KNOWLEDGE SHARING PROGRAM

2011 Modularization of Korea's Development Experience

A Case Study on the Legal Framework and Financing of Transport Infrastructure

2012

MLTM
Ministry of Land, Transport and Maritime Affairs

KOTI THE KOREA TRANSPORT INSTITUTE

2011 Modularization of Korea's Development Experience:

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A Case Study on the Legal Framework and Financing of Transport Infrastructure

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Knowledge Sharing Program

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Preface

The study of Korea's economic and social transformation offers a unique opportunity to better understand the factors that drive development. Within one generation, Korea had transformed itself from a poor agrarian society to a modern industrial nation, a feat never seen before. What makes Korea's experience so unique is that its rapid economic development was relatively broad-based, meaning that the fruits of Korea's rapid growth were shared by many. The challenge of course is unlocking the secrets behind Korea's rapid and broad-based development, which can offer invaluable insights and lessons and knowledge that can be shared with the rest of the international community.

Recognizing this, the Korean Ministry of Strategy and Finance (MOSF) and the Korea Development Institute (KDI) launched the Knowledge Sharing Program (KSP) in 2004 to share Korea's development experience and to assist its developing country partners. The body of work presented in this volume is part of a greater initiative launched in 2007 to systemically research and document Korea's development experience and to deliver standardized content as case studies. The goal of this undertaking is to offer a deeper and wider understanding of Korea's development experience with the hope that Korea's past can offer lessons for developing countries in search of sustainable and broad-based development. This is a continuation of a multi-year undertaking to study and document Korea's development experience, and it builds on the 20 case studies completed in 2010. Here, we present 40 new studies that explore various development-oriented themes such as industrialization, energy, human capital development, government administration, Information and Communication Technology (ICT), agricultural development, land development and environment.

In presenting these new studies, I would like to take this opportunity to express my gratitude to all those involved in this great undertaking. It was through their hard work and commitment that made this possible. Foremost, I would like to thank the Ministry of Strategy and Finance for their encouragement and full support of this project. I especially would like to thank the KSP Executive Committee, composed of related ministries/departments, and the various Korean research institutes, for their involvement and the invaluable role they played in bringing this project together. I would also like to thank all the former public officials and senior practitioners for lending their time and keen insights and expertise in preparation of the case studies.

Indeed, the successful completion of the case studies was made possible by the dedication of the researchers from the public sector and academia involved in conducting the studies, which I believe will go a long way in advancing knowledge on not only Korea's own development but also development in general. Lastly, I would like to express my gratitude to Professor Joon-Kyung Kim for his stewardship of this enterprise, and to his team including Professor Jin Park at the KDI School of Public Policy and Management, for their hard work and dedication in successfully managing and completing this project.

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

May 2012

Oh-Seok Hyun

President

KDI School of Public Policy and Management

Contents | LIST OF CHAPTERS

Summary ····· 15

Chapter 1

Background of Transportation Investment ····· 17

1. Historical Transportation Trends ····· 19

1.1 Before 1960s ····· 19

1.2 After 1960s ····· 23

2. Transportation Infrastructure Trends by Sector ····· 29

2.1 Trends in Roadway Sector ····· 29

2.2 Trends in Railroad Sector ····· 39

2.3 Transportation Infrastructure Trends and National Comprehensive Development Plan ··· 42

Chapter 2

Transportation Investment Strategy ····· 45

1. National Transportation Infrastructure Investment Plan ····· 46
   1.1 Transportation Infrastructure Renovation Master plan ····· 46
   1.2 Relevant Acts ····· 47
2. Organizational Structure by Sector ····· 49
   2.1 Roadway Sector ····· 49
   2.2 Railroad Sector ····· 50
3. Relevant Acts and Policies by Sector ····· 52
   3.1 Roadway Sector ····· 52
   3.2 Railroad Sector ····· 55
4. Transportation Infrastructure Financing ····· 57
   4.1 Transportation Infrastructure Costs Allocations by Authorities ····· 57
   4.2 Transportation Infrastructure Investment Financing by Sector ····· 57

Contents | LIST OF CHAPTERS

Chapter 3

Policies Led to Successful Transportation Investment ····63

1. Establishment of Korea Highway Corporation ····67
2. Railroad Reform and Korea Railroad Corporation ····72
3. Transportation Infrastructure Special Fund ····74
4. National Comprehensive Transportation System Master Plan ····83
   - 4.1 National Comprehensive Transportation System Background and Need ····83
   - 4.2 National Transportation Network Plan ····84
   - 4.3 Mid-term Transportation Infrastructure Investment Plan ····91
   - 4.4 Long-term Transportation Infrastructure Investment Plan by Sector ····102
5. National Integrated Transportation System Efficiency Act ····107
   - 5.1 Background and Progress ····107
   - 5.2 Major Requirements ····108
6. Urban Transportation Maintenance Facilitation Act and Metropolitan Transportation Management Special Act ····111
   - 6.1 Urban Transportation Maintenance Facilitation Act ····111
   - 6.2 Metropolitan Transportation Management Special Act ····114
7. Policy and Technology Support for Efficient National SOC Investments ····119
   - 7.1 Development and Implementation of National Transportation Database ····120
   - 7.2 Development and Implementation of Investment Efficiency Evaluation System ····123
   - 7.3 Transportation Infrastructure Investment Evaluation Policy ····128

Chapter 4

Outcomes and Conclusions ····· 131

1. Outcomes ····· 132

1.1 Increased Investments in Roadway and Railroad ····· 132

1.2 Increased Roadway and Railroad Facilities ····· 135

1.3 Enhancement of Transportation Sector Competitiveness ····· 140

2. Conclusions and Recommendations ····· 145

References ····· 152

Appendix ····· 153

Contents | LIST OF TABLES

Chapter 1

Table 1-1 Road Overview during the Japanese Colonial Rule ····20

Table 1-2 Transport Overview at the Time of Korea's Liberation ····20

Table 1-3 South Korea's Economic Indices until the 1980s ····23

Table 1-4 Urbanization Trends (until the 1980s) ····26

Table 1-5 Gradual Changes in the National Public Land (until the 1980s) ····27

Table 1-6 Transportation Policy by Period (until the 1980s) ····29

Table 1-7 Road Length Changes under the 1st Five-Year Socioeconomic-Development Plan(1962-1966) ····30

Table 1-8 Road Length Changes under the 2nd Five-Year Socioeconomic-Development Plan(1967-1971) ····31

Table 1-9 Road Length Changes under the 3rd Five-Year Socioeconomic-Development Plan(1971-1976) ····32

Table 1-10 Road Length Changes under the 4th Five-Year Socioeconomic-Development Plan(1977-1981) ····32

Table 1-11 Road Length Changes under the 5th Five-Year Socioeconomic-Development Plan(1982-1986) ····33

Table 1-12 Road Length Changes under the 6th and 7th Five-Year Socioeconomic-Development Plans(1987-1996) ····34

Table 1-13 Road Length in the Second Half of the 1990s ····34

Table 1-14 Carriage Share of Railroads ····40

Table 1-15 Modernization Trends of Railroad Construction ····41

Chapter 2

Table 2-1 Mid and Long-Term Transportation Facility Plans ····47
Table 2-2 Laws Pertaining to Transport Implementation ····48
Table 2-3 Road-related Law System ····55
Table 2-4 Financing Ratios between Central Government and the Municipality ····57
Table 2-5 Road Account Revenue Details ····58
Table 2-6 Investment Ratios by Transport Mode in the Five-Year in the Socioeconomic-Development Plan Periods ····60
Table 2-7 Transport Investment in the Last Five Years ····61

Contents | LIST OF TABLES

Chapter 3

Table 3-1 Revenues and Expenditures under the Transportation Facility Special Account (Roads, Railroads, and Metropolitan) ····76

Table 3-2 Gradual Strategies of the Key National Transport Network Plan ····86

Table 3-3 Index Goals of the Key National Transport Network Plan (2nd Revised Plan) ····87

Table 3-4 Investment Size of the 1st Midterm Transportation Facility Investment Plan (2000-2004) ····93

Table 3-5 Facility Development Achievements of the 1st Midterm Transportation Facility Investment Plan (2004) ····95

Table 3-6 Transport Prospects after the Completion of the 2nd Midterm Transportation Facility Investment Plan (2005-2009) ····96

Table 3-7 Transport Prospects after the Completion of the 3rd Midterm Transportation facility Investment Plan (2011-2015) ····96

Table 3-8 Road Length Changes under the Master Plan for Road Improvement (1999-2011) ··103

Table 3-9 Road Length Changes under the Revised Master Plan for Road Improvement (2006-2010) ····104

Table 3-10 Investment Plan under the 1st National Railroad Network Development Plan ····106

Table 3-11 Overview of the South Korea Transport DB Development ····122

Table 3-12 Total Project Cost Management Procedure of the Ministry of Planning and Budget ····124

Table 3-13 Categorization of Policy Analysis Items ····126

Chapter 4

Table 4-1 Transportation facility Investment Percentages of the GDP ····· 133
Table 4-2 Transportation facility Investment Trend after 2000 ····· 135
Table 4-3 Trends in Road and Railroad Transportation facility Expansion ····· 136
Table 4-4 Road Length Trends by Class ····· 137
Table 4-5 Railroad Facilities by Year ····· 138
Table 4-6 Road Length Trends by Year ····· 138
Table 4-7 Railroad Length Trends by Year ····· 139
Table 4-8 Railroad Double-tracking and Electrification Ratios by Year ····· 140
Table 4-9 Inter-Region Mode Split by Category ····· 141
Table 4-10 Domestic Inter-Region Passenger Carriage Ratio Prospects by Category ····· 141
Table 4-11 Traffic Congestion Cost Trends ····· 143
Table 4-12 Logistical-Cost Trends ····· 145
Table 4-13 Transportation facility Expansion Trends and Prospects ····· 148

Contents | LIST OF FIGURES

Chapter 1

Figure 1-1 The Location of Industry on the 2nd Land Development Master plan ····· 25

Figure 1-2 Road Policy Trends ····· 36

Figure 1-3 Key National Road Network (under the 2nd Master Plan for Road Improvement, 7×9+3R) ····· 37

Chapter 2

Figure 2-1 Road-related Organizations ····· 50

Figure 2-2 Railroad-related Organizations ····· 52

Figure 2-3 History of Railroad-related Laws ····· 56

Chapter 3

Figure 3-1 Success Factors of Transport Investment ····· 66

Figure 3-2 Project Investment Evaluation Procedure ····· 130

Chapter 4

Figure 4-1 Transport Network Plan (Road Network, 2011~2020) ····· 150

Figure 4-2 Transport Network Plan (Rail Network, 2011~2020) ····· 151

Summary

The country's transport infrastructure is ranked above the mid-level among the OECD countries. South Korea has drastically developed its transport infrastructure in a very short time since the second half of the 1960s. This drastic transport system development has boosted the capacity of carrying passengers and cargo, further propelling the country's economic growth.

Korea's remarkable transport system development contributed greatly to the country's economic growth by expanding the passenger and cargo carrying capacities of the nation's transport facilities. Such drastic transport infrastructure development is attributed to efforts to develop a comprehensive transport system closely integrating all modes of transport. For transport development, the fundamental transport plan, known as the Twenty-Year Key National Transport Network Plan, and its execution and five-year plans were formulated. To achieve the goals and strategies stipulated in these plans, master transport development plans for roads and railroads are devised, upon which the implementation of transport investment is based.

This study aimed to determine the successful projects and policies involving roads and railroads so as to provide references for the future implementation of transport policies. Towards this end, the study focused on presenting examples of successful laws, systems, organizations, financing, and plan implementations with regard to the expansion of the country's transport facilities.

To determine the background of the country's SOC implementation, changes in South Korea's country's historical context and various categories of transport were examined. And the administrative systems, laws, and financing systems related to roads and railroads were also presented to evaluate how the development of the transport was carried out in the country.

The success factors driving the drastic development of roads and railroads were determined. For the success of the transport development, various factors should be closely harmonized, including the related organizations, laws, systems, and financing. Seven success factors were determined, and their backgrounds and achievements were examined.

First, in terms of organizations, the establishment of KEC and railroad companies was examined. In terms of legislation, the Transport System Efficiency Act, the Urban Transport Improvement Promotion Act, and the Special Act on Large-City and Metropolitan Transport Management were assessed, and their role in the development of a road and railroad was analyzed. In terms of plans, the roles and contents of the Twenty-Year Key National Transport Network Plan and its execution plan, the Five-Year Midterm Transport Facility Investment Plan, were presented. Moreover, the basic road improvement plans-the Midterm Plan for Roads and Railroads and the National Railroad Network Development Plan-were examined. To efficiently expand transport facilities, the supply of transport infrastructure should be timely developed, which further underscores the importance of securing stable investment finance. To secure the needed finance, South Korea established a transport facility special account in the 1990s, which it has been successfully running since then. In this study, the transport facility special account was determined to be a success factor in terms of finance, and was thus discussed in further detail. Lastly, diverse technologies were developed and diverse policies were implemented to efficiently pursue SOC development. This study determined and examined three success factors in this regard including the following: the development and operation of the South Korean Transport DB, the development and operation of the investment project efficiency evaluation system, and the formulation of guidelines for transport facility investment evaluation.

Compared with other countries, South Korea achieved fast economic growth and experienced various economic and political changes since the 1970s. Diverse laws, systems, and financing methods that were introduced at that time were formulated and implemented in line with such domestic circumstances. Thus, these measures and systems-if intended to be applied to other countries-should be reviewed in terms of the relevant country's politics, economy, geography and space, and the people's sentiment. Also, it should be noted that these Korean cases of measures were implemented in the past, so they should be revised and adjusted if they are to be applied in other countries.

2011 Modularization of Korea's Development Experience
A Case Study on the Legal Framework and
Financing of Transport Infrastructure

Chapter 1

Background of Transportation Investment

1. Historical Transportation Trends
2. Transportation Infrastructure Trends by Sector

Background of Transportation Investment

South Korea achieved rapid economic development through industrialization for 40 years since the 1960s. Through its economic-development plans and comprehensive public land development plans, roads and railroads as important SOCs have provided important foundations for economic development. Until the 1990s, transportation policies focused on the expansion of transportation facilities for economic growth. In the second half of the 1970s, urban transport emerged as a new problem. Diverse efforts to ease urban congestion were carried out.

As of 2010, the country's total road length amounted to 105,565 km, and the total railroad length stood at 3,558 km. 3,859 km of expressways had been constructed, while the high-speed railroad extended 369 km. These transportation networks have turned the entire country into a half-day life bloc. The country's transport infrastructure is ranked above the mid-level among the OECD countries. South Korea has drastically developed its transport infrastructure in a very short time since the second half of the 1960s. This drastic transportation system development has boosted the capacity of carrying passengers and cargo, further propelling the country's economic growth.

This chapter deals with the changes in the transportation sector in the period spanning the 1960s, when the development of the country's transport began in earnest, to the 1980s, when the implementation of the 4th Economic-Development Plan was completed. It also examines how these changes influenced the transport development system, which has been seriously implemented since the second half of the 1980s.

1. Historical Transportation Trends

1.1 Before 1960s

1.1.1 Transportation Conditions in the Last Joseon Period and During Japanese Colonial Rule

During the final Joseon period 100 years ago, the country's transportation system developed without guided planning. As horse- and ox-driven carriages were the main Transport modes, road development was meager. Influenced by Japan's railroad development, railroads were established in Korea beginning in the early 1900s. The Gyeongin Line was opened in 1899, followed by the Gyeongbu Line in 1905 and the Gyeongui Line in 1906. This marked the beginning of the systematization of the country's transport infrastructure.

The railroad development had large economic and social impacts. The national public land structure was reformed, the country's local economies were developed, and changes to the mindsets, lifestyles, and culture of the Korean people followed. New commercial cities were constructed alongside the railroad networks. This drastically changed the conventional road-based national public land structure. Although the railroads greatly influenced the national public land structure and the people's lives and culture, the public land development driven by Japanese capital was unbalanced.

While roads had been less developed than railroads, Japan began to construct roads for security and military purposes. 25,500 km of roads were constructed during a thirty-six-year time period. In 1905, Japan sent engineers from its Interior Ministry to Korea to inspect the nationwide road situation. In 1906, Japan devised a seven-year road renovation program and constructed roads, particularly through the Road Management Bureau. In the first stage, four roads with a total length of 255.9 km were constructed. During the second stage, eighteen roads totaling 553.7 km in length were constructed.

With the construction of modern roads, automobiles were introduced to Korea beginning in 1903. By 1945, there were 7,326 automobiles in the country. In 1910, Chongdokbu, the Japanese Governor-General of Korea, enacted and promulgated the Road Act and devised and implemented road plans. In the first road construction period (1911-1917), 36 roads spanning 2,690 km were constructed. Roadways and sidewalks were divided into major road segments, main roads were paved with asphalt, and a bridge was constructed across the Han River. The second road construction periods lasted from 1917-1938, although the plan was postponed from 1922 to 1938 due to financial constraints. Twenty-six roads with a total length of 1,880 km were constructed. By the end of the 1930s, of the total projected 24,538km of roads, 18,910 km or 77% had been constructed. Japan constructed minimal narrow roads for the purpose of governing its colony. In 1938, the Joseon Road Enforcement Decree was enacted, which classified roads into four types: national, local, provincial roads. Moreover, road numbers, road names, junctions, ending points, major stopover points, and relational maps were established for the ninety-two designated roads.

Table 1-1 | Road Overview during the Japanese Colonial Rule

(Unit: km)

Year	National roads	Local roads	City, provincial roads	Total Length
1921	2,014		1,673	3,687
1925	2,357		1,999	4,351
1930	2,906	7,335	8,674	18,915
1935	2,981	8,880	11,771	23,679
	National roads	Local roads		
1940	11,490	15,008	-	26,498
1942	11,731	15,259	-	26,990
1945 (Korea's iberation)	5,263	9,997	8,770.8	24,030

Note: (1) Japan intensively developed northern, southwestern, and southeastern Korea for the exploration and invasion of Korea as well as for its benefit.

(2) In 1945, paved roads (mainly congested roads) accounted for 45% of the total roads in South Korea.

Source: Road Work Handbook, Ministry of Land Transport and Maritime Affairs (MLTM), 2011

1.1.2 Transport Conditions after Korea's Liberation

After its liberation, Korea was embroiled in political and social chaos, which disabled the proper management of even the existing transportation facilities constructed by the imperial Japanese. Furthermore, the Korean War wrought great havoc on the facilities, which were mainly intended for military purposes, creating major regional imbalances. Amidst these dire circumstances, Korea nationalized eight private railroads, including the Chungbuk Line, in 1946, and constructed an electric railroad between Jecheoon and Punggi in 1947. However, these projects suffered from financial difficulties and poor operation.

Table 1-2 | Transport Overview at the Time of Korea's Liberation

Category	Railroads		Public Roads	
Description	Operating distance (km)	6,362	National roads (km)	5,263
	No. of stations	762	Local roads (km)	9,997
	No. of locomotives	1,167	City, Provincial roads (km)	8,771
	No. of passenger rolling stocks	2,027	No. of automobiles	7,326
	No. of freight rolling stocks	15,352		

Source: "Transport Annals"(Transport Newspaper, 1976), "Korea Road" (KEC, 1981)

Though road projects were hindered by financial difficulties, road and bridge improvement projects were activated in 1945. The Seoul-Gangneung, which traversed Gangwon Province, and Seoul-Busan national roads were paved in 1946. 60% of the nation's roads and most of its bridges were destroyed during the Korean War. After the war truce, the Korean government asked its allies for assistance in restoring the provincial road infrastructure. The country obtained aid from ICA and AID from 1954 to 1962. Korea was able to complete the restoration the Han River sidewalks in 1958 begin paving the Seoul-Busan National Road in 1957.

The total length of operating railroads immediately following liberation was 6,362 km. Railroad construction commenced right after the Korean government was established in 1948. Under the Five-Year Economic Revival Plan formulated in 1948, Korea constructed three railroads: the Yeongam Line, the Hambaek Line, and the Mungyeong Line. The existing railroad networks and facilities, however, were destroyed during the Korean War, which made the proper operation of railroads incredibly difficult. Most of the railroads in Seoul were destroyed during the Korean War, except the areas south of Jicheon for the Gyeongbu Line, south of Gyeongju for the Donghae Line, and south of Haman for the Jinju Line. With the support of the UN Armed Forces and the ten-year-long efforts after the Korean War truce, the railroads were restored.

Foreign Borrowings for Transportation Sector Projects

1. Foreign Borrowing-supported Project-Road Sector (A White Paper on Roads, 2003, the Ministry of Construction and Transportation)

After the Korean War ended with the signing of a truce agreement, the South Korean government negotiated aids for war-damage restoration measures with friendly nations that participated in the war. As a result, South Korea began to receive aid from International Cooperation Administration (ICA) in 1954. The country also received from UNKRA (United Nations Korean Reconstruction Agency) and other donors a total of USD 236.7 million in aid in 1955, USD 326.7 million in 1956, and USD 382.8 million in 1957. This assistance continued until 1962. On the other hand, for the road and bridge aids from ICA and AID, a benefaction of USD 15 million and 76,623 was received from 1954 to 1962, thus enabling the country to secure such construction materials as steel, cement, bars, wood, and asphalt. Corresponding labor costs were covered by the government's or municipalities' taxes. In May 1958, the Han River walkway bridge restoration was completed. By 1962, local road pavement and local road bridges restoration were nearly completed. A remarkable ingenuity in restoration work happened in 1952. That was the time when no war-damage restoration aids from the USA were yet received, making it impossible to procure restoration materials domestically. Hence, old railroad tracks were then used in restoring some large and long bridges including the Nakdong River's Goryeong Bridge. It was a stopgap but a highly ingenious idea. In line with restoration projects, Seoul-Busan national

road pavement work was planned, and thus pavement work was conducted in Seoul, Daejeon, Daegu, and Busan beginning in 1957. Road expansion and pavement work was conducted in Seoul-Incheon and Busan-Masan segments as well, and large and long bridges such as Naju Bridge, Munmak Bridge, Sunsan Bridge, and Dalcheon Bridge were constructed. Also, according to the Commercial Industry's coal mine comprehensive development plan, large-scale coal mines in Yeongwol, Samcheok, and Jeongseon in Gangwon Province, as well as Hwasun coalfield in Honam were actively developed. To that end, industrial road network construction plans in consideration of railroads, roads, and coal blocks were formulated and implemented year by year, thus proliferating coal and creating the foundation for the development of coal mines. Hence, the country's war-damage restoration work was successfully carried out thanks to ten years of aids from ICA and others involving huge finance and technical teams, enabling a modernization of various affected structures.

2. Foreign Borrowing-supported Project-Railroads (South Korea's history and development of railroads, co-authored by Lee Yong-sang et al., 2011)

Most of railroad facilities were destroyed during the Korean War, and steam locomotives, which were mobilized to carry war supplies during the war, were dilapidated, making it difficult to properly transport cargoes and people until 1960.

With the aid from FOA, 1,540 rolling cargo stocks were acquired in February 1955. Passenger rolling stocks began to be manufactured locally on February 27, 1959, and their launching ceremony was held on August 20 of that year.

On March 15, 1956, the Busan locomotive factory and the Jecheon factory were established, beginning the inspection and operation of diesel locomotives. Thus, concerted efforts were made to introduce diesel locomotives to modernize powered rolling stocks.

Due to the state financial difficulty caused by war-damage restoration work, the country depended on borrowings from ICA for its most of finances.

Also, as a part of the five-year economic development plan, the country acquired 15 diesel locomotives with a loan from AID, and another 157 trains gradually by July 1967.

In 1963 the lender changed from AID to EXIM BANK and IBRD. In 1968-1978, 100 trains with the borrowings from EXIM and 50 trains with the borrowings from IBRD were acquired, bringing the total of diesel trains to 410.

Diesel trains were imported until 1979 when Hyundai began to manufacture them, spreading locally manufactured diesel trains.

1.2 After 1960s

1.2.1 Growth of National Economy

South Korea achieved an average 8.8% real annual economic growth from 1962 to 1971. From 1972 to 1981, a high economic growth rate was reported at 7.7%. The GNP in terms of current prices rose from KRW 716 billion in 1964 to KRW 105.6 trillion in 1987; hence, the per-capita GNP rose from USD 103 to USD 3,098. The balance on current account also shifted from deficit to surplus in 1986.

This economic development greatly changed South Korea's industrial structure. The industrialization policy under the economic development plan shifted from the country's traditional agriculture-oriented industrial structure to an advanced industrial structure in the second half of the 1980s. From 1961 to 1987, the secondary industrial sector, led by the manufacturing industries, and the SOC and service sector, posted average annual growth rates of 29.5 and 27.1%, respectively. The secondary industrial sector's share in the country's GNP more than doubled from 15.3% in 1961 to 32.2% in 1987.

Table 1-3 | South Korea's Economic Indices until the 1980s

Category	Unit	1964	1971	1987
GNP	Current price (KRW 1 billion)	716	3,295	105,630
Per-capita GNP	Current price ($)	103	278	3,098
Balance on Current account	Current Market price (USD100 million)	△ 0.3	△ 8.5	98.5

Source: Economic Planning Board (EPB), "Major Economic Indices," various years

For South Korea, the economy and transportation system are closely related and have grown alongside one another. In line with the expanding economic scale and production volume, demand for transportation increased as national income rose. The number of passengers increased from 6.79 million in 1961 to 12.01 million in 1986, and the domestic cargo volume increased from thirty-two million tons to 259 million tons. This increase in transport volume further accelerated the economic growth. After 1960, the transportation sector increased its share of the GNP from 2.7% in 1962 to 4.8% 1971 and 6.8% in 1981.

1.2.2 Industrialization

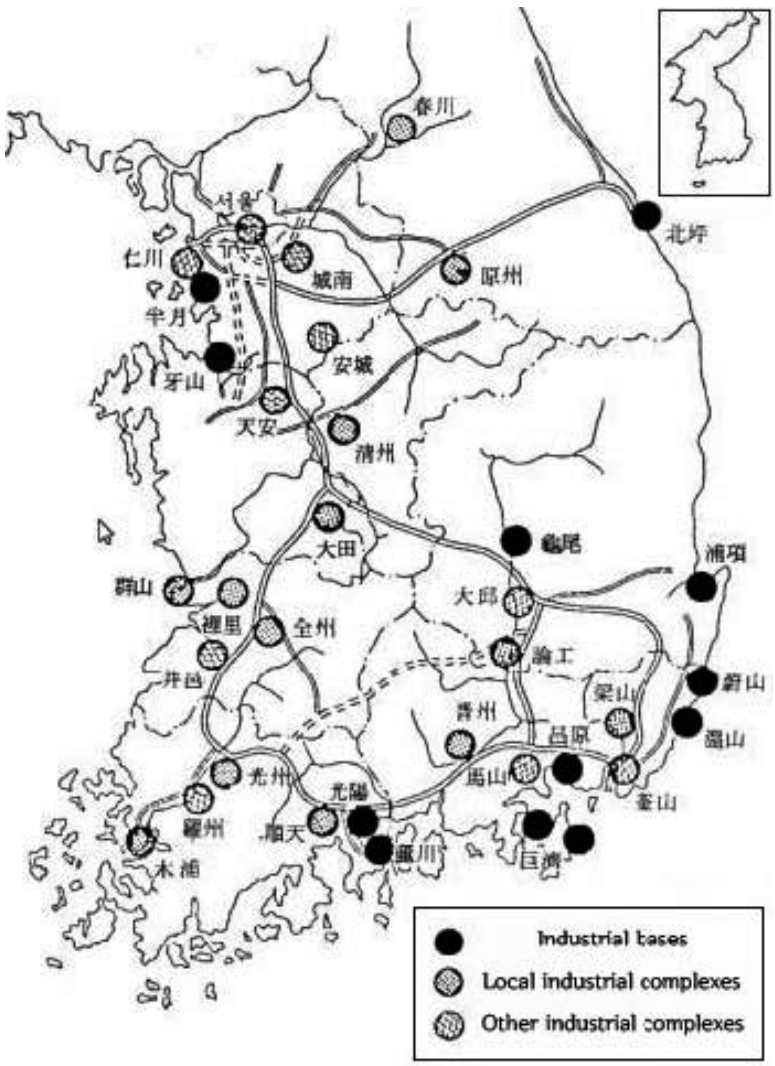
In the first implementation stage of the economic development policy, transport infrastructure and necessary financing sources for its investment were very limited. Moreover, the transportation facilities, which are a base for industrialization, were poor. The railroads were only centered on transporting to/from Seoul, and most of the national roads were unpaved. Railroads were the main means of transport. Industrial-siting policies were implemented to reduce SOC investment costs by clustering relevant industries and developing industrial sites mainly in the Seoul metropolitan and southeastern coastal areas. The country's transport conditions therein greatly influenced the industrial siting. During the early 1960s, the Seoul metropolitan housed Incheon Port, which facilitated the transport of raw materials. With access to railroad services, unlike the other regions, it was a favorable industrial site.

The development of the southeastern coastal industrial-belt region began in the 1960s with growth focused on steel production, petrochemicals, and other key industries requiring imported raw materials. This region was adjacent to the only double-track electric railroad then available, the Gyeongbu Line, and to Busan Port, thus enjoying a favorable location. The region, which became the country's industrial belt due to the policy fostering the heavy-chemical industries, was better able to connect to the Seoul metropolitan. Further development was made possible with the construction of the Gyeongbu Expressway.

In the 1970s, the industries were distributed to the provincial areas, resulting in increased carriage demand greater than the railroad facility capacity. This led to the construction of expressways to and from the Seoul metropolitan. These expressways increased inter-region accessibility and further promoted industrial development. Notably, the Gyeongbu Expressway, which connected the Gyeongin axis and southeastern coastal industrial belt, boosted this region's development as well as the country's economic growth.

In the 1980s, this industrial-hub development brought about an imbalance in regional growth that had to be corrected. The public land development paradigm was shifted to facilitate more balanced development. This changed the investment in transportation strategy from the supply of facilities driven by economic-growth to balanced regional growth.

Figure 1-1 | The Location of Industry on the 2nd Land Development Masterplan



1.2.3 Urbanization

In the early 20th century, the country's public land development was begun by the imperial Japanese, who intended to use Korea as a logistics depot for making inroads onto the Chinese continent. Afterwards, full-fledged public land development began in the 1960s under the country's economic-development plan with a focus on infrastructure expansion that reinforced economic growth. Likewise, transport development was implemented as such.

Together with the economic development plan, a ten-year comprehensive public land development plan was devised and implemented to efficiently use, develop, and preserve public land resources beginning in 1971. Comprehensive socioeconomic development region was planned and implemented in the first development stage, which lasted from 1972 to 1981, which encompass roads, railroads, water, electric power, and communications reinforced economic growth. Moreover, large-scale economic projects were implemented, with priority placed on projects supporting industrialization. This scheme brought about corresponding ripple effects across the board. Among the projects, expressways were developed most prominently, reaching a total length of 1,225 km, which enabled travel across the entire nation within a day. A dense population in Seoul and other large cities ensued with unbalanced regional development. Up until the third plan, the term "development" was used and emphasized, though beginning with the fourth plan; the term "comprehensive public land plan" has been used instead to divert attention away from an image of environmental destruction towards one in harmony with the environment. The fourth plan was recently revised to cover the period from 2011 to 2020.

Due to this push for public land development, the country has experienced rapid urbanization since the latter half of the 1980s. Urbanization was driven by migration in the wake of the Korean War due to political and social changes rather than by industrial development that took place in the years following the country's liberation until the 1960s. True urbanization occurred as many people migrated to the cities from the rural areas as active economic growth presented opportunities for low-wage labor in urban areas. If defining a city by the standard of a county with a population of over 20,000, the urbanization ratio increased from 39.15% in 1960 to 77.9% in 1985, while the number of cities increased from twenty-seven in 1960 to sixty-one in 1986.

Table 1-4 | Urbanization Trends (Until the 1980s)

(Unit: 1,000 people, %)

Category	1960	1966	1970	1975	1980	1985
Total	24,989	29,193	31,435	34,679	37,449	40,432
Urban population	9,784	12,440	15,750	20,480	25,738	31,496
Rural population	15,205	16,753	15,685	14,199	11,711	8,936
Urbanization ratio	39.15	42.61	50.10	59.06	68.73	77.90

Source: Home Ministry, "South Korea City Annals"

Note: Urban population refers to the population of a county-grade city with over 20,000 inhabitants.

The country's urbanization was characterized by rapid urbanization and concentration of population in large cities, especially in the Seoul metropolitan. Until the early 1980s, the investment in transportation focused on the expansion of key roads to reinforce economic development rather than on addressing the urban problems, thereby leading to the creation of serious present-day transport problems in large cities. The gradual changes in the national public land are outlined in <Table 1-5>, from the perspective of public land development, urban development, and transportation facility development.

