	89	89	89	92	92			
	Brisa II	86	86	90	90	89	90	91			
	Fiat132				62	62	62	62			
	Peugeot				20	20	20	20			
Hyundai	Pony	85	90	90	91	92	93	93		97	98
	Stellar	60	61	61	61	62	62	62		97	97
	Granada					21	21	21	28	28	
GMK (Saehan)	Chevrolet	72									
	Gemini			70	75	82	85	86	86	86	86
	Record	58	58	60	62	62	62	64	65	65	75

Source: Hyundai Motor Group, [History of Hyundai Motor], Feb. 1992.

In conclusion, the development of a fully Korean-made vehicle became an opportunity to move away from the previous production methods in which automotive parts for foreign vehicles were imported and assembled and establish a real independent domestic automotive industry. This is a differentiating factor from countries like Brazil and Mexico, which had begun their automotive industries much earlier than Korea, but are still focusing only on knockdown assembly of foreign automobiles.

1.2. Background and Needs of Introduction

1.2.1. Limitations in the Knockdown Assembly and Joint Venture

The initial form of external cooperation the Korean automotive industry pursued, was introducing the technology and facilities required for knockdown assembly. The Saenara Motor Company, the first modern automobile manufacturer in Korea, established a technological alliance agreement with Nissan of Japan in 1962, while Shinjin Automotive Corporation established the loan facility and technology alliance agreements with Toyota in 1966, and produced the Corona. Asia Motor made an agreement with Fiat of France to introduce capital goods and technology in October 1976. Hyundai Motor established a technology collaboration and assembly contract with Ford of the U.K., and began to produce the Cortina. Kia Motors set up a technological alliance agreement with Honda and Toyokokyo (the current Mazda) for the production of motorcycles and 3-wheel trucks. The

company established an additional technology collaboration contract for the production of a 4-wheel truck Titan (E-2000) and cargo truck (E-3800) in order to effectively produce a 4-wheel car.

Table 3-3 | International Cooperation of the Korean Automotive Industry in the Era of Knockdown Assembly

Company	Year	Partner Company	Introduced Model	Contents	
Saenara	1962	Nissan	Bluebird	Introduction of Technology and Facility (Loan)	
Sibal	1963	Isuzu	-	Introduction of Technology and Loan	Bankruptcy
Shinjin	1966	Toyota	Corona	Introduction of Technology and Material (Loan)	
Asia	1965 1967	Renault France Fiat	- Fiat 124	Introduction of Technology and Capital Goods Introduction of Technology and Capital Goods	Cancellation of Contract
Hyundai	1968	U.K. Ford	Cortina	Technological Alliance and Assembly Agreement	
Kia	1959	Honda Toyokokyo Toyokokyo	Two Wheel Vehicle 3Wheel Vehicle E-2000, E-3800 (4Wheel Truck)	Technological Alliance	

Source: KIET(1997), Korea's automotive indsutry development history & growth potential.

As a part of the automotive parts localization plan that was established in 1969, the Ministry of Commerce announced a plan to construct automobile engine plants. Although the government induced individual enterprises to build foundries for automobile engines, the domestic enterprises sought to enter into joint ventures with foreign companies, as they had difficulty in constructing the plants by themselves. Shinjin Automotive Company submitted the plan to construct an automobile engine foundry through a 20/80 joint venture with Toyota. However, the Korean government demanded the company set up a 50/50 joint venture. Later, Shinjin Automotive Company selected GM as a new joint partner and established GM Korea with 50/50 equal ownership. GM introduced and produced out-of-date models like the Chevrolet 1700 and the Record 1900 at the end of 1972. However, the sales were extremely low. Hyundai Motor also established an agreement with Ford to enter into a 50/50 joint venture for technology collaboration on December 29, 1970.

Because their joint venture plan was delayed, the government withdrew their approval of the joint venture in 1973. The most conflicting issues in the negotiation for joint ventures were export and business areas. Hyundai Motor had a plan to produce a large number of excellent small vehicles and export them to global markets through the sales network of Ford. However, Ford had intentions to sell its vehicles by integrating Korea into its global production division system and create a base for simple parts production and vehicle assembly. Meanwhile, Fiat of France withdrew its business in Korea as the technological alliance with Asia Motor expired.

1.2.2. Independent Development of the Korean Automotive Industry

In November, 1970, Kia Motors began to construct a comprehensive automobile plant which included an engine factory, a machinery processing factory, a die and mold factory, press factory, a vehicle body factory, a vehicle axle factory, a painting factory and automobile assembly factory. At the same time Shinjin Automotive Corporation and Hyundai Motor were pursuing joint ventures with foreign companies. After abandoning the joint venture with Ford, Hyundai Motor submitted an automobile plant construction plan to the Ministry of Commerce in April 1974. The plan was to construct a comprehensive automobile plant that produces all types of vehicles including passenger vehicles, buses and trucks. The abandoned joint venture became a catalyst for Hyundai Motor to construct a comprehensive automobile plant and develop Pony, the first Korean-developed model. As a global latecomer in the automotive industry, the Korean automotive industry was required to establish capital and technological collaboration with foreign companies. However, the Korean government limited foreigners' ownership participation to less than 50%. For this reason, most of the Korean automobile manufacturers like Hyundai, Kia and Asia, pushed forward independent management strategies as a form of independent capital. When Korean enterprises established a joint venture with foreign companies to introduce the core technologies necessary for the production of automobiles, they made the ventures mainly with relatively small sized corporations like Mitsubishi rather than giant corporations such as GM, Ford and Chrysler so that the Korean enterprises could prevent themselves from becoming subordinate to partner companies.

Hyundai Motor further strengthened an independent management strategy since the company continuously failed to establish joint ventures due to conflicts over management and royalties despite pursuing alliances several times since its foundation. As the first Korea-developed model, Pony made a success in the mid 1970s, Hyundai Motor reinforced its independent management strategy. In contrast, Shinjin Automotive Corporation

maintained its corporate alliance with GM after the withdrawal of Toyota. The difference between Hyundai and Daewoo is their dependence on foreign capital became apparent in the technology development of the corporations. In terms of the technologies introduced by two companies between 1966 and 1987, Hyundai introduced 61 cases during this period while Daewoo brought only 25 cases. Moreover, Hyundai Motor introduced mainly cutting edge technologies including patents whereas Daewoo focused only on technical guidance.

Throughout the experience in the 1960s, the Korean government perceived that there was a limitation in localizing automotive industry utilizing semi-knockdown and complete knockdown even through the introduction of technology. As a result, the government strived to realize both the construction of independent comprehensive automobile plants and the early development of fully Korean-made vehicle. The factors behind the successful development of the first Korean vehicle, were the government's strong measures for the localization of automotive parts, and its strong will to develop a Korean people's car. As can be seen above, conducting knockdown assembly after importing the automotive parts for foreign models, has a limitation with localizing automotive parts.

1.3. Implementation Strategy and System

1.3.1. Finalization of a Long-term Automotive Industry Promotion Plan

After announcing the 'Automotive Industry Promotion Plan' in January 1973, the Korean government prepared the 'Long-term Automotive Industry Promotion Plan' in June 1973 for a more systematic promotion of the automotive industry. The Prime Minister directed to revise the plan on July 4th in the same year. On July 20th, the government instructed the four major automakers to submit business plans that specify the types of production vehicles. On September 6th, then President Park, Junghee, gave direct instructions for the promotion of the Korean automotive industry.

The government established the 'Long-term Automotive Industry Promotion Plan' on January 16, 1974 and finalized the plan on May 7th in the same year. Although the plan was prepared by the Ministry of Commerce, the President and the Prime Minister gave direct instructions to the companies to prepare business plans, indicating that the government had a strong will for the policy. The government strengthened the effectiveness of the policy by directly instructing companies to submit the plans.

Table 3-4 | Finalization of the Automotive Industry Promotion Plan

January 12, 1973:	The President declared heavy chemical industrialization The President in the early 1980s announced the plan to produce 500 thousand units of the vehicle
June 20, 1973:	Preparation of the Long-term Automotive Industry Promotion Plan
July 4, 1973:	The Prime Minister directed to establish an improved automotive industry promotion policy
July 20, 1973:	The Korean government instructed the four major automakers to submit business plans
September 6, 1973:	The President gave a direct instruction to promote the Korean automotive industry
January 16, 1974:	The Long-term Automotive Industry Promotion Plan was established

1.4. Details of Plans and their Implementation

1.4.1. Main Contents of the Plans related to the Development of Fully Korean-made Vehicle

The contents of the measures regarding the development of the Korean people's vehicle, are described well in the official document, 'Submission of Business Plan for the Mass Production of Korean People's Car' that were sent to individual automakers on July 20 1973. The contents can be summarized as follows:

A. The basic goals of the Korean automotive industry for the 1980s, are to realize the production of 500 thousand vehicles and the export volume of $150 million.

B. The automotive industry is a vital sector as it is a leading industry closely related to the technological and economic advancement of related industries and the industry would make a great contribution to the economic growth of Korea as an export industry in the future.

C. Thanks to the industry's experience on the knockdown assembly in the last decade and the intense promotion of the machinery industry resulting from the heavy chemical industrialization policy, the current Korean automotive industry has grown enough to create the system for the mass production of a Korean-developed vehicle.

D. Domestic demand for automobiles required for the economic activities of citizens, is expected to grow from 1976, creating a turning point to a motorized society.

E. Regarding the passenger vehicle industry, it is necessary to accelerate the increase in demand for economical vehicles commensurate with the situation of Korea, and consequently, pursue the mass production of the vehicle.

F. To save on steadily rising fuel costs, it is necessary to encourage the use of small cars.

G. The problems caused by the current knockdown assembly of foreign vehicle are summarized as follows: 1) in the long-term, it is impossible to produce a large number of foreign vehicles whose types frequently change; 2) the quantity of produced vehicles is small; 3) the vehicles are more expensive than in the originating countries and their quality is poor; 4) even if the vehicles are produced with fully domestically manufactured parts, it is difficult to create export destinations; 4) consequently, the Korean automotive industry would contract and the development of related industries would be delayed.

H. The groundbreaking development of the Korean automotive industry can be only achieved when the industry can produce an excellent quality, low-priced people's car.

I. The advantages resulting from producing a Korean-developed vehicle are as follows: 1) it enables simplification and stabilization of vehicle type and model; 2) it becomes easy to standardize the form and specification of vehicles; 3) it enables establishing a mass production system and improve the quality of the vehicle; 4) it make it possible to create export destinations for exporting a Korean-developed model; 5) it enables the industry to strengthen its international competitiveness by accumulating technologies.