Table 1-5 | Gradual Changes in the National Public Land (Until the1980s)

Category	1950s	1960s	1970s	1980s
Public land development	Restoration of public lands Consumer goods industry	Economic construction Light-industry development	Expansion of industrial infrastructure Heavy-chemical industries	Balanced regional development Technology-intensive industries
Urban development	Urbanization Restoration and improvement	Concentration in large cities Land readjustment	Large city improvement New industrial city construction	Development of metropolitans Construction of satellite cities
Transportation facility development	Public land improvement	Construction of industrial railroads Electrification of railroads	Expressways Subways	Framework of the entire national public land Expansion of the inter-region road networks

Source: Modern Society Research Institute, National Development and Policies, 1984

1.2.4 Transportation Policy

After the 1960s, the mainstream transportation policy focused on facility investment under the national economic development plans and comprehensive public land development plans. The 1960s, during which the implementation of the Five-Year Economic-Development Plan began, is a growth base creation period for the promotion of the heavy-chemical industries after the light-industry development period. Intensive investments were made in the transport infrastructure, such as railroads and roads. Under the initial plan, the transportation sector aimed to efficiently connect the raw-material production areas, factories, and consumers so as to maximize the production activities. Industrial railroads were electrified to carry coal. In the first-plan period, a budget of KRW 21.5 billion or 4.6% of the state coffers was allocated for railroads, while investment in roads amounted more than five times that for

railroads. After the second half of the 1960s, with the increase in number of automobiles, demand in road carriage rose, in response to which large investment in roads was made. During the 2nd Five-Year Economic-Development Plan period, the public road investments represented 62% of investments for the entire transportation sector.

The implementation of a comprehensive public land development plan began in the 1970s public land. Significant socioeconomic growth was achieved during the 1970s, and the expansion of urbanization and sharp rise in the number of automobiles greatly changed the transportation policy. The transportation policy was implemented not as part of the economic plan but rather the public land plan, which focused on strategies for fostering the export industries and for developing hub areas. Specifically, more investments were made for the expansion of harbors and expressways. Road investments represented 50% of total investment in transportations, while the investments in railroads accounted for a significantly lesser share, resulting in the continuous reduction of its carriage share. Urban transport problems following the rapid urbanization intensified in the 1970s, especially in the Seoul metropolitan. To alleviate some of these problems, requiring investments were made in the construction of subways and electric railways.

Urban transport problems worsened in the 1980s as increasing use of automobiles in the country caused parking and congestion problems. The 2nd Comprehensive Public land Development Plan was under implementation during the 1980s. The GDP was increasing and the number of automobiles rapidly increased. Accordingly, transport policies focused on enhancing access to underdeveloped areas and addressing urban traffic congestion. National, local, city and county roads were paved, and the 88 Olympic Expressway was constructed to promote movement and exchange between the southeastern and southwestern regions of the country. Moreover, the special account for road improvement projects was established to secure a substantial road construction budget. It became the prototype of today's special account for transportation facilities.

Table 1-6 | Transportation Policy by Period (Until 1980s)

Category	1960s	1970s	1980s
Major policies	· Initial investment focus on railroads · Road investment and road network strengthened after mid-period · Expanded licensing of transportation operators and increased number of automobiles country's transport capacity · Protection and foster of initial automobile industry	· Expansion investment in harbors and expressways · Automobile industry fostered · Subways and electric trains constructed in the Seoul metropolitan	· SOC expansion, including expressways and airports · Continued development of automobile industry · Expansion of national and local roads to increase daily-life convenience. · Urban transportation measures devised

Source: A Study on the Transportation Policy for Advanced Industries, KOTI, 1993

2. Transportation Infrastructure Trends by Sector

2.1 Trends in Roadway Sector

As mentioned earlier, road planning and construction projects began in the Joseon and Japanese colonial periods, beginning with road improvement projects. Road construction began full-swing with socioeconomic development. Under the 1st Five-Year Socioeconomic-Development Plan (1962-1966), which was called Economic Development Plan until 1982, a total road budget of KRW 14 billion was allocated. 431 bridges, as well as industrial roads totaling 73.7 km in length were constructed to develop coalmines. With the support of the National Defense Ministry and the 8th U.S. Armed Forces, roads totaling 488 km in length were paved. In addition, 120 km of roads were improved (e.g., road expansion, road line improvement). Moreover, with the enactment of the Road Act in 1963, special-city roads were created. Increases in the road network during this period are outlined in <Table I-7>.

On the other hand, during the 1st Five-Year Socioeconomic Development Plan period, the demand-supply imbalances in the transportation sector slowed the economic growth. IBRD investigated this problem upon request of the Transport Ministry. The study determined the details of the investment factors and transportation facilities, and recommended an increase in road construction investment and reduction in railroad investment in order to promote economic growth. Moreover, the study recommended that the term expressway be used, the term Road Section should be upgraded to Road Bureau, and toll-based roads would be inappropriate for some time if foreign loans were unavailable.

Table 1-7 | Road Length Changes under the 1st Five-Year Socioeconomic-Development Plan (1962-1966)

(Unit: km, %)

Year	National Roads			Local Roads	Special-City Roads	City, County Roads	Total	Paving Ratio
	1st-Grade	2nd-Grade	Total					
1962	-	-	5,743	10,542	-	10,884	27,169	4.1
1966	3,135	5,501	8,186	10,395	1,862	14,003	34,476	5.8

Source: Road Work Handbook, MLTM, 2011

Note: In line with the 1963 Road Act amendment, the national roads were classified into 1st and 2nd-grade national roads and special-city roads were created.

IBRD's Survey of Transport

1. Background

· In the first five-year economic development plan period, an imbalance in demand for transportation occurred, hurting economic growth.

· The Transport Ministry and the Construction Ministry led efforts to write research reports based on surveys.

- IBRD's survey report on South Korea's transport

- The Ministry without portfolio formulated future transport network measures

- Korean Industry Management HQ made research reports on public roads and public road transport projects.

2. Outline of IBRD's Transport Survey (Jan 1965-June 1966)

· The Transport Ministry requested IBRD to conduct research

· A foreign consulting firm defined details on nationwide transportation facilities and investment requirements.

· The firm recommended reducing investment in railroads and instead expanding road investment to further boost the country's economic growth.

· The firm also recommended expanding the Road Section into Road Bureau.

· The firm concluded that the construction of toll-pay roads would be negative for some time unless the country seeks to earn foreign borrowings.

· The term expressway was first used in the country.

Source: Road Work Handbook, MLTM

Under the 2nd Socioeconomic Development Plan (1967-1971), the main Transport modes shifted from railroads to roads, and road pavement and maintenance were conducted as a part of the nationwide road improvement projects. Moreover, the Road Improvement Promotion Act and the Special Account Act for Road Improvement were promulgated (1968), enabling the investment of fuel taxes and driving taxes in road construction. The budget thus drastically increased from KRW 30 billion to KRW 68.7 billion, leading to the fundamental reform of the road policy. In 1967, construction of the Seoul-Incheon Expressway began and a ten-year expressway construction plan was devised. The road length changes in this period are outlined in <Table 1-8>.

Table 1-8 | Road Length Changes under the 2nd Five-Year Socioeconomic-Development Plan (1967-1971)

(Unit: km, %)

Year	Express-ways	National Roads	Local Roads	Special-City Roads	City, County Roads	Total	Paving Ratio
1966	-	8,186	10,395	1,862	13,033	33,476	5.8
1971	655	8,146	10,760	5,661	15,413	40,635	14.2

Source: Road Work Handbook, MLTM, 2011

Note: In line with the 1970 Road Act amendment, expressways were established, and the 1st and 2nd-grade national roads were changed into general national roads.

In the 3rd Socioeconomic-Development Plan period (1972-1976), expressways were constructed, turning the entire country into a one-day life bloc. Notably, the construction of the Gyeongbu Expressway drastically increased the carriage share of public roads. The ratio of paved national roads significantly increased from 23.7% to 70.2%, and the construction of the Honam, Namhae, and Yeongdong Expressways was implemented. Moreover, with loans obtained from IBRD, key roads began to be paved. The National Road Maintenance Office was established to perform maintenance work of national roads. The road length and paved road ratio changes in this period are outlined in <Table 1-9>. South Korea began to borrow money from IBRD in 1972 to construct roads. With loans amounting to USD 764.5 million obtained on six occasions, 571 km of expressways were constructed, 300 km of national roads were expanded, and 2,968 km of national roads were paved. The expressways contributed greatly to the country's economic development.

Table 1-9 | Road Length Changes under the 3rd Five-Year Socioeconomic-Development Plan (1971-1976)

(Unit: km, %)

Year	Express-ways	National Roads	Local Roads	Special-City Roads	City, County Roads	Total	Paving Ratio
1971	655	8,146	10,760	5,661	15,413	40,635	14.2
1976	1,142	8,232	10,854	7,291	17,995	45,514	24.0

Source: Road Work Handbook, MLTM, 2011

Note: With acquired foreign loans, the ratio of paved roads increased from 28.3% in 1971 to 45.5% in 1976.

During the 4th Socioeconomic Development Plan period (1977-1981), road development focused on linking expressways with major industrial locations to increase the efficiency of key roads, on the paving national roads and major local roads, and on the expansion of congested roads into four lanes. The Daegu-Masan Expressway and Busan-Masan Road were expanded into four lanes. The ratio of paved national roads improved from 45.5 to 55.4% in 1981. Changes in the total road length and paving ratio in this period are outlined in <Table 1-10>.

Table 1-10| Road Length Changes under the 4th Five-Year Socioeconomic-Development Plan (1977-1981)

(Unit: km, %)

Year	Express-ways	National Roads	Local Roads	Special-City Roads	City, County Roads	Total	Paving Ratio
1976	1,142	8,232	10,854	7,291	17,995	45,514	24.0
1981	1,245	12,247	11,013	9,043	17,428	50,336	34.1

Source: Road Work Handbook, MLTM, 2011

In the 5th Socioeconomic-Development Plan period (1982-1986), 47 segments, including Gyengju-Pohang, spanning 1,233 km were constructed under the fourth IBRD-loan-based project. Much progress was particularly made in 1983. In 1986, for the fifth ADB-loan-based project, segments including Jeonju-Ulju, which spanned 380 km in length, were expanded and paved. In addition, the Daegu-Gwangju, Hoedeok-Nonsan, and Nonsan-Gwangju expressway segments were expanded, while dilapidated roads were repaired and narrow bridges improved. The road connectivity and road-paving ratios increased. Additionally,

defective roads were improved, and projects focused on enhanced security were carried out. The national-road-paving ratio reached 77.1% in 1986. The changes in the total road length and paving ratio in this period are outlined in <Table 1-11>.

Table 1-11 | Road Length Changes under the 5th Five-Year Socioeconomic-Development Plan (1982-1986)

(Unit: km, %)

Year	Express-ways	National Roads	Local Roads	Special-City Roads	City, County Roads	Total	Paving Ratio
1981	1,245	12,247	10,013	9,043	17,428	50,336	34.1
1986	1,415	12,258	10,313	10,724	18,942	53,654	54.2

Source: Road Work Handbook, MLTM, 2011

In the 6th Socioeconomic-Development Plan period (1987-1991), expressway construction and expansion were intensified. The Singal-Ansan, Pangyo-Guri, and Yangjae-Cheongwon segments as well as Yeongdong Line were expanded. The Special Account for Road Projects Act was promulgated in 1988. By 1991, 92% of national roads had been paved. The 3rd Comprehensive Public land Development Plan (1992-2001) was devised during the 7th Socioeconomic-Development Plan period (1992-1996), Public land. Under this plan, the three following strategies were implemented: strengthening of the country's industrial competitiveness; increasing social equality, balanced development, globalization, and autonomy; and creating the foundations for reunification foundations. A plan to construct 7×9-lattice-type key road networks with a total length of 6,000 km was devised, and the Special Account for Road Projects Act was incorporated into the Special Account for Transportation facilities Act, ensuring a stable funding source. The changes in the total road length and paving ratio in the 6th and 7th Socioeconomic-Development Plan periods are outlined in <Table 1-12>.

Table 1-12 | Road Length Changes under the 6th and 7th Five-Year Socioeconomic-Development Plans (1987-1996)

(Unit: km, %)

Year	Express-ways	National Roads	Local Roads	Special-City Roads	City, County Roads	Total	Paving Ratio
1986	1,415	12,258	10,313	10,724	18,942	53,654	54.2
1991	1,597	12,114	10,643	12,717	21,016	58,088	76.4
1996	1,886	12,464	17,147	14,857	35,989	82,342	72.7

In the second half of the 1990s, a master plan for road improvement was formulated, thus expanding roads systematically. The master plan for road improvement, which was formulated in December 1998, was implemented to equalize access distance to promote a balanced development of national public lands by 2020. The road improvement master plan was implemented to address congested segments, strengthen regional connection, develop major national roads into trunk roads and multi-function roads, and remodel road networks in consideration of road functions. Afterwards, the master plan was revised in December 2005 and again in June 2011. The road length after the second half of the 1990s is outlined in < Table 1-13>.

Table 1-13 | Road Length in the Second Half of the 1990s

(Unit: km, %)

Year	Express-ways	National Roads	Local Roads	Special-City Roads	City, County Roads	Total	Paving Ratio
1999	2,040	12,418	17,145	17,892	38,039	87,534	74.7
2006	3,103	14,224	17,677	17,738	49,319	102,061	76.8
2009	3,776	13,819	18,138	18,749	50,501	104,983	79.2

The full-fledged construction of expressways, which played a pivotal role in the country's economic growth, began with the 2nd Five-Year Socioeconomic Development Plan (1962-1966). Though expressways were considered necessary, construction was considered impossible up until 1966 due to limited circumstances. Ulsan Oil Refinery was constructed on May 7, 1964 during the 1st Five-Year Socioeconomic Development Plan period, enabling the mass production of asphalt. Moreover, cement production facilities were expanded, and construction technologies were somewhat improved by undertaking overseas road

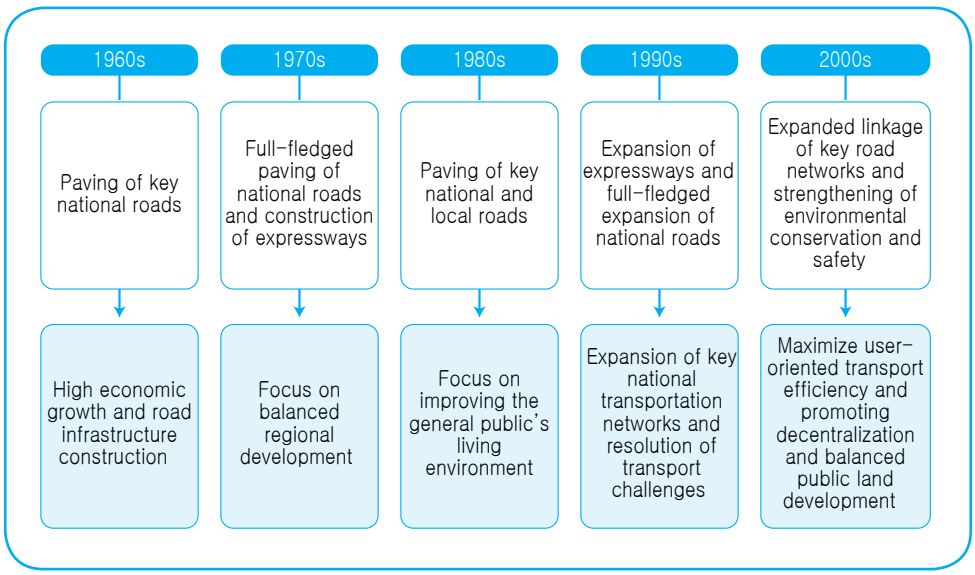
projects. Following the successful implementation of the first plan, cargo volume rapidly increased between Seoul-Incheon and Seoul-Busan among the major Seoul port segments. Moreover, the 2nd Five-Year Socioeconomic Development Plan, which aimed at fostering South Korea's high-growth and heavy-industries, shifted focus from railroads to public roads in the country's surface transportation system.

To attain industrialized status, the government decided to construct an expressway connecting Incheon, Busan, and Seoul under the 2nd Five-Year Socioeconomic Development Plan (1967-1971). The Seoul-Incheon Expressway construction scheme was determined on March 24, 1967 and implemented on May 1 of the same year. The construction of the Gyeongbu Expressway (Seoul-Busan) was also decided in the second-plan period. The project was tested by constructing the first 30km Seoul-Suwon segment. The model project commencement ceremony was held on June 1, 1968. This marked the beginning of the full-fledged expressway construction era.

The President and Construction Minister frequently visited the Gyeongbu Expressway construction sites to check on the work progress and to encourage construction workers. The expressway opened earlier than planned. After eleven months of construction, the Seoul-Suwon segment was opened on December 21, 1968. The Suwon-Osan segment was opened on December 29 of the same year. In 1969, the Osan-Cheonan, Cheonan-Daejeon, and Daegu-Busan segments were opened. The Daejeon-Daegu segment, which entailed the most difficult work, was opened on July 7, 1970. By 1970, the entire 428km-long Gyeongbu Expressway was opened. The Gyeongin and Gyeongbu Expressway prompted the country to make advancements in all sectors, including society, economy, culture, military, and technology. They also turned the country into a one-day life bloc, promoting regional and economic development. Transfer of human and material resources across multi region was made possible. The expressways balanced the development of the public land and improved the quality of life for the Korean people.

The road policy trends from the 1960s to the 2000s are outlined in the following diagram.

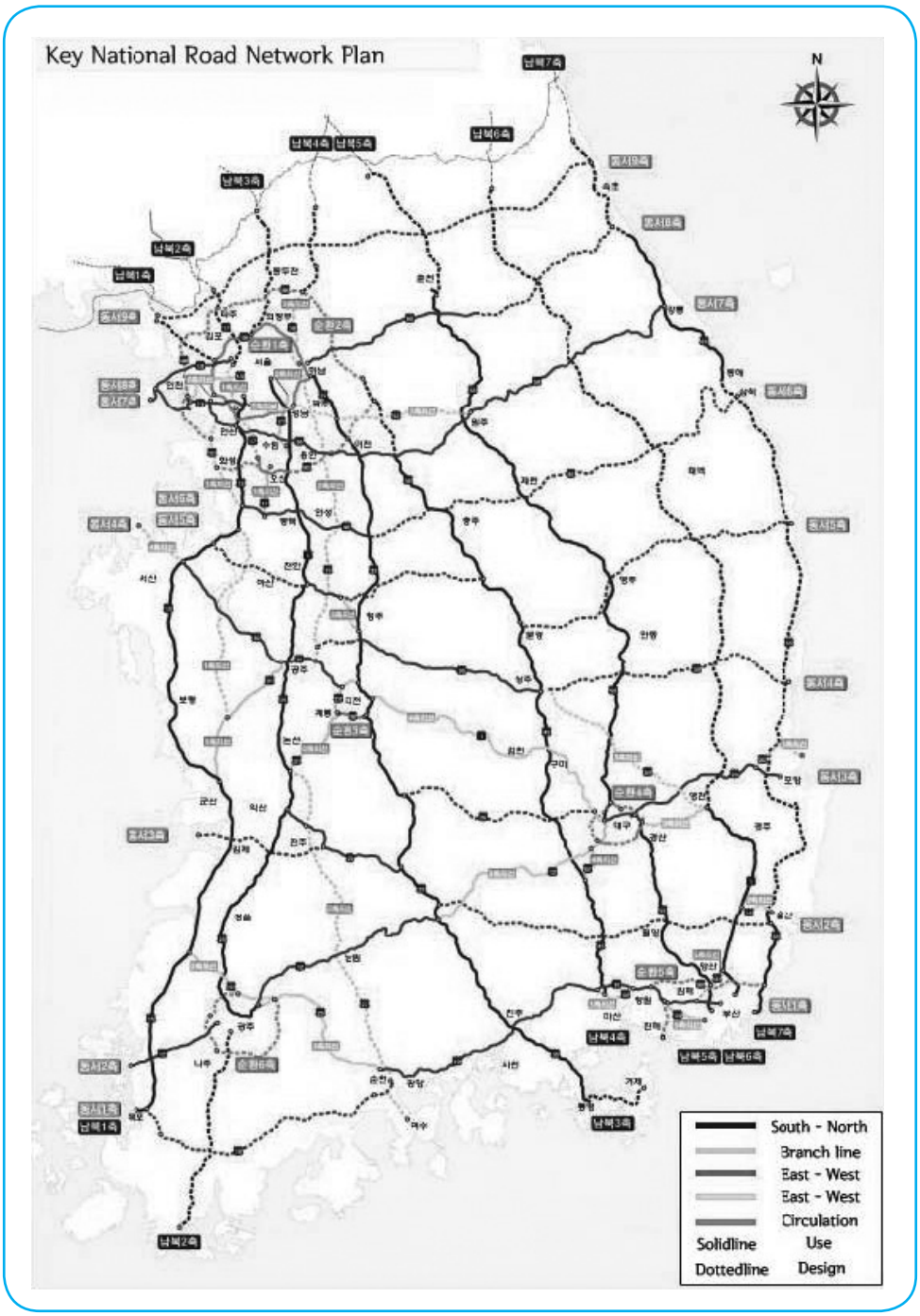
Figure 1-2 | Road policy trends



In conclusion, the construction of road facilities was driven by the creation of large-scale industrial complexes and the increased distribution demands despite the economic difficulties. The implementation of policies fostering heavy industries continued for the advancement of the industrial structure. Large-scale industrial facilities were constructed in locations ideal for increasing operational efficiency. For example, in 1964, Ulsan Oil Refinery was constructed. The construction of large-scale industrial complexes such as the Ulsan Petrochemical Industrial Complex, Onsan Nonferrous Complex, Changwon Machinery Complex, and Banwon Industrial Complex continued, drastically increasing the carriage demand. The construction of expressways and improvements in road networks continued. Expressways totaling 1,415 km in length, including the Gyeongin Expressway, were constructed in 1968, and the 88 Olympic Expressway was constructed in 1984. Expressway expansion has continued until today, reaching a total length of 3,859 km by 2010. A ubiquitous expressway is being realized in line with the ever-developing information technology and the convergence of life, culture, and information.

[Figure1-3] shows the country's trunk roads and their plans as stipulated in the second revised master plan for road improvement in 2011.

Figure 1-3 | Key National Road Network Plan
(under the 2nd Master Plan for Road Improvement)



Overview of Gyeongin Expressway Construction

Construction of the country's first expressway, Gyeonggin Expressway, began on May 1,1967. Scheduled for completion in 1969 at a cost of KRW 2 billion, Gyeonggin Expressway had a projected length of 32 km and a width of 31 m (six lanes). The Construction Ministry established a construction work office and contracted with Saman Co. for the project. On February 28, 1968, however, the Ministry changed the plan's target completion date to the end of 1968, a year earlier than planned, in a bid to prepare for the increasing traffic volume and to promote the Gyeongin region development, according to The Blue House Memorandum No. 4 concerning the Gyeongin Expressway construction. To raise the needed funds, the government stipulated that three privatesector builders, Hyundai E&C, Daelim, and Sambu, establish Gyeongin Expressway Co., which would undertake the construction and management of the project. Gyeonggin Expressway Co. took over the project from Saman Co., and began the construction work on March 24, 1968 by dividing the remaining works into three segments, allotting one segment to each of the three builders. The projected six lanes and 31 m width were changed into four lanes and width of 20.4m. The total budget increased from KRW 2 billion to KRW 3.38 billion. The cost was financed by a KRW 1.47 billion government investment, a KRW 1.28 billion private-sector capital, and a KRW 630 million ADB loan.

The initially completed 23.5km segment of Gyeongin Expressway was opened on December 21, 1968. The 6km soft-ground segment was later completed by KEC, formerly known as KHC, on July 21, 1969 after the completion of its surface construction work. The 0.484 km Incheon Port second-dock segment was completed on April 19, 1973, thereby marking the construction of the whole Seoul-Incheon route, which spanned 29.984 km in length. The expressway shortened travel time between Seoul and Incheon from forty-five minutes to twenty-four minutes, thereby reducing transport costs and contributing to the development of the Gyeongin region and its industries. Satellite cities were also constructed, dispersing the population of the Seoul metropolitan.

Overview of Gyeongbu Expressway Construction

The Gyeongbu Expressway was the country's one of the largest civil-engineering project ever. The Gyeongbu Expressway sprang from a joint meeting of the ruling party and the government at the Blue House on November 7, 1967. In the meeting, the Construction Minister reported on the progress of the expressway construction in the country, and President Park Chung-hee proposed the construction of Gyeongbu Expressway. In the same year, Park Chunghee, who ran for a second presidential term, proposed the Gyeongbu Expressway construction as his election campaign pledge. He predicted that the projected rapid economic growth would result in traffic congestion tantamount to a transport war. The Gyeongbu Expressway project was incorporated

in the expressway project plan involving seventeen routes and a length of 1.760 km, under the Great Public land Construction Plan.

On November 22, the Presidential Guideline on Gyeongbu Expressway Construction, involving four lanes and a design speed of 80-120 km, etc., was announced. In addition to the already-ongoing Gyeongin Expressway made possible by an ADB loan, the Gyeongbu Expressway proposal met with strong opposition and criticism from the opposition parties. Critics claimed that it was impossible to construct an expressway on the Gyeongbu route as the country had already procured loans from IBRD to construct the Daejeon-Mokpo, Busan-Sucheon, Seoul-Gangneung, and Mokpo-Samcheok expressways, and paving of national roads had yet to be finalized. To meet the minimum construction budget of KRW 30 billion, a reduction in the road layer by 10 cm was planned, and the gradual-paving method was adopted. Moreover, pieces of equipment were introduced from the military engineering units and the U.S. Armed Forces' engineering units. Various efforts were exerted (Construction Economy Newspaper, July7). In part due to such efforts, a milestone construction commencement ceremony was held on February 1, 1968, and the 31.3km Seoul-Suwon test segment was opened on December 21 of the same year. The opening of the 14.2 km-long Suwon-Osan segment followed on December 30 of the same year. The 38.1 km-long Osan-Cheonan segment was opened on September 29, 1969, followed by the 68.8 km-long Cheonan-Daejeon segment on December 10, 1969 and the 122.8km-long Daegu-Busan segment on December 29. The 152.8 km-long Daejeon-Daegu segment, the most difficult construction segment, was opened on July 7, 1970. Finally, the whole Seoul-Busan Gyeongbu Expressway, with four lanes and a length of 428 km, was opened.

2.2 Trends in Railroad Sector

In the 1st Five-Year Socioeconomic-Development Plan period (1962-1966), heavy investments were made in the traverse connection of railroads for the development of economic foundations. Railroad expansion connecting resources and production through industrial railroads also took place. The following lines were opened in the 1960s: Neugui Line in 1963 (Neunggok-Uijeongbu, 31.9 km), the Donghaebukbu Line in 1962 (Bukpyeong-Gyeongpodae, 50.3 km), the Gyeongbuk Line in 1966 (Gimcheon-Jeomchon, 58.6 km), the Gyeongjeon Line in 1968 (Samnangjin-Songjeongni, 80.5 km), and the Gyeongin Double-Track Line in 1965 (Juan-Yeongdeungpo, 23.3 km). From the second-plan period to the 3rd Five-Year Socioeconomic Development Plan period (1967-1980), IBRD conducted a feasibility study, after which the establishment of new railroad lines, railroad improvement, and railroad electrification projects were implemented. In this period, the Yeongdong Line, the Mungyeong Line, the Yeocheon Line, and the Chungbuk Line were converted to double-track lines, while the Jungang Line and the Taebaek Line were electrified.

Until the mid-1960s, railroads represented high share of the transportation sector. However, with the construction of expressways and other roads, the competitiveness and role of railroads diminished in the 1970s. While railroads represented the largest portions of the total passenger and cargo carriage in 1961 with 53.0% and 88.3%, respectively, figures declined to 20.9% and 37.8%, respectively, by 1986.

Table 1-14 | Carriage Share of Railroads

Category			1961	1966	1971	1976	1981	1986
Passenger	People carriage (1,000 people)		88,291	138,299	128,159	248,699	411,129	518,956
	Carriage share (%)	People (People-km)	13.0 53.0	8.3 42.5	4.1 27.1	4.7 24.4	4.8 23.6	4.3 20.9
Cargo	Carriage amount (1,000 tons)		15,373	24,064	31,955	43,629	48,761	58,238
	Carriage share (%)	Ton (Ton-km)	47.9 88.3	46.6 86.9	27.3 49.6	28.9 49.5	27.8 41.8	22.0 37.8

Source: MTLM, "Transport Statistical Annals"

Nonetheless, railroads played a pivotal role in the economic development process. Notably, railroads carried cargo and resources for industrialization, such as cement and coal. Until 1971, inlet lines connecting railroads and industrial complexes were actively constructed. In the 1970s, the industrial railroads reached their carrying capacity, and the demand for construction materials increased as the Seoul metropolitan grew. Industrial railroads in the Seoul metropolitan and in the Taebaek region were electrified to increase capacity. In addition, the double-track construction continued to enhance the railroad carrying capacity, increasing the capacity share from 15.1% in 1961 to 24.5% in 1985.

Table 1-15 | Modernization Trends of Railroad Construction

(Unit: km, %)

Category	1961	1966	1971	1976	1981	1985
Railroad facilities	4,630	5,049	5,582	5,653	6,045	6,280
Double-tracking ratio	15.1	14.9	16.8	18.3	22.9	42.5
Electrification ratio	-	-	-	13.2	13.7	13.8

Source: MTLM, "6th Five-Year Socioeconomic Development Plan (Transportation Sector), 1986

Though railroad construction and improvement were implemented to increase the carrying capacity of railroads, less investment was made in railroads compared with roads, which contributed to the reduced mode share of railroads. The railroad unit separated from the Transport Ministry in 1963, and the National Railroad Administration, a government-invested corporation was launched. Bureaucratic operation and inefficient management have been cited as factors of the diminished railroad mode share and.

While South Korea's economy continued to grow and quality of life for the general public increased in the 1990s, the erstwhile minimal railroad investment was identified as a problem. The population had reached 42.87 million people in 1990, indicating a 170% increase from 1960. The number of automobiles reached 3,395,000. In stark contrast, the operating length of railroads had slightly increased by 59 km of railroad track between 1962 (3,032 km) to 1990 (3,091 km) while the railroad network had been extended from 4,696 km of tracks in 1962 to 6,435 km in 1990, a mere 137% increase.

Following the intense economic development, population figures and the distribution of goods increased in the cities with the emergence of traffic congestion as a serious national issue in the 1980s. Full-fledged urban railroad construction began in the 1970s and focused on the electric-train network in the Seoul metropolitan. The construction of the Ansan Line, the Guro Triple-Track Line, the Bundang Line, the Gwacheon Line, and the Ilsan Line began. The era of high-speed-rail era was ushered in during the 1990s, prompting a turnaround in the transportation system. The importance of eco-friendly railroads was recognized in line with the adoption of a low-carbon and green-growth strategy as a response to climate change after 1990.The most noticeable growth from the 1990s to the present was laying the foundation for high-speed rails as a means of green transportation. When the Gyeongbu segment reached its full carrying capacity in the early 1970s, domestic and overseas research institutes proposed the construction of a new railroad as a solution. Diverse construction methods were discussed, and a feasibility study was carried out. The Gyeongbu High-Speed Rail began construction in 1992, and its first segment (Seoul-Daegu) was opened twelve years later. In addition, full-fledged construction of the Honam High-Speed Rail (targeted for completion in 2017) and the Seoul Metropolitan High-Speed Rail (targeted for completion in 2014) are being carried out.

2.3 Transportation Infrastructure Trends and National Comprehensive Development Plan

The country's transportation sector contributed not only to the rapid economic development of economy after the 1960s but also the productive use of public lands, industrial development, and increase in population. After the 1960s, the transportation sector was developed with the intent of boosting economic development rather than general public land development, in the case of the country's construction of the Gyeongbu and the Gyeonggin Expressways. Due to limited investments in implementing industrial policies, however, less investment was allotted to the transportation sector.

Planning and implementation of transport projects was not carried out for a long time, although comprehensive measures for the efficient development of public land were required. For this reason, the transportation agenda was incorporated into the comprehensive public land development plan beginning in the 1970s and has continued since.[1]

The 1st Comprehensive Public land Development Plan was carried out from 1972 to 1982. The transportation agenda were incorporated into the plans of industrial institutes as well as those for urban development, living environments, water resources, and public land conservation, thereby greatly contributing to SOC expansion while mainly supporting the country's economic development. In this first plan period, investment focused on the construction of expressways, Seoul metropolitan's electrified railways networks, and subways as well as on facilities coping with the increasing demand for transportation in line with rapid industrialization and urbanization. Investment for the transportation sector represented 16.9% of the total investment budget for the first half of the public land plan 15.7% in the second half, both of which were relatively high portions. The most investment was devoted to public roads, which represented 62.1% of the total transportation sector in the first half and 54.5% in the second half of the period.

In the 2nd Comprehensive Public land Development Plan period (1982-1991), transportation agenda items were incorporated into plans in accordance with population policies, resource development, environmental conservation, and citizens' living environment, in a bid to construct the country's infrastructure framework. Moreover, transport development focused on resolving the gap between poorly paved road and well maintained roads present across the regions, which was a byproduct of the country's rapid economic growth. In the 2nd Comprehensive Public land Development Plan period, transportation sector investment only accounted for 9.5% of total investments during the first half of the period.

During the periods of the 1st and 2nd Comprehensive Public land Development Plan, significant achievements and shortened travel time were attained in the transportation sector. Interregional accessibility was improved, and travel from one end of the country to the other was possible within one day. Moreover, transportation expansion improved the spatial connection for regional development and facilitated the development of industrial

1 The long-term comprehensive transport policy research for the 2000s (KOTI, 1998) is summarized.

complexes and tourist resources, among other items pertaining to regional growth. Until the implementation of the second plan, the goal of balanced regional development had been somewhat neglected, leading to polarized public land development that was centered on the Gyeongbu Line axis linking the northwestern region and southeastern regions together. Moreover, from the 1960s-80s, the development focused on roads, boosting the road carriage share of the Transport modes.

Following the economic development of the 1960s that resulted in increased incomes and industrial changes, demand in passenger and cargo transportation rapidly increased within cities and between regions. Moreover, the unbalanced regional development that occurred as an outcome of industrialization policies also led to subsequent concentration of employment opportunities and population in urban areas. A perpetual cycle appeared beginning with population concentration in large cities, followed by increased aggravation of the country's transport and housing urban problems. To address these issues, increased investment in large cities was made. Further population concentration in large cities would lead to the creation of gigantic cities, which would contribute to acceleration in transport problems in large cities. As mentioned earlier, the transportation sector investment until the 1980s focused on key roads to support economic development. However, reduced investment in transportation in anticipation of urbanization further worsened the problems of large cities. Thus, the implementation of the transportation policy until the 1980s was limited by the state's economic policy.

The 3rd Comprehensive Public land Development Plan was formulated to address the above shortcomings. This plan intended to develop the provincial areas while containing the concentration of development in the Seoul metropolitan in order to balance regional development. Comprehensive high-speed transport and communication networks were developed, facilitating the logistical flows of passengers and cargoes, while the expansion of international airports and seaports helped the country to globalize. During the 3rd Comprehensive Public land Development Plan (1992-1999), efforts focused on the decentralized development of public lands, the use of public lands to preserve production resources, the improvement of national welfare, the conservation of the public land environment, and the creation of public land foundations, in preparation for the unification of South and North Korea.

The 4th and current Comprehensive Public land Development Plan (2000-2020) aims to realize the integrated management of public lands in the 21st century. This encompasses regional integration, integration of the environment and development, integration with Northeast Asia, and integration of South and North Korea. The plan seeks to create an open-type integrated public land axis to emphasize environmentally friendly public land management and to create foundations for exchange and cooperation between South Korea and North Korea. The plan was revised in 2005 and 2011 to include the construction of an administrative complex city and the relocation of some public agencies to the provincial areas in an effort to achieve balanced regional development. Further revisions included

the opening of high-speed rails and the pursuit of sustainable development of public land that take socioeconomic changes into consideration, such as an increasingly aging society. In accordance with this plan, Incheon International Airport was constructed in 2000 and the full-fledged construction of Gyeongbu High-Speed Rail was implemented. The era of expressways spanning 2,000 km began and construction of expressways with private sector financing was implemented in hopes of efficiently developing the key national transportation networks. The fourth plan factors changing socioeconomic conditions following the 1997-1998 financial crisis, expected accelerated globalization, knowledge informatization, and a progressive public land strategy in line with the decentralization policy. Moreover, the plan aims to reduce huge social costs incurred by traffic congestion, high population density, and environmental pollution due to the population concentration in the Seoul metropolitan area. Furthermore the plan includes efforts to address unresolved imbalance in regional development, which has worsened despite the implementation of the third plan, as well as infrastructure shortages along the east-west axes of the Korean peninsula. Towards these ends, the planned public land development includes the division of public lands into three axes resembling an upside down pi symbol (π) consisting of the east, west, and south coastal areas. Additional efforts to balance regional development includes the "7+1" specialized regions, which consist of the Seoul metropolitan and blocs of Gangwon Province, Daegu, Busan, Chungcheong Provinces, Jeonbuk Region, Gwangju, and Jeju Island. The government has set five goals for public lands as listed: ① Mutual benefit; ② Competitiveness; ③ Welfare; ④ Sustainability; and ⑤ Prosperity and Unity.

In the 3rd and 4th Comprehensive Public land Development Plan periods, automobile ownership surged among Korean people as urban areas expanded, which caused a surge in traffic demand. This called for a policy of efficient, comprehensive traffic demand management. That emphasized the importance of public transportation. Various demand management measures were devised and implemented, including increase in traffic taxes, limited use of parking areas annexed to facilities, and first priority to public transport first-priority. To promote public transportation, an automatic fare collection system and integrated fare structure that would allow the use of one transport card to access and transfer multiple modes of public transportation was established. A discounted transfer fare system for public transportation was also implemented to encourage greater use of public transport and mitigate the demand for private automobiles.

Revised in 2011, the 4th Comprehensive Public land Development Plan has multi-pronged goals, including shifting the transport infrastructure focus onto railroads and marine transport; developing green Transportation modes, such as electric vehicles and hybrid automobiles; and promoting bike riding and pedestrian activity in the urban areas. This paradigm shift is in stride with realizing a low-carbon, energy-saving future and re focusing the country's transportation policy from efficiency to environmental friendliness.

Chapter 2

Transportation Investment Strategy

1. National Transportation Infrastructure Investment Plan
2. Organizational Structure by Sector
3. Relevant Acts and Policies by Sector
4. Transportation Infrastructure Financing

Transportation Investment Strategy

1. National Transportation Infrastructure Investment Plan

1.1 Transportation Infrastructure Renovation Master Plan

In the second half of the 1990s, the separate, individual expansion of transport by category (e.g., railroads, airports, ports) was criticized for not efficiently achieving national transportation policy goals. Based on results of feasibility studies conducted under the different modes, this became an object of concern for hindered intermodal connectivity and duplicated functions and routes. Furthermore, balanced budgeting by region and category were difficult to achieve. In response, the government formulated a 20-year master plan for the key national transportation networks striving towards to developing an efficient national transportation system in accordance with the Transportation System Efficiency Act (currently Transportation Efficiency Act). A corresponding five-year midterm transportation facility investment plan was prepared as an execution plan. In addition to the Key National Transport Network Plan, mid- and long-term plans as well as basic plans by transport mode were devised. The most prioritized plans by category included the Master Plan for Road Improvement and the National Railroad Network Construction Plan. Their legal grounds, formulation periods, and responsible authorities are outlined in <Table 2-1>.

Table 2-1 | Mid- and Long-Term Transportation Facility Plans

Plans	Legal Grounds	Formulation Period (Year)	Authority
Key National Transport Network Plan	Article 4, Transportation Efficiency Act	20	MLTM
Third Midterm Transportation Facility Investment Plan (2011-2015)	Article 6, Transportation Efficiency Act	5	MLTM
Basic Plan for Road Improvement	Article 22, Road Act	10	MLTM
Five-Year National Road Construction Plan	Article 23, section 2, Road Act	5	MLTM
Five-Year State-supported Local Road Plan	Article 23, section 2, Road Act	5	MLTM, special- or metropolitan-city mayors responsible for surveys and designs concerning special- or metropolitan-city segments
Plan for Improving the Congested Roads in Large-City Blocs	Article 23-2, Road Act	5	MLTM
National Railroad Network Development Plan	Article 4, Railroad Construction Act	10	MLTM

Source: National Law Information Center, Ministry of Government Legislation

1.2 Relevant Acts

The construction of Key National transportation facilities, such as roads and railroads, is implemented under the fundamental Key National traffic network plan and the midterm transportation facility investment plan. The plan is implemented in accordance to the Construction Technology Management Act (Construction Technology Act), the National Finance Act, and the National Integrated Transportation System Efficiency Act (Transportation Efficiency Act). The Construction Technology Act stipulates a process whereby the processes of construction work execution processes, such as the plan, design, execution, supervision, and maintenance, are executed in close relationship. The National Finance Act stipulates that a preliminary feasibility study be conducted to set budgets for large-scale projects followed by a second feasibility study for projects with a specific amount

of costs for the purpose of managing project costs. In addition, the Transportation Efficiency Act stipulates the formulation of a Key National Transport Network Plan and a Midterm Transportation Facility Investment Plan as well as specific SOC project implementation measures, such as feasibility studies and second feasibility studies. Moreover, the Fund Management Act, under the control of the Ministry of Planning and Budget, stipulates the conduct of prior feasibility studies to review project implementation right before the budget execution.

Table 2-2 | Laws Pertaining to Transport Implementation

Ministries	Laws	Relevant Clauses	Description
Ministry of Construction and Transport	Transportation Efficiency Act	Article 3	Key National Transport Network Plan
		Article 5	Midterm Transportation Facility Investment Plan
		Article 8	Evaluate implementation of Midterm Transportation Facility Investment Plan
		Article 10	Investment evaluation guidelines and commissioned evaluation of feasibility studies
	Enforcement Ordinance of the Construction Technology Act	Article 38	Basic scheme–feasibility study–design –construction–completion–evaluation –maintenance
Ministry of Planning and Budget	Fund Management Act	Article 8	Preliminary feasibility study
		Article 8	Total project cost management
	Enforcement Ordinance of the Budget and Accounts Act	Article 9	Budget for large-scale development projects
	Total Project Cost Management Guidelines	-	Project scheme–preliminary feasibility study–feasibility study and formulation of a basic plan–basic design–execution design –ordering and contracting–construction

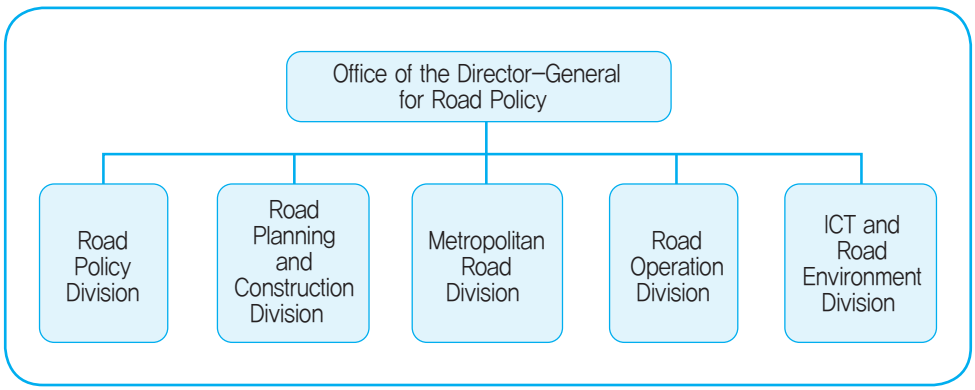
2. Organizational Structure by Sector

2.1 Roadway Sector

The history of road administration and responsible authorities began in 1943 with the establishment of a transport bureau under the control of the Japanese Governor-General of Korea that integrating all categories of transportation facilities, including public roads. In 1947, the Civil Engineering Ministry was established to take responsibility for road construction and improvement projects. The Restoration Ministry was responsible for road construction right before and after the Korean War. In May 1961, the Restoration Ministry was replaced by the Construction Ministry, and the Public land Construction Bureau under its control was responsible for roads. In July of the same year, the Construction Ministry was dissolved, and the Public land Construction Administration was installed to undertake transport work. In 1962, the Public land Construction Administration was disbanded, and the Construction Ministry was reestablished. In 1968, to cope with ever-increasing traffic demand, the Road Section under the control of the Construction Ministry was promoted to the Road Bureau to strengthen its road construction function, such as the development of Key National road networks. In 1969, KEC was established to consistently implement road construction and management as well as relevant projects. As such, road administration further development as it underwent many changes. The Construction Ministry was incorporated into the Transport Ministry according to the December 3, 1994 amendment of the Government Organization Act. The Ministry of Construction and Transport (MCT) was established to reduce the size of bureaucracy, address traffic congestion, and efficiently invest in and operate SOC. MCT continued operations until it was reshuffled into the Ministry of Land, Transport and Maritime Affairs (MLTM) when its functions were merged with some of the functions of the Maritime Affairs and Fisheries according to the 2008 amendment of the Government Organization Act. The road-related institutes under the control of MLTM include the Seoul, Wonju, Daejeon, Iksan, Busan, and Jeju branches as well as KEC, Korea Research Institute for Human Settlements (KRIHS), Korea Institute of Construction Technology (KICT), and the Korea Transport Institute (KOTI).

Today, MLTM manages all road work in Korea. The existing road-related organizations include the Office of the Director-General for Road Policy, which controls the Road Policy Division, the Road Planning and Construction Division, the Metropolitan Road Division, the Road Operation Division, and the ITS & Road Environment Division. These divisions perform road administration, planning, construction, and maintenance works, and supervise KEC. The first road-related organization, the Road Division of the Construction Bureau, which is under the control of the Home Ministry, was established in 1948. In 1968, the Road Division was promoted to the Road Bureau. Since then, it has undergone reorganization twelve times.

Figure 2-1 | Road-related organizations



2.2 Railroad Sector

The country's railroad history first began during the Japanese colonial period when the Railroad Bureau, the first railroad administration organization, was established in 1894 under the Public-Road Division of the Agriculture and Industrial and Commerce Ministry. In 1899, the West Railroad Bureau was established, under the control of the Royal Household Affairs Ministry. The same year, the Seoul-Jemulpo Railroad was constructed by Gyeongin Railroad Joint Venture. Gyeongbu Line was opened in 1905, followed by Gyeongui Line a year later.

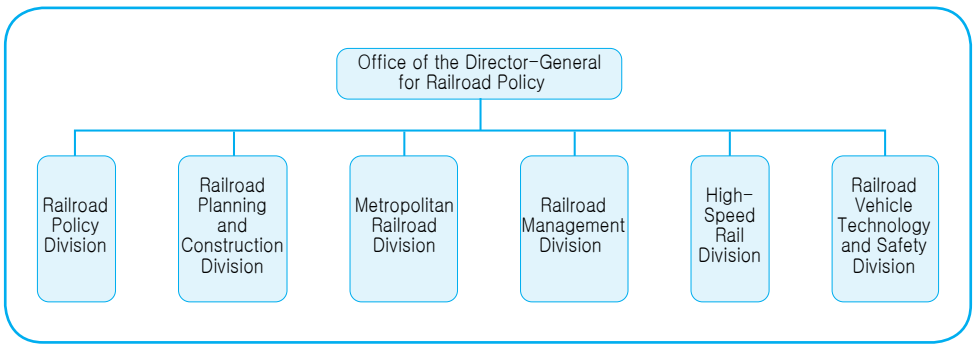
In 1900, the Bureau was promoted to the Railroad Agency per government policy enabling independent railroad management. Under this integrated agency, the Railroad Management Bureau was established in 1906, which operated several railroad companies. After the forced annexation of Korea by Japan in 1910, the Railroad Agency's function was transferred to the Railroad Bureau of the Japanese Governor-General of Korea, which continued to operate until 1943 when it was reorganized into the Transport Bureau. During Japanese colonial rule, the Hamgyeong and Jungang Line were constructed under the Japanese Governor-General of Korea in 1928 and 1942, respectively. After Korea's independence, some private railroads were nationalized, and the Transport Ministry controlled the railroad business.

After Korea's liberation in 1945, the Transport Division of the U.S. Army Military Government in Korea took over the management of railroad operations. The division was later placed under the Railroad Transport Bureau. In 1948, the Transport Division and the agencies under its control were transferred to the Transport Ministry, which incorporated public roads, marine transport, and aviation affairs under one department and six bureaus. The Local Railroad Transport Bureau was reshuffled into a railroad bureau. To operate railroads more professionally under an independent unit system, the Railroad Agency was launched in 1963 independent of the Transport Ministry. The Railroad Agency had five bureaus and twenty-four sections. Also included were logistical offices, heavy equipment

offices, and hotels as well as local branches in Seoul, Busan, Daejeon, Yeongju, and Suncheon. In 1973, to effectively implement the train electrification project, the Engineering Bureau was reshuffled into the Electricity Bureau and the Rolling-Stock Bureau, and the Material Procurement Bureau was incorporated into the Accounting Bureau. In 1974, the local railroad bureaus were renamed local railroad agencies. In 1985, the railroad hospital was privatized, thereby annulling the railroad hospital organization.

As of January 2010, railroad organization was headed by MLTM, under the control of which is the Office of the Director-General for Railroad Policy, the Railroad Policy Division, the Railroad Planning and Construction Division, the Metropolitan-Railroad Division, the Railroad Management Division, the High-Speed Division, and the Railroad Vehicle Technology and Safety Division. The Railroad Policy Division has a number of responsibilities, including the coordination and overseeing of railroad policy implementation, railroad management improvement support, and planning of national railroad network construction, and supervision of KEC and Korea Rail Network Authority. The Railroad Planning and Construction Division is responsible for the implementation of all railroad construction-related laws and decrees, the establishment and operation of relevant systems and criteria as well as feasibility studies for general railroad construction projects, technical surveys, and approval of basic plans and execution designs. The Metropolitan-Railroad Division is responsible for the implementation of policies and systems for metropolitan and urban rails, financial support, and light-rail and magnetic-levitation train projects. The Railroad Management Division is responsible for railroad business licensing and other approval systems, transport and railroad logistics improvement, and maintaining order and devising anti-crime measures within the railroad areas. The High-Speed Rail Division is responsible for the high-speed rail construction projects and for the coordination thereof, and for the operation of the SOC Construction Impulsion Committee. Lastly, the Railroad Vehicle Technology and Safety Division is responsible for formulating railroad safety policies, operating railroad safety systems, and conducting R&D on railroad industry technologies as well as formulating measures against rail accidents, reports on railroad accidents, and recovery works.

Figure 2-2 | Railroad-related Organizations



3. Relevant Acts and Policies by Sector

3.1 Roadway Sector

The first conceptual modern road law was the Road Rule enacted and promulgated by the Japanese Governor-General of Korea in 1911. It consisted of eleven clauses stipulating the types and management of roads and cost shouldering. Road conservation- and traffic safety-related laws were also enacted and implemented, such as the 1913 Road Regulation and the 1921 Automobile Regulation.

In 1938, the Joseon Road Enforcement Decree and Joseon Private Road Rule were enacted, stipulating road management and facility conservation as well as the construction, management, and use of private roads. In 1961, the existing Road Enforcement Decree was expanded and the Road Act was enacted and promulgated effecting rational road management and the democratic sharing of public costs. In 1967, the Road Improvement Promotion Act was enacted, stipulating the formulation of a long-term road improvement plan to achieve balanced improvement in the nationwide road network. In 1970, the Express National Road Act was enacted and promulgated, designating express national roads and stipulating the management and conservation of road structures.

The current road-related laws include the Road Act, Express National Road Act, Toll Road Act, Private Road Act, and KEC Act. The Road Act defines road improvement and management that contributes to the development of the national transportation system and the improvement of public welfare. The aforementioned act, which is a basic law for public roads, has three enforcement decrees, including the Enforcement Decree of the Road Act. This enforcement act defines the types of roads (seven types, including express national roads) and the pertinent administrative agency as well as the construction procedure, criteria for, and the management of roads. This act also defines the types and grades of roads including the following: express national roads, general national roads, special- and metropolitan-city roads, local roads, city roads, county roads, and district roads. The current road administration agencies are MLTM for national roads, provincial governors and

special-autonomous-province governors for state-supported local roads, and administrative agencies for other roads acknowledged by them. Administrative agencies are to devise a Master Plan for Road Improvement every ten years and must conduct a feasibility study thereof every five years. They are mandated to undertake road construction works, including renovation, repair, and maintenance. They must also keep records of books. For road-related costs, MLTM-managed roads are to be financed by the state, while the other roads should be financed by the municipalities to which the managing administrative agencies belong. The corresponding taxes are to be borne by those parties responsible for losses, and compensation for losses will be acknowledged.

The Express National Road Act aims to define all important matters concerning express national roads so as to improve such roads and to contribute to the development of automobile transportation networks. This act has two enforcement decrees stipulating the special regulations on express national roads in addition to the Road Act. This act designates routes, intersection methods, road adjacent areas, and traffic limits, and delegates the works of the related administrative agencies (e.g., KEC). Express national roads are designated by presidential decrees, specified by road number, road name, starting point, end point, and major intermediate points. The administrative agency for express national roads is the Ministry of Construction and Transport, which may delegate some of its authority to KEC. When an expressway, a road, a railroad, a track, and/or a passage intersect, a three-dimensional connecting facility must be built without any exceptions allowed. The Ministry of Construction and Transport may designate expressway access areas. No one shall pass or enter express national roads unless using automobiles. The Ministry shall install signs banning or limiting passage at the entrances of expressways or at other necessary locations.

The Toll Road Act aims to define matters concerning toll roads so as to promote transport convenience and to contribute to national economic development. This act has two enforcement decrees stipulating the road construction criteria, toll road construction, approval and management, and toll collection to secure the needed finances and to promote road improvement. The road administrative agency may collect tolls if the users will remarkably benefit from them, although an exemption is granted when a road is the only available transport route in the vicinity. Regardless of such requirements, tolls may be charged for express national roads, tourist roads, roads connecting land and islands, and islands. If a road is under the control of a local road administrative branch and is closely related to public land development, tourism promotion, and the convenience of the residents, and if the aforementioned requirements are met, the Ministry of Construction and Transport may then construct or renovate such roads and collect tolls. Entities other than the concerned road administrative agency, subject to the approval of such road administrative agency, may construct or renovate a road and collect tolls. For the linkage of a toll road and a different road, approval must first be obtained from the Ministry of Construction and Transport. The toll road agency may establish toll road management rights to collect tolls and occupation fees for the relevant toll road. The toll road management right is considered a real estate right, and unless otherwise stipulated in this act, the realty regulation of the

Civil Act shall apply, with modification when deemed necessary. The toll road management right with a mortgage established shall not be disposed of without the agreement of the mortgagee. Tolls are collected according to the automobile types. The toll road agency shall not collect tolls whose total revenues exceed total road construction costs. The tolls and additional tolls collected by the Ministry of Construction and Transport shall belong to the state coffers, and the tolls collected by a local road agency shall belong to the municipality. Such tolls shall not be used for purposes other than the repayment of the principal of the road construction and renovation, and the payment of the road management costs. The state and municipalities should establish a special account for toll roads, and should manage the related revenues and expenditures.

The Private-Road Act defines the criteria for the construction and management of private roads not subject to the Road Act. The establishment of a private road requires the approval of the concerned mayor or county governor. The owner of a private road may, to increase its utility, request the mayor or county governor to improve the segment connecting the private road with the pubic road. A private road shall be managed by its owner, who shall not, except for the road structure conservation or the prevention of passage danger, limit or ban general public passage through the road, and who may collect a service fee for the use of the road. If a private-road owner intends to limit or ban passage through the road or to collect a service fee for the use of the road, he/she must first obtain approval thereof from the mayor or county governor. The regulation on acts banned for road conservation under the Road Act shall apply to private roads, with modification when deemed necessary.

The KEC Act defines the establishment of KEC as well as the construction and management of roads. KEC's tasks include constructing, renovating, maintaining, and repairing toll roads and roads that are necessary for promoting the use of toll roads and toll express national roads, as determined; establishing and managing toll parking lots; constructing and managing service areas and refueling stations in line with toll roads; acquiring and managing realty necessary for road projects; surveying, designing, and supervising construction works together with overseas highway agencies; carrying out development projects for areas adjacent to toll roads; and making investments and carrying out equity participation in projects related to its works.

Table 2-3 | Road-related Law System

Road Act	Basic act on public roads · Seven types of roads (express national roads, etc.), and designation of relevant agencies · Road construction procedures and criteria, and management thereof, etc. * Construction procedure: Designate route (presidential decree)→Determine road area→Implement construction work→Complete construction→Open road
Express National Road Act	Special provisions on Express National Road Act in addition to Road Act · Designation of road routes, intersection methods, road access areas, and passage limitations · Delegation of road agency works (MLTM→KEC), etc.
Toll Road Act	Defines establishment, approval, and construction of toll roads to secure road funds and to promote road improvement. · Establishment criteria (benefits and alterative roads) · Collection of tolls (within total principal of construction and administrative costs for sake of user benefits)
Private Road Act	Provisions on criteria for construction and management of private roads not subject to application of Road Act · Criteria for private roads · Structure and use of private roads · Approver of road establishment: mayors and county governors · Other: Banning passage of general public and limiting collection of tolls (roads for public use)
KEC Act	Provisions on KEC establishment, and establishment and management of roads · Matters concerning capital, stock issuance, and registration · Works, disposition of revenues and losses, issuance of debentures, subsidies, etc.

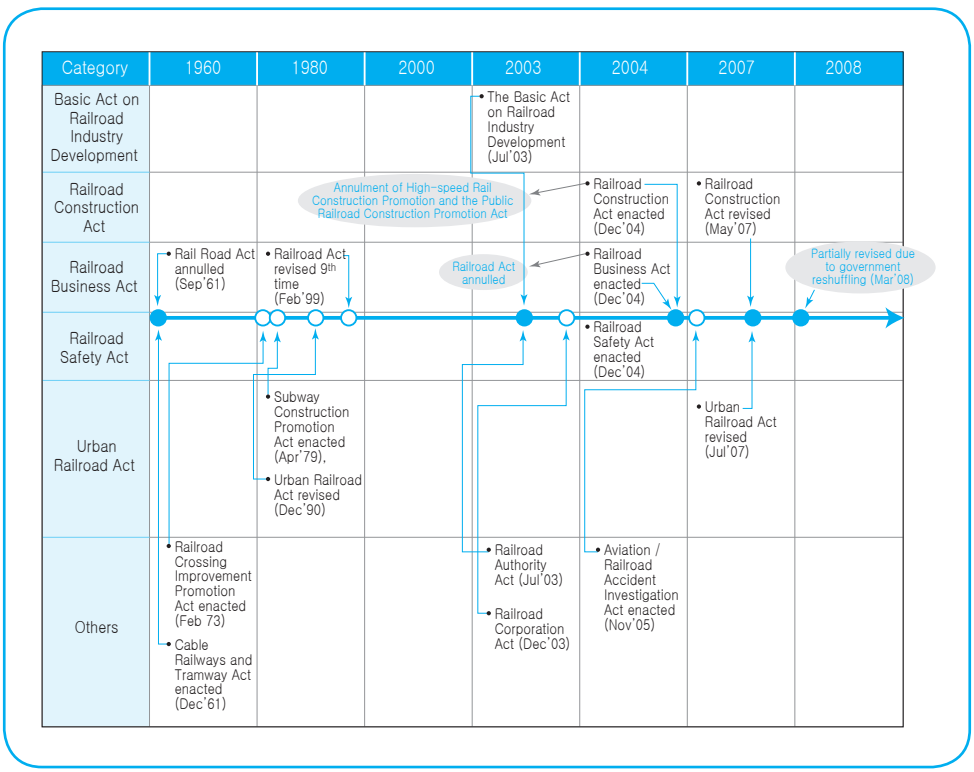
3.2 Railroad Sector

The country's first railroad-related law was the Domestic Railroad Rule, which was enacted and promulgated in 1896. It stipulated physical requirements such as the track width, and administrative details such as the establishment and operation of railroad companies. To enhance its colonial reign, imperial Japan enacted the Joseon Private Railroad Decree in 1920 and the Joseon Private Railroad Supplementation Act in 1921, thereby focusing on the construction of private railroads. Railroad improvements were difficult after Korea's liberation due to social disturbance, the separation of the South-

North Korean railroads following the division of public lands, and war-ravaged situation. In line with the formulation of the 1961 Socioeconomic Development Plan, the Railroad Act was promulgated to facilitate the operation of railroads and paved the way for railroad development. In December 2004, the Railroad Act was superseded by the Railroad Industries Act, which has been amended five times since. The railroad industry was restructured and divided into the railroad facility sector and the operation sector. Moreover, the launching of high-speed rail, the diversification of user requirements, and other market changes has prompted the country to efficiently manage its railroad businesses and to develop a healthy railroad development infrastructure.

As of 2010, there were ten railroad-related laws in the country as listed: the Railroad Industry Development Basic Act, Railroad Construction Act, Railroad Business Act, Railroad Safety Act, Railroad Crossing Improvement Promotion Act, Urban Railroad Act, Tramway Transport Act, Korea Rail Network Authority (KR) Act, KEC Act, and Act on the Development and Use of Railway Station Spheres. In addition, there are ten railroad-related presidential decrees and nineteen MLTM decrees.

Figure 2-3 | History of Railroad-related Laws



Source: MLTM, A Study on the Advancement of the Railroad Technology Standards, 2009

4. Transportation Infrastructure Financing

4.1 Transportation Infrastructure Costs Allocations by Authorities

Financing for transportation facility investment are shared by the central government, municipality, public corporation, and private sector, and financing distribution vary according to the project characteristic and scale. The ratios by category among the central government, municipality, and implementer are summarized as follows.

Table 2-4 | Financing Ratio between Central Government and the Municipality

Category	Shared Financing	Implementer
National road	Central government (CG)-100%	MLTM
Expressway	CG-50%, KEC-50%	KEC
State-supported local road	CG-70%, municipality-30%	Municipality
Metropolitan road	CG-50%, municipality-50%	Municipality
Subway (Seoul)	CG-50%, municipality-50% (CG-40%, Seoul City-60%)	Municipality
Metropolitan railroad	CG-75%, municipality (KNR)-25%	Korean National Railroad (KNR)
High-speed rail	CG-45%, KHRA-55%	Korea High-Speed Rail Authority (KHRA)
General railroad	CG-100%	KNR

Source: Jeong, Il-ho et al., "CG-Municipality Cooperation for Activating the SOC Supply and Operation for the Road Category," KRIHS, 2004

4.2 Transportation Infrastructure Investment Financing by Sector

4.2.1 Roads

Road construction projects were financed by a general account until 1988, after which a special account was used for more stable and efficient road project financing from 1989 onwards. The special account has been financed by the gasoline special-consumption tax (90%), diesel special consumption tax, and a special consumption tax for private automobiles, so that users bear the costs. Shortages have been supported by the general accounts.

Gasoline and diesel taxes were established in 1994 as a stable and efficient funding source for the transportation sector. The road project special account was expanded into the transportation facility special account to include not only the road account but also

the urban railroad, high-speed rail, airport, and harbor accounts. In 1996, the gasoline and diesel special consumption taxes were changed from price-dependent taxes to quantity-dependent taxes.

Under the 2010 transportation facility special account, road account revenues included operating revenues, 53.0% of the transfer from transport, energy and environmental taxes (railroad, 24%; public transport, 10.0%; harbor, 13.0%), 100% of passenger automobile special-consumption tax revenues, the expressway construction financing principal and the interest on it, and road occupation tax revenues.

To address the road facility shortages resulting from inadequate road investment in the 1980s, a special road account was introduced in the late 1980s, which increased the budget remarkably. As land acquisition and other construction costs have risen, however, road expansion has been limited, further aggravating road traffic congestion and resulting in greater losses. This negatively impacts the national industrial competitiveness. To address these problems and to strengthen the country's sustainable growth potential, the important SOC road network must be expanded, and diverse financing measures are needed.