J. Therefore, the government would provide intensive support for the production of passenger vehicles that meet the certain requirements. Also, the government would aggressively promote the production of vehicles as one of the strategic industries for heavy chemical industrialization in order to realize the mass production of an economic Korean people's car commensurate with the situation in Korea and establish the base for its export. The requirements are as follows: 1) vehicle type-newly designed type that has neither been produced nor sold in foreign countries; 2) production price per unit-about $2,000; 3) cylinder capacity-under 1,500cc; 4) localization rate-90% (introduction of knockdown assembly is not permitted); 5) number of production units-50,000 thousand per year; 6) launch of production-1975.

K. The companies should submit the plan consistent with the guidelines above by October 5, 1973.

The "Long-term Automotive Industry Promotion Plan' finalized in 1974, defined the vehicle as Korean-developed small car. It also defined Korean-developed vehicles as a newly designed type of vehicle that had neither been produced nor sold in foreign countries.

Table 3-5 | Long-term Automotive Industry Promotion Plan

A. Needs to produce Korean-developed small car
1. Smooth supply of vehicles for the rising demand resulting from the localization of small cars commensurate with the situation in Korea
2. It is essential to encourage the use of small car to save fuel cost

B. Advantages Resulting from the production of a Korean-developed small car
1. Simplification of vehicle type and the stabilization of vehicle model
2. Standardization of automotive parts and vehicle specifications
3. Improvement of vehicle quality through the establishment of a mass production system
4. Improvement of industrial competitiveness through the acceleration of technology accumulation
5. Creation of more export destinations through the Korean-developed model

C. Korean-developed Small Car Production Guidelines
1. Vehicle type: economic vehicle that does not require any model change and a newly designed type of vehicle that has neither been produced nor sold in foreign countries
2. Specification: Engine cylinder capacity under 1,500 cc
3. Localization: more than 95%
4. Production launch: 1975
5. Production Size: More than 50,000 units per year
6. Production price per unit: about $2,000

D. 7 Principles for the Promotion of the Korean Automotive Industry
1. Promotion of finished vehicle production plants
   - Expanding and promoting mainly the existing factories
   - Pursuing new designs while not permitting foreign capital-based joint ventures
2. Creation of new types of vehicles
   - Actively supporting establishing the mass production system for a Korean people's small car
3. Facilitation of a Mass Produced Korean People's Car
   - Reducing the commodity and automobile taxes for the Korean People's Car
   - Completing the construction of a mass production system that can produce 50,000 units per year by 1975
4. Mandatory establishment of core automotive parts factories
   - Obliging the installation of car body and engine production facilities within existing automobile plants
   - Establishing the base for the export of Korean vehicles by expanding the production capacity of core parts

5. Construction of automotive parts plants having international competitiveness
   - Inducing the introduction of foreign capital and joint ventures for the mass production of general automotive parts
   - Expanding the range of tax exemption for raw materials and abolishing the tax exemption for KD imports after 3 years
6. Producers
   - Enterprises that are qualified based on the requirements above and submit business plans that finalize the estimate of yearly vehicle demand, determine vehicle type, identify appropriate financing methods and technology introduction contracts and include documentation that the enterprises would make timely investment
7. Designation of a People's car
   - An economic small vehicle that meets the small car production guidelines would be designated as the people's car. The vehicle would be preferentially exempt from financial taxes and the general guidelines of administrative policies so that 80% of the passenger vehicle demand would be provided preferentially to the automaker

Source: Oh, Wonchol, Korean Economic Construction Model, Volume 4th, Kia Economic Research Institute, May. 1995.

1.4.2. Process of Korean Vehicle Development

As Hyundai Motor underwent repeated failures with corporate alliances while the government pushed forward automotive industry promotion policies, the company planned to construct an automobile manufacturing plant for the development of the Korean people's car and its production, thus setting the following basic principles:

1. Developing Hyundai's own vehicle model and establishing the model as a leading export item
2. Establishing no ownership-based joint venture with foreign companies
3. Constructing a comprehensive automobile plant and realizing a complete localization of new vehicles
4. Constructing facilities having an internally competitive size

In practice, Hyundai Motor was the only company that submitted a business plan to independently design and manufacture a totally new type of vehicle in accordance with the guidelines of the 'Submission of Business Plan for the Mass Production of Korean People's Car.' Kia Motor and GMK were planning to produce basic models by following the types of the vehicles produced by Mazda (formerly Toyokoyo) and Opel, the subsidiary of GM in Germany. Asia Motor did not even confirm the model of vehicle. Hyundai Motor began the

development of fully Korean-made made model and set up the strategy for the production of the vehicle. The enterprise established the service contract with a foreign design company to outsource the design of the vehicle body. For the finished vehicle manufacturing, Hyundai Motor invited foreign experts for consultation. The company developed parts that required a sophisticated technology for the vehicle body stamping molds through the one-time technical support of a foreign parts producer and acquired the stamping and molding technologies through the overseas training of its company's workers.

As the most emphasized and important element in the development of the automobile is design, Hyundai Motor established a $1 million design contract with Italdesign in Italy, which was a quite a large contract back then. Giugiaro was in charge of the styling while Mantovani was responsible for design and planning the vehicle body. Giugiaro was one of the most renowned persons in vehicle styling design of the time. The basic design of the vehicle was completed in February 1974 after which, the design company undertook the detailed design of the vehicle. The design engineers at Hyundai Motor were sent to the company to conduct collaborative work for the individual design process and Hyundai was able to accumulate design and planning technologies. In the same year, Coversosa located in Torino Italy, began the manufacturing of the master model on March 15th and produced the first prototype on April 5th.

After the production of the prototype, the next stage was to complete the construction of a comprehensive automobile manufacturing plant. To tackle the technical problems, Hyundai Motor invited Turnbull, an automobile technology engineer from the U.K. and appointed him as the general technology manager. U.K.'s automobile technology was transferred to Hyundai Motor through him. The company also hired six foreign technical engineers to advise and consult on chassis, vehicle body, various vehicle testing, molding, press and engines. At the same time, Hyundai Motor implemented overseas training programs to secure engineers and technicians required for the production of the new vehicle. From the end of 1973, when the construction of comprehensive automotive plant was completed, to the end of 1975, Hyundai Motor sent about 200 engineers to overseas training as a part of technology collaboration with foreign companies. The period of the training programs varied from a month to more than a year. Hyundai Motor also trained about 2,000 technicians annually in accordance with their individual positions and production stages. Thanks to the technology collaboration contract, about 30 foreign engineers were sent to Hyundai Motor to provide technology services.

Throughout the development and preparation process for production, Hyundai Motor completed the construction of a comprehensive automobile plant in November 1975.

Production of the Pony, the first Korean-developed vehicle, began in earnest in January 1976. Not only did the Pony achieve a 90% localization rate, almost reaching the requirement suggested by the government, but fully met the other requirements such as engine cylinder capacity and the year of production launch. The development of a fully Korean-made vehicle and the construction of an automobile plant required a massive amount of money. According to the History of Hyundai Motor, the company spent $71.25 million on the development and construction in the first stage (between 1973 and 1975). Among the expenses, Hyundai was lent $51.12 million won from foreign countries while it financed $19.14 million by increasing capital and its earned surplus.

1.4.3. Governmental Support for Sales

The Korean government supported the Long-term Automobile Promotion Plan by reducing the commodity and automobile taxes in 1974. The government cut the special consumption tax for vehicles under 1,500cc from 40% to 15%, the tax for vehicles under 2000cc from 50% to 20% and the tax for vehicles over 2,000cc from 100% to 40%.

As the domestic economy was growing 10% annually, the sharp reduction in the taxes led to an expansion of domestic sales. The domestic demand for vehicles, which had been 35,000 units in 1976, increased to 130,000 units in 1978 and astronomically rose to 162,000 units in 1979.

1.5. Analysis of Factors behind the Success

While every country and enterprise wishes to achieve the successful development of automotive industry, the factors behind the success of the Korean automobile manufacturers was to independently develop vehicles based on strategic needs and sell them in the global market without any restriction or limitation. Although core technology is essential for an enterprise to have competitiveness in the global automobile market and develop its own model, it is very difficult to secure the technology. That is why most of the countries producing automobiles, remain at the stage of merely conducting knockdown assembly for other advanced automobile manufacturers. An enterprise could choose between introducing foreign technology or developing its own vehicle to secure the automobile technology, however, major advanced automakers are reluctant to transfer their core technologies to potential competitors. Therefore, another choice is to develop technology on its own. The Korean automotive industry chose to develop technology on its own, which was the only strategy for survival, and in the end, realized its technological independence despite many difficulties.

The success of the Pony is greatly attributable to government policies. Although the final policy related to the development of a fully Korean-made vehicle, was the 'Long-term Automotive Industry Promotion Plan' finalized in 1974, the government established polices for the development of the vehicle and induce enterprises to respond to the policies from the early 1970s. The most representative case was the governments demand that the Korean automakers submit business plans in 1973. That is to say, the government was directly involved in the enterprises' business planning by demanding the automakers submit specific business plans in response to the government polices related to the development and production of a Korean vehicle. Leaders like the President and the Prime Ministers, who showed a great interest in development, strongly pushed ahead with the policies.

The government prepared the details of the development plan so precisely that the plan suggested a clear orientation for the Korean automotive industry. For instance, the government demanded export plans occur with consideration of domestic demand and the narrow domestic automobile market. Since then, the Korean automobile emerged as one of the main export items, despite not having any special measure for its export, because initially, the Korean government instructed the automakers to develop a vehicle that could be exported.

However, it would have been impossible to realize the development of a fully Korean-made automobile unless the automobile manufacturer made an aggressive investment. The large scale investment was the matter of company survival and Hyundai Motor pushed forward the investment based on the positive prospect for the future.

The efforts made by all the workers involved in the development process were also one the critical factors behind the success. Korean workers, engineers and technicians participated in every area from the design and development of detailed automotive parts, to the construction of automobile plants, and by doing so they internalized the related technologies and experience. Workers involved in the project did their best not to miss a single technology. Without such an accumulation of technology and experience, the development of a fully Korean-made vehicle would have ended as a one-off project and it would have been very difficult to expect the release of a follow-up model.

As a fully Korean-made vehicle was developed, foreign automobiles became one of the fully restricted import items. Not only that, the government reduced various taxes for the vehicle class of the Korean-developed model, leading to the expansion of market demand. That is, the government guaranteed the market for the Korean-developed vehicle through the import restriction and tax cuts. In addition, the domestic demand for automobiles

increased in line with personal income rise, serving as a factor for raising sales of the vehicle. However, the market protection policy limited the options for domestic consumers and led the consumers to purchase high priced cars compared to their quality or function, resulting in a decline in consumer welfare, although helping the success of the vehicle. From a long-term perspective, however, Korean consumers could have a variety of choices, as Korea became an automobile producer thanks to the increase in domestic automobile production.

1.6. Implications for Follower Countries

The development process of the Korean automotive industry provides many implications to developing countries, which strive to move toward the development of their own vehicle from the KD production of foreign vehicles. First, a government should establish clear goals and plans for the development and the production of its own vehicle. Such a goal and plan should not be simply the ideas made by a government, but the practical initiatives resulting from the close communication with enterprises. The Korean government prepared the draft of the 'Long-term Automotive Industry Promotion Plan' first, and based on that draft, received the business plans from the enterprises. After that, the government finalized and announced the final plan. For this reason, the plan was very specific and served as guidelines for the enterprises despite being the government's plan. Therefore, developing countries should select a specific type of vehicle for development in consideration of the targeted market and the situation of enterprises and prepare plans to induce the participation of companies through the prospects of the specific market.

Not only that, policies implemented by a government should be reliable ones. Government's strong will to foster automotive industry could be a driver inducing the investment of enterprises. The Korean government's policies for development of a fully Korean-made vehicle, not just reflected the strong will of the government and national leaders, but also included the various follow-up support measures such as the preferential allocation of investment funds and market vitalization measures. In addition, the government implemented the plans after long preparation and the thorough review by the President and Prime Minister. As a result, the enterprises undoubtedly followed the plan.

Even if a plan is well prepared, it cannot succeed unless there is an innovative entrepreneur who would take a risk to make an aggressive investment. The amount of money Hyundai Motor had to initially invest on vehicle development and related facilities was more than $70 million, then a significantly large sum. While the lending from foreign countries accounted for the most part in the investment, the capital increase and earned

surplus made by Hyundai Motor also represented a significant part in the investment. It was obvious that, if the project failed, Hyundai Group would not just have gone bankrupt but also borne the burden of a significant amount of debt. However, Chung, Juyoung, the chairman of Hyundai Group decided to make a bold investment with his positive view and passionate entrepreneurship. Therefore, developing countries should find entrepreneurs who can boldly push forward the development and the production of their own vehicle in order to promote independent development of an automotive industry. This is because such an investment cannot succeed unless the enterprise or entrepreneur has the sense that failure would have a huge price. Although most developing countries are deeply interested in the independent development of an automotive industry, they have difficulty finding an entrepreneur to make a bold investment and take the risk.

It is also important to establish a mechanism to accumulate independently developed technologies and production experience in the process of developing its own model. Although it is inevitable to introduce external technologies and facilities, it is necessary to internalize such external technologies and production processes. Therefore, it is important to select partner enterprises necessary for the introduction of the technology and equipment and the construction of the automobile plant, as well as establish a plan to directly introduce technology and pursue negotiation. The most important element is that the workforce from developing countries must acquire technologies and fully understand the production procedure of advanced foreign companies in the entire process of independent vehicle development. Along with this, it is essential to secure technological capability by engaging in overseas training programs to improve the independence of the production and technology development.

The development and production of a fully Korean-made vehicle achieved by Hyundai Motor, provides many implications even to the countries that do not strive to independently develop its automotive industry through the development of its own vehicle model, but pursues development through foreign enterprises. The development of an automotive industry is dictated by whether the industry has human resources equipped with technological capability. Although Daewoo Motor was taken over to GM, GM is still operating in the small vehicle R&D sector in Korea because the workforce involved in the Korean automotive industry has great technological capability. Therefore, it is critical to come up with measures to lead the domestic technical workforce to participate in the process of development for the vehicles that are locally produced, even though the country strives to develop its automotive industry through foreign capital.

2. Automotive Parts Localization Policy

2.1. Goals and Outcomes

2.1.1. Goals

Promotion of the automotive parts industry at the early stage of the automotive industry's development was concentrated on automotive parts localization. With the parts localization ratio surpassing 90%, the policy goal was shifted to enhancing the competitiveness of the automotive parts industry. The main objectives were to improve self-design capability, new product development capability and quality of automotive parts and the industry.

2.2.2. Outcomes

The development of a Korean vehicle dramatically improved the parts localization rate. In the 1960s and early 1970s, a wide range of automotive parts localization policies had been implemented, all of which barely made progress. Accordingly, the government put forward a Korean made model development policy that greatly contributed to enhancing localization. As self-design capability of the parts industry improved, the rate of companies who used approved drawings exceeded 60% in 1990s.

Since the 2000s, autonomous product development capability of the automotive parts producers witnessed improvement of their capability to develop products so much so that their transactions with not only domestic partners but also overseas companies expanded. As a result, a number of Korean automotive parts companies became leading parts suppliers for major automakers such as GM. On top of such achievements, the level of existing automotive parts companies improved, securing the capability to supply parts for next generation vehicles including eco-friendly and smart cars.

Table 3-6 | Key Parts Suppliers of Ray EV

Parts	Supplier
Inverter	LSIS (Nuintek, JYProto)
Motor	Hyosung (Seil Industrial, LeeJo Metal)
Reducer	Wia (Woosu AMS, Il Kwang Metal, Samgong Gear)
Regenerative Brake	Mando (LGInnotek, GMS, Continental, Seoyoung Precision)
Battery System	SKInnovation (SKME, Yongsung Electro Device)
Low Voltage DC/DC Converter	Mobis (Orient Electronics, Digital Electronics, Yongin Electronics)
Battery Pack	Mobis (Halla Climate Control, Inzi Controls, Shinyoung, LSIS, Kefico)
Charger	Mando (Infineon, Freescale)

Source: Ministry of Knowledge Economy, eco-friendly car data.

The export of automotive parts has been drastically increasing in recent years and a host of overseas auto companies are showing keen interest in the Korean automotive parts industry. Consequently, plenty of domestic automotive parts companies have grown into world-class companies as six Korean companies were listed in the World's Top 100 Automotive Parts Suppliers in 2012.

Table 3-7 | Korean Companies in the World Top 100 Automotive Parts Suppliers

(Unit: million dollars)

2004			2012		
Ranking	Name of Company	No. of Sales	Ranking	Name of Company	No. of Sales
92	Mando	1,195	8	Hyundai Mobis	21,351
			38	Hyundai Wia	5,885
			46	Mando	4,115
			70	Hyundai Powertech	2,858
			90	Hyundai Dymos	1,935

Source: Automotive News.

2.2. Background and Needs of Policy Introduction

With the growing perception that the development of the automotive industry should be based on the promotion of the automotive parts industry, auto industry development policies have been focused on fostering the automotive parts industry and localizing automotive parts, rather than be based on simply the assembly of automobiles. While domestic automakers began to have competitiveness on the global stage, the government's automotive industry development policies have mainly focused on nurturing the automotive parts industry. It was necessary to foster the automotive parts industry for the improvement of finished vehicles' competitiveness.

2.3. Implementation Strategy and System

The comprehensive automotive parts industry promotion policies in the early stage of automotive industry development, focused on localizing automotive parts. By specifying detailed objectives for localization and specifying the items subject to localization in the plans regarding car production, the government encouraged companies to meet the objectives.

Parts industry integration measures are designed to form relationships between part suppliers and automobile manufacturers and suggested detailed methods in many plans including the 'Master Plan on Promoting the Automotive Industry.' The measures include methods for automakers to nurture automotive parts producers for parts localization. In addition, the government established promotion policies are not limited to the automotive industry, but also suggest measures to the entire parts and materials industry. However, the automotive parts industry accounted for the important portion.

2.4. Details and Implemented Measures

Designation of thirteen domestic automotive parts as item groups encouraged by the Ministry of Transportation, the Ministry of Commerce and the Ministry of National Defense (ROK Army Headquarters) in 1948 was the first policy to promote the domestic parts industry. The automotive parts localization policy launched with full-effect in 1962 when modernized assembly production began.

2.4.1. Localization Policy in the Era of KD Assembly

a. Localization Policy in the Initial Era of KD Assembly

Localization of automotive parts was emphasized as an important issue in the 'Automotive Industry 5-Year Plan,' which was the first systematic plan for automotive industry development. The plan aimed to achieve full localization of parts within five years by initially permitting the introduction of parts necessary for production from foreign countries, and later, promoting localization on a graduated basis. Article 6 (Restriction on Import of Foreign Cars) of the 'Automotive Industry Protection Act' that was enacted together with the 'Five-Year Plan,' stipulated "the Minister of Commerce shall restrict the import of foreign cars and their parts and components to protect the domestic automotive industry."

However, these automotive industry development plans were initially carried out without considering domestic automotive parts companies, which actually contracted the automotive parts industry. In particular, Article 7 (Exemption of Tariff) of the 'Automotive Industry Protection Act' stipulated that "machinery or parts for industrial facilities and components necessary for producing and assembling cars can be subject to tariff exemption until they are domestically produced, as prescribed by decrees." Accordingly, Saenara Motor Company could import the entire set of parts from abroad without tariffs. The provision had been in effect for a while, leading automobile assembly companies to prefer importing parts from abroad with non-tariff preference over parts localization. Since Saenara Motor Company suspended the production at the Semi-Knocked Down (SKD) stage, it became even more difficult to implement the localization plan.

As the 'Five-Year Plan on the Automotive Industry' ran into a snag with the suspension of vehicle production by the Saenara Motor Company, the Ministry of Commerce unveiled an 'Automotive Industry Integration Measure' in December 1963. The plan was to enhance the localization of automotive parts by integrating and unifying Saenara Motor Company, Sibal Automotive Enterprise, eight provisional assembly factories and Asia Motors, into the Korea Machinery Enterprises Inc, which had already smoothly implemented the 5-Year Plan.

As mentioned above, there were policies to pursue localization of automotive parts in the early 1960s, but they neglected promotion of existing automotive parts companies or localization of the parts industry as they placed too much emphasis on the introduction of modernized automobile assembly systems. In particular, production of compact cars (passenger vehicles) was not related to the existing domestic parts industry. As Korean

automakers such as Sibal Automotive Enterprise, which used domestic parts, were excluded from car production, the foundation for the domestic parts industry was severely undermined.

b. Introduction of Integration Plans

As one integration plan turned out a failure, the government came up with the 'Master Plan on Automotive Industry Promotion (Integration Measure)' in August 1964. In January 1965, the government announced the 'Five-Year Plan on Localization,' which aimed to localize all automotive parts by 1969. This measure aimed to integrate all the existing parts manufacturers (seventy-five companies under the Korea Auto Industries Coop. Association), into the existing car manufacturing factories under operation. A plan to supply all the domestic automotive parts through a single assembly line was established and Shinjin Automotive Corporation was designated as a parent company for the integration plan.

The purpose of the integration plan was to lead the Korean automotive parts companies to secure global competitiveness and improve localization. However, the integration policies in the 1960s did not result in any significant achievements. That was because Shinjin, which was designated as the parent company, only focused on the import of KD parts by using its monopoly status. Too many model modifications in relationship to the size of demand also hindered localization of the automotive parts. The localization rate of Shinjin in 1966 was 21%. The company used only some parts for automobiles such as tires and batteries, which were less significant than other parts. Although the government encouraged localization continuously since then, the localization rate of Shinjin in 1967 stood at 23.7% and recorded a mere 38.2% in 1969 when full localization was supposed to be achieved.