Table 2-5 | Road Account Revenue Details

(Unit: KRW 100 million)

Category	2010 Budget	
	Amount	Description
Total	77,817	94,069 ('09)
▣ Road	77,281	90,634 ('09)
· Transport special account ("TSA") (road account)	76,630	
· Operating revenue	2,133 (2.8%)	· Land-lending fees (157) · Government investment revenue (dividend: 734) · Other interest (KEC) and asset revenues · Current transfer revenue (98) · Goods and service sales revenues (2) · Land and other sales revenues (39) · Recovery of the road-financing principal (810)

Category	2010 Budget	
	Amount	Description
· General account transfer revenue - Transport, energy, and environmental taxes - Passenger automobile special consumption tax - General account additional transfer	66,306 (86.5%) 49,111 (64.1%) 15,142 (19.7%) 2,053 (2.7%)	· Transport, energy, and environmental taxes - Gasoline: KRW 529/l - Diesel: KRW 375/l · Passenger automobile individual-consumption tax - Under 2000 cc: 5%; above 2000 cc: 10%
· Carryover from the previous year	2,269 (3.0%)	
· Transfer from another account (e.g., airport)	5,922 (7.7%)	
▫ TSA (inter-account transaction)	△10,154	· Metropolitan roads (2,472), industrial-complex access roads (7,682)
▫ TSA (inter-account fund transaction)	△141	· Advance principal (127), advance interest (8.3), public-officials pension (5.3)
▫ TSA (road account)	△30	· Provincial and new town access road construction support (30)
▫ Metropolitan special account (MSA) (metropolitan development account)	8,333	· Metropolitan roads (2,742), local roads (5,861)
▫ MSA (provincial development account)	1,405	· Private capital (1,405)
▫ MSA (Jeju special account)	1,238	· Old national roads (762), old national road management (156), local roads (320)
▣ Others (logistics, etc.)	536	· Advance principal, etc. (141) · Congested roads (335), metropolitan BIS support (60)

Source: MLTM, Road Handbook 2010, 2010

4.2.2 Railroads

The railroad sector experienced drastic reductions in investment for thirty years from the 1st Five-Year Socioeconomic Development Plan in 1962 to the 6th Five-Year Socioeconomic Development Plan in 1991. Moreover, the investment priority was placed on the construction and operation of urban railroads and trains rather than on the expansion

of key inter-regional railroads, which resulted in a regional imbalance in railroad facilities. From 1971, when expressways were first opened, to 2001, the railroad networks increased by 17% in length while the expressway network increased by a high 225%. This lowered the railroad carriage share.

During the 1988-1998 decade, the road investment represented 62.42% of total SOC investment, while railroad investments, including that for high-speed rails, represented 9.55% of total investment. In terms of the distribution of the eleven-year investment monetary amount, road investment represented KRW 30.7 trillion, which was 6.5 times more than the KRW 4.7 trillion railroad investment. Excluding high-speed rail, road investment amounted to twelve times the value as general railroad investment. The investment was based on the transportation system concept rather than on the construction concept. Although railroad transport is a more efficient mode of transport than road transport, intensive investment has been devoted to roads, resulting in increased numbers of vehicles and worsened environmental pollution among multiple negative impacts. From the perspective of the transportation system and its efficiency, investment ratios by mode of transport should be reconsidered.

Table 2-6 | Investment Ratios by Transport Mode in the Five-Year Socioeconomic Development Plan Periods

(Unit: %)

Mode	1st Plan (1962-1966)	2nd Plan (1967-1971)	3rd Plan (1972-1976)	4th Plan (1977-1981)	5th Plan (1982-1986)	6th Plan (1987-1991)
Railroad	48.4	18.5	15.3	15.8	16.9	20.9
road	30.6	54.0	46.9	54.8	47.2	57.8
harbor/ airport	21.0	27.5	35.2	16.4	15.1	20.2
subway	-	-	2.6	13.2	20.8	1.1
Transportation sector ratio of GNP	-	-	1.3	2.1	2.4	2.1

Source: EPB, Budget Plan, 1992

Under the five-year socioeconomic development plans after Korea's liberation, the railroad construction project was implemented as a key national industry. In the 1st Five-Year Socioeconomic Development Plan period (1962-1966), the transportation sector investment ratio was relatively high at 60.0%. From the 2nd Five-Year Socioeconomic-Development Plan period, however, the road sector investment ratio rose to 50% while railroad investment decreased. Moreover, railroad investments were focused on the

purchase of train cars to increase the carrying capacity and facility improvements rather than the expansion of railroads and railroad networks. This contributed to a supply shortage of railroad facilities.

Table 2-7 | Transport Investment in the Last Five Years

(Unit: KRW 100 million)

Category	2006	2007	2008	2009	2010
Road	73,567	75,330	79,259	92,736	77,281
Railroad	32,941	34,625	40,345	51,838	42,020
Urban railroad	12,953	12,845	14,108	16,143	11,492

Railroad account revenues consist of the following: transfers from general accounts, state revenues under Article 33 of the KR Act, transfers and deposits received from different accounts, local and foreign loans under the Act on the Introduction and Management of Public Foreign Loans, deposits received from the public funds under the Public-Fund Management Act, sales revenue of state-owned assets (under the control of and as designated by MLTM according to Article 39 of the State Property Act), and other revenues. Expenditures consist of the construction, improvement, and management costs of general-railroad and high-speed rail infrastructures, and for the modernization of facilities and equipment; investment costs in, support for, and financing in KR for the aforementioned purposes; relevant R&D and technology development costs, repayment of deposits received, borrowing principals, and foreign loans; and other account-operating costs.

Chapter 3

Policies Led to Successful Transportation Investment

1. Establishment of Korea Highway Corporation
2. Railroad Reform and Korea Railroad Corporation
3. Transportation Infrastructure Special Fund
4. National Comprehensive Transportation System Master Plan
5. National Integrated Transportation System Efficiency Act
6. Urban Transportation Maintenance Facilitation Act and Metropolitan Transportation Management Special Act
7. Policy and Technology Support for Efficient National SOC Investments

Policies Led to Successful Transportation Investment

Full-fledged SOC investment began in the 1960s and expanded through the 1970s under the Five-Year Socioeconomic Development Plan. SOC investment continued during the 1980s in line with economic development efforts, though there were reductions due to increased financing of other categories. Heightened SOC investment need prompted investment and changes in the 1990s. The Korea Expressway Corporation (KEC) was established in 1969 to efficiently establish, expand, and manage key roads. More systematic investment was achieved in the 1990s and thereafter.

Transportation projects were able to be successfully implemented because of the government's huge efforts and consensus for such necessity, among many factors. This study examines major policies and measures to appropriately respond to the changing times and circumstances after the 1960s.

A great change in transportation, especially in the road category, is the establishment of KEC in 1969. KEC enabled a systematic construction and management of the country's toll-pay roads, including the construction of the key road networks involving expressways. In 1993, a special account for transportation facilities was established, thus stably financing the investment in transportation facilities. This is a representative financing example. After the 1990s, diverse systems were established to efficiently implement transport projects, along with the enactment of the Transportation System Efficiency ActTransportation System Efficiency Act aimed at dealing with overall transport. Diverse laws were enacted to effectively cope with ever diversifying transport problems. Examples of these laws aimed at handling urban transport problems were the Urban Transport Improvement Promotion Act and the Special Act for Large City-Metropolitan Transport Management, which were enacted in 1996. This study examines these three laws.

In addition, in the second half of the 1990s, a mid- and long-term master plan began to be formulated to secure the transportation investment efficiency. The Key National Transport Network Plan, the so-called top-tier master plan in the transportation sector, was formulated in 1998, and also the corresponding action plan, namely, the mid-term transportation facility transportation facility investment plan, was formulated, enabling a systematic implementation of Key National transportation facility transportation facility projects with connectivity made possible between Transport modes. The Key National Transport Network Plan includes a 20-year project implementation plan for the whole Key National transportation facilities involving land, sea, and air transport. This plan therefore examines roads, railroads, and airports. The Plan includes a 10-year comprehensive project plan for roads and railroads to enhance the connectivity between plans and sectors, as well as implementation efficiency.

In addition to these legal mechanisms, diverse policies and measures were formulated in the 2000s to implement transport projects, and this study examines the building of national transport DB, the development of investment project evaluation system, and the formulation of transportation facility investment evaluation guidelines. The national transport DB was developed to encompass and manage all national transport data in order to reduce individual transport survey costs and to secure the unity and standard of transport data analysis. Previously, whenever individual investment in transportation projects were implemented, individual surveys on relevant areas were conducted to create basic data such as OD and networks, and this wasted budgets and created errors in forecasting demand. After the 2000s, when the DB was built, standard transport data started to be utilized, thus saving expenses in implementing transport projects, and determining with objectivity and fairness whether to implement transportation investment projects or not. To build and manage the national transport DB, the government operates the National Transport DB Center within the government-invested KOTI.

The country's investment project evaluation system can manage the lifecycle of investment in transportation projects transparently and systematically-from conceptualization to selection to implementation to maintenance and management-to boost the efficiency of transportation investment projects. This study examines the country's systematic evaluation and management system for the whole process from preliminary feasibility study to feasibility study to follow-up evaluation. Lastly, it examines the transportation facility investment guidelines aimed at enhancing the objectivity and fairness of determining transportation investment projects. The guidelines concern the methods of evaluating the economic feasibility of transportation facility investment projects. These guidelines offer basic assumptions for evaluating economic feasibility as well as standard demand forecasting methods, standard cost calculation methods, etc. so as to be able to minimize human errors in evaluating projects. The guidelines are managed and regularly updated by the MLTM.

After the 2000s, to ensure efficient operation in the railroad sector, public corporations for railroads were established, and this study examines the Korea National Railroad, which was divided into Korea Rail Network Authority and KORIL. Cases of indicated examples are chronically outlined as follows.

○ 1969: Establishment of Korea Expressway Corporation (KEC) (organization)

○ 1993: Establishment of the transportation facility special account (finance)

○ 1996: Enactment of the Urban Transport Improvement Promotion Act and the Special Act on Large-City and Metropolitan Transport Management

○ 1998: Formulation of the Comprehensive National Transport Network Plan

○ 1999: Enactment of the Transportation System Efficiency Act

○ After 2000:

Restructuring of railroad sector through public incorporation (organization)

Provision of support for technology development and policymaking to efficiently implement transport (policy)

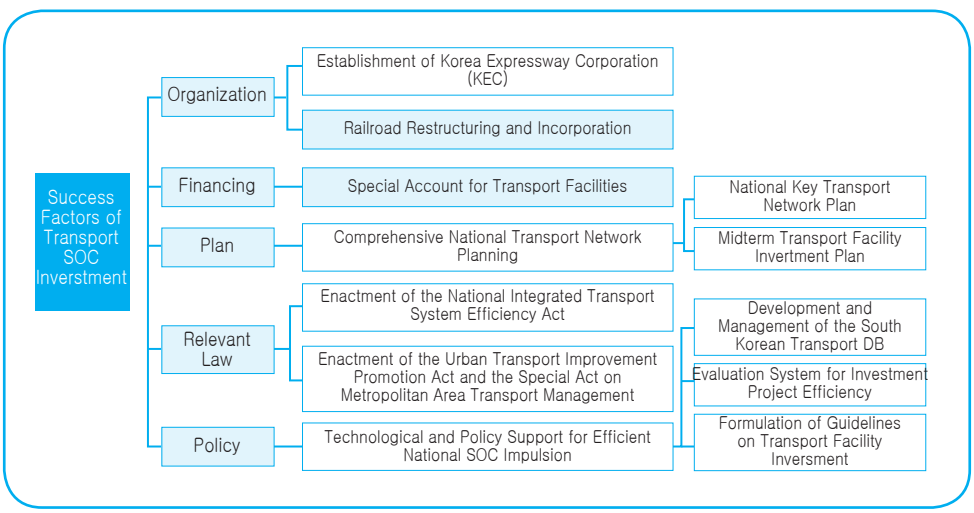
Development and management of a South Korean transport DB

Development and operation of investment project efficiency evaluation system

Formulation of the Transportation Facility Investment Evaluation Guidelines

The aforementioned success factors are classified into legal systems and financing. Specifically, they are classified into organizations, financing, planning, legal systems, and support policies. These cases are outlined in [Figure 3-1].

Figure 3-1 | Success Factors of Transport investment



1. Establishment of Korea Highway Corporation

Korea Expressway Corporation (KEC) is South Korea's quasi-market-oriented public corporation that was established to construct and maintain expressways and to conduct relevant businesses for the promotion of road improvement and development of road transport.

Since 1967, the Construction Ministry pushed to establish Korea Expressway Corporation (KEC) to respond to ever increasing demand for transportation. The government enacted a KEC Act bill to allow KEC to use a capital of KRW 2 billion in ① establishing and managing toll-pay roads, ② collecting tolls for pay-based roads, and ③ engaging in road construction and improvement works, as well as to issue road bonds aimed at raising the finances.

KEC was established on February 15, 1969, according to the KEC Act (Law No. 2083) and the Enforcement Decree of the KEC Act (Presidential Decree No. 3745), which was enforced in January 1969. KEC's duties include feasibility study evaluation and basic design according to expressway construction plans; implementation of expressway construction projects; maintenance of expressways; management of paving, structures, and road facilities; maintenance and repair of expressways and intelligent expressway businesses such as intelligent traffic information systems, traffic information centers, and hi-passes.

In accordance with the complete revision of the KEC Act in 1986, its capital was set at KRW 5 trillion, consisting of investments by the central government and municipalities as well as by Korea Development Bank. As deemed necessary, up to half of the capital can be raised by issuing stocks.

KEC was established to take over the management of toll expressways such as Gyeonggin and Gyeongbu Expressway once opened. Several revisions of the act added more duties to KEC's responsibilities, such as the supervision of overseas projects beginning in 1976 and toll-free road management starting from 1977. Upon its establishment, KEC took over the management of Gyeongin Expressway and the 45.5 km-long Seoul-Osan segment of the Gyeongbu Expressway Line. It also constructed and took over major local expressways such as Honam, Yeongdong, Donghae, and Guma, which is a feeder line of the current Jungbu Inland Expressway. In June 1984, KEC took over the management of 88 Olympic Expressway, and in April 1985, it began the construction of Jungbu Expressway. As such, it played a decisive role in modernizing the provincial road networks after the mid-1960s as well as road expansion, road improvement and overall development of road transport in Korea. In 1994, KEC implemented a comprehensive mechanized toll collection system. In 1997, it increased its capital to KRW 10 trillion. In 1999, it expanded the Gyeongbu, Yeongdong, Guma (currently a feeder line of Jungbu Inland Expressway), Jungang, and Gyeongin expressways as well as Seoul Express Beltway.

In 2002, Expressway Information and Communication Co. and Expressway Management Authority were privatized, and the Cheonan-Nonsan Expressway (currently the Nonsan-Cheonan Expressway) was constructed. In 2004, KEC took over the construction management of the Donghae and Jungbu Inland expressways, and established Hi-pass offices nationwide in 2007. Hi-pass, a wireless expressway toll payment system, was first tested in June 2000 on six roadways at the following three toll gates: Seongnam, Cheonggye, and Pangyo. In October 2008, the average Hi-pass use rate nationwide surpassed 30%. In June 2009, Hi-pass users reached 2.5 million after the introduction of the pay-later Hi-pass card system, expansion of Hi-pass lanes, and provision of a Hi-pass fee discount system. The history of KEC is outlined as follows:

○ July 17, 1969	Promulgation of the KEC Act (Law No. 2083)
○ January 28, 1969	Promulgation of the Enforcement Decree of the KEC Act (Presidential Decree No. 3745)
○ February 15, 1969	Inauguration of KEC with a capital of KRW 50 billion
○ December 30, 1972	Increased its capital to KRW 150 billion
○ November 28, 1973	Completion of the construction of the new KEC building
○ March 2, 1976	Launched branches (Suwon, Daejeon, Gwangju, and Daegu)
○ June 27, 1984	Took over management of 88 Olympic Expressway (the 175.3km Okpo-Damyang segment)
○ May 12, 1986	Increased capital to KRW 700 billion
○ December 31, 1990	Increased capital to KRW 1.5 trillion
○ June 11, 1993	Increased capital to KRW 5 trillion
○ March 1, 1994	Implemented across-the-board mechanized toll collection system
○ August 10, 1995	Implemented a regional-division-head system (six branches→ six regional divisions)
○ May 10, 1999	Implemented a pilot Hi-pass system
○ June 30, 2000	Began to operate the Hi-pass system (Seongnam, Pangyo, and Cheonggye offices)
○ December 2, 2002	Privatization of Expressway Management Authority (currently KR Industry)
○ March 6, 2003	Ranked second in 2002 Public-Corporation Innovation Evaluation (of 214 agencies)
○ February 14, 2007	Promulgated new CI

○ December 13, 2007 Developed a Hi-pass system across its offices nationwide

KEC currently has a headquarters office, six regional divisions, thirty-three provincial branches, and 146 offices, as well as the Road Research Institute, Paving Office, and sixteen construction offices. Its workforce consists of 4,534 people. As of December 29, 2009, it managed twenty-nine road routes with a total length of 3,511 km. KEC's history of expressway construction is outlined as follows:

○ 1960s

1966	Devised expressway construction plan in line with 2nd Five-Year Socioeconomic Development Plan
May 1967	Began construction of Gyeongin Expressway
February 1968	Began construction of Gyeongbu Expressway
December 1968	Simultaneously opened some segments of Gyeongin Expressway and Gyeongbu Expressway

○ 1970s

July 1970	Opened entirety of Seoul-Busan Gyeongbu Expressway (428 km)
December 1970	Opened Daejeon-Jeonju Honam Expressway (79.5 km)
December 1971	Opened Singal-Saemal Yeongdong Expressway (104 km)
November 1973	Opened Jeonju-Busan Honam and Namhae Expressway (348.8 km)
October 1975	Opened Saemaul-Gangneung Yeongdong Expressway (97 km) and Gangneung-Donghae Expressway (30 km)
December 1977	Opened Daegu-Masan Expressway (84.2 km)

○ 1980s

September 1981	Opened Busan-Naengjeong Namhae feeder line (20.6 km)
June 1984	Opened Okpo-Damyang 88 Olympic Expressway (175.3 km)
December 1987	Opened Seoul-Nami Jungbu Expressway (123.6 km)
December 1988	Opened Yeongdong-Donghae Expressway (12.5 km)

○ 1990s

November 1991	Opened Pangyo-Guri Seoul Express Beltway (23.5 km) and Singal-Ansan Expressway (23.2 km)
December 1993	Opened Guri-Toegyewon Seoul Express Beltway (2.7 km)
July 1994	Opened Incheon-Ansan Seohaean Expressway (27.6 km) and Seochang-Gwangmyeong Second Gyeongin Expressway (10.8 km)

July 1995	Opened Pangyo-Hakui Seoul Express Beltway (8.8 km)
August 1995	Opened Daegu-Andong, Jecheon-Wonju, and Hongcheon-Chuncheon Jungang Expressway (139 km)
December 1995	Opened Pyeongchon-Hakui Seoul Express Beltway (5.3 km), the Iljik-Ansan segment of Seoul-Ansan Expressway (9.1 km), and Gwamyeong-Seoksu Second Gyeongin Expressway (4.7 km)
June 1996	Opened Daedong-Daejeo segment (8.8 km) of Busan-Daegu Expressway and the Yangsan-Daedong segment (7.5 km) of Busan-Daegu feeder line
December 1996	Opened Ansan-Anjung Seohaean Expressway (42.7 km) and West Jinju-Jinju segment (7.8 km) of Daeejon-Tongyeong Expressway
November 1997	Opened the Gimpo-Sinpyeong segment (3.5 km) of Seoul Express Beltway
July 1998	Opened Jangsu-Seoun segment (8 km) of Seoul Express Beltway
August 1998	Opened Muan-Mokpo Seohaean Expressway (23.2 km)
October 1998	Opened Hamyang-West Jinju segment (50.2 km) of Daejeon-Tongyeong Expressway and Seocheon-Gunsan Seohaean Expressway (22.7 km)
November 1998	Opened Seoul-Iljik segment (5.2 km) of Seoul-Ansan Expressway
July 1999	Opened Gupo-West Busan segment (3.9 km) of Busan-Daegu Expressway
September 1999	Opened Andong-Yeongju segment (25.5 km) of Jungang Expressway and Panam-Biryong segment (2.4 km) of Daejeon Nambu Express Beltway
November 1999	Opened Anyang-Jangsu and Seoun-Gimpo segments (29.1 km) of Seoul Express Beltway

○ 2000s

June 2000	Opened Yeongju-Punggi Jungang Expressway (9.5 km)
November 2000	Opened Anjung-Dangjin Seohaean Expressway (18.8 km)
December 2000	Opened West Daejeon-Panam segment (18.4 km) of Daejeon Nambu Express Beltway and the Daejeon-Muju segment (43.6 km) of Daejeon-Jinju Expressway
August 2001	Opened Wongju-Hongcheon Jungang Expressway (42.5 km)

September 2001	Opened Danjin-Seocheon Seohaean Expressway (103.7 km), Sinpyeong-Ilsan segment (2.1 km) of Seoul Express Beltway, and Sangju-Gimcheon Jungbu Inland Expressway (32.1 km)
November 2001	Opened Changwon-Sanin segment (16.2 km) of Masan Express Beltway, Muju-Hamyang segment (59.4 km) of Daejeon-Tongyeong Expressway, and the Gangneung-Jumunjin segment (20 km) of Donghae Expressway
December 2001	Opened Punggi-Jecheon Jungang Expressway (50.5 km) and Gunsan-Muan Seohaean Expressway (113.3 km)
December 2002	Opened Pyeongtaek-Anseong segment (28 km) of Pyeongtaek-Eumseong Expressway, Yeoju-Chungju Jungbu Inland Expressway (42 km), and Cheonan-Nonsan Expressway (81 km) (privately financed)
January 2004	Opened Sangju-North Sangju Jungbu Inland Expressway (12.7 km)
July 2004	Opened Chungju-Goesan Jungbu Inland Expressway (14.9 km)
November 2004	Opened Gangneung-Donghae segment (40.7 km) of Donghae Expressway
December 2004	Opened Daegu-Pohang Expressway (68.4 km) and Chungju-Sangju Jungbu Inland Expressway (50.3 km)
December 2005	Opened Jinju-Tongyeong segment (48.8 km) of Tongyeong-Daejeon Expressway
December 2006	Opened Jangseong-Damyang segment (27.3 km) of Gochang-Damyang Expressway
August 2007	Opened West Anseong-Namanseong segment (10.1 km) of Pyeongtaek-Eumseong Expressway
November 2007	Opened Muan Airport-Naju segment (30.6 km) of Muan-Gwangju Expressway, Cheongwon-Sangju Expressway (80.5 km), and Hyeonpung-Gimcheon segment (62.0 km) of Jungbu Inland Expressway
December 2007	Opened Iksan-Jangsu segment (59 km) of Iksan-Pohang Expressway and Gochang-Jangseong segment (17.2 km) of Gochang-Damyang Expressway
November 2008	Opened Anseong-Eumseong segment (21.2 km) of Pyeongtaek-Eumseong Expressway

○ 2010s

July 2010	Marked 40th anniversary of Gyeongbu Expressway opening
September 2010	Opened Yeoju-North Yeoju segment (17.6 km) of Jungbu Inland Expressway
December 2010	Opened Jeonju-Suncheon segment (113.5 km) of Suncheon-Wanju Expressway

2. Railroad Reform and Korea Railroad Corporation

The country's railroad business was put under the control of the government with the installation of the Transport Ministry in 1948. In 1960, the Transport Business Special Account Provisional Action Act introduced a corporate accounting system to this sector. In 1963, the railroad work was removed from the Transport Ministry and was assumed by the Railroad Agency, an independent corporation, for the purpose of improving railroads alongside economic development, and to utilize a more autonomous accounting system for public corporations rather than a controlled one under the Budget and Accounting Act, which enabled more flexible operation. The Corporate Budget and Accounting Act, which was promulgated on December 31, 1961, were applied to five special accounts (railroad, communication, monopoly, grain, and procurement), under which a corporate accounting method was implemented. Requirements included the drawing up of balance sheets and profit statements as well as cost calculation accounting based on transactions.

Though railroads dominated the long-distance carriage of passengers and cargoes up until the 1990s, their management conditions worsened during the 1970s with the increasing use of expressways and automobiles as a result of improvements in public-road conditions. Railroad losses exceeded KRW 70 billion at one point in the early 1980s. Though the railroad business adopted the corporate accounting system, it suffered losses each year due to its use of non-corporate management methods. The country's railroad management was limited in its ability to respond quickly to new changes because of centralized decision making process, inflexible management, irrational organizational expansion associated with a stable increase in demand, and an unclear chain of command. Therefore, the government restructured national railroad management by through divisions into facilities and operation in order to address chronic losses and improve overall railroad services. KNR suffered heavy operating losses from large construction projects, and its services worsened because of its rigid operation as a public agency. To address these problems, the government changed the construction division-which required significant amounts of finance-into an authority that was responsible for facilities and construction in order to reduce its financial burden. Moreover, the operations division was converted into a public corporation with the goal of creating a more rational management system. The new public corporation was now able to conduct advertising, marketing, and various supplementary businesses on its own.

Efforts to convert KNR into a railroad authority were made in the mid-1980s. The Transport Ministry, which controlled KNR, began to review a railroad authority measure in 1985. It drew up the Korea Railroad Corporation (KORAIL) Act in 1988 and promulgated it the following year. Typical of structural shifts, the corporation launching was delayed by KNR's debts, financial support, conversion of manpower layoffs into other functions, and possible railroad strikes. This idea was shelved at the end of 1995.

Efforts improve the sluggish railroad operation and to privatize the maintenance and operation of the railroad facilities picked up more momentum by March 1999 with the decision to combine the construction division of KNR with KHRA to create a new railroad construction authority. The operation division restructuring was targeted for completion in 2001. The privatization plan was delayed due to policy inconsistencies. In July 2003, railroad restructuring legislation, such as the Basic Railroad Industry Development Act, KR Act, and KORAIL Act were promulgated. Accordingly, KNR's tasks were divided between KR (facilities) and KORAIL (operation). The 100%-government-invested KORAIL would undertake the responsibilities of attracting customers, ticket sales, and commercial activities such as carriage and automobile maintenance. Ownership of railroad facilities, including SOC infrastructure like roads, airports, and harbors, remained in the hands of the state. KR, on the other hand, undertook the construction of railroads and the management of facilities. KR was launched on January 1, 2004 when the Construction Division and the High-Speed Rail Construction Authority were integrated under the control of KNR. KORAIL, on the other hand, was launched on May 1, 2005 when it took over the other divisions of KNR. The history of railroad restructuring in South Korea is outlined as follows:

○ 1980s	Railroad restructuring discussions began.
○ 1989-1995	KORAIL Acts promulgated. Plan delayed twice despite efforts to establish Railroad Corporation, twice. And Act eventually dissolved in 1995 (enacted in 1993)
○ May 1999	Government decided to privatize railroad sector and to create railroad authority
○ October 1999 -June 2000	Study on railroad-restructuring measures conducted by Samil Accounting Corporation
○ February 2001	Regulation on the Railroad Restructuring Reform Committee (Presidential Decree No. 17131) enacted
○ March 2001	Railroad Restructuring Preparation Group launched
○ February 27 -March 19, 2001	Public notice regarding proposed Railroad Restructuring Basic Act issued
○ August -November 2001	Hearings held on bill (the plan failed due to the union's opposition)

- ○ December 17, 2001 Bills submitted to National Assembly (Railroad Industry Development and Restructuring Act and KR Act)
- ○ December 26, 2001 Railroad Restructuring Center launched (one division staffed with nine people)
- ○ December 28, 2001 Railroad Restructuring Basic Plan confirmed
- ○ February 25-27, 2002 Railroad union strike
- ○ April 15, 2002 Railroad restructuring bills submitted to relevant committee of National Assembly
- ○ October 21, 2002 Bill on Korea Railroad Corporation submitted to National Assembly
- ○ January 28, 2003 Presidential Transit Committee announced railroad restructuring adjustment measure
- ○ June 2-30, 2003 Bills on railroad development and restructuring prepared (Basic Railroad Industry Development Act, KR Act, and KORAIL Act)
- ○ January 1, 2004 KR established
- ○ January 1, 2005 KORAIL established

KR consists of four divisions, two departments, three centers, a research institute, and five regional divisions. Its duties include the following: railroad construction facility asset management; the development and management of railroad facility technologies and provisional support; development and operation of railway station spheres in line with the construction of railroads; railroad safety management anti-disaster measure implementation; and construction of overseas railroads, railroad connecting South Korea and North Korea, Northeast Asian railroad networks.

KORAIL consists of official headquarters, twelve regional divisions, and affiliates. Its headquarters houses five divisions, nine departments, and sixty-three bureaus, with a total of 2,678 staff. In addition, KORAIL affiliates include the following: a research institute, an information technology center, an accounting integration center, a human resources development institute, a railroad traffic control center, a special multiple-unit operation center, a rolling-stock maintenance center, and other offices.

3. Transportation Infrastructure Special Fund

Stable funding sources are essential to increase the efficiency of transportation facility investment. South Korea's economy more than doubled in scale during the decade (1983-1992), and the number of vehicles increased fivefold. However, the transport infrastructure, including railroads, roads, harbors, and airports, expanded by slightly less than 20% and exceeded their respective capacity limitations. This severely

limited the country's industrial development and also fueled increases in socioeconomic costs. Traffic congestion threatened further economic growth, which prompted drastic improvement measures beginning in the 1990s.

The government enacted the Transport Tax Act in 1993 to provide a stable supply of transportation facilities, while the Transportation Facility Special Account Act was enacted in 1994 to facilitate transportation facility expansions and to create an efficient investment system. This act was first named Road and Other Transportation Facility Special Account Act, but it was renamed Transportation Facility Special Account Act in 1995. These two acts formed the legal bases for establishing the transportation facility special account. The road and other transportation facility special account was established by incorporating the road project special account and the urban-railroad-project special account together as well as absorbing the high-speed rail, airport, and harbor project accounts supported by the general accounts. Pursuant to the Special Act on Large City and Metropolitan Transport Management promulgated in 1998, the metropolitan transportation facility account was additionally established to stably raise the project costs for the construction and improvement of metropolitan roads, metropolitan electric railroads, and other metropolitan transportation facilities under the act.

In December 2006, the expiration date of the Transportation Facility Special Account Act was extended from December 31, 2006 to December 31, 2009, provided that the ratio of transferring transport, energy, and environmental tax revenues to the transportation facility special account changed from 0.858 to 0.800.

The ratios for sharing transport tax revenues for each account were stipulated in the Enforcement Rule of the Transportation Facility Special Account Act under the MLTM Decree. The transportation facility special account had four accounts: the road, airport, metropolitan, and reserve accounts. Of the special account finance, the Enforcement Rule specified the distribution of the special account as follows: road account, 65.5%; railroad account, 18.2%; airport account, 4.3%; metropolitan account, 2%; and the remainder, 10%. The revenues and expenditures for the road and railroad categories are outlined in the following table.

Transportation facility special account revenue sources are classified into transport and other taxes, non-tax revenues such as facility use charges, and transfers from general accounts. Of these, the largest revenue item is the transport tax, 85.8% of which is transferred to the special account. As such, this portion represents about 70% of the total special account. The transport tax refers to gasoline and diesel special-consumption revenues. In addition to the transport tax, the transportation special account revenue also comprise of the passenger automobile special consumption tax, automobile import tariff, the deposits received from financial investment and loan special accounts, airport service charges, and transfers from general accounts. Of these, the next largest portion is the passenger automobile special consumption tax, which represented 13.4 and 11.6% of the total transportation facility special account revenue in 1995 and 1997, respectively.

With the transportation facility special account, investment in transportation increased with stability to expand the country's SOC, which was driving force of national economic growth. The government extended the year of the special account from the end of 2003 to 2006 by revising the Transportation Facility Special Account Act. In March 2004, the said act was amended to establish an urban railroad account and to revise the Environment Rule of the Transport Account Act, which enabled flexible readjustment of the transport tax sharing ratios for each account.

The special account greatly helped secure much needed investment in transportation finance. With its major revenue source being the gasoline special consumption tax, which followed the principle of having users assume the costs of the transportation service provided. The said special account raised KRW 5 trillion in 1994, KRW 12.4 trillion in 2000, and KRW 14.2 trillion in 2004. The percentage of the GDP devoted to transportation facility investment increased from 1.56% in 1994 to 2.4% in 2000 and 2.1% in 2004.