Table 3-8 | Localization Rate and Number of Car Production of Shinjin Automotive Company

	1966	1967	1968	1969
Localization Rate (%)	21.0	23.6	27.6	38.2
Number of Cars Produced	3,117	4,983	11,629	19,494

Source: Oh Won-Chol, "Korean Economic Construction Model", Kia Economic Research Institute May 1996.

Table 3-9 | Localization of Vehicles (1968)

Assembly				
Domestic Supply (38.19%)				Import (61.81%)
Engine (5.75%)	Chassis (8.34%)	Body (19.95%)	Electronics and other parts (4.15%)	engine transmission propeller shaft steering system front axle rear axle brake system door hood and fender
fuel pipe fuel hose air cleaner fuel tank pan V belt muffler radiator	pedal bracket part parking brake wheel cap tire and tube spring shock absorber	bumper door head lamp door handle glass molding sheet silencer muffler weather strip trim	heater radio lamp battery wire harness battery cable wiper switch bolt	

Source: Oh Won-Chol, 「Korean Economic Construction Model」, Kia Economic Research Institute May 1996.
Note: These figures were estimated based on the vehicle Corona produced by Shinjin Automotive Company in 1968.

c. Introduction of Horizontal Integration

As the integration measures and five-year plan on localization did not make remarkable progress, the government reexamined the existing localization and integration plans completely and in accordance with then President's orders to established another localization plan in October 1968. The 'Basic Plan for Automotive Industry Promotion (3-Year Localization Plan)' announced in December 1969 was the plan established under the President's direction. The plan was to set up a mass production system and promote rapid enhancement of localization, by unifying vehicle models to avoid the small quantity batch production, which had been pointed out as the biggest hurdle hampering localization. The annual localization targets for specific parts were set in the plan. Full localization of passenger cars / buses and trucks was planned to be achieved by 1972 and by 1974 respectively.

Table 3-10 | Full Vehicle Localization Plan (1969)

(Passenger Car Localization Plan)

Major Parts and Localization Rate	1969 (Base Year)	1970	1971	1972	Total
	38%				38%
A Total of Localization in 1970	20%				
Rear axle	8%				
Wheel	2%				
Hub, Drum	2%				
Clutch	2%				
Electronics	6%				58%
Total Localization in 1971	17%				
Front axle	6%				
Steering system	2%				
Transmission gear	8%				
Engine accessories	1%				75%
Total Localization in 1972	25%				
Engine	15%				
Car body	10%				100%

(Bus and Truck Localization Plan)

(Unit: %)

	1969	1970	1971	1972	1973	1974
Bus	77.5	81	85	90	98	100
Truck	34	45	60	85	90	100

Source: Oh Won-Chol, 「Korean Economic Construction Model」, Kia Economic Research Institute May 1996.

Along with the plan, the government promoted horizontal integration by consolidating automotive parts factories, even though vehicle assembly was operated in three factories. Horizontal integration is a strategy where one automotive parts company does business with several assembly companies so that it can have equal bargaining rights in transactions. It aims to promote the auto industry by completely separating assembly factories and parts factories. Back then, the demand for automotive parts was so low, as the absolute quantity of car production was small, that consolidation of the automotive parts industry was necessary. Accordingly, only engine processing plants and vehicle body assembly plants were built uniquely for vehicle assembly, while automotive parts such as engine accessories, transmissions and axles, steering systems, electronics, braking systems and body parts were supplied from a single, specialized automotive parts plant. In other words, the policy made three automakers be supplied with specific parts from one parts company.

d. Assessment on Parts Localization Policy in the Era of KD Assembly

Since the establishment of the 'Automotive Industry 5-Year Plan,' all vehicle-related policies suggested full parts localization within three or five years as one of the policy' objectives, but little progress was made. The localization rate of domestic cars was only 50~60% in 1972, the final target year of full localization set in the '3-Year Localization Plan,' which was the last vehicle policy in 1960s. This localization rate was even calculated by assuming that an assembly company used all localized automotive parts even if it used parts that are not domestically made, so the actual localization rate was much lower than the figure. That is to say, when an automobile manufacturer used a product, which was localized only 10% by a parts company, the company was deemed to use Korean-made products.

In the 1960s, there had been policy changes almost every two years. For instance, the 'Automotive Industry 5-Year Plan' and the 'Automotive Industry Protection Act' were established in 1962, the 'Automotive Industry Integration Measure' was laid out in 1963, the 'Master Plan on Automotive Industry Promotion (Integration Measure)' was launched in 1964 and the 'Basic Plan for Automotive Industry Promotion (3-Year Localization Plan)' was announced in 1969. Most of the policy changes were attributable to failure in achieving parts localization. The poor progress of the localization plans is closely related to the then automotive part import policies. The 'Automotive Industry Protection Act' enacted in 1962, provided that the Minister of Commerce can limit import of automotive parts but he could also permit the import of automotive parts without tariff if deemed necessary. Under the law, Saenara Motor Company could import all their parts from abroad with zero tariffs. Since then, other enterprises also focused more on importing parts rather than localizing. Localization itself required development costs. Plus, the quality of domestic parts was poorer than that of imports, despite the price being higher than imports. For instance, Hadonghwan Motors produced car wheels but the price was two to three times higher than imported wheels and the company frequently failed to meet production dead lines.

Therefore, the automotive parts industry promotion plan that almost totally restrained import and mandated the use of domestic parts was relatively effective. Under the plan, the yearly localization rate was set for production of specific automotive parts and companies who used these automotive parts could produce more cars based on the principle of allocation. As a result of the plan, major automotive parts such as axles and transmissions were domestically produced.

2.4.2. Development and Integration of the Automotive Industry

From the initial stage of development, the government implemented policies to nurture Korea's auto industry by separating automakers and automotive parts producers. Automakers took charge of assembly, engine and body while automotive parts companies produced the finer parts. Such separation policies were fleshed out in integration measures.

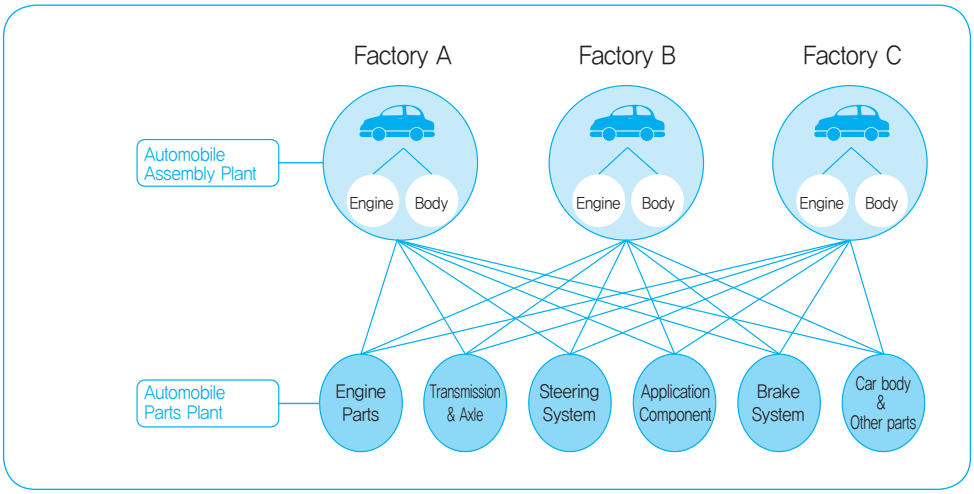
The initial meaning of "integration" was to clarify the role of assembly and parts companies in order to guarantee independent growth of automotive parts suppliers. The measure placed more emphasis on preventing the internalization of imports or automobile assembly companies to facilitate stable production of automotive parts companies rather than on boosting cooperation. The development of cooperative relations, which was the original purpose of the integration measure, was realized later as the quality of finished vehicles became an issue when the auto industry developed to some extent.

a. Implementation of Horizontal Integration

Horizontal integration adopted under the 'Master Plan on Automotive Industry Promotion' in August 1964 and the '3-Year Localization Plan' in December 1969 started to bear fruit as Korean-developed vehicles were produced. In the 'Automotive Industry Promotion Act' following declaration of the 'Heavy Chemical Industrial Policy' in January 1973, the government required automakers to develop fully Korean-made models and promoted separate promotion of assembly and automotive parts plans.

In the 'Long-term Automotive Industry Promotion Plan' in May 1974, the government mandated individual parts companies to have a mass production system specializing in one automotive part and push forward horizontal integration with automobile assembly companies. The 'Horizontal Integration Plan' categorized automotive parts such as engine parts, transmissions and car wheels, steering systems, electronics, braking systems, car bodies and other parts into specific items and designated a production plant for each item so that it could be produced and supplied by one factory. By doing so, the plan aimed to lead automotive parts producers to secure global competitiveness in terms of quality and price by producing more than 50,000 units of automotive parts on an annual basis. In addition, the government actively promoted foreign joint ventures while establishing the Changwon Industrial Complex and giving financial and tax benefits.

Figure 3-1 | Horizontal Integration System of the Automotive Parts Industry



Source: Oh Won-Chol, 「Korean Economic Construction Model Vol. 4」, Kia Economic Research Institute May 20, 1996.

As the production of finished cars was shifted from only KD parts assembly to a substantial portion of production using domestic parts in the 1970s, the Korean automotive parts industry began to build the foundation for development. Promotion measures such as separation and promotion of parts and automobile assembly companies, specialization and enlargement of parts companies, prohibition on import of similar parts to those produced domestically and promotion of integration as presented in the 'Long-term Automotive Industry Promotion Plan' were assessed to play a pivotal role in advancing the automotive parts industry in the 1970s.

It was in January 1975, when the government designated items and companies subject to integration of automotive parts to expedite localization and enhance quality, that the government-led plan on integration of automotive parts producers was improved. The plan aimed to streamline and integrate the parts industry, which was inefficient and fragmented in order to lay a foundation for mass production. The government designated a total of 145 automotive parts as items subject to integration. Among them, 62 parts were designated as items for localization and 87 companies were selected for integration. To provide a legal basis for the integration measure under the 'Long-term Promotion Plan,' the 'Promotion of Alliance between Small and Medium Enterprises Act' was enacted in December 1975, which facilitated establishment of new parts companies and promoted active production.

Table 3-11 | Status of Automotive Parts Localization (1975)

(Unit: Number of items & companies)

	No. of Items	No. of Localized Items	No. of Integrated Companies
Engine	31	16	26
Clutch	3	2	2
Transmission	5	2	2
Rear Axle	9	6	6
Front Axle	4	2	1
Steering Unit	9	1	1
Car Wheels	2	1	2
Suspension System	2	2	3
Braking System	6	5	5
Electronics	14	14	18
Vehicle Body	56	7	14
Common Parts	4	4	7
Total	145	62	87

Source: Ministry of Commerce, 「Long-term Automotive Industry Promotion Plan」, January 1974.

* Policy related to Integration of Small and Medium Enterprises

In 1966, the 'Basic Act on Small and Medium Enterprises' was enacted and Articles 18 and 19 of the Act prescribed that the government shall come up with measures to promote integration and rationalize subcontracting. In 1967, the government established measures promoting integration between small and medium enterprises as a part of the machine industry promotion measures. In 1969, the government set up the selection criteria for businesses subject to specialization and integration in order to designate the types of businesses subject to integration and it announced a guideline on specialization and integration of SMEs in 1970. However, integration measures adopted before 1975 were just administrative measures with minimal effect. Nonetheless, with the enactment of the 'Act on Promotion of Alliance Between Small and Medium Enterprises' in 1975, the government actively carried out projects for the integration of SMEs. In 1976, the Enforcement Decree and the Enforcement Rule for the Act were enacted. Notifications on the standard for promoting the integration of SMEs and a notification on items subject to integration for specific businesses were made in 1977. The criteria were as follows: 1) clarifying the fields of order by parent company and improving ordering methods; 2) modernizing facilities, enhancing technology and improving quality of subcontractors; 3) improvement of the methods for deciding unit cost, methods for examining supply and other conditions for transactions; and 4) matters necessary for integration.

* Case of Strongly Implemented Integration Policy

In 1970s, Hyundai Motor Company included construction of transmission and rear axle factories in a construction plan for a general automotive plant, but the government maintained the position that automotive parts companies shall be in charge of those areas in accordance with integration policies. In line with such a stance, the government attached a condition that 'production technologies for transmissions and rear axles shall be provided to existing or new affiliate factories and new factories shall be built in Changwon Industrial Complex through a joint investment with existing company' for granting approval for the construction contract on general automotive factory submitted by Hyundai Motor Company. On March 2, 1974, the government also added a condition for approving introduction of loans that 'the construction plan for transmission and rear axle factories shall be excluded from the head company's business plan and a separate business plan shall be made via consultation with existing companies and be approved.' Hyundai responded that self-production of transmissions and rear axles by automakers was a global practice and the production size for Hyundai's own demand was justification for approval. Hyundai also proposed to the government to ease the approval conditions in order to rapidly implement the construction plan by including those factories in the general automotive construction plan, as it needed to prepare production of particular specifications. However, the government put a brake on Hyundai's demand, noting that introduction of technology was necessary for localizing transmissions and rear axles for the small passenger cars that Hyundai planned to produce. Additionally, there were two existing companies specializing in those parts, Dongyang Warner and Korea Spicer, so it would be better for Hyundai Motor Company to help existing companies to sign a technology introduction contract.

Along with the parts integration policy, the government took a significant measure to transfer the rights to examine and approve importation of automotive parts to Korea Auto Industry Coop. Association from 1975. Before then, the Ministry of Commerce had the rights and it sometimes granted approval for import of parts that were being localized due to outside pressure.

Because the Korea Auto Industry Coop. Association had the rights to examine the approval for automotive parts, there was no reason for the association to permit the import of parts that could be produced by domestic auto parts companies (members of the association). For this reason, automakers had no choice but to use domestically produced parts. This dealt a huge blow to KD production methods, serving as an opportunity to enhance localization rates.

In May, 1976, the government announced a localization measure for production of a Korean-developed model adjusting the system to allow general automotive plants to produce not only car bodies and engines for passenger vehicles but also transmissions and axles. Yet, the government compelled that only parts companies could produce other parts, including power transmissions, braking and steering systems. Along with this policy, it beefed up support for localization of machinery by facilitating technological development.

The 'Basic Plan on Machinery Industry Promotion' announced in February 1977 reiterated the promotion measures for localization and integration. In July 1977, the government temporarily designated 62 companies with accumulated technology and sound financial structure and selected 50 automotive parts that were produced by these companies as intensive promotional items.

Owing to the government's parts industry promotion policies, the Korean automotive parts industry achieved rapid growth. Most large-scale automotive parts factories including Dong Yang Machinery began to be constructed within the Changwon Industrial Complex. To enhance their competitiveness in the global market, domestic automotive parts suppliers sought technical relationships with leading companies abroad. The number of automotive parts companies also greatly increased. In particular, the number of member companies joining Korea Auto Industry Coop. Association rapidly grew starting in 1975. The figure more than tripled in four years from less than 100 in 1975 to 327 in 1979 and the number of relatively big corporations nearly quadrupled.

Table 3-12 | Changes in the Export of Automotive Parts

(Unit: thousand dollars)

	1975	1976	1977	1978	1979	1980	1981
Spring	1,455	3,478	3,615	3,359	4,541	3,605	7,411
Automobile Light Bulbs	2,007	2,276	2,958	3,103	1,934	1,630	872
Piston Ring	1,402	1,153	1,151	1,978	1,884	3,451	3,292
Piston & Pin	884	745	759	751	863	1,844	3,368
Metal Bearing	262	408	615	650	1,059	1,340	1,971
Axle Shaft	130	216	71	164	1,224	237	918
Cylinder Liner	300	325	317	139	161	1,107	1,829
Ball Bearing	40	215	144	758	1,943	4,644	3,340
Engine Valve	21	39	33	78	200	1,195	1,860
Ignition Coil	17	6	16	31	61	47	-

	1975	1976	1977	1978	1979	1980	1981
Axle	-	260	915	151	93	1,015	1,975
Wiper Blade	107	149	265	251	424	1,099	1,391
Engine	30	261	5,196	2,154	239	2,084	4,430
Wheel Disc	310	225	166	144	422	543	1,484
Gear	71	577	191	234	87	189	1,330
Tire Chain	1,748	1,455	1,302	2,820	3,981	5,707	3,021
Radiator	26	81	48	265	970	752	1,152
Others	878	2,088	5,588	12,776	16,568	23,424	71,354
Total	9,688	13,957	23,350	29,806	36,654	53,913	110,998
Number of Exporting Countries	43	57	68	84	87	85	103
Number of Items	45	69	79	91	84	97	110
Number of Companies	35	49	61	68	63	86	149

Source: Oh Won-Chol, 「Korean Economic Construction Model Vol. 4」, Kia Economic Research Institute 1996

In addition, the export of automotive parts increased rapidly, going up by over 11 times from less than 10 million dollars in 1975 to 110 million dollars in 1981, which was similar to the amount of finished car exports. Not only that, the number of exporting companies, exported destinations and exports items sharply increased. The most important role of horizontal integration policies was to guarantee a stable demand base for automotive parts by strictly regulating the automobile assembly companies' production of parts and the import of parts that could be domestically produced. Thus, the government led the horizontal integration policy while automobile manufacturers played an insignificant role.

The localization and integration promotion policies had positive effects such as a surge in new part companies, an increase in the amount of production and exports, and the improvement of localization rates. However, integration was not achieved as much as expected. Automotive parts suppliers faced a limit to enlargement and specialization under the small quantity batch production philosophy. Due to the features of horizontal integration, forging a cooperative relation with automakers for financial and facilities support as well as technical and management guides for automotive parts producers was not done in a smooth way. In fact, the horizontal integration policies were focused more on nurturing parts companies than policies to strengthen collaboration between automotive parts producers and automobile assembly companies.

b. Transition to Vertical Integration

Recognizing the limitations of strengthening cooperative relations between automobile assembly companies and automotive parts suppliers through horizontal integration, from 1978, the government sought for new measures to create an autonomous affiliate relationship between parent companies and parts suppliers. The measures included a partial revision of horizontal integration measures under the long-term promotion plan and began using vertical integration. Vertical integration was aimed at encouraging automobile manufacturers to actively support parts companies by having affiliated automotive parts companies for each automobile manufacturers company. The purpose was to reinforce the role of automobile assembly companies in providing financial and facility support as well as technical and management guides.

The government chose vertical integration as vehicle assembly production had exponentially grown in the mid 1970s while development of Korea's own vehicle model and mass production of domestic vehicles kicked into high gear. As the automotive industry grew, the quality of automotive parts mattered more than the economic size of parts production. To address the quality issue, automotive parts companies, the government but also automobile assembly companies had to play a pivotal role. From the perspective of the automakers, the quality of automotive parts was closely related to the quality of finished cars. Against this backdrop, the automakers realized the need to foster parts companies. The promotion of automotive parts producers by automakers through the horizontal integration system had a limit in that it was unclear who would be responsible and who would benefit from resources invested for promotion.

Hyundai Motor Company maintained a close relation with automotive parts suppliers from the initial stage of producing its own vehicle model, Pony. From the project planning stage, it selected qualified companies after a survey on the status of the Korean parts producers, promoted technological cooperation with the selected companies and helped them introduce advanced technology from abroad. By conducting thorough quality inspections, the company improved the quality of companies who failed to meet the required standard by offering quality guidance jointly with dispatched technicians for technological alliance. The development of Korea's own vehicle models was impossible without the support of relevant automotive parts companies while the parts companies could not enhance the level of production and quality without the support of automobile manufacturers. Thus, vertical integration can be said to have begun with the development of fully Korean-made vehicle models.

The vertical integration system was actively put forward as a joint project on designated integration was implemented in 1979 under the first revision of the 'Promotion of Alliance Between Small and Medium Enterprises Act' on December 5, 1978. Under the revision, the establishment of joint projects on designated integration was shifted from a reporting system to an approval system, and the Minister of Commerce was granted the rights to revise a business plan while strengthening the function of cooperatives. The joint project plan refers to establishment of a business plan jointly by an automobile manufacturer operating the type of business subject to designated integration and an automotive parts supplier consigned to manufacture items subject to designated integration. By doing so, an automaker was encouraged to directly foster certain parts suppliers. In the same year, the government expanded the scope of integration, imposed a duty upon automakers and, at the same time, reinforced penalties. However, vertical integration was not achieved based on autonomous relationships but led by the government. For this reason, the relationship between automakers and parts suppliers was perfunctory in many cases.

In June 1981, the Korean government established the 'Measure for Improving Productivity of Automotive Parts Industry' to revitalize the automotive parts industry and develop it as export-oriented industry after a regulation measure for finished car assembly companies. To this end, the government sharply increased the number of items subject to integration from 42 to 102. In 1981, the Korean government also set up a plan to invest 10 billion won from a 47 billion won investment plan by the Industrial Bank of Korea and Korea Credit Guarantee Fund for automotive parts suppliers, to provide 10 billion won of low-interest working funds for SMEs and another 3 billion won out of 6 billion won from a machinery industry promotion fund preferentially to affiliated factories specialized in automotive parts. In addition, the government set a target to export automotive parts worth 1 billion dollars by 1986.