Table 3-1 | Revenues and Expenditures under the Transportation Facility Special Account (Road, Railroad, and Metropolitan)

Account	Revenue	Expenditure
Road account	- 65.5% of transport tax - Passenger automobile special consumption tax - Transfers from general accounts - Revenue from investment and stake participation in, and loaning to, government-invested agencies - Deposits received and transferred from other accounts - Local and foreign loans - Deposits received from state management funds - State portion of toll road revenues - Revenue from road management and operation	- Road construction, management, operation, survey and research, and technology development - Investment and stake participation in, and loaning to, government-invested agencies for road project support - Principal repayment for deposits received and local and foreign loans acquired for road projects

Account	Revenue	Expenditure
Railroad account	- 18.2% of transport tax - Tariff on automobiles, parts, and components, except those for railroads and tracks - Transfers from general accounts - Payment to state coffers for construction of high-speed rail - Loans for construction and operation of urban railroads and high-speed rail - Deposits received and transferred from other accounts - Local and foreign loans - Deposits received from government bond management funds - Other deposits received	- Construction, improvement, and modernization of general railroad infrastructure facilities and equipment - Subsidies and loans for urban railroad construction and operation - Investment in and loans for high-speed rail construction - Survey and research on and technology development for railroad construction and operation - Repayment of principals for deposits received and foreign and local loans
Metropolitan transportation facility account	- 20% of transport tax - Transfers from general accounts - Loans for construction and operation of metropolitan transportation facilities - Deposits received and transferred from other accounts - Local loans - Foreign loans - Deposits received from government bond management funds - Other revenues	- Construction, operation, survey and research, and technology development for metropolitan transportation facilities - Subsidies and loans for construction and operation of metropolitan transportation facilities - Repayment of principals for deposits received and loans acquired * Metropolitan transportation facilities: metropolitan roads, metropolitan railroads, transfer parking lots, etc.
Reserve	- 10% of transport tax	- Allotted to necessary accounts according to budget

Source: Hong Gap-seon, Estimation of the Transportation Facility Investment Scale and Finance Expansion Measures, KOTI, 1998

Transportation Facility Special Account Act

• Background and Overview

- This act aims to facilitate the expansion of roads, railroads, airports, and harbors, and to ensure the efficient management and operation of these facilities by establishing the transportation facility special account.
- The account is classified into the road, railroad, public transport, airport, Metropolitan transportation facility, and harbor accounts. These are managed and operated by MLTM.
- Revenues for each account come from transfers from general accounts, state transfers from road tolls, airport service charges, and local and foreign loans, varying from one count to another. Moreover, the expenditures consist of the management and operation and the survey and research costs for the management and operation of roads, railroads, and airports; repayment of principals for foreign and local loans; various investments; and operation costs for other accounts.
- Transfers from general accounts consist of entire transport tax revenues under the Transport Tax Act; the passenger vehicle special consumption tax under the Special Consumption Tax Act; and the tariff on automobiles, parts, and components, except those for railroads and tracks, under the Tariff Act.
- The Enforcement Rule of the Transportation Facility Special Account Act was also promulgated.

• History

- In December 1993, the Road, Etc. Transportation Facility Special Account Act was promulgated to stably secure the investment finance for SOC facilities, which are crucial for national economic development, and to incorporate various relevant accounts, thereby efficiently managing and operating the relevant budget.
- In December 1995, the said act was renamed Transportation Facility Special Account Act. Moreover, transport tax sharing ratios for each account were allowed to be determined under MLTM decrees instead of presidential decrees, and other provisions were improved. Adjusted sharing ratios adjustment was intended to stabilize the investment for transportation facilities such as roads, railroads, airports, and harbors, and to boost the account operation efficiency.
- In line with the Special Act on Large City and Metropolitan Transport Management promulgated in April 1997, the metropolitan transportation facility account was added to the transportation facility special account to stably finance the costs for

the construction and improvement of metropolitan roads, metropolitan subways, and other metropolitan transportation facilities.

- In July 2005, the urban railroad account was changed into the public transport account, creating the bases for stably supporting the finance for fostering and supporting the public transportation system, including buses, in addition to urban railroads. Moreover, transferred to the fisheries development fund stipulated in the Special Act on Support for Fishermen, Etc. and the Fisheries Industry in Line with the Conclusion of the Fisheries Accord were the occupation and use charges imposed on the collection of stone and sand from the Exclusive Economic Zone out of those imposed on the use of public waters (belonging to the current harbor account tax revenue), under the control of MLTM, or on the collection of minerals, under the Mining Act.
- In December 2006, the validity term of the Transportation Facility Special Account Act was extended from December 31, 2006 to December 2009, provided that the ratio of transferring the transport, energy, and environmental tax to the transportation facility special account was reduced from 0.858 to 0.800.

• Overview of Revenues and Expenditures

1. Road Account

Road account revenues are comprised of a number of sources, including transfers from general accounts, revenue from investment and loans, and deposits received and transfers from other accounts. Additional revenue sources consist of local and foreign loans acquired under the Act on the Introduction and Management of Public Foreign Loans, deposits received from public funds under the Public-Fund Management Act, and the station portion of the revenue generated under Article 55 and 73 of the Road Act and Article 22 of the Toll Road Act. Finally, revenue from road construction, improvement, management, and road operation are allocated to the road account. Expenditures, on the other hand, consist of the expenses for road construction and improvement, management and operation, survey and research, and technology development; investment and stake participation in and loaning to government-invested agencies towards supporting road projects under the Basic Government-invested Agency Management Act; repayments of principals for deposits received and of foreign and local loans acquired; and other expenses for the operation of the account.

2. Railroad Account

Railroad account revenues consist of transfers from general accounts, payments to the state coffers under Article 33 of the KR Act, revenue from loans, and deposits received and transfers from other accounts. Additional revenue come from local

and foreign loans acquired under the Act on the Introduction and Management of Public Foreign Loans, deposits received from the public funds under the Public-Fund Management Act, proceeds from the sale (under Article 39 of the State-owned Property Act) of state-owned properties that are under the responsibility of and are designated by MLTM, and other revenues. Railroad account expenditures are comprised of expenses for the construction, improvement, and management of general railroad and high-speed rail infrastructures and for the modernization of facilities and equipment. Investment and stake participation in and loaning to KR, etc., for the construction, improvement, and management of general railroad and high-speed rail infrastructures and modernization of facilities and equipment also account for railroad expenditures. Moreover, expenses for survey and research and technology development in connection with the construction and operation of general railroads and high-speed rails, repayments of the principals for deposits received and of foreign and local loans acquired, and other expenses for the operation of the account also comprise expenditures.

3. Public Transport Account

Public transport account revenues consist of transfers from general accounts, loans, and a deposit received and transfers from other accounts. They also include local and foreign loans acquired under the Act on the Introduction and Management of Public Foreign Loans as well as deposits received from public funds under the Public-Fund Management Act. Finally proceeds from the sale (under Article 39 of the State-owned Property Act) of properties that are under the responsibility of and are designated by MLTM and other revenues account for public transport account revenues. The myriad of expenditures of the public transport account, on the other hand, consist of expenses for the construction, improvement, and management of urban railroad infrastructures and for the modernization of facilities and equipment; subsidies and loans for urban railroad construction and operation; and investment and stake participation in and loaning to KR, etc., devoted to constructing and improving urban railroad infrastructures and to modernizing facilities and equipment. Further expenditures include expenses for survey and research and technology development in connection with the construction and operation of urban railroads; subsidies and loans for the upgrading and diversifying of public transportation facilities under Article 2, section 3 of the Act on Fostering Public Transport and Promotion of the Use Thereof; and subsidies and loans for the expansion and improvement of public facilities under Article 2, section 3 of the preceding act, and expenses for survey and research and technology development for the promotion of the use thereof. Lastly repayments of the principals for deposits received and of foreign and local loans acquired; repayment of the principal for the debt of Busan Transport Authority acquired by the government under Article 4 of the Supplementary Rule of the Busan

Transport Authority Annulment Act as well as other expenses for the operation of the account are accounted expenditures of the public transport account.

4. Airport Account

Airport account revenues are comprised of transfers from general accounts, navigation safety facility service charges among the service charges stipulated in Article 86 of the Aviation Act, noise charges under Article 109 of the said act, and aviation development project revenue under Article 2, section ___ of the said act. Additionally, proceeds from the sale of relocation complexes in line with the implementation of relocation measures related to aircraft noise damage prevention projects under Article 107 of the said act are allocated to the airport account. Transfers from other accounts, repayments of the principals for deposits received and of local and foreign loans acquired under the Act on the Introduction and Management of Public Foreign Loans, deposits received from the public funds under the Public-Fund Management Act, and other revenues are devoted to the airport account. Expenditures consist of expenses for airport construction and expansions, navigation safety facility improvements and expansions, and aircraft noise prevention measures. Further expenditures include subsidies, stake participation in, and loans acquired by the implementers of airport construction projects under Article 6 of the Seoul Metropolitan Airport Construction Promotion Act, expenses for survey and research and technology development airport construction and operation, repayments of the principals for deposits received and of foreign and local loans acquired, and other expenses for the operation of the account.

5. Harbor Account

The harbor account revenue consists of transfers from general accounts; harbor facility service charges under the responsibility of MLTM under Article 32 of the Harbor Act; service charges for state-owned properties that are under the responsibility of and designated by MLTM under Article 25 of the State-owned Property Act; proceeds from the sale of properties under Article 40 of the said act; occupation and service charges under the responsibility of MLTM under Article 9 of the Public-Waters Management Act; payments to the state coffers under Article 31 of the Korea Container Terminal Authority (KCTA) Act; payments of loans, repayments of the principals for deposits received, and transfers from other accounts; payments of local and foreign loans acquired under the Act on the Introduction and Management of Public Foreign Loans; repayments of deposits received from public funds under the Public-Fund Management Act; and other revenues. The expenditures of the harbor account, on the other hand, consist of the expenses for harbor survey and research and technology development; the expenses for the construction and improvement and maintenance and repair of harbor facilities; the investment in loaning to KCTA; repayments of the

principals for deposits received and of foreign and local loans acquired; and other expenses for the operation of the account.

6. Metropolitan Transportation facility Account

Revenues for the metropolitan transportation facility account include transfers from general accounts, loan payments, repayments of the principals for deposits received, and transfers from other accounts. Other revenues include payments of local and foreign loans acquired under the Foreign Capital Introduction Act, repayment of the principals for the deposits received from public funds under the Public-Fund Management Act, metropolitan transportation facility charges under Article 11-6, section 1 of the Special Act on Large City and Metropolitan Transport Management, and other revenues. Expenditures consist of expenses for the construction and improvement and management and operation of metropolitan transportation facilities and for relevant survey and research and technology development; subsidies and loans for the construction and operation of metropolitan transportation facilities; and transfers to the railroad project special account, etc. Other expenditures include repayments of the principals for deposits received and of foreign and local loans acquired, transportation facilities whose segments and locations are designated by the Metropolitan Transport Committee under Article 11-6, section 3, paragraph 2 of the Special Act on Large-City and Metropolitan Transport Management, and other expenses for the operation of the account.

4. National Comprehensive Transportation System Master Plan

4.1 National Comprehensive Transportation System Background and Need

As transportation facilities are interdependent, an efficient investment therein should be linked with other relevant facilities. The remarkable development of South Korea's transport channeled the creation of growth engines boosting national economic development in the 1960s, while it supported the diversification of economic activities in the 1980s and subsequent periods. In the process, however, many problems emerged. For example, investment was disproportionally focused on roads, creating an imbalance in transportation facilities. Moreover, in the second half of the 1990s, connectivity between transportation facilities was emphasized. Traffic congestion in large cities cannot be addressed with road construction alone and without expanding urban railroad networks; rather, the planning and review of the national transportation network system as a whole needed to also encapsulate express national roads, general national roads, and high-speed railroads from a comprehensive perspective.

To devise a comprehensive national transportation network plan, current transportation situation and the entire future national traffic volumes should be forecasted by region and transport axis. Moreover, to forecast future traffic volumes, it is necessary to secure data regarding future population figures by region, number of vehicles, land use levels, employment structure, and GNP and GDP. As obtaining these data takes much time and money, devising a comprehensive transportation plan at the national level is challenging. Nonetheless, South Korea has been able to devise a systematic twenty-year national transportation network plan that encompasses all roads, railroads, airports, and harbors, thanks to the South Korean Transport Database (DB). The South Korean Transport DB Center, which is responsible for building and operating the South Korean Transport DB, built nationwide inter-regional O/D and networks based on regular large-scale surveys, and provided future traffic index forecasts, thereby enabling the easy and efficient formulation of a comprehensive national transportation network plan.

The comprehensive national transportation network plan is divided into the key national transport network plan and the midterm transportation facility investment plan. These two transportation plans are fundamental. While the key national transportation network plan is a master plan devised every 20 years, the midterm transportation facility investment plan, which is an execution plan for realizing the former plan, which is devised every five years.

4.2 National Transportation Network Plan

4.2.1 Plan Overview

The Comprehensive Public land Development Plan and the SOC Expansion Plan were implemented as part of the first to six 'Five-Year Socioeconomic Development Plan' from 1962 to 1991, throughout which the number of vehicles and traffic demand surged explosively. The government established the transportation facility special account in 1994, investing KRW 5 trillion in 1994, KRW 12.4 trillion in 2000, and KRW 14.2 trillion in 2004. Transportation facility investments increased from to 1.56% of the GDP in 1994 to 2.4% in 2000 and 2.1% in 2004.

Though investment in transportation facilities surged after the 1990s, Comprehensive Facility Expansion Plan could not adequately meet the total demand for transportation. Moreover, connectivity between transportation modes such as roads, railroads, airports, and harbors was lacking. Expansion of transport modes was unbalanced, and the national transportation policy goals could not be met. A systematic long-term comprehensive transportation plan was needed to meet the onset of the Northeast Asian era. In March 1998, the government designated the formulation of the key national transportation network plan as a state task. A taskforce was established for this purpose in April 1998. A key national transportation network plan was formulated by planning for each transport mode, consultation with relevant agencies, and public hearings. In February 1999, the Transportation System Efficiency Act (currently National Transportation System Efficiency ActTransportation System Efficiency Act) was promulgated, while, the Key National Transport Network Plan (2000-2019) was finalized in December 1999 after deliberations by the Transportation Policy Committee, which were led by the Prime Minister, commenced.

The plan was later revised to consider the transportation system at a more comprehensive scale and to respond to changing circumstances. In 2007, the 1st Revised Key National Transport Network Plan (2000-2019) was formulated. Though mid- and long-term traffic master plans are fundamental, they have been found to be partially inadequate in its implementation. The revised plan was further revised with the formulation of the 2nd Revised Key National Transport Network Plan (2001-2020) in 2011, which comprehensively considered the National Railroad Network Plan, the Master Plan for Road Improvement, the 3rd Basic Harbor Development Plan, and the 4th Mid- and Long-Term Comprehensive Aviation Development Plan. Moreover, the 2nd Revised Key National Transport Network Plan also addressed strategies for green transportation associated with the climate convention and intermodal transportation systems.

4.2.2 Nature of the Plan

The four objectives of the Key National Transport Network Plan geared towards globalization and informatization, are as follows: development of transportation networks boosting national competitiveness in the 21st century; development of cost-saving logistical systems and high-efficiency multimodal transportation systems; development of speedy, convenient, and environmentally friendly transportation systems; and development of the Korean Peninsula's transportation networks in preparation for the unification of South Korea and North Korea.

Formulated under the National Integrated Transportation System Efficiency Act, the plan offers an efficient and comprehensive twenty-year development scheme for the national transportation network involving land, marine, and air transportation. As such, it offers a long-term, comprehensive investment policy for key national transportation facilities, encompassing roads, railroads, airports, and harbors. The plan includes the following major points:

- ○ Overview of key national transportation facilities and respective problems;
- ○ Future transport circumstances, changes and prospects;
- ○ Objectives and strategies of the plan;
- ○ Strategies by task;
- ○ Calculation of investment size and measures for securing finance; and
- ○ Analysis of investment effects and prospects.

4.2.3 Plan Overview

Four objectives for globalization and informatization were set for the Key National Transport Network Plan

- ○ Development of transportation networks for boosting national competitiveness in the 21st century
- ○ Development of cost-saving logistical systems and high-efficiency multimodal transportation systems
- ○ Development of speedy, convenient, and eco-friendly transportation systems
- ○ Development of the Korean Peninsula's transportation networks in preparation for the Unification

The plan divided the period into four stages until 2020, and indicated the direction for the development of key national transportation facilities, as shown in <Table 3-2>.

Table 3-2 | Gradual Strategies of the Key National Transport Network Plan

Category	1st Stage (1998-2002)	2nd Stage (2003-2007)	3rd Stage (2008-2012)	4th Stage (2013-2020)
Development directions	- Complete expansion projects - Address country's capacity issues Establish foundation for key national transportation network	- Create framework of key national transportation network - Expand/ upgrade high-speed transport services	- Expand base for the national key transportation network - Develop key transportation network for high-speed/ mass carriage	- Complete key national transportation network - Continue implementation of cutting-edge and enhanced transportation system

Source: Ministry of Construction and Transport, Key National Transport Network Plan, 2000

The Key National Transport Network Plan was formulated in 1998. The plan was first revised in 2007 in response to changes in international trade, such as the South Korea-USA FTA, and to the changes in the public land, such as the construction of Sejong city (Multifunctional Administrative City), innovative cities, and corporate cities, and to strengthen the country's sustainable transportation system. Under the first revised plan, the objectives were revised as follows:

- Expansion of transport infrastructure encompassing roads, railroads, airports, and harbors to advance towards becoming a first-rate global transport and logistical power in the 21st century;
- Integration of land, sea, and aviation transportation networks to develop an efficient comprehensive national transportation system of connectivity between Transport modes;
- Reduction of socioeconomic costs associated with transport and logistical activities, such as traffic congestion, logistical, and traffic accident costs, to bolster the national competitiveness; and
- Development of a sustainable comprehensive national transportation system for the present and future generations.

In 2010, the plan was revised for the second time to achieve the national goals of intermodal transport and low-carbon, green growth. The second revised plan is outlined as follows:

· The plan, the fundamental transportation plan, was entirely improved to systemize the plans by category.

  - Create the basic transport framework involving roads, railroads, etc., and review the measures for devising the plans by category.

- Review the measures for improving the individual plans for roads, railroads, and other categories, and for securing planning-time consistency, unity, and interconnection.

· It was necessary to set the goals and visions of the second revised plan oriented toward the future with of green growth and reduced energy consumption.

- Expand investment of green transport, and link land, marine, and aviation networks that mutually complement one another, adjust their alternative relationships, and create synergies.

- Develop a green transport and logistical system geared towards low carbon emissions and energy saving.

· Allocate appropriate transport finance and transportation sector investment from the government budget.

- Prioritize investment in transportation between means and within the same means in line with the SOC investment focused on the green-transport priority.

- Review the mid- and long-term investment plans and finance procurement measures.

The second revised plan involves transportation facility investment plans by category from 2011 to 2020. By 2020, expressways are targeted to have expanded to 5,470 km, and the operating-railroad distance to 4,955 km, and the target double-track achievement ratio is 77.7%, and the electrification ratio 83.6%. The passenger handling capacity of airports is targeted to have expanded to 95,850,000/year, and the container handling capacity of harbors to 34.12 million TEUs per year. The objective of the Comprehensive Key Transport Network Development Plan is geared towards turning South Korea into the transport and logistical hub of Northeast Asia, and also realizing public land development.

Table 3-3 | Index Goals of the Key National Transport Network Plan (2nd Revised Plan)

Category		2001	2005	2009	2015	2020
Roads	Length of express national roads (km)	2,637	2,968	3,776	4,290	5,470
	Length of general national roads (km)	14,254	14,224	13,820	14,312	14,384
Railroads	Operating length (km)	3,125	3,392	3,378	3,997	4,955
	Length of high-speed rails (km)	-	240.4	240.4	653.2	701.8

Formulation of the Key National Transport Network Plan

① Formulation of the Key National Transport Network Plan (2000-2019) in December 1999

1. Plan formulation history

· March 1998	Formulation of a key national transportation network plan selected as state task
· April-October 1998	Plan drafted
· October 1998	Hearings held to gather opinions from various sectors about plan
· November-December 1998	Draft plan formulated and consultations with related ministries regarding plan
· February 1999	The Transportation System Efficiency Act Transportation System Efficiency Act promulgated as basis of plan
· March-August 1999	Whole plan complemented in line with said act
· September-November 1999	Consultation with related ministries municipalities (16 cities and provinces)
· November 1999	The Transportation Policy Coordination Working Committee, headed by the Vice Minister of Construction and Transport, deliberated plan
· December 1999	The Transportation Policy Committee, headed by the Prime Minister, deliberated plan
· December 199	Plan finalized and announced (Ministry of Construction and Transport No. 1999-386)

2. Objectives of the plan

· Secure transport infrastructure to bolster the national competitiveness in the 21st century

· Develop a cost-saving logistical system and a highly efficient multimodal transportation system

· Develop a speedy, safe, convenient, and green transportation system

· Develop a transportation network in preparation for the unification of Korean peninsula

3. Gradual development strategies

· Phase 1 (2000-2009)

- Completion of existing expansion project and addressing inter-region transport difficulties of highest priority Diversify key transport axes to distribute and adjust interregion demand for transportation and drastically improve mobility and accessibility nationwide
- Expand international transportation facilities, such as building new airports and harbors, to establish foundation for South Korea's development as transport and logistical hub of Northeast Asia
- Push to restore South Korea-North Korea transportation network to support bilateral exchange and cooperation

· Phase 2 (2010-2019)

- Continue expanding key road networks and develop rail-centered, high-speed, massive key transportation networks.
- Expand and upgrade high-speed transport services to respond to changes in demand for ransportation quality.
- Complete key national transportation network, including expansion of South-North and East-West transport axes, and further road segment connections
- Continue to implement transportation system innovation and upgrades to enable South Korea to play role of transport and logistical hub of Northeast Asia.

② Formulation of 1st Revised Key National Transport Network Plan (2000-2019) in December 2007

1. History of plan formulation

· April 2006	Formulation of revised plan commenced
· May 2006	Ministry of Construction and Transport review meetings held
· July 2006	Strategy and Environment Evaluation Committee and Advisory Council meetings held
· October 2006	Advisory meetings held for calculating appropriate allocation of fund for the transportation sector
· January 2007	Related agencies' combined planning working group launched
· Until August 2007	Ten meetings held on revised plan

· March 2007	Advisory meetings held for strategy and environment evaluation
· May 2007	Hearings held to gather opinions on research results from various sectors
· September 2007	Ministry of Construction and Transport NGO Advisory Group meetings, strategy and environment evaluation meetings, and Sustainable Development Committee deliberation meetings held
· August-October 2007	Consultation with related agencies
· October 19, 2007	National Transport Coordination Working Committee (head: Vice Minister of Construction and Transport) meetings held
· November 2007	Plan deliberated on by the National Transport Committee
· December 2007	Plan finalized and announced (Construction and Transport Notice No. 2007-539)

2. Plan objectives

· Expand transport infrastructure encompassing roads, railroads, airports, and harbors in leap towards becoming a first-rate global transport and logistical power in the 21st century

· Develop integrated network of land, sea, and aviation transport to form an efficient national comprehensive transportation system with connectivity between Transport modes

· Reduce socioeconomic costs associated with transport and logistical activities, such as traffic congestion, logistical, and traffic accident costs, to increase national competitiveness

· Develop sustainable comprehensive national transportation system for present and future generations

3. Major tasks

· Bolster efficiency and interconnectivity of the national transportation system.

· Improve mobility and accessibility to key land transport routes

· Expand global transport and logistical networks

· Gradually create Northeast Asia's single transport and logistical market

· Realize a sustainable national transportation system

· Develop transport technologies and an intelligent national transportation system

· Boost competitiveness of South Korea's transport and logistics industries

4.3 Midterm Transportation Infrastructure Investment Plan

4.3.1 Plan Overview

The Midterm Transportation facility Investment Plan is formulated every five years based on a twenty-year period in accordance with Article 6 of the National Integrated Transportation System Efficiency ActTransportation System Efficiency Act. The first plan (2000-2004), which began to be drafted in January 2000, was confirmed in March 2001 and completed in 2004. The second plan (2005-2009) began to be drafted in June 2004, was confirmed in February 2006, and was completed in 2009. The third plan (2011-2015) was devised and announced in September 2011.

The plan includes the following: (1) transportation facility supply objectives and basic investment direction; (2) scale of the key national transportation facility development project; (3) investment priorities and required finance; (4) appropriate modal share among the transportation facilities; and (5) connectivity between key national transport and local transportation facilities.

The said act includes provisions on the execution of the Midterm Transportation facility Investment Plan. First, heads of the related agencies are required to reflect the Midterm Transportation facility Investment Plan agenda in their transport-related plans, under different laws, as well as their respective business plans. Moreover, according to the Midterm Transportation facility Investment Plan, finance must be appropriately allotted to each item of the transportation facility special account as stipulated in the Transportation Facility Special Account Act. If the transportation facility development project included in the Midterm Transportation facility Investment Plan is privately financed, it should be reflected in the privately financed investment project basic plan stipulated in Article 10 of the Private Finance Investment Act with regard to SOC infrastructure. To facilitate increased connectivity between the key national transport and local transportation facilities, MLTM may devise and implement measures to connect and operate relevant investment finances according to the pertinent presidential decrees as deemed necessary.

The Midterm Transportation facility Investment Plan is an execution plan and is thus evaluated according to the method stipulated in the aforementioned act, which requires the heads of relevant administrative agencies to evaluate the results of the midterm investment implementation by category before submission to the National Transport Committee. This committee should review the evaluation report and should notify the head of the relevant agency of the review results. The relevant agency head should, according to section 2, take the necessary action to efficiently implement the Midterm Transportation facility Investment Plan depending on the results of the review.

4.3.2 Nature of the Plan

The Midterm Transportation facility Investment Plan is devised every five years to formulate a comprehensive investment plan and transport policies regarding key national transportation facilities based on the Key National Transport Network Plan. Targeted facilities include key national transportation facilities, such as express national roads, general national roads, detour roads replacing the national roads, state-supported local roads, high-speed rail lines, general railroads, metropolitan railroads, airports, ports of trade, and multimodal logistical terminals. Local transportation facilities (linked to the key national transportation facilities), such as metropolitan roads, congested roads, urban railroads, light rail, coastal harbors, and logistical complexes. The nature and function of the Midterm Transportation facility Investment Plan are outlined as follows:

- An intermodal plan implementing the Key National Transport Network Plan on a five-year basis;
- An investment plan for nationwide transportation facilities, including the Key National transportation facilities under the Key National Transport Network Plan, and the local transportation facilities that are connected to the Key National transportation facilities;
- A five-year plan for the development of key national transport and local transportation facilities, to address the country's overall transport problems and to efficiently respond to the various changing situations in the country;
- A five-year plan for determining the optimal investment size, finance allocation, and investment priority considering the limited finance, traffic demand forecasts, etc.; and
- A plan for preventing budget waste due to duplicate and excessive investment, for intensive investment for construction completion, and for the pursuit of green growth in a bid to maximize investment efficiency.

The Midterm Transportation facility Investment Plan is further outlined as shown below.

- Analyze transport situations and problems
- Forecast future circumstances and traffic demands
- Set plan objectives and strategies
- Calculate key national transportation facility investment size and investment ratios between transport modes
- Adjust investments in key national transportation facility development projects
- Work out measures to secure and raise needed finances
- Devise measures to execute and manage plan

4.3.3 Major Outline of the Plan

a. 1st Midterm Transportation facility Investment Plan (1999-2004)

The Ministry of Construction and Transport (now MLTM) devised the 1st Midterm Transportation facility Investment Plan (2000-2004) to efficiently invest in transportation facilities, such as roads and railroads, in efforts to develop a high-efficiency, low-cost comprehensive national transportation system. Under this plan, a total budget of KRW 99.9 trillion (average yearly increase rate: 5.9 and 3.5% of the GDP) was allocated for the expansion of transportation facilities during the plan period (2000-2004). Moreover, budget allocations for each transport mode were distributed as KRW 54.7 trillion for roads (55%), KRW 28.6 trillion for railroads (29%), KRW 4.6 trillion for airports (5%), KRW 9.9 trillion for harbors (10%), and KRW 2.1 trillion for logistical facilities and others (2%). 65% of funds have been projected (KRW 64.8 trillion) to come from the central government, with 5% (KRW 4.6 trillion) from local governments, 19% (KRW 19.4 trillion) from public enterprises, and 11% (KRW 1 1.1 trillion) from private-sector capital.

Table 3-4 | Investment Size of the 1st Midterm Transportation facility Investment Plan (2000-2004)

Category	Total	Road	Railroad	Airport	Harbor	Other Logistics
Investment size (KRW trillion)	99.9	54.7	28.6	4.6	9.9	2.1
Percentage (%)	100	55	29	5	10	2
Average annual growth (%)	5.9	4.1	11.7	-21.0	20.2	13.5

Source: Ministry of Construction and Transport, 1st Midterm Transportation facility Investment Plan, 2001

Under the first plan, appropriate finance allocations for the transport modes, such as a higher investment ratio for railroads and harbors, were proposed based on studies conducted by five state-run research institutes, including KOTI, on developing a highly efficient multimodal transportation system that reduces logistical costs and bolsters national competitiveness. Moreover, to achieve efficient investment, such as preventing duplicate investments in transportation facilities, the plan proposed intensive investment for construction completion as well as setting economic efficiency and balanced regional development as investment priorities.

By category, a total of KRW 54.7 trillion (expressways, KRW 24.1 trillion; general national roads, KRW 28.9 trillion; metropolitan roads, KRW 1.7 trillion) was allocated for the construction of key road networks. As proposed in the Key National Transport Network Plan, they include seven South-North axes and nine East-West axes in a grid-type

expressway network, forty-five expressway projects with a total length of 2,889 km were planned(19 completion-intended projects, 1,515.3 km; 16 continuous projects, 890.6 km; ten commenced projects, 483.3 km). Moreover, to address bottlenecks on general national roads in urban segments, a total length of 2,321 km, including sixty-seven urban detour segments totaling 386 km in length, was projected to be constructed. They include 1,341 km for key national roads, 386 km for urban detour roads, and 595 km of state-supported local roads. In addition, the plan proposed the construction of eight harbor hinterland roads, twenty-seven roads servicing industrial complexes and metropolitan roads totaling 449 km in length that would facilitate transport and logistics further.

The mode split for environmentally friendly and more efficient railroads was projected to double from 7.6% to 14.2%. The plan proposed a budget of KRW 28.6 trillion (high-speed rails, KRW 8.3 trillion; general railroads, KRW 7.9 trillion; metropolitan railroads, KRW 4.1 trillion; urban railroads, KRW 8.4 trillion), with the investment ratio gradually increasing from 25% in 2000 to 31% in 2004. For high-speed rails, the plan proposed the opening of the first stage of Gyeongbu High-Speed Rail (Seoul-Daegu) and the electrification of its Daegu-Busan segment to develop an X-shaped high-speed rail network traversing the Korean Peninsula. The construction of Honam High-Speed Rail was projected after the specific route was determined based on a master plan. For key general railroads, a total of thirty-three projects with a total length of 2,569 km (nine projects with a total length of 775.1 km intended for completion, seven continuous projects with a total length of 422.3 km, and eighteen commenced projects with a total length of 1371.7 km) were planned to be retrofitted with double tracks and electrified in a bid to connect them with high-speed rails. For metropolitan railroads, a total of thirteen projects with a total length of 363.4 km (four projects intended for completion with a total length of 73.9 km, six continuous projects with a total length of 262.6 km, and three commenced projects with a total length of 26.9 km) were proposed. Moreover, for urban railroads, the construction of railroads with a total length of 233 km (seven subways, including Seoul Line No. 9 and Busan Line No. 2 and 3 and two light electric rails) was proposed.

During the first investment plan period, Incheon Airport was opened, enhancing its profile as an international hub airport. With the opening of high-speed rail, travel time across the country was drastically reduced to half a day. By transport mode, 82.2% of the planned expressway construction and 111.3% of planned national road construction were carried out. For railroads, 98.5% of the planned increase in operating distance was achieved, with 86.5% of planned electrification completed and 101.3% of planned double-track conversion.

Table 3-5 | Facility Development Achievements of the 1st Midterm Transportation Facility Investment Plan (2004)

Category		Set Goal	Results	Achievement (%)
Road	Expressway (km)	3,555	2,922.9	82.2
	National road (km)	12,804	14,246	111.3
Railroad	Operating distance (km)	3,425	3,374.1	98.5
	Double-track Development ratio (%)	38.6	39.1	101.3
	Electrification ratio (%)	46.0	39.8	86.5

Source: Ministry of Construction and Transport, 2nd Midterm Transportation facility Investment Plan, 2006
Note: The road plan and results include the road expansion projects.

b. 2nd Midterm Transportation facility Investment Plan (2005-2009)

During the 2nd midterm transportation facility investment period, sixteen projects were completed, including 884 km of expressways and the opening of the entire Jungbu Inland Expressway. 637 km of national roads were constructed through 77 projects until 2009. Moreover, the expressway innovative traffic information system, dubbed FTMS, was installed in the newly constructed expressways with a total length of 1,359 km by 2010.