In the 1980s, government-led integration was shifted to private-led integration through revision of the 'Promotion of Alliance Between Small and Medium Enterprises Act.' By strengthening the operation of the integration promotion council in 1982 as a transition to private-led integration, the government facilitated the mutual cooperation between parent company and suppliers. Under the revision of the 'Promotion of Alliance Between Small and Medium Enterprises Act' in 1983, the government-led integration deliberation committee was changed to a private-led SMEs integration promotion council and a part of the guidance rights were entrusted to the private sector. Along with these changes, the government carried out a policy to help parent companies form and operate suppliers associations with an aim to promote more autonomous integration.

As a result of such measures, in 1984, the automotive suppliers association under individual automotive parts companies such as Daewoo Automotive Suppliers Association under Daewoo Motors, DongA Automotive Suppliers Association (formerly SSangYong Automotive Suppliers Association) under DongA Motor Company (formerly SSangYong Motor Company), Hyundai Automotive Suppliers Association under Hyundai Motor Company and Asia Automotive Suppliers Association under Asia Motors were formed.

In addition, suppliers associations began forming under primary parts producers after 1985. Starting from the launch of the Suppliers Association under Kia Machinery Industries in December 1985, suppliers associations under Korea Spicer Industries, Seil Heavy Industries, Mando Machinery, Kia Precision Machinery, Daewoo Precision Industries, Pungsung Electro-Mechanics and Daewoo Mechatronics were established.

Table 3-13 | Status of Automotive Suppliers Associations for Each Parent Company

Name of Parent Company	Name of Council	Date of Establishment	No. of Members
Kia Motors	Kia Automotive Suppliers Association	1977.11.18	178
Daewoo Motors	Daewoo Automotive Suppliers Association	1984. 3.15	136
Hyundai Motor Company	Hyundai Automotive Suppliers Association	1984. 4.12	293
SsangYong Motor Company	SsangYong Automotive Suppliers Association	1984. 3.30	182
Asia Motors	Asia Automotive Suppliers Association	1985.10.11	121
Hyundai Precision	Hyundai Precision Suppliers Association	1994. 4.26	80
Daewoo Heavy Industries	Daewoo Heavy Industries Suppliers Association	1984. 3.30	166
Hyundai Car Service	Hyundai Service Suppliers Association	1984. 4.12	46
Daerim Motor Company	Daerim Automotive Suppliers Association	1984.11.29	94
Hyosung Motors & Machinery	Hyosung Machinery Suppliers Association	1985.11.22	104
Kia Heavy Industries	Kia Heavy Industries Suppliers Association	1985.12.26	67
Tongil Heavy Industries	Tongil Heavy Industries Suppliers Association	1987. 6. 1	60
Mando Machinery	Mando Machinery Suppliers Association	1987.12.18	89
Kia Precision Machinery	Kia Precision Machinery Suppliers Association	1988. 3.29	60
Daewoo Precision Industries	Daewoo Precision Industries Suppliers Association	1987.12. 2	31
Pungsung Electro-Mechanics	Pungsung Electro-Mechanics Suppliers Association	1989.12.20	26
Daewoo Mechatronics	Daewoo Mechatronics Suppliers Association	1990. 5. 9	69
Samsung Heavy Industries	Samsung Heavy Industries Suppliers Association	1984. 4.25	60

Source: Korea Auto Industries Coop. Association, "A Handbook on Automobile Industry 1996."

The Hyundai Automotive Suppliers Association aimed to pursue win-win growth between Hyundai Motor Company and member companies. The members of the association were parts makers, processing outsourcing companies or relevant companies who were closely related to production of Hyundai Motor Company. With recommendations by Hyundai

Motor Company, companies who had been doing business with Hyundai Motor Company for more than 2 years and whose supply to Hyundai Motor Company accounted for more than 40% of total sales were eligible to be a member. Main activities of the association were focused on management and technology exchange to facilitate effective communication between Hyundai Motor Company and its suppliers, to cut parts production costs and to enhance the quality of automotive parts. The association was not autonomously organized nor operated by suppliers, but by automobile assembly companies with an aim to improve the quality of finished cars. Consequently, though the rules of the association provided that the association was run by membership fees and subsidies, in reality, the association was operated with subsidies from automobile assembly companies 100%.

Therefore, the association was more like a parent company's organization for supporting and managing parts suppliers. Most of the budget for the associations went into training on technology and quality as well as technology exchange, which is considered to have greatly contributed to enhancing technology of SMEs with weak technological capability.

Table 3-14 | Changes in Sales of Automotive Parts

(Unit: 100 million won)

	Sales Figures			
	OEM	A/S	Export	Total
1980	3,304	330	356	3,990
1985	11,013	1,614	1,296	13,373
1990	50,234	4,020	3,546	57,800

Source: Korea Automobile Manufacturers Association, 「A Handbook on Automobile Industry」, each year.

Owing to the efforts made by the government and automobile assembly companies for integrating the automotive parts industry, the Korean automotive parts industry grew remarkably. The total sales of automotive parts producers more than tripled from 399 billion won in 1980 to 1 trillion 337.3 billion won in 1985 and to 5 trillion 780 billion won in 1990, which was nearly a five times increase. Not only the total sales but also the export of automotive parts dramatically grew by over 10 times in 1980s.

2.4.3. Policy Recommendation for the Qualitative Growth of the Automotive Industry

The automotive industry witnessed significant growth due to integration measures and other supporting policies. However, there were still some issues to be resolved such as import of core parts from Japan as well as low quality products and less competitive technologies of the domestic parts manufacturers. To address these issues, the government launched a master plan on development to advance the domestic components and materials industry. With the enhancement of the industry structure and improvement of adverse trade conditions with Japan since the 2000s, the government implemented policies to advance the parts and materials industry and enacted the 'Act on Special Measures for the Promotion of Specialized Enterprises, etc. for Components and Materials' in February 2001. The government implemented policies on multiple fronts to support the technological development of the parts industry, penetration into global markets and establishment of reliable infrastructure. In the initial stage, the government focused on policies that reaped short-term return on investment, such as development of parts and establishment of necessary infrastructure. Then, after the mid 2000s, the focus moved towards policies that supported the penetration of components and material manufacturers into global markets.

In July 2001, the government established the 'Basic Plan on Development of Materials and Components Industry,' which was a long-term strategy to develop the parts and materials industry. To achieve the vision of making Korea the world-class supply chain hub of parts and materials, the government set out to accomplish three major goals: foster companies that specialize in parts and materials, develop next-generation technologies, and supply domestic parts to the global procurement market. To this end, large-scale projects were launched including projects to develop parts and materials technology, provide comprehensive technical support and build credible infrastructure. Such efforts were part of the very first master plan on development led by the government to nurture the parts and materials industry, which played a significant role in advancing the industry and strengthening its competitiveness. In addition to the aforementioned plans, there were other plans to support R&D efforts to develop automotive parts technologies. Most of the supporting policies focused on technology development and the same went for policies that supported the development of automotive parts.

Table 3-15 | Major Technological Development Project on Automotive Parts

Categories	Project Title	Period	Head Agency
Critical-Bridging Technology	Development of Cockpit Module for Vehicles	2000.9~2004.8	Duckyang Industry
	Development of Front-End Cooling Pack System for Vehicles (2 stage)	2004.11~2006.10	KATECH
	Development of Chassis Corner Module for Vehicles	2001.10~2005.7	KATECH
	Development of High Voltage (42V) System Parts and System for Vehicles (2 stage)	2005.9~2007.8	KATECH
	Technology Development of Diesel Engine for Emissions Regulation	2003.9~2006.8	KATECH
Parts Material	Development of Car Body Network System	2003.7~2007.6	Daewoo Precision Industries and 3 others
	Development of Chassis for Vehicle (Al Control Arm. Al Sub-frame)	2003.12~2007.1	Central and 2 others
	Development of Electronic Control Type Auxiliary Transmission	2003.12~2008.1	Dymos and 2 others
	Development of Electronic Control Type Suspension	2004.10~2008.9	Hyundai Mobis and another
	Development of Electronic Control Type Parking Brake	2004.10~2008.9	Mando and another
	Development of Carbon-Ceramic Brake System	2004.10~2008.9	DACC and 2 others
	Others (12 projects in the automobile industry)	-	-

Source: Korea Automotive Technology Institute, Innovate Korea, Report on Field Survey on Automotive Industry, Ministry of Commerce, Industry and Energy, 2006.

In order to supply Korean automotive parts in the global procurement chain, the government redoubled its efforts to boost export. Up until then, most of the exported parts were supplied as replacement parts for after-sales service of Korean vehicles exported overseas or used in the production lines of the domestic automobile manufacturers' overseas plants. In order to become global players, the small and medium-sized automotive parts manufacturers needed to expand their customer base. Against this backdrop, the Ministry of Knowledge Economy announced the 'Automotive Parts Competitiveness Enhancement Plan' to improve the export competitiveness of the automotive parts industry. Established in major regions, "Auto-parts Park", which was established in major regions, was designed

to help facilitate working relationships between foreign automotive companies and Korean parts manufacturers by serving as a contact point, identifying source routes, and sharing relevant information. To capitalize on the geographical proximity of Korea, Japan, and China and boost supplies of automobile components, the Ministry Knowledge Economy released plans to build a global milk run infrastructure for automotive parts with Japan and China and signed a bilateral agreement which allowed imported cars from partner countries to be driven in their respective lands. Under the planned milk run logistics where automotive parts stuffed in a container will be loaded on a trailer and sent to a final destination using ferries, suppliers will be able to receive the container intact and pick up necessary components from the automakers directly and timely. This system will also allow faster deliveries as it would not require time-consuming procedures and cargo handlings at container terminals, thus cutting time and cost. Transit time from South Korea to Japan would be cut to four days instead of the current 30 days. Also, to support the Korean auto suppliers that expanded into the US market, the government established communication channels with state governments, which are at the center of auto production in the United States.

In addition, the government arranged technical cooperation agreements to reduce the technology gap with auto part market leaders in Europe and gradually expand the supply of Korean automotive parts in Europe. Furthermore, export consultation meetings were held in emerging economies such as India and Brazil in collaboration with KOTRA to offer networking opportunities between Korean auto suppliers and the local companies. To cope with the trends in the global parts industry, namely greater demand for module parts, efforts will be made to develop technologies to integrate existing parts and pursue joint research projects with global auto manufacturers. At the same time, the government announced plans to develop parts that have huge potential in the long-term in order to secure future growth engines.

To help small and medium-sized auto suppliers comply with rules of origin under the FTA and enjoy tax exemption benefits, the government joined hands with the Korea Customs Service to expand the FTA-PASS, which lowered the financial burden of the SME suppliers to build the system independently. The Korea Auto Industries Cooperative Association voluntarily launched a one-stop support service system to handle complaints or requests and provide consultation to automotive parts companies that supply to multinational companies. Staff exclusively responsible for supporting the auto suppliers provided consultation or connected them to relevant institutions that offered policy consulting.

2.5. Analysis of Factors behind the Success

Although the growth of the automotive parts industry in Korea was largely driven by the advances in the finished vehicle industry, the fundamental success factor lies in the government's sustained policies to nurture the industry and localize the production of automotive parts. Policies introduced in the early stages of development ended in failure. Nevertheless, the government did not give up and continuously devised and implemented new policies. For instance, the government announced the 'Automotive Industry 5-Year Plan' in 1962, then laid out five important policies in an effort to achieve localization of automotive parts. Rather than simply importing assembly parts to Korea, the government stressed the importance of locally produced automotive parts. Thus, the government required full localization of automotive parts in the development and production of independent vehicle models. As companies worked hard to meet the government requirement, the localization rate of automotive parts reached 90% early on.

Also, the government implemented adequate policies to support the growth of the automotive parts industry in the different stages of development. It also assigned appropriate roles to the automotive parts manufacturers in the process of developing and producing independent vehicle models in Korea. A prime example is the implementation of integration measures. In the early days when it was difficult to realize economy of scale due to the small size of the automotive industry, the government promoted horizontal integration in order to promote industry growth. When the production capacity increased and cooperation with the finished vehicle manufactures became necessary, the government pushed ahead with vertical integration so that the finished vehicle industry could trigger the growth of the parts industry. Voluntary cooperation among companies was critical to the success of vertical integration. Nonetheless, the role the government played by implementing policies that fostered cooperative relationships within the industry cannot be neglected. Amid the focus on shared growth, the government has laid forth policies that stress such cooperative relationships once again.

The government's strong import control in the initial stages of development was instrumental in protecting the nascent automotive parts industry and laying the foundation for stable growth going forward. Instead of an outright ban on imported automotive parts, the government thoroughly reviewed types of automotive parts to determine whether to impose import control and applied this equally to locally produced parts. In the process, automotive parts that were problematic in terms of quality or price were eliminated, giving more room for manufacturers that produced competitive automotive parts to ensuring a stable environment.

Since the 1990s, the government concentrated its efforts on promoting qualitative growth of the automotive parts industry. First, the government launched policies to promote the machinery and parts industry in the 1990s. Then from early 2000, the government enacted the 'Act on Special Measures for the Promotion of Specialized Enterprises, etc. for Components' and launched the basic plan to systematically nurture the automotive parts industry. In order to achieve qualitative growth, the policy focus was on improving the quality of the parts and relevant technologies. Also, taking a step further from domestication of automotive parts, the government set out to make Korea the export hub of the parts industry. Aside from the government support stipulated in the 'Act on Special Measures for the Promotion of Specialized Enterprises, etc. for Components,' industry players voluntarily provided a wide range of technical support as well as assistance for the export of domestic automotive parts. A comprehensive system is in place to support the small and medium sized parts manufacturers from identifying new demand sources and assisting in the logistics and delivery of products.

In general, the growth of the domestic automotive parts manufacturers is regarded as a corollary of the development of the finished vehicle sector. However, if domestication of the automotive parts had not been achieved early on, the Korean automotive industry could not have sustained the growth momentum on its own. The development and production of the Pony, the independent vehicle model, is particularly noteworthy because it paved the way for Korea to develop relevant technologies on its own. Development of the independent vehicle model would not have been possible without the localization of automotive parts. As such, the competitive edge of the automotive parts industry lies behind the recent success of Korean auto manufacturers that produce world-class automobiles with price competitiveness. As such, the Korean government's consistent support is attributable to the competitiveness of the automotive parts industry. The Korean government has signaled sustained policy support in the development of the automotive parts industry going forward. Initially enacted as a temporary statute, the 'Act on Special Measures for the Promotion of Specialized Enterprises, etc. for Components' was extended to 2021. This is a testament to the strong determination of the government to continuously support the automotive parts industry.

2.6. Implications for Follower Countries

Among the various policies implemented by the Korean government to advance the domestic automotive industry, policies to support the automotive parts industry are particularly important. When it comes to supporting finished-automobile manufacturers, the government can lay out plans to set the direction and provide indirect support to foster the relevant environment. On the other hand, the government has more room to support the automotive parts industry under the WTO regimen in a wide range of ways such as formulating efficient transaction relations with the auto makers and supporting the small and medium-sized parts manufacturers. Thus, regardless of the development path that the latecomer countries choose to take, the government should make it a priority to focus on the development of the automotive parts industry.

Mandating foreign carmakers to use a set proportion of locally produced parts can be problematic. However, there are policy measures that the government can choose to attract foreign automotive parts manufacturers into the country while supporting the growth of domestic automotive parts makers. As a latecomer, the government needs to provide consistent support for the automotive parts industry in order to achieve sustained growth of the automobile industry as a whole. Despite several setbacks, the Korean government maintained its focus on domestication of automotive parts by revising the 'Automotive Industry 5-Year Plan' and was able to find reasonable solutions to the challenges it faced. Since there are more than 30,000 parts that go into one finished car, the development of the parts industry will not be achieved all at once. Given the characteristics of the industry, parts manufacturers are bound to be small and medium-sized enterprises needing consistent support from the government. That is why the automotive parts industry needs sustained policy support even after achieving full localization of automotive parts. Market leaders such as Germany also continue to support the parts industry through joint research projects. In addition, policies such as the integration measures implemented by the Korean government to foster cooperative relations between parts manufacturers and automakers should be replicated in the developing countries. Furthermore, when foreign automakers enter the domestic market, the government should encourage close collaboration between these global companies and local auto suppliers.

Chapter 4

Conclusion

Conclusion

During the Japanese occupation of Korea, some industries related to the automobile existed. Through independence and the effects of the Korean War, a fledgling Korean auto industry was born from automobile repair and parts industries. Later, a modern auto manufacturing industry started through knockdown production. However, earnest development of the Korean auto industry could be said to have begun in 1975, with the independently developed Pony. Some criticize the Pony, in that the model relied on foreign technology for most of its development and production processes, including design, engine, core parts, and the production line itself. However, the Pony is significant in that it served as a watershed for Korean auto industry development. Through this foreign technology, Korea was able to develop the Pony Excel, which was marketed in North America. Also, the development of indigenous engines and transmissions in the 1990s would not have been possible if not for the Pony's development.

By 1980, Spain and Brazil had manufactured over a million vehicles, but Korea still stood at 120 thousand vehicles. However, 30 years later, in 2010, the Korean auto industry surpassed these two countries. The auto industry in the two aforementioned countries are subordinated to multinational firms from other developed countries, whereas Korean auto firms have independent management, independent development of core technologies, and compete in the global market without limitations.

Table 4-1 | Acquisition Strategy for Development Capacity of Phased Independent Technology

Separation		1992~94	1995~97	1998~2000	2001~
Technology Development Stage		Learn of core technology	Individual technology development	Application technology development	Future new technology development
Independent Model Automotive Development		Small & Medium Car Jeep	Full-size Car Commercial	Electric Car	Future car
PARTS DEVELOPMENT	Engine	Establishment of planning & testing technology (Lean-burn Engine)	Low-pollution Engine (Alternative Engine)	High Performance Engine (Ceramic Engine)	Future Engine (Stirling Engine)
	T/M	Low noise T/M	A/T	Continuously Variable Transmission	New technology application of electric control
	chassis	Establishment of system planning technology	Chassis system of electric control	High performance Chassis system of electric control	Comprehensive control of Chassis system
	Car body	Ditto	Optimization of car body planning	New material application car body Car body group service technology	High safe car body
	Electronic Device	Sensor & ECU	Complex wire device Solid type instrument Warning information system	External information system	High level of information system
	Safe device	Passive seat belt	Air bag	Collision avoidance system System of keep distance between cars	Automatic operation system

Source: Private Development Association of Motor Vehicle Manufacturers, "medium & long term plan for automotive industry", p10. 1992.

Table 4-2 | Auto Production by Country

(Unit: 1,000 vehicles)

	Korea	Spain	Brazil	Mexico	Argentina
1975	36	814	930	361	251
1980	123	1,182	1,165	490	281
1985	378	1,418	967	398	137
1990	1,321	2,053	914	820	99
1995	2,526	2,333	1,630	929	285
2000	3,114	3,033	1,670	1,917	340
2005	3,699	2,752	2,493	1,682	319
2010	4,271	2,387	2,428	2,345	716
2012	4,561	1,979	3,342	3,001	764

Source: KAMA.

The Korean auto industry's development shows marked differences regarding government policies, corporate management structure, corporate strategies, technological strategies, and even corporate performance, from those of Mexico, Brazil, or Spain, where foreign firms lead the industry.

Table 4-3 | Development Comparison of the Automotive Industry in Newly Industrialized Countries

	Mexico, Brazil, Spain	Korea
Government Policy	laissez-faire	Intervention
Supply Policy	laissez-faire	Developing indigenous models
Demand Policy	laissez-faire, Tariffs	Import ban, market protection, Tariffs
Enterprise		
Management Right	Foreign capital	Domestic capital
Company Strategy	Dependence Strategy Domination Foreign Capital Auto Production Supply Base	Independence strategy
Means of Technology Acquisition	Joint ventures (50~100% share)	Introduction of Technology, Joint Venture (under 50% share)

	Mexico, Brazil, Spain	Korea
Investment of Technology Development	Weak	Relatively strong
Peculiar Model	None	Main auto model for Export
Export	Foreign sales network	Independent sales network

Source: Yong –Suk, Hyun, "Hyundai Automotive Speed Management", Korea Institute for Management, 2013.

As we can see, Korea is unique in that domestic auto firms were able to achieve success through indigenous model development. Such a development model cannot be easily adapted to latecomer countries. Most countries seeking to promote an auto industry already have some auto-making infrastructure. However, these countries rely on foreign capital to develop their auto industry. For example, Thailand is the 9th largest automaker in the world, but foreign firms manage production. Except for some countries such as Malaysia, most of the countries in Southeast Asia and Latin America rely on foreign firms. This model of production is different from the Korean knockdown production model. Knockdown production involves domestic firms, and leads to accumulation of production technology and experience, while production by foreign firms has a characteristic of only having a production base.

Therefore, the Korean development model would be more applicable to countries where domestic firms are in the knockdown production stage or are seeking to develop an auto industry from scratch. Latecomer countries relying on foreign capital could seek autonomous development, but in the presence of foreign firms in the market it is difficult to imagine a fledgling domestic automaker grow. Such upstart firms would need to find niche markets, such as electric vehicles. By adopting existing chassis and parts, and acquiring batteries and motors through imports or investment, growth in electric vehicles shouldn't be too difficult. Fuel-efficient light vehicles could be selectively promoted. However, without some form of government policy to foster demand, such growth models are likely to fail. Electric vehicles do not have mass-market appeal due to technical problems, inconvenience of use, and high price. Demand promotion policies also require a budget.