As for high-speed rail, the 2nd Gyeongbu High-Speed Rail Project involved the construction of the Daejeon-Daegu downtown segment (57 km) and the Daegu-Busan segment (117 km) as well as the continued construction of Honam High-Speed Rail. For general railroads, 81.6 km of railroads, including the Incheon International Airport railroad, were retrofitted with double tracks and electrified through three projects, while 482 km of railroads, including the Deokso-Wonju segment of Jungang Line, were expanded under eight projects.

Table 3-6 | Transport Prospects after the Completion of the 2nd Midterm Transportation Facility Investment Plan (2005-2009)

Category		2004 (A)	2009 (B)	Remarks (B-A)
Road	Express-national-road length (km)	2,923	3,807	883
	General-national-road length (km)	14,246	14,883	637
Railroad	Operating distance (km)	3,374	3,455.6	81.6
	Double-track development ratio (%)	39.1	59.5	20.4
	Electrification ratio (%)	39.8	58.5	18.7

Source: Ministry of Construction and Transport, 2nd Midterm Transportation facility Investment Plan, 2006

c. 3rd Midterm Transportation facility Investment Plan

The 3rd Midterm Key Transportation facility Investment Plan should be devised in line with the long-term goals stipulated in the Key National Transport Network Plan. The third plan should review and incorporate the goals proposed in the second plan. Thus, the third plan should aim to expand the country's transportation facilities in a timely manner that also bolsters national competitiveness and welfare of the Korean public, while also developing infrastructure to achieve balanced regional development and strive towards making South Korea the transport and logistical hub of Northeast Asia. Investment patterns should be changed to expand the key national SOC infrastructures, link public land into a network, and develop a cost-saving logistical system and a efficient multimodal transportation system. Furthermore improvements in the safety, environmental, and maintenance functions as well as the efficiency of existing facilities should be made along with supply-oriented facility investment.

In addition, an integrated transportation system should be developed to maximize the investment efficiency by allotting finance between the SOC categories and within the same categories rationally and efficiently that work towards achieving the national management goals and balanced regional development.

Table 3-7 | Transport Prospects after the Completion of the 3rd Midterm Transportation facility investment Plan (2011-2015)

Category		2009 (A)	2015 (B)	B/A
Road	Express national road length (km)	3,776	4,282	1.13
	General national road length (km)	13,820	14,369	1.04
Railroad	Operating distance (km)	3,378	4,093	1.20
	High-speed rail length (km)	240.4	653.3	2.12

Source: MLTM, 3rd Midterm Transportation facility Investment Plan, 2011

Formulation of the Midterm Transportation facility Investment Plan

① Formulation of the 1st Midterm Transportation facility Investment Plan (2000-2004) in March 2001

1. History of plan formulation

· February 1999	Transportation System Efficiency was enacted (Enforcement Decree enacted in August 1999)
· December 1999	Key National Transport Network Plan confirmed implemented
· February -July 2000	Each relevant agency submitted a Midterm Transportation facility Investment Plan (draft)
· April 2000	Taskforce established for formulation of Midterm Transportation facility Investment Plan
· August 2000	Draft Midterm Transportation facility Investment Plan prepared
· October 2000	Public hearings held to gather opinions
· November 2000	Taskforce meetings were held for the formulation of the Midterm Transportation facility Investment Plan.
· December 2000	Transportation Policy Coordination Working Committee (headed by Vice Minister of Construction and Transport) deliberated plan
· December 2000 -February 2001	Transportation Policy Committee (headed by Prime Minister) deliberated plan
· March 2001	Plan finalized and announced

2. Plan Objectives

- Secure transport infrastructure facilities necessary for bolstering national competitiveness
- Realize cost-saving logistical system and high-efficiency multimodal transportation system
- Realize speedy, safe, convenient, and eco-friendly transportation system

3. Plan Strategies

- Make appropriate transportation facility investments considering the financial and economic conditions, facility supply goals, etc.
- Prioritize investments, such as putting first priority on the completion of the existing projects and on addressing the inter-region transport difficulties, in an effort to achieve efficient investments.

- Enhanced priorities

○ Make investment in state projects a top priority, such as construction of Incheon International Airport and Gyeongbu High-Speed Rail, in order for completion within planned period, and intensively invest in individual projects to ensure completion.

○ Develop a rational modal share system, strengthen connectivity between transportation investment projects, and consider a balanced regional development effect

○ Enhance transport operational efficiency, such as through ITS projects along with transportation facility investment projects, in a bid to maximize use of country's transportation facilities

○ Strengthen investment considering new policy objectives (i.e., environment and safety), and expand investment in maintenance, repair, and safety of country's transportation facilities

- Lowered priorities

○ Cancel or defer unessential and non-urgent projects, and boldly adjust duplicate investment projects

○ Exclude inadequate projects with inadequate plans

② Formulation of the 2nd Midterm Transportation facility Investment Plan (2005-2009) in February 2006

1. History of plan formulation

· December 1999	Transportation System Efficiency ActTransportation System Efficiency Act enacted (Enforcement Decree enacted in August 1999)
· December 1999	Key National Transport Network Plan finalized and announced
· March 2001	1st Midterm Transportation facility Investment Plan (2000-2004) finalized and announced
· June 2004	Outsourced formulation of 2nd Midterm Transportation facility Investment Plan (2005-2009) completed
· July 2004	Taskforce established for formulation of Midterm Transportation facility Investment Plan
· August 2004	Draft Midterm Transportation facility Investment Plan prepared

- September -December 2004 — Plan discussed within ministry and with Ministry of Fisheries and Maritime Affairs.
- December 14, 2004 — Public hearings held to gather opinions
- December 2004 — 2nd Midterm Transportation facility Investment Plan (draft) prepared
- January May 2005 — Consultation with Ministry of Planning and Budget
- June August 2005 — Detailed investment plans coordinated by category
- September -October 2005 — Plan discussed with related ministries
- October 2005 — Strategy and Environment Evaluation Committee deliberated on and a pproved plan
- November December 2005 — National Transport Coordination Working Committee (headed by Vice Minister of Construction and Transport) deliberated plan
- December 2005 National Transport Committee (headed by Prime Minister)-February 2006 deliberated plan
- February 2006 — Plan finalized and announced via gazettes

2. Objectives of the plan

- Expand transportation facilities in a timely manner to bolster the national competitiveness and to increase convenience for and enhance welfare of Korean public

- Develop infrastructure to achieve balanced regional development and establish South Korea as transport and logistical hub of Northeast Asia

- Realize a cost-saving logistical system and a high-efficiency multimodal transportation system

- Allocate finance rationally and efficiency among SOC categories and within same categories to maximize investment efficiency and develop an integrated transportation system

3. Strategies of the plan

- Expand key national SOC facilities to construct a network-type public land system.
- Develop hub ports as logistical bases of Northeast Asia in the 21st century
- Develop a high-efficiency, high-value-added logistical system

- Promote public transport in large cities, and properly manage traffic demands therein
- Increase the operational efficiency of the existing transportation systems using sophisticated technology

③ Formulation of the 3rd Midterm Transportation facility Investment Plan (2011-2015) in September 2011

1. History of plan formulation

· March 2001	1st Midterm Transportation facility Investment Plan (2000-2004) finalized and implemented
· February 2006	2nd Midterm Transportation facility Investment Plan (2005-2009) finalized and implemented
· November 2007	1st Revised Key National Transport Network Plan (2000-2019) finalized and implemented
· December 2010	2nd Revised Key National Transport Network Plan (2001-2020) finalized and implemented
· January 2011	3rd Midterm Transportation facility Investment Plan revised and research conducted
· February 2011	Taskforce launched and operated for plan formulation
· May 2011	Midterm Transportation facility Investment Plan drafted
· June 2011	Policy discussion meetings held
· June-July 2011	Draft plan discussed with relevant ministries and municipalities
· August September 2011	National Transport Committee deliberated confirmed plan
· September 2011	Plan finalized and announced (MLTM Notice No. 2011-508)

2. Necessity of Plan Formulation

- Revise and complement 3rd Midterm Transportation facility Investment Plan in line with 2nd
- Revised Key National Transport Network Plan Change plan goals, strategies, and period
- Formulate five-year execution plan (2001-2005) to implement Key National Transport Network Plan

3. Plan Objectives

- Develop a green transportation system to lead low-carbon and green-growth era.
- Develop intermodal transportation system focused on efficiency, connectivitiy, and integration
- Expand transport in a timely manner to bolster national economic competitiveness
- Reduce socioeconomic costs, such as traffic congestion and logistical costs.
- Bolster country's global competitiveness by expanding and improving transport and logistical facilities

4. Plan Strategies

- Develop and expand an eco-friendly, energy-saving, green transportation system
- Expand country's seamless, interlinked transportation network to enhance network efficiency
- Adjust intersector stocks efficiently to bolster national competitiveness
- Increase efficiency of transportation facilities using sophisticated technology Expand global networks to bolster South Korea's international transport and logistical capabilities

4.4 Long-term Transportation Infrastructure Investment Plan by Sector

The aforementioned Key National Transport Network Plan and the Midterm Transportation facility Investment Plan are South Korea's fundamental transportation plans and aim to offer long-term transportation facility investment directions and investment plans for key national transportation facilities, such as roads, railroads, airports, and harbors. In addition, mid- and long-term plans by category, such as roads and railroads, were devised pursuant to the relevant laws to efficiently expand the country's transportation facilities. The Master Plan for Road Improvement, the fundamental road plan, and the National Railroad Network Development Plan, the fundamental railroad plan, were formulated in line with the Key National Transport Network Plan. These plans and their implementation results are outlined below.

4.4.1 Roads-Master Plan for Road Improvement

South Korea's road plans formulated under laws include the Master Plan for Road Improvement (henceforth "Road Master Plan"), the Five-Year National Road Construction Plan, and the Five-Year State-supported Local Road Plan. Of these, the fundamental plan is the Road Master Plan, and the National Road Construction Plan has the nature of an execution plan of the Master Plan for Road Improvement. The Road Master Plan is formulated on a ten-year basis by Road Agency, according to the Road Act. The Road Master Plan includes road improvement goals and directions, road improvement and management plans, eco-friendly road construction measures, financing measures and other matters deemed necessary by MLTM or by the Road Agency for systematic road improvement.

The Road Master Plan is the mid- and long-term road plan for the implementation of the Comprehensive Public land Plan, and serves as a guideline for the local and other road improvement plans. Moreover, the Road Master Plan replaces the master plans for the construction projects of express national roads, national roads, and state-supported local roads, pursuant to Article 21, section 3 of the Construction Technology Management Act, and to Article 38-7 of the Enforcement Decree of this act. As such, the plan is very important.

The Road Master Plan was devised in 1998 at a time during which the short-term plan period (1998-2002) expired for the operation of expressways, general national roads, detour roads replacing national roads, and state-supported local roads, which were all under the responsibility of the Ministry of Construction and Transport (currently MLTM). New road policy paradigms needed to be introduced to meet environmental and safety requirements, to increase investment efficiency, and to respond to the local era. Moreover, as the 4th Revised Comprehensive Public land Plan (2006-2020), the National Finance Management Plan (2005-2009), and the Key National Transport Network Plan (2000-2019) had been revised, the Road Master Plan needed revision in response to the socioeconomic changes.

In 2005, a revised Road Master Plan (2006-2010) was devised. The Revised Road Master Plan evaluated investment as successful. For the expressway investment results, investment costs were 92.3% of planned costs, while 96.7% of planned project volumes were achieved. For the national-road investment results, actual investment cost amounted to 99.1% of planned costs, while 97.2% of planned project volumes were carried out. The investment ratio for the state-supported local roads was 95.6% of the plan.

The Revised Road Master Plan (2006-2010) placed top priority on the development of a main expressway network to support decentralization and balanced public land development. It also aimed to improve traffic-congested segments and to strengthen the connections between roads to address urban traffic congestion. The road improvement strategy put first priority on the provision of support for balanced public land development. Furthermore, the strategy also focused on enabling access to the expressways from anywhere in the country within thirty minutes and increase connecitivity of the expressway network in order to enable travel across the entire country within half a day. In 2011, the 2nd Revised Road Master Plan (2011-2020) was devised, and the Road Master Plan is outlined as follows:

a. Overview of the Master Plan for Road Improvement (1999-2011) (devised in December 1998):

· Develop balanced road networks nationwide by 2020.

- Standardize accessibility to promote balanced national public land development.

· Address traffic congestion segments and strengthen regional connectivity

· Turn major national roads into key roads and 3D intersections to enhance road facilities.

· Improve road networks, focusing on road functions

Table 3-8 | Road Length Changes under the Master Plan for Road Improvement (1999-2011)

(Unit: km, %)

Year	Express-ways	National Roads	Local Roads	Special-City Roads	City, Provincial Roads	Total	Paving Ratio
1999	2,040	12,418	17,145	17,892	38,039	87,534	74.7
2006	3,103	14,224	17,677	17,738	49,319	102,061	76.8

b. Revision of the Master Plan for Road Improvement (2006-2010), devised in December 2005

· Convert key road investments from local to urban areas

- Improve Circulation of the transport in large cities, and congested roads to enhance investment efficiency

· Devise Road Master Plan guidelines for local roads to strengthen connectivity between expressways, national roads, and local roads and to prevent duplicate investments

Table 3-9 | Road Length Changes under the Revised Master Plan for Road Improvement (2006-2010)

(Unit: km, %)

Year	Express-ways	National Roads	Local Roads	Special Roads	City, County Roads	Total	Paving Ratio
2006	3,103	14,224	17,677	17,738	49,319	102,061	76.8
2009	3,776	13,819	18,138	18,749	50,501	104,983	79.2

c. 2nd Master Plan for Road Improvement (2011-2020), devised in June 2011

- Maintain same total nationwide key road networks as existing plan while integrating nationwide road networks (7×9) and Seoul metropolitan road networks (7×4+3R).
- Promote large-city traffic congestion segment improvement projects; complete beltway networks in Busan, Daegu, etc.; and facilitate construction and operation of underground roads.
- Adjust road grades and improve road management systems in an effort to computerize road management
- Manage traffic demand and expand ITS to support green growth
- Strengthen road-related international activities to enhance the country's global profile
- The total required budget is KRW 69.9 trillion, of which KRW 68.2 trillion will be obtained from state coffers, according to the National Finance Management Plan, while the balance will be obtained from private capital and public enterprises.

4.4.2 Railroads-National Railroad Development Plan

a. Overview of the National Railroad Network Development Plan and Its Implementation Results

The National Railroad Development Plan ("NR Plan") is a state mid- and long-term plan (based on a ten-year period) for efficient and systematic railroad investments in line with Article 4 of the Railroad Construction Act. The NR Plan is South Korea's fundamental comprehensive railroad plan formulated in line with the Key National Transport Network Plan, the Midterm Transportation facility Investment Plan, and the Large City and Metropolitan Transport Plan. It may be reviewed and devised every five years. The NR Plan is outlined as follows:

- Mid- and long-term railroad construction plan
- Reducing transfer times between modes
- Financing measures
- Eco-friendly railroad construction measures

The NR Plan has a 10-year implementation period, targets the nationwide space, and encompasses high-speed rail, general railroad, and metropolitan railroad projects. Research on the master plan for the NR Plan in the 21st century was completed in 2004, and a taskforce was established in 2005 to formulate the NR Plan. The Draft NR Plan was prepared and complemented in consultation with the relevant ministries in July 2005 with the promulgation of the Railroad Construction Act. The plan was reviewed by the Railroad Construction Review Committee in 2005. In March 2006, the 1st NR Plan (2006-2015) was devised, and the 2nd NR Plan (2011-2020) was devised in 2011. The plans are outlined as shown below.

b. 1st National Railroad Network Development Plan (2006-2015)

The 1st NR Plan aims to drastically boost South Korea's railroad competitiveness to enable the railroads to compete with other Transport modes and to attract the maximum traffic demand. It also aims to achieve a running speed of 180-200 km/h to enable travel between large cities in two to three hours, thereby enhancing the speed competitiveness of railroads. Moreover, the plan aims to provide access to major railroad stations within thirty minutes and to strengthen the role of railroads as a safe and pleasant Transport modes that is people-oriented and eco-friendly

During the period of the first plan, an investment of KRW 40.4 trillion was proposed. In the first half (2006-2010) of the period, a KRW 20.4 trillion investment was projected, 64% of which, or KRW 13.1 trillion, was planned to be financed by the state coffers.

Table 3-10 | Investment Plan under the 1st National Railroad Network Development Plan

(Unit: KRW 100 million)

Finance	Total Project Cost	By 2005	2006-2010	2011-2015	Total
State coffers	699,151	132,309	131,384	185,500	316,884
Municipality cost	43,916	5,460	10,846	14,448	25,294
Private capital	47,818	15,683	32,135	-	32,135
Others	106,247	76,140	30,107	-	30,107
Subtotal	897,132	229,592	204,472	199,948	404,420

Source: Ministry of Construction and Transport, 1st NR Plan, 2006

The first plan aimed to develop an X-shaped national railroad network connecting the entire country. Two high-speed rail routes (Gyeongbu and Honam High-Speed Rail) were projected to form the major framework of the national railroad network, and six South-North axes and six East-West railroad network axes would connect with the high-speed rails to create key high-speed railroad networks. Moreover, high-speed freight cargo railroad systems were planned to be developed by achieving high speeds of the major key lines and by improving problematic segments as well as by expanding the railroad networks connecting with major industrial complexes and harbors.

Moreover, to increase access to the high-speed railroads, the expansion of transfer systems to and from high-speed rail stations was proposed to widely promote the benefits of high-speed rail services. Furthermore, the development of intermodal transfer centers connected to railroad stations were proposed to enabling general railroad stations to serve as regional transport hubs.

In addition, the construction of a South-North railroad connection was proposed for transporting freight cargo, while the expansion of detour routes in the outer Seoul metropolitan was planned. The long-term goal of realizing the silk road of railroads, connecting South Korea-North Korea, Russia, China, Russia, and Europe through the intercontinental railroad was also proposed. In determining the investment priority for the plan, the factors of efficiency, equality, and other conditions were to be comprehensively considered.

c. 2nd National Railroad Network Development Plan (2011-2020)

After the 1st NR Plan, the need for fundamental transportation plan enabling efficient investment in transportation through the systemization of individual development plans of roads, railroads, harbors, and airports was pointed. Enhancing compatibility and connectivity between these plans was voiced. Moreover, a future-oriented transportation policy was

needed in line with the green-transport strategy, the KTX high-rail development strategy, and domestic and overseas transport environment changes. This led to the formulation of the 2nd NR Plan.

The 2nd NR Plan proposes the integration of public land through the rail network and the restructuring of the network into a multi-core, open structure. Towards such end, the plan aims to connect the major railroad points nationwide in a daily commuting time of one hour and thirty minutes, thus integrating the country in a single urban bloc. Four tasks were thus determined, and they are outlined as follows:

- Connect major points nationwide via high-speed KTX networks
- Develop metropolitan and express railroad networks that can cover large-city areas in thirty minutes
- Develop a green railroad logistics system
- Create an environment conducive for the convenient use of railroads

The 2nd NR Plan (2011-2020) requires a KRW 88 trillion investment for the expansion of the railroad networks, consisting of funds from the state coffers (KRW 59 trillion), municipalities' costs (KRW 3 trillion), and private capital and others (KRW 26 trillion). For budgeting by category, KRW 16 trillion will be allotted for high-speed rails, KRW 46 trillion for general railroads, and KRW 26 trillion for metropolitan railroads.

5. National Integrated Transportation System Efficiency Act

5.1 Background and Progress

Most South Korean laws pertaining to construction and transport impact the daily lives of the Korean public, such as real estate, water resources, and transport. They include twelve different categories as listed: public land policy, land, housing, city, construction economy, technology safety, roads, water resources, freight logistics, land transport, railroads, and aviation. To strengthen coordination and process of developing transport policies for diverse categories, the Transportation Efficiency Act aims to mandate the planning and evaluation of transportation facility investment, the implementation of intelligent transportation systems, and appropriating finances for the expansion and management of transportation facilities. Thus, the Transportation Efficiency Act aims to direct the development of an efficient transportation system between transportation facilities by requiring the formulation of the Key National Transport Network Plan, the Midterm Transportation facility Investment Plan, and the Master Plan for an Intelligent Transport System. The Transportation Efficiency Act was drafted in October 1998, was reviewed through public hearings, and later promulgated in February 1999 in consultation with the relevant ministries.

To strengthen coordination in the formulation of investment plans for the road, railroad, and other categories, the Key National Transport Network Plan was required to include comprehensive transportation facility investment guidelines. A five-year national traffic survey plan was mandated to prevent the duplication of national traffic surveys conducted by MLTM and the individual traffic surveys conducted by the heads of municipalities. The act was partially amended and renamed National Comprehensive Transportation System Efficiency Act Transportation System Efficiency Act after improvements were made to the existing system.

The Key National Transport Network Plan was devised for the first time in 1999, according to the Transportation Efficiency Act. It has been revised twice since then, the first time in 2007 and the second time in 2011. The 1st Midterm Transportation facility Investment Plan (2000-2004) was formulated in 2001, the 2nd (2005-2009) in 2005, and the 3rd (2011-2015) in 2011. In 2000, Master Plan 21 for a national intelligent transportation system was devised.

5.2 Major Requirements

The Transportation Efficiency Act has undergone revisions on twenty-four occasions since enacted in 1999. It includes provisions on the formulation of a comprehensive transportation plan, the conduct of national traffic surveys, feasibility studies of transportation investment projects, and other issues regarding efficient transportation facility investment. It also includes planning and evaluation provisions for the efficient implementation and management of transportation facility development, such as enhancements to transport logistical hubs and the intermodal transportation system, development of intermodal transit centers and intelligent transportation systems, and promotion of transport technologies. It also encompasses the relevant organizations and budget. The act is outlined as follows:

- Formulation of the Key National Transport Network Plan ("Key Network Plan")

The Transportation Efficiency Act requires the formation of a key network plan to systematically configure key national transportation networks, to enable key national transportation facilities to mutually function closely, and to enable the speedy, safe, and convenient operation of the country's transport modes. The plan is devised on a 20-year basis and should align with the Comprehensive Public land Development Plan, take precedence over the Basic Large City and Metropolitan Transport Plan, the Basic National Logistics Plan, and other transport and logistics plans. The Key Network Plan should be reflected in the plans regarding land use and is required to include the following components: traffic prospects and traffic demand forecasts, comprehensive transportation policy and transportation facility investment directions, key national transportation network development goals and strategies, key national transportation facility development projects and intermodal systems, relevant financing directions and investment priorities, the development and utilization of transport technology, the interconnection of key

national transport and foreign transportation networks, and other transportation system improvements.

- Formulation of the Midterm Transportation Facility Investment Plan ("Midterm Investment Plan")

The Midterm Investment Plan is required to be devised every five years for the effective implementation of the key national transport projects defined in the Key Network Plan and related local transportation facility development projects. The agenda included in the Midterm Investment Plan must be reflected in other relevant transportation plans. Finances must e appropriately allotted to the various items of the transportation facility special account according to this plan, and the investment finance sharing ratios set in this plan must be reflected in the relevant budget. The Midterm Investment Plan is required to include the transportation facility supply goals and investment directions, scale of key national transportation facility projects, and investment priorities and financing. Other required components include appropriate modal share structures and investment finance allotments between transportation facilities, intermodal development of key national transport and local transportation facility development projects, an investment plan for local transportation facility development projects, and other transportation facility investment matters.

- National Traffic Survey

The Transportation Efficiency Act requires the conduct of national traffic surveys to properly devise and implement national transport policies such as the Key Network Plan and the Midterm Transportation Facility Investment Plan. Specifically, the surveys aim to gather data on the transportation facility operation and traffic volume to enable the formulation of proper transportation plans and the efficient operation of Transport modes and facilities. The survey plan must be devised on a five-year basis with regard to its objectives and strategies, survey details, and methods to prevent duplication with other individual surveys. The efficiently conduction of traffic surveys jointly utilization of survey results are also stipulated.

- Formulation of a Master Plan for Intelligent Transport Systems ("ITS Plan")

The Transportation Efficiency Act requires the formulation of theITS plan for the development and use of sophisticated transport technologies, such as electronics, control, and communication as well as traffic information in Transport modes and facilities. The mandated ITS plan indicates steps to ensuring scientific and automatic operation and management of transportation systems, while also enhancing transport efficiency and stability. The ITS plan is a ten-year national plan for promoting the development and spread of intelligent transportation systems in the ground transport, marine transport, and aviation sectors. The ITS plan is to be revised every five years, as deemed necessary, and should provide the basis for individual ITS plans for vehicles and roads, railroads, sea transport, and aviation. The ITS plan includes ITS development objectives and directions; R&D, industrialization, and standardization of ITSs; finance for ITS development; and other

system improvement measures. Strategies and implementation systems for the development and operation of ITSs by transport service and categorized by land, sea, and aviation; are also included in the ITS plan.

- Formulation of a Midterm Intermodal Transport System Development Plan ("Midterm Intermodal Plan")

  The Transportation Efficiency ActTransportation Efficiency Act requires the formulation and implementation of a five-year midterm intermodal transportation system development plan subject to deliberation by the National Transport Committee for the development of a nationwide intermodal transportation system. It includes the development of intermodal transportation systems and the formulation and implementation of intermodal transportation system development measures. This plan should include the plan's objectives and directions, various intermodal development projects, an overview of and prospects for transport and logistics hubs, the selection of intermodal transportation facilities projects, investment priorities, the necessary financing, and other relevant matters.

- Formulation of a Master Plan for the Development of Intermodal Transportation Centers ("Intermodal Transportation Center")

  The Transportation Efficiency Act requires the formulation of a five-year development plan for intermodal transportation centers (ITC) subject to deliberation by the National Transport Committee centers. This plan should include the directions for efficient ITC development, a survey on and analysis of the country's major intermodal and transfer facilities, ITC development measures, budgeting for the development of ITC, and other matters that are necessary for the development and activation of ITCs under presidential decrees.

- Formulation of a National Transport Technology Development Plan ("TT Development Plan")

  The Transportation Efficiency Act requires the formulation of a five-year TT development plan for the promotion of R&D on transport technologies and the efficient use of results. This plan should include the TT development directions and goals; analysis of domestic and overseas TT environment; mid- and long-term development strategies for key technologies; mid- and long-term investment plans and financing measures promoting TTs; the demand for, supply of, and fostering measures for TT human resources; the use of TTs and other TT promotion measures; support measures for TT-development-related research institutes; and other matters that are necessary for the formulation of a TT development plan.

- Establishment of a National Transport Committee ("NT Committee")

  The Transportation Efficiency Act requires the establishment of an NT Committee under the control of MLTM, which will deliberate on important policies related to

national transportation systems as well as on transport-related policies stipulated in other laws. The NT Committee shall deliberate on the formulation and revision of the Key National Transport Network Plan and Midterm Transportation Facility Investment Plan as well as evaluating their results. Additional deliberations shall include financing measures for transportation facility development projects, the formulation and revision of a national traffic survey plan, midterm intermodal transportation system development plans and measures and the formulation of national transport and logistics competitiveness indices. Furthermore, the NT Committee shall also address the designation of the first-class transport and logistical hubs and the changing thereof, the formulation and revision of intermodal transportation centers (ITC) and their development plans, including their designation and revision of major designation details. Lastly, the NT Committee shall also deliberate the formulation and revision of the ITS plans, execution plan for national transport technology development, and other important state policies for transportation systems, as put forth for deliberation by the chairperson.

6. Urban Transportation Maintenance Facilitation Act and Metropolitan Transportation Management Special Act

6.1 Urban Transportation Maintenance Facilitation Act

6.1.1 Background and Progress

Urban congestion has been continually worsening due to the surge in the travel in urban areas by the general public and increased use private automobiles, all of which point to the need for improvements to urban transport management systems in 1986, the government enacted the Urban Act to promote transportation facility improvement and efficient operation and management of transport modes and systems in efforts to facilitate urban traffic throughput make transport services more convenient to use.

The Urban Act was revised several times to respond to the worsening urban traffic congestion, particularly in the Seoul metropolitan. In January 1999, the act was revised to further strengthen its traffic impact evaluation function in efforts address traffic problems of large cities, limit the passage of automobiles in specific urban transport improvement zones, and impose and collect traffic-inducing charges from owners of facilities that increase traffic in the urban transport improvement zones.

In 1992, the Urban Act was revised to include the expansion of the urban transport improvement zones into small and medium-sized cities with the overall goal of responding to the surging number of automobiles and the frequently traveling public as well as the improvement of the traffic impact evaluation system and of the other current related systems.

In 1995, the Urban Act was revised to mandate the systematic formulation of a basic plan, a midterm plan, and an annual execution plan for urban transport improvement

that efficiently respond to ever-worsening urban traffic problems; to mandate the traffic impact evaluation of areas other than the urban transport improvement zones; and to allow municipalities to autonomously conduct traffic demand management, such as limiting of automobile use and the collection of congestion charges.

In addition, in 2003, the Urban Act was revised to designate urban transport improvement zones that facilitate urban traffic throughput and increase transport convenience, to improve the procedure for formulating the urban transport improvement plan, to improve the legal grounds for traffic-causing charges, and to implement a system for designating traffic congestion special management areas or traffic congestion-causing facilities requiring special management. Amendments to the Urban Act strive towards reducing urban traffic congestion by strengthening travel demand management in urban locales.

6.1.2 Major Outline

- Designation of Urban Transport Improvement Zones ("UTIZ"), and Public Notification

  Under the Urban Act, MLTM may designate a city with a population of over 100,000 (in the case of a combined urban and rural city, excluding the population in the eup and myeon administrative areas) as a UTIZ. In the case of other cities or counties, MLTM may also so designate and notify the city or country upon its initiative or upon the request of the mayor or county governor, as deemed necessary. MLTM may also designate a traffic bloc involving two or more adjacent UTIZs, and may notify the public of such, for the formulation of transport-related plans.

- Formulation of a Master Plan for Urban Transport Improvement ("UTI Plan")

  The mayors and county governors of UTIZs (including special-city mayors, metropolitan-city mayors, and special-province governors) are required to devise a 20-year UTI plan according to the relevant presidential decrees. The UTI plan should include the current situation of and prospects for urban traffic and measures for effectively managing the incoming and outgoing traffic, and for the improvement of metropolitan transportation systems such as roads, railroads, and urban railroads. The UTI plan should also cover the improvement of transportation facilities, improvement of public transportation systems, management of transportation systems and improvement of the traffic clearance, and construction and operation of parking facilities. Furthermore, other included items are facility expansions for bicycle use, development of eco-friendly transportation systems, and the related investment project plans and financing measures. Likewise, relations with the other UTIZs within the traffic block or adjacent areas should be considered. The UTI plan should be devised in line with the Master Urban Plan, and any road improvements should be governed by the Master Plan for Road Improvement. In accordance with the UTI plan, a ten-year midterm urban transport improvement plan should be devised, along with annual execution plans.

- Analysis of Traffic Impacts and Formulation of Traffic Impact Improvement Measures

Those who intend to conduct relevant projects in a UTIZ or a traffic bloc involving a UTIZ should analyze the traffic impacts and devise appropriate traffic impact improvement measures. Included items are urban development, creation of industrial locations and complexes, and energy development. Additionally, the construction of harbors, roads, railroads (including urban railroads), airports as well as the development of tourist complexes and special zones should be included. Furthermore, the installation of sports facilities, construction of buildings specified under presidential decrees pursuant to the Construction Act, and businesses impacting traffic shall be accounted for. Lastly, large-scale renovation, remodeling, and change of usage must also be analyzed.

- Imposition and Collection of Traffic-causing Charges

Mayors are allowed to impose and collect annual traffic induction charges from owners of traffic-causing facilities in a UTIZ. Such facilities should be located in a city with a population of over 100,000 (in the case of a combined urban and rural city, excluding the population in the eup and myeon administrative areas) and should be bigger than the sizes designated by the relevant presidential decree. Such charges should not be imposed on foreign governmental agencies, international- and foreign aid-organization facilities based in South Korea, nor on residential buildings, facilities whose traffic-causing volumes are drastically small or on which the imposition of such charges is deemed inappropriate due to inevitable public reasons, and facilities of national meritorious-service organizations and other non-profit organizations under the Act on the Establishment of Organizations by National Meritorious-Service Contributors, Etc., when such facilities are used for purposes other than those intended. Such charge exemption, however, shall not apply when the facility is being used for a purpose other than the intended one.

- Designation of a Special Management Area for Traffic Congestion ("SMATC")

As deemed necessary to facilitate urban traffic clearance and transport convenience, mayors may designate a specific area within a UTIZ as a SMATC, and may take traffic demand management action against vehicles entering facilities (except residential facilities) located in the SMATC that are bigger than the size designated by the relevant presidential decree and the SMATC. Moreover, mayors may designate facilities (excluding residential facilities) that cause serious traffic congestion to the nearby key roads and that are bigger than the size designated by the relevant presidential decree as special management facilities for traffic congestion, and may take traffic demand management action against such facilities.