For the auto industry to develop in latecomer countries, firms able to undertake investment and manage risk are needed, in addition to government support through policies. Government policies are called for where there is need for market protection, a choice of model with potential demand and clearly defined policy boundaries. Unlike the initial stages

of the Korean auto industry development, latecomer countries are bound by international trade norms. Setting up a growth model in this environment poses many challenges.

Regardless of the auto industry development model, the Korean policy of parts localization and industry promotion has many lessons for latecomer countries. However, the policy of setting localization goals for individual items and urging companies to achieve those goals may be problematic for some countries. However, the government may set non-coercive goals. Especially, setting the tone of the relationship between auto manufacturers and parts manufacturers is important in developing countries. It is not easy for foreign auto firms to set up a system whereby local parts manufacturers are nurtured. Countries with somewhat developed auto industries need continual effort at improving technology and quality levels of their parts industries. These countries may benefit from learning from the Korean government's policies aimed at promoting the parts and materials industries.

The specific lessons from the Korean auto industry will differ according to the development level of the industry in general. The development history of the Korean auto industry could be thought of in terms of value chain. The value chain in an auto industry can generally be divided into R&D, parts procurement, assembly and finishing, marketing, and AS. During the knockdown production stage of the Korean auto industry, assembly and parts procurement were important in the value chain. In this stage, assembly experience was accumulated to some degree, but parts procurement was weak. In the next stage, the indigenous model development stage, technology began to take the limelight. Indigenous models needed technology of their own. In this stage, technology was brought in from the outside, instead of being developed in-house.

There have been instances of further technological transfers from abroad. But indigenous technology developed from such transfers. Technology began to gain significance as it was applied to new products. Such indigenous technology was used to develop and export the Pony Excel. As exports took off, marketing and brand power began to take prominence within the value chain. In the 1990s, foreign technology research centers were established to strengthen the R&D sector, to lead technological progress and develop models suited to local markets. Indigenous engines and transmissions were also developed. In the 2000s, an independent quality control system, production systems, and cutting-edge technological development took place on the higher end of the value chain. In the 1990s, the production sector within the value chain began to expand overseas. The 2000s saw a major expansion of offshore production, with 50% of Korean auto output coming from overseas. A global value chain was now coming into place. China, for example, is not only a production base, but an R&D base as well.

In case of the auto parts industry, early stages saw a focus on policies aimed at promoting production. A localization goal was set. Import restrictions and vertical integration was introduced to provide demand for the parts industry. To acquire necessary technology, demand firms provided technical guidance and technological transfers. Through horizontal integration, the industry moved beyond simple production, to building a cooperative relationship between the parts industry and the auto industry, focusing on roles such as improving technological and quality levels. Recently, the Korean auto parts industry is emphasizing independent R&D, seeking qualitative growth. Parts manufacturers are not only carrying out design and quality control of existing products, but also independently carrying out R&D of new products and technology. Following the trend, government policies are focusing on technological development aimed at qualitative growth. Korean auto parts industries are now finding consumers in foreign markets, and are finding brand power and marketing increasingly important. Along with the trend of automakers to shift production abroad, parts manufacturers are also building factories overseas. Some firms are even undertaking foreign direct investment independent from vehicle manufacturers.

Not all Korean policies aimed at auto industry promotion have been successful. Early efforts at promoting the auto parts industry failed to achieve production localization. The pursuit of industry integration to achieve economy of scale led to monopolies. The regulation policies of the 80's failed to achieve integration, and hindered firms such as KIA by excluding them from the passenger car market. However, Korea's vision of an independent development model, including various policies and plans, has been ultimately important in developing the Korean auto industry.

Industrial development policies, especially in the auto industry, must be formulated with respect to dynamic development of the industry. If countries made decisions based on present comparative advantage or competitiveness, no country would be justified in pursuing a policy of auto industry development. When the Korean auto industry was in crisis in the 1980's, many were of the opinion that Korea should develop as a parts manufacturing base, giving up comparatively disadvantageous whole vehicle production. In response, in 1982, KIET published a study on Koreas auto industry's development future. The logic was that a development strategy considering product lifecycles was needed, not a strategy based on comparative advantages coming from factor endowments. Back then the U.S. and Japan were gaining competitiveness in the auto industry, which began in the United Kingdom and Germany. Theories of comparative advantage were difficult to account for during such global changes, but product lifecycle theories were better suited to explaining the trends. In the end, the auto industry was not something reserved for advanced countries, but an

industry where developing countries such as Korea could equally partake. Furthermore, the economic ramifications of the auto industry could be used to jump-start other industries. Therefore, there is justification for establishing auto industry development strategies in latecomer countries. The Korean development experience could offer ample lessons for these countries.

Every country has different circumstances. Each country must be analyzed for its industry development level, industry conditions, market conditions, and production conditions, among other factors. After such an analysis, the Korean development model must be compared for which elements may be of help to the corresponding latecomer country. In case of Thailand, auto production itself is quite mature and now seeks to develop the parts industry. Therefore, Thailand is interested in the Korean model of parts industry development, especially the relationship between the demand firms and policies aimed at improving the technological and quality levels. As a follow-up, we need a report that categorizes latecomer countries by development level and market conditions, suggesting which elements from the Korean auto industry development model can be applied.

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Appendix 1

〈Main History of Automotive Industry〉

The 1980s saw integration of the auto industry. Some government officials were of the opinion that given the lack of capital and technology, knockdown production of vehicles was better than promoting the auto industry itself. Despite such negative opinions, Hyundai Motors wished for parts localization and producing a 'Korean' vehicle. To this end, Hyundai was active in developing technology and human capital.

Afterwards, the Korean auto industry went to foreign markets starting with the Pony 2 and the Excel. From the late 80s to the 90s, the Korean government pursued two policies to promote the auto industry. The first is the parts localization policy, whereby each imported parts for a new automobile was analyzed for possibility of domestic production through black down, and promoting domestic production as much as possible by limiting the number of imported items. The second was the categorization of SMEs. The government controlled the demand between vehicle manufacturers and parts manufacturers, leading to shared growth among the industry. These two policies have been the cornerstone of Korean auto industry development.

In the 90's, new firms could enter the auto industry, a move that had been restricted throughout the 80's. At the time, companies such as Hyundai Precision Manufacturing, Mitsubishi and Samsung Heavy Industries sought to enter the market with the Jeep, the Pajero, and with various commercial and passenger vehicles. Of these, Samsung won the government's approval, through its political bases in Daegu and Busan. However, this move led to numerous debates among the industry. Especially, established companies fiercely objected to redundant investment within the domestic industry by foreign capital. Afterwards, in 1997, the IMF crisis led to massive restructuring in the Korean auto industry.

In 2004, Hyundai Motors experienced a drastic improvement in quality. There were some negative views about the company regarding its monopoly position in the market, but acquiring and integrating Kia Motors is widely regarded by many as a wise move. Especially, integration of R&D functions and parts procurement led to synergy. Cost reductions were achieved through simplifying business platforms. In an anecdote about product quality, the then-president of HMC, Mong-ku Chung, had great pride about the quality of products, willing to delay model production until he was satisfied about its quality.

The present success of the Korean auto industry is owed to appropriate government industrial policies and the entrepreneurial spirit, combined with capital and technology to develop indigenous vehicle models. Domestic consumers, by buying these vehicles, knowingly or unknowingly, led to economy of scale, and ultimately, the present success.

Source: Interview with expert Sung Ik, Kim (director of KAMA).

Appendix 2

〈**Important milestones in Korean Auto Parts Industry**〉

From the independence of Korea on August 15, 1945 to the formation of the Korean government in 1948, there was no such thing as an auto industry, only sales of parts for repair and maintenance. In 1962, Saenara Motors produced the Bluebird with help from the Japanese company Nissan. The rate of parts localization was 0%. When the Corona RT40 was produced in 1966, localization was 20%. There was no OEM production back then. The Italian Giugiaro designed the Pony 1, with its engine technology from obtained from Mitsubishi. The localization rate for the Pony 1 was 91%. When the parts industry categorization policy took place in 1969, the government focused more on promoting the parts industry rather than promoting automobile OEM.

The oil shock of 1979 affected the Korean auto industry as well. The industry output decreased from 204,000 vehicles in the 70s to 123,000 vehicles in the 80s. Such decease severely hurt the primary parts suppliers, some of which filed for bankruptcy. This was the motivation behind the government's restriction on the investment by the auto industry (Sehan Motors, Hyundai Motors) in heavy chemicals industries.

During the restructuring in the 90's, many foreign firms entered the Korean auto parts market. Collaboration with Japan, which started in 1966, led to improvement in Korea technologies through the production of Pony 1 and 2, leading to increased output. However, many parts manufacturers went bankrupt during the IMF crisis in 1997. Before the IMF, domestic parts manufacturers were dominant in collaboration projects with foreign firms, with the Korean side owning 51% of the shares. However, after the crisis, the difficult financial situation of Korean firms led to situations whereby foreign firms held a majority share. The introduction of foreign capital into the Korean market in 1990s improved the technology-sharing environment between the firms.

From 2004 onwards, quality of parts improved dramatically. This was the result of continued government support to improve the quality of parts since the early stages of the industry. The effort included the introduction of KS quality control system in the parts industry in the early 70's. Factories without KS certification could not produce auto parts. Also, in the late 70's, the Ministry of Commerce and Industry enacted quality control measures. With this policy, auto manufacturers began to implement quality control systems and 100ppm policies in each factory.

Koreas development of an auto industry is unique among developing nations. Behind the industry's progress lies the willpower of government officials in charge of auto industry policies in the 70's, and the entrepreneurial spirit of President Juyoung Chung of Hyundai Motors, along with the efforts by the parts industry to improve technology.

Source: Interview with Expert Moon Su, Go (Executive director of KAICA).

Appendix 3

〈 **Independent Model and Technology Development of Hyundai Motors** 〉

When Hyundai pursued the development of its first independent model, "Pony," most industry experts viewed the project with doubt. The industry thought that Hyundai had no technology, no engine, no parts manufacturers and that independent development was doomed to fail. However, through active investment and willpower, the Pony was developed. A key milestone in Hyundai's technological maturity came when then President Seyoung Jung invited retired engineers from Mitsubishi and Toyota to Korea to transfer technology to Korean engineers. The corporate willpower to pay for training engineers was a great achievement, even in hindsight. Hyundai Motor Company is usually at the center of any recount of the Korean auto industry. Most of Hyundai engineers in the 80's and the 90's came from GM. Back then, GM was the foremost in management, especially product development. GM shared that know-how with Hyundai, Daewoo, and Samsung, directly and indirectly contributing to technological progress.

Source: Interview with Expert Sung sang, Lee (former director of GM).

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