- Establishment of a Local City Transport Project Special Account ("LCTPS Account")

To secure the finance that is necessary for implementing the master plan and for improving the urban transport, and to efficiently operate and manage transportation

facilities, an LCTPS account may be established in special cities, metropolitan cities, and special provinces and cities located in a UTIZ. The UCTPS account shall consist of congested passage charges, traffic induction charges, fines, transfers from general accounts, and revenues related to urban transport. The special account revenue should be used for projects involving the expansion of transportation facilities and for improving the operation thereof; surveying and researching on urban transport; improvement of the services of Transport modes and bettering the management of public transport companies; and the management of the traffic demand and the taking of traffic demand management action as well as the improvement of road and traffic safety facilities.

6.2 Metropolitan Transportation Management Special Act

6.2.1 Background and Progress

In efforts to efficiently address traffic problems of metropolitan regions, the MATM Act was promulgated in April 1997 to define matters concerning the formulation of a large-city and metropolitan transportation plan as well as establish and operate a large-city metropolitan transport committee in a bid to coordinate metropolitan traffic problems.

In January 2000, the said act was revised so that when applicable, the central government and municipalities, among cities and provinces would share the costs for the construction of metropolitan electric railroads by based on actual costs rather than length of the metropolitan electric railroad.

In January 2001, the said act was revised to require the formulation of metropolitan transport improvement measures to ease metropolitan traffic congestion caused by large-scale development projects, to extend the financial burden of metropolitan transport not only metropolitan subways but also to metropolitan transport modes, and to address other related problems.

Revisions in July 2003 focused on creating parking and rest areas nationwide for business cargo trucks operating nationwide, facilitating logistics, reducing traffic congestion costs, and to building cargo storage and delivery as well as cargo information bases. The revised act mandated the construction of public-vehicle depots in outer urban areas by including the public-vehicle depots stipulated in the current Cargo Truck Operation Business Act in the metropolitan transportation facilities stipulated in the MATM Act, in a bid to allow the central government and municipalities to facilitate the construction of public-parking lots using the metropolitan transportation facility account stipulated in the Transportation Facility Special Account Act.

In January 2007, the formulation and implementation of the Master Plan for Long-Term Metropolitan Transport was required to respond to the changing metropolitan transport environment spurred by rapidly expanding areas of large cities, and to develop efficient metropolitan transportation systems. To urgently address the housing difficulties in the

metropolitans, MLTM was allowed to directly devise metropolitan transport improvement measures with regard to state development projects. The said act was revised to mandate the prior review of metropolitan transportation systems related to large-scale housing projects as one measure towards preventing transport congestion in such areas, and to address the other related problems.

6.2.2 Major Outline

- Formulation of a Master Plan for Large-City and Metropolitan Transport Management ("MT Plan")

  The Special Act on Large-City and Metropolitan Transport Management requires MLTM to devise a 20-year MT plan in consultation with the heads of central agencies and the relevant special-city mayors, metropolitan-city mayors, or provincial governors, which takes measures to efficiently manage transportation systems in large cities and metropolitans. The MT plan should include the current overview and long-term forecast of the large-city and metropolitan traffic demand; the goals and gradual implementation strategies of the Master Plan for Metropolitan Transport Management; and the improvement of the existing metropolitan transportation systems and the efficient management of the metropolitan traffic demand. Other items to be included are the long-term expansion of the metropolitan transportation facilities and the connection thereof with other transportation facilities; the long-term expansion and improvement of the large-city public Transport modes; financing measures for the construction of metropolitan transportation facilities and the setting of the related investment priorities; and the metropolitan transport improvement measures stipulated under presidential decrees. Moreover, to effectively expand the large-city and metropolitan transportation facilities and to improve the metropolitan transportation systems, as stipulated in the MT plan, MLTM should devise a five-year MT plan in consultation with the heads of the relevant central agencies and city mayors and provincial governors.

- Formulation of Metropolitan Transport Improvement Measures ("MTI Measures")

  The relevant city mayors and provincial governors should formulate MTI measures in line with large-scale development projects and other projects stipulated in presidential decrees that have an impact on transport conditions in large cities and metropolitans. As deemed necessary, however, the central government may directly formulate MTI measures, granted in consultation with the relevant city mayors or provincial governors, to urgently address the housing difficulties in the large cities or metropolitans or to promote balanced regional-development projects and other state projects that are under its direct responsibility or that have been approved, permitted, or licensed. The MTI measures, as submitted or devised accordingly, should be determined via deliberation by the committee, and should be submitted to the relevant mayor or provincial governor (or they should be notified of such). This procedure shall also apply when the MTI measures are revised.

- Financial Support for Metropolitan Transportation Facilities

The central government should, according to the relevant presidential decrees, support the financing of the projects involving the construction and improvement of metropolitan transportation facilities (excluding metropolitan railroads) that are being implemented by the heads of municipalities according to the execution plan for large-city and metropolitan transport.

The costs of the metropolitan railroad construction or improvement projects should be shared, according to the project implementer, by the central government or municipality; by a joint corporation established by the central government, a municipality, or private enterprise; by municipalities; and by a joint corporation of municipalities and private enterprises. Moreover, the costs to be borne by the municipality, if shared by the relevant cities and provinces, should be shared based on the actual costs incurred for their respective segments of a metropolitan railroad. The relevant mayors and provincial governors, however, may have consultation and may determine their respective cost-sharing ratios differently.

- Imposition of Metropolitan Transportation facility Charges

Those who implement projects that have impacts on the large-city and metropolitan transport as stipulated in the relevant presidential decrees should pay the metropolitan transportation facility charges for the construction and improvement of the metropolitan transportation facilities. Such projects include housing development projects under the Housing Promotion Act; urban development projects under the Urban Development Act; land creation and housing construction projects under the Housing Act; and housing redevelopment projects, housing reconstruction projects, and urban environment improvement projects, and other similar projects, under the Urban and Residential Environment Improvement Act.

- Establishment of a Local Metropolitan Transportation Facility Special Account ("LMTFS Account")

The recipient cities and provinces in metropolitans may establish an LMTFS account to finance the expansion of the metropolitan transportation facilities and other relevant measures. The said account consists of metropolitan transportation facility charges as well as the central government's and municipalities' share of the cost for the construction of new metropolitan railroads and for the improvement of the existing ones. All matters concerning the operation and management of the said account shall be determined by the relevant municipal and provincial rules.

Plan in line with the Special Act on Large-City and Metropolitan Transport Management

① Master Plan for Large-City and Metropolitan Transport Management ("LCMT Master Plan")

· Background

Demand for transportation continues to rise due to the development of new towns and other metropolitan expansion projects, causing serious traffic congestion and metropolitan transport problems. The need to prepare a systematic and sustainable long-term master plan addressing the metropolitan transport problems was indicated as well as a need to devise mid- and long-term transportation plans to continuously and consistently implement metropolitan transport policies. In January 2007, the Special Act on Large-City and Metropolitan Transport Management was enacted, requiring the formulation of a 20-year master plan for the effective management of the metropolitan transport. The Five-Year LCMT Master Plan was changed into the Metropolitan Transport Execution Plan.

· Purpose

The LCMT Master Plan aims to devise a long-term comprehensive transportation plan for efficiently coping with the ongoing large-city and metropolitan transport circumstances. Moreover, it aims to offer the direction for the formulation of the Five-Year Metropolitan Transport Execution Plan, and to provide a framework for resolving the metropolitan transport problems by closely linking the relevant national and local plans.

· Warranty

- Special Act on Large-City and Metropolitan Transport Management enacted (April 10, 1997)Ministry of Construction and Transport's Metropolitan Policy Department was launched (April 10, 1998)Five-year metropolitan transportation plans established by area
- 1st Seoul Metropolitan Transport Plan (1999-2003) established on December 19981st Five-Year Local Major-City Metropolitan Transport Plan (2002-2006) established on December 2001 2nd Seoul Metropolitan Transport Plan (2004-2008) established in April 2004Special Act on Large-City and Metropolitan Transport Management partially revised (January 19, 2007)20-Year Master Plan for Large-City and Metropolitan Transport Management legalized (Article 3 was newly established)Formulation of Master Plan for Large-City and Metropolitan Transport Management outsourced (April 2006-March 2007)Hhearing held on formulated Master Plan for Large-City and Metropolitan Transport Management (March 28, 2007)

- Advisory NGO meeting held regarding plan (March 29, 2007)

· Draft Master Plan for Large-City and Metropolitan Transport Management was discussed with relevant ministries (April 30-May 9, 2007)Sustainability Committee deliberated on Draft Master Plan for Large-City and Metropolitan Transport Management (July 4, 2007)Large-City and Metropolitan Transport Management Working Committee deliberated plan in writing (July 12-20, 2007)Large-City and Metropolitan Transport Management Working Committee held meeting to deliberate plan (October 2, 2007)Large-City and Metropolitan Transport Management Working Committee deliberated plan (November 21, 2007)Master Plan for Large-City and Metropolitan Transport Management finalized and announced (December 4, 2007)Scope

The Master Plan for Large-City and Metropolitan Transport Management is devised for the Seoul metropolitan as well as the Busan-Ulsan, Daegu, Gwangju, and Daejeon areas. The Seoul metropolitan includes Seoul City, Incheon City, and Gyeonggi Province. The plan covers a 20-year period, from 2007 to 2026.

The metropolitan transportation facilities under the special act include the metropolitan roads, metropolitan railroads, transfer facilities, and key-route express buses. On the other hand, the metropolitan facilities under the Master Plan for Large-City and Metropolitan Transport Management formulated by MLTM include transportation facilities (region-to-region railroad networks and road networks) within metropolitans that cover the starting and ending points to secure the continuity and completeness of passage, and transportation facilities in a sense broader than as defined under the law.

② Execution Plan

The execution plan is devised based on a five-year period in consultation with the heads of the relevant central-government agencies and the mayors and provincial governors to effectively implement the expansion and improvement of the metropolitan transportation facilities defined in the Master Plan for Metropolitan Transport.

③ Improvement Measures

The metropolitan transport improvement measures aim to define the matters that are necessary for the formulation of metropolitan transport improvement measures in line with the large-scale development projects in large-city areas, pursuant to Article 7 of the Special Act on Large-City and Metropolitan Transport Management and Article ___ of the Enforcement Decree of the same act, so as to devise and implement systematic and effective improvement measures.

The spatial scope of the metropolitan transport improvement measures is 20 km within the borders of the development project zone (10 km if the development project zone is located in a specified part of a metropolitan city); provided that the measure should include development plans that are not included in the listing of traffic volumes at the origins and destinations between areas within 10 km of the development project zone (within 5 km in the case of a special or metropolitan city), after surveying the area. If the impact on the metropolitan transport reaches areas within or beyond 20 km from the development project zone (10 km if the development project zone is located in a special or metropolitan city), the scope should be the range affected by the metropolitan transport.

7. Policy and Technology Support for Efficient National SOC Investments

In order to efficiently implement transport construction, it is crucial to devise a mid- and long-term master plan and its execution plan along with an implementation organization, financing, and laws and systems. In addition, to enhance the investment efficiency of transport projects, technical support is needed for the successful implementation of transport projects. These technical and policy support measures have greatly helped South Korea expand its road and railroad facilities.

Of the various technologies and policies hitherto implemented, the South Korean Transport DB, the investment project evaluation system, and the investment evaluation guidelines can be cited as the prime success factors, for the reasons cited below.

First, to devise an appropriate mid- and long-term transportation plan, the accurate forecast of the traffic demand is essential. Nationwide traffic demand estimation, however, requires a vast amount of surveys, time, and budget, and should also be regularly updated. South Korea developed the South Korean Transport DB from 1998, which has been providing traffic demand forecasts for entire country and major large cities. The South Korean Transport DB helps in the formulation of the master plan and the decision making process concerning transport policies, especially with the implementation of transport projects.

Moreover, the transport projects require large-scale budgets and time, and trigger huge construction ripple effects. Investment finances create different effects according to the project in which the finance is invested. Therefore, it is crucial to select and manage projects properly. South Korea has developed and is implementing a systematic evaluation system, from planning to design to follow-up evaluation, thus enhancing the investment efficiency of transportation facilities.

Lastly, whether to implement a transportation investment project depends mainly on the results of its feasibility study, and to enhance the objectivity of the feasibility study project

and the investment efficiency, the Korean government formulates and distributes evaluation guidelines for transportation facilities. The methods stipulated in the guidelines should apply, with the necessary modification if deemed necessary, when conducting a feasibility study of a transportation investment project to be implemented by the central government. After the 1990s, the O/D (Origin-Destination Table) and networks provided by the South Korean Transport DB, as well as the standard methods stipulated in the guidelines, have been used in the evaluation of the feasibility study of transportation investment projects, thereby enhancing the evaluation confidence of the South Korean Transport DB, and alleviating excessive investment problems associated with erroneous demand forecasts. These are further discussed below.

7.1 Development and Implementation of National Transportation Database[2]

7.1.1 Background and Achievements

In the second half of the 1980s, traffic survey times and methods for feasibility studies of transportation facility development projects varied by research institute and transportation facility, which made data less reliable and difficult to reuse and share. Notably, since one-time traffic surveys for individual projects were carried out, the lack continuous and consistent data resulted in an inadequate nationwide traffic database.

The need for the development of a South Korean transport DB that would enable a more efficient implementation of transport projects arose, and the Korean government took action in the latter half of the 1990s. In 1999, the government enforced the Transportation System Efficiency Act (currently National Integrated System Efficiency Act) and conducted national traffic surveys. This act requires the development and operation of a South Korean transport DB that conducts national traffic surveys that will aid in properly devising and implementing national transport policies, such as the Key National Transport Network Plan and the Midterm Investment Plan. The Transport DB was also to comprehensively manage transport-related data, including those obtained from the national traffic survey and individual traffic surveys of municipalities.

Thus, the South Korean Transport DB Development Project began. South Korean Transport DB Center was established at KOTI, thereby establishing a systematic national traffic data system. The DB Center's National Traffic Demand Survey and DB Development Project began as a public nationwide inter-region traffic survey project in 1988. Afterwards, the 1st National Traffic Survey Plan, which was the midterm plan, was devised in August 2009 according to the National Integrated Transportation System Efficiency Act, which was passed by the National Assembly Transport Committee. This project is currently ongoing. In 2011, the 2nd Draft National Traffic Survey Plan was prepared with an expected completion date set for 2012, and it provides the framework for the next five years of national traffic surveys and DB development.

2 Korea Transport DB Center.

The South Korean Transport DB Development Project aims to survey the operation of transportation facilities and means, traffic volumes, and the transportation networks at the national level, so as to gather and analyze traffic data while create databases that allow jointly data use for the formulation of transport policies and plans. The South Korean Transport DB has prevented similar and duplicate surveys in line with the implementation of road and railroad projects, thus reducing related costs, as well as the utilization of future O/D and networks in the formulation of mid- and long-term master plans.

The National Traffic Demand Survey and DB Development Project are carried out annually based on the five-year national traffic survey. The first stage of the five-year project from 1998 to 2002 established the foundations for the South Korean Transport DB and enabled the provision of traffic DB services. In the second stage, from 2003 to 2007, the South Korean Transport DB was expanded and upgraded through efforts to improve the system of gathering and aggregating traffic DB, design user-oriented Internet services, expand the volume of traffic information and promote the use thereof, strengthen the utilization and analysis of the traffic DB, and promote cooperation with the related agencies with regard to traffic survey conduction and traffic data use. The National Traffic Demand Survey and DB Development Project are now under way, enabling regular surveys and detailed analyses and studies of relevant data, enhancing DB reliability and utilization.

7.1.2 Major Projects

The Korea Transport DB Development Project consists of statistical data, literature on and onsite surveys of land and sea transport, aviation, and logistics; research on and analysis of survey results; survey and development of national transportation networks; development and operation of DB systems; and operation and management of the relevant projects.

In 2005, a nationwide study was carried out to determine the passenger traffic volumes at the origins and destinations between regions as well as the conditions of cargo logistics, from which an inter-region O/D traffic volume DB was later created. In 2006, passenger travel was surveyed by metropolitan, enabling the survey of O/D traffic volume by metropolitan, detailing the passenger travel characteristics as well as renewing nationwide inter-region O/D traffic. Moreover, a nationwide survey of transportation facilities was conducted that enabled updates of the whole transport theme map.

In conjunction with the nationwide municipalities, the regular nationwide O/D passenger traffic volume was surveyed in 2010, while a nationwide O/D cargo traffic volume survey was conducted in 2011. Based on the 2010 Passenger Survey results extrapolated surveys and demand forecasting are being conducted in conjunction with the municipalities in order to obtain new nationwide O/D passenger traffic data. This will further improve the timeliness and reliability of O/D data.

As of 2011, the South Korean Transport DB had provided 158 transport statistics items, 38,278 literature items, nationwide inter-region and metropolitan O/D passenger traffic volume by mode and destination (current and future), nationwide inter-region cargo volume by tonnage/product item (current and future), networks for current and future traffic analyses for the entire country and by metropolitan, transport theme maps, traffic-causing units, and mode split results.

Table 3-11 | Overview of the South Korean Transport DB Development

Category	Description of Major Projects	Remarks
Passenger demand survey and analysis	Survey nationwide O/D passenger traffic volume, totaling of nationwide passenger O/D and travel demand forecasting , update nationwide passenger O/D, and research on the travel cost function	Including marine traffic
Cargo demand survey and analysis	Survey nationwide O/D cargo traffic volume, totaling of the nationwide cargo O/D and demand forecasting, update nationwide cargo O/D, and development of logistical networks	Including marine traffic
National traffic network development and analysis	Survey of transportation networks, development of a transportation network GIS DB, development of networks for use in analyses, and network development and analysis	
National traffic statistics survey and analysis	Survey of traffic-causing source units, survey of national traffic statistics, survey of carriage results and mode split ratios, survey of traffic costs and greenhouse gas emissions and development of a DB of such data, and survey of special traffic and travel statistics	
DB system development and operation	Development and operation of a DB system, and improvement of the DB management system and Website	

DB project management of DB projects, project publicity, operation of Korea Transport DB Consultative Council, and provide support for operation of Korea Transport DB Inspection Center

7.1.3 Utilization and Expected Benefits

The Korea Transport Database ("KTD") is being effectively used by the government ministries and municipalities to devise and implement transport policies and plans. The KTD service began in April 2001, and the obtained data are now used for a variety of purposes by multiple entities, including not only national agencies but also businesses, academia, and research institutes. A variety of GIS-T information, statistics, and public-traffic information are available to the general public via the Internet and other media.

While the KTD service was provided online and offline in the past, both data application and downloading are now available the KTD Website, streamlining the procedure. Various databases on transport research results as well as a basic data analysis function are provided online.

In addition to general transport analysis, KTD is used in a wide range of other areas: MLTM's Gyeongbu high-speed-rail intermodal transportation system, the Home Ministry's national safety management information system, KOTI's formulation of metropolitan transportation plans for five local large-city and metropolitans, revamping of the Seoul and Daejeon bus route systems, Jeollanam-do Province road book computerization, Busan's transport DB management system, Gwangju's urban logistics plan, the National Police Agency's improvement of its traffic accident management system and electronic maps, and the Ministry of Environment's research on wild-animal habitats based on landscape ecology.

The number of such data provisions since the KTD service commencement in April 2001 has reached over 1,000. Notably, national agencies have been using the transport theme maps of KTD to develop ITSs, and the O/D traffic data have been used in pre-feasibility and feasibility studies of national transportation facilities.

KTD is expected to drastically reduce the transport survey costs, manpower development and time. KTD helps adequately allocate transportation investment finances and determine the investment priorities, and provides follow-up evaluation, thereby increasing the efficiency of transportation facility investment. This will also certainly reduce indirect national costs, such as traffic congestion and logistical costs.

7.2 Development and Implementation of Investment Efficiency Evaluation System

7.2.1 Transport Investment Project Impulsion Procedure

The implementation procedure for transportation investment projects is sequentially conducted. SOC projects must be managed in terms of their entire life cycle. Though the project implementation procedure can vary according to the country or researcher, it usually consists of the planning, budgeting, execution, and management stages. These stages are segmented into seven steps, as shown in the following table.

A transport project takes a long time to implement, and its plan must be updated in the process to reflect changing circumstances. In South Korea, each stage is assessed using its own evaluation scheme, thus providing feedback and helping implement the project efficiently with the whole life cycle in perspective. In the planning stage, the Key National Transport Network Plan is devised so that a feasibility study is conducted for plural projects. A preliminary feasibility study is conducted during the budgeting stage, while a feasibility study is conducted during the execution phase, thus verifying the feasibility of the project. This can boost the efficiency of the transportation investment project.

Table 3-12 | Total Project Cost Management Procedure of the Ministry of Planning and Budget

Stage	Procedure	Description
Planning	Project planning	The central government agency ("CGA") head refers to similar projects and sets appropriate project size, total project cost, and project period
Budgeting	Preliminary feasibility study	If an estimated total project cost exceeds KRW 50 billion, the CGA head, requests that Minister of Planning and Budget conduct a preliminary feasibility study.
Execution	Feasibility study and formulation of master plan	The CGA head conducts a feasibility study of the technology, environment, society, finance, site, and transport in terms of the whole life cycle of the facility. The CGA head devises a master plan considering the urban management plan, the project's environmental impacts, and the relevant laws.
	Basic design	The CGA head assigns an adequate period and cost to the basic design to prevent flaws from occurring in the construction process. Basic design generally must be approved by the PB Minister before proceeding with the execution design.
	Execution design	The CGA head should reflect the results of the environmental-impact assessment, traffic impact assessment, and consultation with municipalities; examine the experts' design details once or more times; request the Public Procurement Service administrator to examine the adequacy of the unit prices proposed in the execution design; and consult with the PB Minister on the project scale, total project cost, and project period.
	Order placing and agreement	The PB Minister notifies the CGA head and the PPS administrator of the adjusted total project cost. If there is a difference between the budgeted total project cost and the actual contract price, the CGA head should request that the total project cost be changed.
	Construction	If deemed necessary, the CGA head may consult with the PB Minister to adjust the construction cost, compensation cost, and supplementary facility cost according to the total-project-cost adjustment criteria (Management Guidelines, Article 51-87).

Source: MPB, Total-Project-Cost Management Guidelines, 2006

7.2.2 Evaluation system by project stage

a. Planning-evaluating plan feasibility

Based on such legal and system grounds, South Korea operates an SOC implementation evaluation system according to stages. In the planning stage, in which the Comprehensive Key National Transport Network Plan and the Midterm Transportation Facility Investment Plan are devised, a feasibility study of the SOC Investment Project Plan is conducted before a long-term plan is devised. The feasibility study of the plan is stipulated in Article 17 of the National Integrated Transportation System Efficiency Act. The act requires a feasibility study of the plural public transportation facility development projects included in the formulation of the Key National Transport Network Plan or the Midterm Transportation Facility Investment Plan. The feasibility study of the plan is conducted according to the comprehensive evaluation procedure stipulated in MLTM's Transportation Facility Investment Evaluation Guidelines, as follows:

- Set national transportation policy goals
- Allocate appropriate investment finance among transport modest
- Prioritize investment within the modes of transport
- Assess competition relation
- Review policy considerations
- Determine final priority

b. Budgeting-preliminary feasibility study

In the budgeting stage, a transportation investment project is evaluated through a preliminary feasibility study. This procedure was adopted by the Kim Dae-jung administration, which was launched in 1998 with the task of overcoming the national economic crisis, in an effort to reform the public sector. The government established Article 9-2 of the Enforcement Decree of the Budget Account Act in April 1999 to adopt the preliminary feasibility study system, which applies to any public construction project with a total cost exceeding KRW 50 billion. The procedure aims to increase fairness and transparency in determining large-scale public-investment projects on a priority basis to prevent budget waste and to enhance financial efficiency. To secure the objectivity of the preliminary feasibility study, the preliminary feasibility study standard guidelines for road and railroad projects should apply.

The preliminary feasibility study is a draft study of large-scale development projects that analyzes their economic and policy feasibility and verifies their investment priority, adequate investment time, and financing methods, in an effort to ensure that large projects are embarked on based on solid grounds and that the projects shall be financially productive.

The study targets projects with an estimated total cost of over KRW 50 billion each (for municipalities' projects, a state-supported amount of over KRW 30 billion). It is the central-agency head who requests that the PB Minister conduct the study.

The most important step of the preliminary feasibility study is the economic feasibility analysis, but policy analysis and comprehensive evaluation are also conducted. For the steps of the economic feasibility study, there is demands-and-benefits estimation, economic and financial feasibility study based on cost-benefit analyses, and sensitivity analysis. The cost-benefit analysis method is used to calculate the project's demands and benefits as well as its costs, including the total project costs and the maintenance costs. And if the benefit vs. cost ratio is greater than 1, the project is considered feasible.

Unlike the economic feasibility analysis, the policy feasibility analysis evaluates other considerations of the project and the project's social benefits or costs, which cannot be quantified. The policy feasibility analysis items are classified into common basic evaluation items and special evaluation items about the project's special characteristics and background. The basic items deal with general considerations and general items applied to all projects. They include undeveloped region for balanced regional development, regional economic-ripple effects, consistency with the relevant plans and policies, project imperativeness and preference, financing possibility, and environmental assessment. These and other factors are shown in <Table 3-13>.

Table 3-13 | Categorization of Policy Analysis Items

Medium Category	Detailed Category
Balanced regional development	· Undeveloped region · Regional economic-ripple effects · Additional evaluation items (optional)
Policy consistency and project imperativeness	· Consistency with relevant plans and policies · Project imperativeness and preference · Additional evaluation items (optional)
Project risk factors	· Financing possibility · Environmental feasibility · Additional evaluation items (optional)

Special project characteristics· Additional evaluation items (optional)

Balanced regional development under the medium category includes regional backwardness, regional economic-ripple effects, and additional relevant items. Policy consistency and project imperativeness include consistency with relevant plans and policies, project imperativeness and preference, and additional relevant items. The project

risk factors include financing possibility, environmental feasibility, and additional relevant items. Lastly, the special characteristics of the project include all other items.

The last step of the preliminary feasibility study puts together the economic and policy feasibility analysis results to finally assess the feasibility of the project. Towards that end, the analytic hierarchy process (AHP), a multi-criteria analysis methodology, is applied. AHP supports the evaluation of multiple decision-making goals and evaluation criteria, and of the different preference-based alternatives to individual evaluation criteria. AHP has been widely used in multi-criteria decision making since being developed by Thomas Saaty in the early 1970s. It clusters homogenous evaluation items that are necessary for decision making, organizes such items into multiple levels of a hierarchy, and analyzes and sorts them together by level, thus supporting the process of reaching the final decision. AHP performs the procedure shown below.

1. Conceptualize project
2. Determine evaluation criteria and structuring the hierarchy
3. Weigh evaluation criteria
4. Score alternative preferences
5. Synthesizing t-scores
6. Give feedback
7. Conclusions

From 1999 to 2005, a total of 224 projects were subjected to a preliminary feasibility study, and 70% of such projects belonged to the transportation facility category. Only 55% of the proposed projects were considered feasible and were thus financed.

c. Execution-feasibility study, etc.

In the execution stage, the need for conducting a feasibility study and the total project cost are evaluated. The feasibility study is stipulated in Article 57 of the Enforcement Decree of the Construction Technology Management Act, which requires the order placement agency to conduct a feasibility study of the project. However , if a construction project, however, has a total estimated cost less than KRW 50 billion and the order placement agency does not consider the feasibility study necessary given the characteristics of the project, a feasibility study can be waived. Likewise, the order placement agency is required to provide a warranty for the estimated construction costs as well as a construction cost increase ceiling to maintain the feasibility of the construction project.

This procedure aims to require the order placement agency-according to Article 57, section 2 of the Enforcement Decree of the Construction Technology Management Act-to evaluate the entire construction project process, from installation to removal in terms of the technology used as well as the environment, society, finance, site, and transport to enhance the financial efficiency of the project. Thus, the feasibility study aims to determine

if the investment in the construction and expansion of public transportation facilities is rational and objective. The order placement agency is required to conduct a feasibility study according to Article 57, section 2 of the said act. To ensure the objectivity of the feasibility study, which is performed mainly in the basic design stage, it should be conducted based on the Transportation facility Investment Evaluation Guidelines. The study should include the following details:

- Evaluation summary;
- Project overview (project outline and location map or situation diagram);
- History of Progress;
- Analysis of socioeconomic indices and other data;
- Economic feasibility analysis;
- Comprehensive analysis;
- Financial feasibility analysis (if deemed necessary); and
- Feasibility study results and recommendation.

Moreover, another feasibility study should be conducted if there is an unpredicted fall in the traffic demand (by over 30%) or an increase in cost (by over 20%). With regard to the preliminary feasibility study and the feasibility study, the guidelines for total project costs stipulate that large-scale public investment projects, which take a long time to execute from conceptualization to completion, have to be closely managed to effectively cope with a change in demand according to the project stage, increase the financial-investment efficiency and to prevent budgetary waste.

As such, the country's SOC projects undergo several stages of evaluation and feedback, such as a preliminary feasibility study, a feasibility study, resurvey of the demand forecasts, and feasibility restudy, thus verifying their feasibility and adequacy and enhancing efficiency in transportation investment.

7.3 Transportation Infrastructure Investment Evaluation Policy

Economic feasibility is the most essential index in determining the feasibility of transportation projects. It is determined mainly through the cost-benefit analysis method. The benefits are determined by structuring a demand for transportation forecasting model and calculating the benefits by item. The evaluator's subjective views, however, have a great impact on the application of the basic units for the calculation of the benefits or discount ratios for the economic feasibility analysis, thus causing errors.

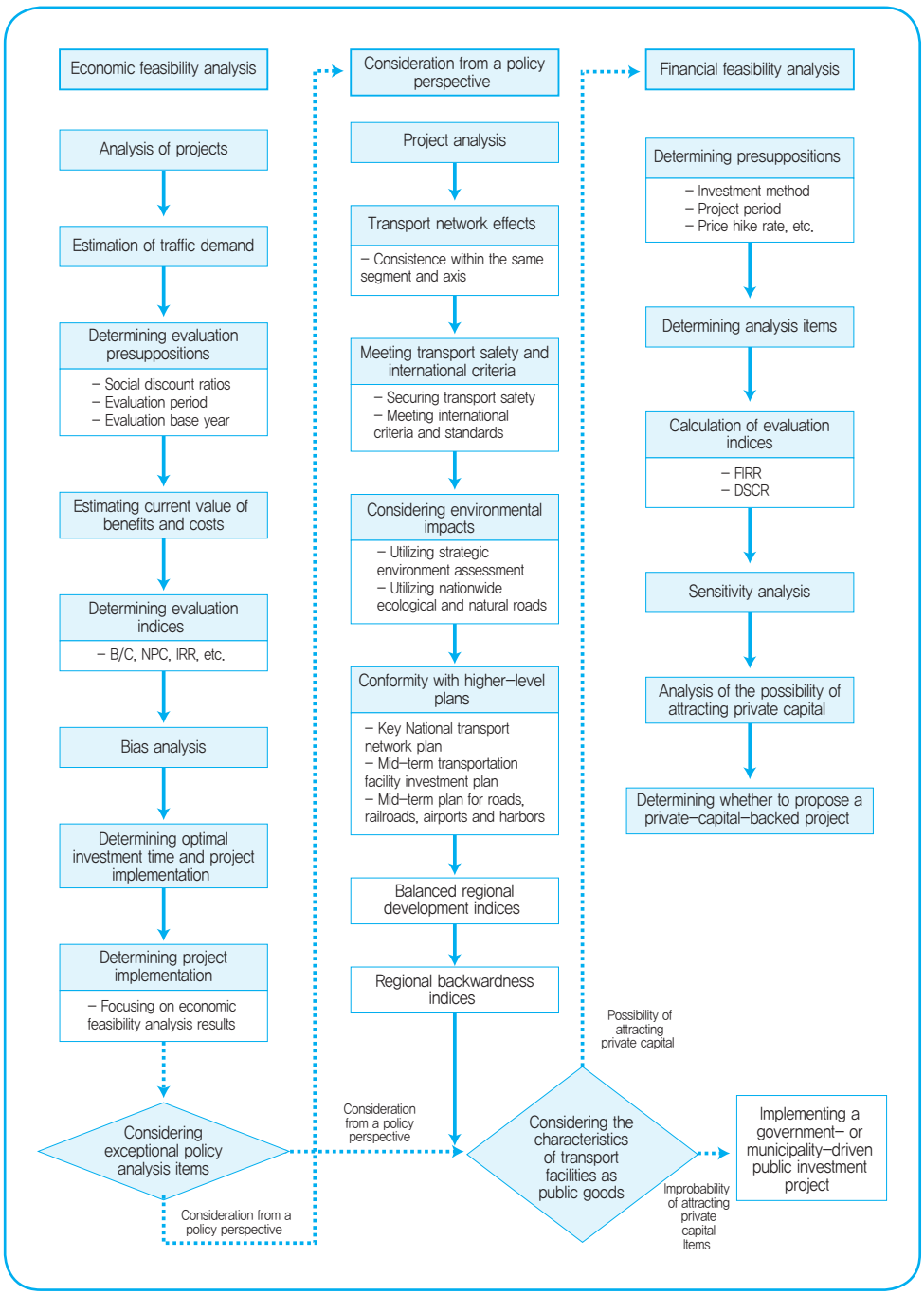
To address this problem, the government, under the relevant law, stipulates that the same analysis method and basic units be used in the evaluation of the economic feasibility of all transportation investment projects. Moreover, the Transportation Facility Investment

Evaluation Guidelines have been drafted and distributed. In evaluating the economic, financial, and comprehensive feasibility of transportation facility development projects according to Article 18 of the National Integrated Transportation System Efficiency Act, the aforementioned guidelines define the estimation process for the traffic demand, costs, and benefits as well as the investment evaluation items, evaluation criteria, and evaluation methods, so as to determine the investment feasibility, investment priority, and investment allocation to increase the efficiency of the investment. The said guidelines were revised for the third time in 2009 and are now being revised for the fourth time. The guidelines include the following details:

- Targets of the investment evaluation, and the evaluation system to be used;
- Phased project evaluation methods and procedures under a midterm plan;
- Traffic demand forecast methods and procedures;
- Cost-benefit estimation items and methods;
- Economic-feasibility analysis method;
- Comprehensive evaluation method, including the evaluation of the investment priority;
- Financial-feasibility analysis method; and
- Other relevant matters.

The investment evaluation guidelines apply to public transportation facility development projects with a total cost of over KRW 30 billion, with an exception provided. The project investment evaluation procedure is shown in the following diagram.

Figure 3-2 | Project Investment Evaluation Procedure.



Chapter 4

Outcomes and Conclusions

1. Outcomes

2. Conclusions and Recommendations

Outcomes and Conclusions

1. Outcomes

1.1 Increased Investments in Roadway and Railroad

Significant efforts were made in the second half of the 1960s and thereafter to expand roads because of the importance of transportation and logistics in the country's economic development. The five-year socioeconomic development plans, which begun in the 1960s, dealt with roads and railroads as essential areas, and a special account was established in the 1990s to secure stable funding sources needed for the transportation sector. These measures contributed to the continued growth of road and railroad facility investments and were pivotal for advancing South Korea's SOC to the level of advanced countries. The results of investment in transportation since the 1960s are examined as follows.

1.1.1 Before 2000

With the rapid economic growth achieved thanks to the national socioeconomic development plan begun in 1962, the role of the road and railroad transportation sector strengthened. As discussed above, transportation sector development was implemented as part of a socioeconomic development scheme.

For the road category, full-fledged investment began in the second half of the 1960s, when the 2nd Socioeconomic Development Plan was enforced. The road investment budget increased from KRW 6.1 billion in the of the first-plan to KRW 114.7 billion in the second-plan period, which represented over 1% of the country's GDP. From then until the 2000s, investment continued to rise until the sixth-plan period, when over KRW 10 trillion was invested in the road category. For the railroad category, the investment has also continued to grow since the 1960s, albeit at a lower rate than the road category. In the 1st Socioeconomic Development Plan period during the first half of the 1960s, more investments were made

in railroads than in roads, though the share reversed for the second-plan period with significantly more investment in roads than railroads.

In the 3rd Five-Year Socioeconomic Development Plan period, greater investment ratios were allotted for the construction of expressways and harbors. In the 4th and 5th Socioeconomic Development Plan periods, the share of investment for railroads, roads, and harbors were reduced to finance the construction of subways.

In the late 1980s, as part of the 6th Five-Year Socioeconomic Development Plan, road investment swelled, while the investment for other transportation facilities shrank. Moreover, the percentage of the GDP for transportation facility investment fell to under 2%. In the seventh-plan period (1992-1996), railroad investment sharply rose, increasing to 0.45% of the GDP. Investment in road, railroad, subway, airport, and harbor facilities greatly increased during the eighth-plan period from 1997, with investment in roads and railroads accounting for 2.64% of the GDP.

Table 4-1 | Transportation Facility Investment Percentages of the GDP

(Unit: KRW 100 million (current price), %)

Socioeconomic Development Plan Period	GDP	Transportation Facilities					Total
		Roads	Railroads	Subways	Airports	Harbors	
1st (1962-1966)	33,753	61 (0.18)	215 (0.64)	-	26 (0.07)	52 (0.16)	355 (1.05)
2nd (1967-1971)	106,901	1,147 (1.07)	634 (0.59)	83 (0.08)	76 (0.07)	267 (0.25)	2,207 (2.06)
3rd (1972-1976)	413,723	4,674 (1.13)	2,669 (0.65)	248 (0.06)	189 (0.05)	1,284 (0.31)	9,064 (2.19)
4th (1977-1981)	1,583,855	16,302 (1.03)	7,434 (0.47)	5,532 (0.35)	1,469 (0.09)	3,451 (0.22)	34,188 (2.16)
5th (1982-1986)	3,674,664	37,191 (1.01)	9,647 (0.26)	24,379 (0.66)	2,223 (0.06)	6,186 (0.17)	79,626 (2.17)
6th (1987-1991)	7,868,142	115,225 (1.46)	14,620 (0.19)	789 (0.01)	2,538 (0.03)	11,538 (0.15)	144,710 (1.84)
7th (1992-1996)	16,424,035	189,693 (1.15)	73,162 (0.45)	30,523 (0.19)	13,944 (0.08)	20,655 (0.13)	327,977 (2.00)
8th (1997-2000)	24,368,166	526,943 (2.16)	117,890 (0.48)	86,276 (0.35)	36,161 (0.15)	48,373 (0.20)	815,643 (3.35)

Source: Ha, Heon-gu and Kim, Cheon-gon, 2000

Note: Railroads include high-speed rail investments and the metropolitan transport accounts (from 1998).

1.1.2 After 2000

Transportation facility investment as measured by percentage of the GDP shrank after the 2000s in comparison with figures prior to the 2000s, though the economy continued to expand in scale. Nonetheless, the budget for roads and railroads continued to rise until the second half of the 2000s. To overcome the global financial crisis, the total transport special account was increased from KRW 13.9 trillion in 2008 to KRW 17.1 trillion in 2009.

The road budget continued to increase, from KRW 7.5 trillion in 2000 to KRW 8.1 trillion in 2002 and KRW 8.4 trillion in 2003, though the budget somewhat declined in 2004-2007. To overcome the effects of the global financial crisis, the road budget was increased in 2008 and 2009 and reverted to pre-2008 levels in 2010, when it stood at KRW 7.7 trillion or 52.1% of the total transportation budget.

The railroad budget continued to rise to KRW 2.7 trillion in 2000, KRW 3.2 trillion in 2002, and KRW 3.5 trillion in 2003 until it somewhat declined in 2004-2007. Following the national transportation policy goals of climate change response and low-carbon, green growth, however, railroad investment have been increasing since 2008, unlike the road category. Increased railroad investment will continue in the future. As of 2010, the railroad sector accounted for 24.1% of the total transportation, and 32.9% if including the urban railroad category.

Table 4-2 | Transportation Facility Investment Trend after 2000

(Unit: KRW 100 million)

Category		2002	2003	2004	2005	2006	2007	2008	2009	2010
Total transport special account (transport tax revenue)		132,558 (76,515)	143,703 (85,818)	135,529 (91,940)	130,587 (105,327)	125,953 (89,054)	129,027 (89,827)	139,424 (79,259)	170,780 (90,428)	146,999 (92,663)
Road account	Size	80,976	84,363	78,950	69,164	64,828	66,641	73,354	90,684	76,630
	%	61.1%	58.7%	58.3%	53.0%	51.5%	51.6%	52.6%	53.1%	52.1%
	Transport tax	50,118	56,237	60,221	51,589	48,979	47,877	42,800	48,379	49,111
Railroad account	Size %	32,962	35,870	31,744	21,537	20,276	20,459	23,946	33,303	35,395
		24.9%	25.0%	23.4%	16.5%	16.1%	15.9%	17.2%	19.5%	24.1%
	Transport tax	18,364	20,091	21,514	17,837	13,358	13,141	11,889	14,920	22,239
Urban railroad account (public transport from 2006)	Size %	(8,474)	(7,399)	(8,966)	13,312	13,874	13,487	14,665	17,416	12,925
		6.4%	5.1%	6.6%	10.2%	11.0%	10.5%	10.5%	10.2%	8.8%
	Transport tax	Included in the railroad account (budget was separated from 2005)			12,655	8,015	8,983	7,926	9,043	9,266

Source: MLTM, Major Statistics on the National Transport, 2011

1.2 Increased Roadway and Railroad Facilities

Extensive efforts in terms of legislation and financing were poured into roads and railroads to bring about significant development in these areas. This helped foster the strength of the South Korean economy. Notably, road and railroad facilities greatly expanded after 2000 thanks to the efforts exerted since the 1980s. As shown in <Table IV-3>, the total road length doubled from 1990 (56,715 km) to 2010 (105,565 km). Notably, the total expressway length more than doubled from 1990 (1,551 km) to 2010 (3,859 km). The total expressway length increased 1.8 times from the 2000s to the 2010s.

As for railroads, there was a greater focus on straight-line and double tracks rather than increasing the total length. However, the length of double tracks increased by more than 1.7 times from just 847 km in 1990 to 2,301 km in 2010. Notably, after the opening of high-speed rails in 2004, 368.5 km of high-speed rail tracks had been laid by 2010, helping significantly reduce travel time. In this section, the transportation facility expansion efforts focused on roads and railroads before and after 2000 are discussed.

Table 4-3 | Trends in Road and Railroad Transportation Facility Expansion

Category		1990	2000 (A)	2010 (C)	C/A
Road	Total length (km)	56,715	88,775	105,565	1.19
	Express-national-road length (km)	1,551	2,131	3,859	1.81
Rail-road	Total length (km)	3,091	3,516	4,094	1.16
	Double-track length (km)	847	1,332	2,301	1.73
	High-speed-rail length (km)	-	-	368.5	-

Source: MLTM, Major Statistics on the National Transport, 2011

1.2.1 Before 2000

a. Roads

The total length of roads in South Korea in 1936 was 24,283 km, and there was relatively little growth until 1960, at which point there were 27,169 km of roads. With the full-fledged socioeconomic development plans that marked the country after the 1960s, the length of roads totaled 40,244 km. The length increased to 88,775 km by 2000 as road construction continued. While only 9.6% had been paved in 1970, the figure sharply rose in the 1980s and 1990s and increased to 75.8% in 2000. From 1970 to 2000, the total expressway length quadruples from 551 km in 1970 to 2,131 km in 2000, the highest increase in the road category. The striking increase can be ascribed to intensified road investment since 1960.

Table 4-4 | Road Length Trends by Class

(Unit: km, %)

Category (Year)	Road Length by Class					Total (Overall)		
	Express National Roads	General National Roads	Special- and Metropolitan-City Roads	Local Roads	City, County Roads	Length	Paved Length	Paving Ratio
1936		6,075		10,308	7,902	24,284	538	2.2
1940		6,111		10,669	7,932	24,711	613	2.5
1950		5,213		10,131	10,339	25,683	649	2.5
1960		5,706		10,579	10,884	27,169	1,005	3.7
1970	551	8,122	5,476	10,880	15,216	40,244	3,864	9.6
1980	1,225	8,232	7,939	11,021	18,535	46,951	15,599	33.2
1990	1,551	12,161	12,299	10,672	20,033	56,715	40,545	71.5
2000	2,131	12,413	17,839	17,151	39,240	88,775	67,266	75.8

Source: After 1960, each province; 1961-1966: Construction Annals; before 1960, Public land Construction Annals (1960)

b. Railroads

While the provincial road facilities were greatly expanded in the decades after the 1960s, the total railroad length nearly stagnated because efforts were focused on the construction of straight-line and double tracks as well as electrification. The country's total railroad length was 3,193 km in 1970 and 3,123 km in 2000 due to the efforts to straighten the railroad lines. However, the total double-track length, which amounted to 512 km in 1970, doubled over the next 40 years and reached 938.6 km in 2000.

Table 4-5 | Railroad Facilities by Year

(Unit :km)

Year	Total Railroad Length	Single-Track	Double-Track	Narrow-Gauge Railroads
1970	3,193.2	2,556.0	511.8	125.4
1980	3,134.6	2,415.0	719.6	47.0
1985	3,120.6	2,310.0	763.6	46.9
1990	3,091.3	2,198.2	846.8	46.3
1995	3,101.2	2,199.0	882.0	20.2
2000	3,123.0	2,184.4	938.6	20.2

Source: Korea LBS Society, Improvement Measures for SOC Investment Financing, and Their Execution System, 2004

1.2.2 After 2000

a. Roads

Expansion of road facilities also continued after 2000. The total road length increased from 91,396 km in 2001 to 105,565 km in 2010. Notably, the total length of express national roads increased from 2,636 km in 2001 to 3,859 km in 2010. The road-paving ratio increased from 76.7% in 2000 to 79.8% in 2010.

Table 4-6 | Road Length Trends by Year

(Unit: km, %)

Category (Year)	Road Length by Class					Total (Overall)		
	Express National Roads	General National Roads	Special-, Metropolitan-City Roads	Local Roads	City, County Roads	Total Length	Paved Length	Paving Ratio
2001	2,636	14,253	17,809	15,704	40,992	91,396	70,145	76.7
2005	2,968	14,224	17,506	17,709	49,885	102,293	78,587	76.8
2006	3,102	14,224	17,738	17,677	49,318	102,060	79,191	77.6
2007	3,367	13,831	18,109	18,174	49,535	103,018	80,642	78.3
2008	3,447	13,905	18,516	18,192	50,174	104,236	81,829	78.5
2009	3,775	13,819	18,749	18,137	50,500	104,983	83,196	79.2
2010	3,859	13,812	18,878	18,180	50,835	105,565	84,196	79.8

Source: MLTM, Road Work Handbook, 2011

b. Railroads

The total length of railroad tracks did not change greatly until 2004 with the opening of the first high-speed rail. Until that point, investment in transportation was focused on road construction and the electrification and double-tracking of railroads rather. Moreover, until the early 2000s, vast investments were exerted in the construction of urban railroads in efforts to address traffic congestion in urban areas, which led to an imbalance of railroad construction between regions. The total railroad length was 3,125.3 km in 2001, which was not much different from before 2000. After 2004, however, due to the opening of high-speed rails and metropolitan railroads, the railroad length was extended from 430 km to 3,557.3 km by 2010. The double-track-railroad length increased 760 km, from 1003.8 km in 2001 to 1,763 km in 2010.

Table 4-7 | Railroad Length Trends by Year

Category		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Rail-road (km)	Total	3,516	3,526.4	3,539.7	3,550.7	3,796.5	3,861.7	3,874.1	3,899.4	3,885.1	3,911.9	4,094.3
	High-speed	-	-	-	-	238.6	240.4	240.4	240.4	240.4	240.4	368.5
	General (metropolitan)	3,123	3,125.3	3,129.3	3,140.3	3,135.5	3,151.6	3,151.6 (123.8)	3,158.7 (123.8)	3,140.8 (123.8)	3,137.5 (126.2)	3,188.8 (536.9)
	Urban	393	401.1	410.4	410.4	422.4	469.7	482.1	500.3	503.9	534.0	537.0

Source: MLTM, Major Statistics on the National Transport, 2011

While the total length of railroad tracks did not increase much, the improvements from converting existing tracks to double tracks as well as electrification greatly increased the carrying capacity and overall service levels of railroads in South Korea. While only 39.8% of railroads were double tracks in 2001, the percentage increased to 56.2% by 2010, while the electrification ratio increased from 30.3% in 2001 to 65.63% in 2010.

Table 4-8 | Railroad Double-tracking and Electrification Ratios by Year

Category		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Double-tracking ratio (%)	Total	37.9	39.8	40.0	40.4	45.8	47.3	47.6	48.8	49.8	51.7	56.2
	High-speed	-	-	-	-	100	100	100	100	100	100	100
	General	29.9	31.9	31.9	32.5	34.3	35.4	36.0	36.8	38.8	39.7	43.7
	Urban	100	100	100	100	100	100	100	100	100	100	100
Electrification ratio (%)	Total	30.2	30.3	30.4	30.7	52.9	55.4	59.4	59.4	60.2	62.1	65.5
	High-speed	-	-	-	-	100	100	100	100	100	100	100
	General	21.4	21.4	21.4	21.7	43.0	45.2	50.1	49.9	50.7	52.7	55.8
	Urban	100	100	100	100	100	100	100	100	100	100	100

Source: MLTM, Major Statistics on the National Transport, 2011

1.3 Enhancement of Transportation Sector Competitiveness

Sustained expansion of the transportation sector has not only increased the carrying capacity of the transportation network but also contributed significantly to national economic development and competitiveness since the 1970s. Since 1980, however, rapid urbanization and the effects of traffic congestion in urban areas and worsening traffic problems have become important social issues. Surging cargo volumes in line with growing economic scale has also resulted in increased transport and logistical costs. These problems are inevitable in the process of economic development and will cause huge social costs if not effectively handled. South Korea has experienced rising traffic congestion costs and logistical costs since 1990 from an increase in it national economy, while the rate of cost increase has slowed down since the second half of 2000s. This is in part attributed to the efforts to cope with transport problems and strengthen the competitiveness of the transportation sector that have been taken since the second half of the 1990s through the midterm master plans involving legal and systematic improvements.

1.3.1 Changes in the Mode Split

Road category investment intensified beginning in the 1970s, which resulted in roads accounting for the highest modal share for domestic inter-region travel. In 2001, the inter-region modal split by category was 83% for roads and merely 14% for railroads. However, this ratio has been gradually changing since 2000. Since the 2004 launching of high speed rail, modal shares for roads for have diminished to 81.6% while the mode share for road increased to 15.4%. Though this increase is modest, it is meaningful given that the road carriage ratio had been continuously rising for multiple decades. Notably, with the environment and climate change emerging as international issues, the country set low

carbon and green growth as important goals of its transportation policy, which also explain the significance of the decrease in road modal share. This change, as discussed earlier, is attributed to efforts to intensify rail investment since the 2000s.

According to the second revised Key National Transport Network Plan, which was devised in early 2011, the projected inter-region modal share has proposed that the modal share for railroads will increase to 27% by 2020. Rising oil costs and ever increasing international pressure for climate change adaptation and low carbon emissions will call for greater efforts to enhance the mode split for sustainable transport modes.

Table 4-9 | Inter-Region Mode Split by Category

(Unit: %, man.km, ton.km)

Category		2001	2002	2003	2004	2005	2006	2007	2008	2009
Domestic passenger	Road	83.02	83.21	82.65	81.59	82.22	82.24	81.68	81.35	81.77
	Railroad	13.61	13.51	14.00	15.37	15.05	15.03	15.65	15.91	15.38
	Aviation	3.19	3.10	3.16	2.83	2.54	2.54	2.47	2.50	2.66
	Sea	0.18	0.18	0.20	0.20	0.19	0.19	0.20	0.23	0.19

Source: KOTI, 2010 South Korean Transport DB Development Project, June 2011

Table 4-10 | Domestic Inter-Region Passenger Carriage Ratio Prospects by Category

Category		2008		2020	
		Traffic Demand	Ratio (%)	Traffic Demand	Ratio (%)
Million people-km/year	Road	205,750	81.4	184,875	69.3
	Railroad	40,243	15.9	72,745	27.3
	Aviation	6,335	2.5	8,472	3.2
	Sea	579	0.2	601	0.2
	Total	252,907	100.0	266,693	100.0

Source: MLTM, 2nd Revised Key National Transport Network Plan, 2011

1.3.2 Decreasing traffic congestion costs

Increased demand for transportation resulting from the expansion of large cities and the surging number of private automobiles caused traffic congestion in urban areas. Despite the continued expansion of road and railroad transportation facilities, these efforts have not been successful in coping with the ever-increasing traffic demand. These transport problems increased social costs, such as traffic congestion costs, which have risen sharply since the early 1990s, at an annual rate of 18.0% from 1991 to 1999. South Korea realized that simple transportation facility expansion could not resolve its transport woes; since the second half of the 1990s, it exerted diverse efforts to maximize the effects of its transportation facility investment by considering the various transport modes in a comprehensive fashion. As discussed earlier, such efforts included the state-level formulation of mid- and long-term master plans such as the Key National Transport Network Plan and the Midterm Transportation Facility Investment Plan, and other measures for the development of related technologies and policies. As a result, traffic congestion costs fell 4.1% annually from 2000 to 2008. For expressways, the average rate of annual increase in congestion costs fell from 33.9% (1991-1999) to 3.5% (2000-2008). The average rate of annual increase in annual congestion costs for general national roads fell from 15.3% (1991-1999) to -0.1% (2000-2008), thereby falling to one-tenth from the second half of the 1900s. Given the limited transport budget, efficient investment is an important policy goal, and insightful transport policies prepared for prospective changes to transport circumstances should be implemented.

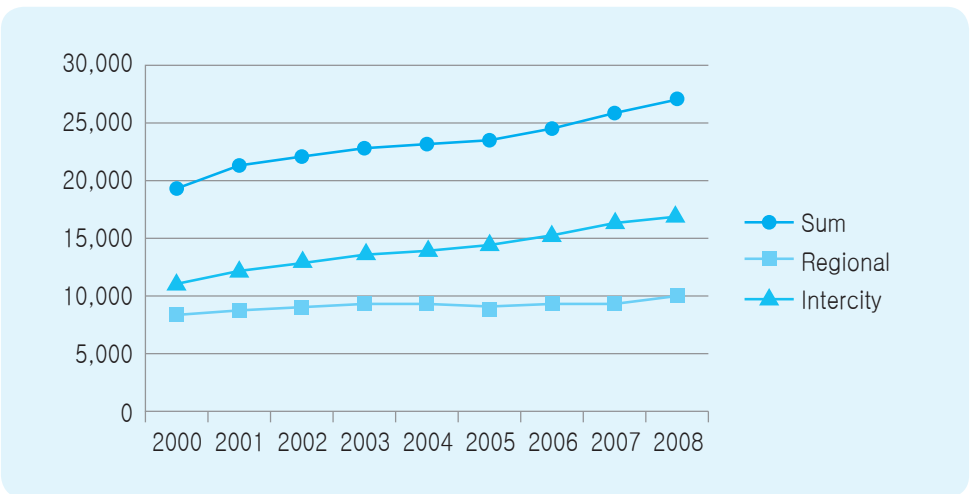
Table 4-11 | Traffic Congestion Cost Trends

(Unit: KRW billion, %)

Category		Inter-Region Roads				Urban Roads[1]	Total
		Express National Roads	General National Roads	Local Roads	Total		
1991		260	1,231	167	1,658	2,906	4,564
1999		2,693	3,857	1,086	7,635	9,478	17,113
2000		2,151	5,138	1,010	8,299	11,149	19,448
2001		1,985	5,607	1,197	8,789	12,321	21,110
2005		2,279	5,126	1,728	9,134	14,564	23,698
2006		2,413	4,920	1,847	9,180	15,441	24,621
2007		2,675	4,932	1,767	9,373	16,489	25,862
2008		2,831	5,097	1,953	9,881	17,022	26,903
Yearly increase ratio	1991-2008	15.1	8.7	15.6	11.1	11.0	11.0
	1991-1999	33.9	15.3	26.3	21.0	15.9	18.0
	2000-2008	3.5	-0.1	8.6	2.2	5.4	4.1

Source: MLTM, Major Statistics on the National Transport, 2011

Note: 1) Special-city roads, metropolitan-city roads, and city roads



1.3.3 Decreased rate for logistical costs

The national logistical costs are defined as the total costs of national resources used for transport, storage, warehousing, handling, packaging, logistical information, and general administration. National logistical costs simultaneously imply the size of a country's logistics industry and costs for logistic activities. Thus, the logistical costs consist of the transport cost, maintenance cost, packaging cost, logistical information cost, and general administrative cost. Of the total logistical cost, the transport cost ratio has been continuously increasing. This ratio rose from 58.9% in 1991 to 70.4% in 2008. It is important to effectively reduce the transport costs in order to reduce overall logistical costs, which are key factors to national competitiveness.

The total logistical costs continue alongside the country's economic development, though the rate of increase has been gradually diminishing since the 1990s. The transport cost rose to 14.4% annually in 1991-1999, while it fell to 7.76% annually in 2000-2008. This reduced rate of increase for logistical costs is attributed to the fact that the country has striven to formulate a key national transportation network plan, strengthen the connectivity between transport modes, and continue expansion of transport and logistical facilities, such as airports and harbors, since the 1990s.

Given that the integration of global transport and logistics markets will only accelerate and the logistical cost will progressively account for a greater percentage of the GDP, reducing transport costs through the development of efficient transportation systems is an essential policy goal.

Table 4-12 | Logistical-Cost Trends

(Unit: KRW billion, %)

Category		Total	Transport Cost	Maintenance Cost	Packaging Cost	Handling Cost	Logistical-Information Cost	General Administrative Cost
1991		31,989	18,857	9,147	865	642	1,180	1,298
1999		78,892	55,178	14,300	1,721	1,055	3,340	3,298
2000		77,119	49,909	19,803	1,644	1,144	2,359	2,260
2001		80,792	55,016	18,353	1,741	1,140	2,297	2,245
2005		101,019	76,957	16,889	2,063	1,809	1,621	1,680
2006		106,193	80,398	18,085	2,123	1,974	1,774	1,840
2007		117,112	88,127	21,318	2,278	1,991	1,668	1,730
2008		128,304	90,315	29,059	2,423	2,519	1,958	2,031
Average annual rate of increase	1991-2008	8.5	9.7	7.0	6.2	8.4	3.0	2.7
	1991-1999	11.9	14.4	5.7	9.0	6.4	13.9	12.4
	2000-2008	6.6	7.7	4.9	5.0	10.4	-2.3	-1.3

Source: MLTM, Major Statistics on the National Transport, 2011

Note: The transport costs do not include the international cargo transport costs.

2. Conclusions and Recommendations

Since first opening the Gyeongbu Expressway in 1968, South Korea has successfully developed advanced surface transport infrastructure involving roads and railroads in only forty years. This remarkable transportation system development contributed greatly to the country's economic growth by expanding the passenger and cargo carrying capacities of the nation's transportation facilities. Such drastic transport infrastructure development is attributed to efforts to develop a comprehensive transportation system closely integrating all modes of transport. For transport development, the fundamental transportation plan, known as the Twenty-Year Key National Transport Network Plan, and its execution and five-year plans were formulated. To achieve the goals and strategies stipulated in these plans, master transport development plans for roads and railroads are devised, upon which the implementation of investment in transportation is based. The implementations of transportation investment projects, whose plans are systematically formulated, enable various transport modes to complement one another and more efficient investment in the country's transportation facilities.

To promote synergistic multimodal transportation systems, backing from the relevant organizations, laws, systems, and financing are essential. The domestic transport infrastructure sector exerted diverse efforts beginning in the 1980s to achieve these goals, thus creating solid foundations for the development of a comprehensive transportation system with connectivity between the country's transport modes.

This study aimed to determine the successful projects and policies involving roads and railroads so as to provide references for the future implementation of transport policies. Towards this end, the study focused on presenting examples of successful laws, systems, organizations, financing, and plan implementations with regard to the expansion of the country's transportation facilities.

To determine the background of the country's SOC implementation, changes in South Korea's country's historical context and various categories of transport were examined. For the historical context, the times before and after the 1960s, when full-fledged development of the country's transport was catalyzed, were examined. For the circumstances prior to the 1960s, transport circumstances during the Japanese colonial rule and after Korea's liberation were discussed. For the circumstances after the 1960s, the historical changes related to the country's economic size, industrial-complex locations, urbanization, and transport policies were examined. For the circumstantial changes by category of transport, changes in road- and rail-related policies and subsequent facility investments were examined. For the road category, the construction of the country's most important road route, the Gyeongbu Expressway, was closely examined. Moreover, as the country's transport infrastructure played a key role in its economic development, an in-depth examination of the role of transport infrastructure in South Korea's socioeconomic development plans and national comprehensive development plans was conducted. To evaluate how the development of the transport was carried out in the country, the administrative systems, laws, and financing systems related to roads and railroads were also presented.

The success factors driving the drastic development of roads and railroads were determined. For the success of the transport development, various factors should be closely harmonized, including the related organizations, laws, systems, and financing. Seven success factors were determined, and their backgrounds and achievements were examined. First, in terms of organizations, the establishment of KEC and railroad companies was examined. In terms of legislation, the Transportation System Efficiency Act, the Urban Transport Improvement Promotion Act, and the Special Act on Large-City and Metropolitan Transport Management were assessed, and their role in the development of a road and railroad SOC was analyzed. In terms of plans, the roles and contents of the Twenty-Year Key National Transport Network Plan and its execution plan, the Five-Year Midterm Transportation facility Investment Plan, were presented. Moreover, the basic road improvement plans-the Midterm Plan for Roads and Railroads and the National Railroad Network Development Plan-were examined. To efficiently expand transportation facilities, the supply of transport infrastructure should be timely developed, which further underscores the importance of

securing stable investment finance. To secure the needed finance, South Korea established a transportation facility special account in the 1990s, which it has been successfully running since then. In this study, the transportation facility special account was determined to be a success factor in terms of finance, and was thus discussed in further detail. Lastly, diverse technologies were developed and diverse policies were implemented to efficiently pursue SOC development. This study determined and examined three success factors in this regard including the following: the development and operation of the South Korean Transport DB, the development and operation of the investment project efficiency evaluation system, and the formulation of guidelines for transportation facility investment evaluation.

Acknowledging that infrastructure development is essential to national competitiveness, South Korea has exerted extensive efforts since 1960 to construct advanced transport infrastructure matching the level of developed nations in terms of both quantity and quality. In this study, South Korea's transport infrastructure achievements from the 1960s to the present were assessed. In terms of investment, the budget allocated for road and railroad development rose stably after the 1970s and enabled the continued expansion of the provincial road and railroad facilities. Beginning in the 1970s, for the road category, efforts were focused on expanding key national roads, resulting in a drastic increase in the total length of express national roads and key national roads. For the railroad category, urban railroads were constructed to relieve urban traffic congestion, while efforts to double-track, electrify, and straighten railroad routes improved the quality of the country's railroads. Lastly, in the increase in social costs (e.g., traffic congestion costs, logistical costs) in the transportation sector has been decelerating in the 2000s.

Notably, the formulation of master plans also considers future circumstantial changes at the midterm time period. The peak oil theory, climate change response, and international political changes were already reflected in the formulation of the Key National Transport Network Plan, which made possible investment in transportations towards developing a low-carbon and green growth-oriented transportation system. The Key National Transport Network Plan states the following projected goals up to 2020 by reflecting the following predictions of the future: a 1.45-fold increase in the total length of express national roads from 2009 to 2020, a 1.47-fold increase in the total length of railroads in operation, and a threefold increase in the total length of high-speed rail.

Table 4-13 | Transportation facility Expansion Trends and Prospects

(Unit: km)

Category		2001 (A)	2005	2009 (B)	2015	2020 (C)	C/A	C/B
Road	Express-national-road length	2,637	2,968	3,776	4,290	5,470	2.07	1.45
Rail-road	Operating length	3,125	3,392	3,378	3,997	4,955	1.59	1.47
	High-speed-rail length	-	240.4	240.4	653.2	701.8	-	2.92

Source: MLTM, 2nd Revised Key National Transport Network Plan, 2011

In conclusion, the development of transport infrastructure such as roads and railroads takes a long time from planning to completion. Therefore, if a project is implemented without initial long-term insights, inefficiencies are bound to arise. Furthermore, as transport infrastructure projects are allotted massive budgets, to effectively execute such budgets, implementation feasibility studies should be conducted to verify the project feasibility by the implementation stage. To successfully develop South Korea's transport infrastructure, midterm master plans were formulated, and the country's transport policies were consistently implemented. Towards these ends, extensive efforts were exerted to improve existing related laws and systems, develop the related technologies, and raise the needed finance. It is hoped that this study will be a good reference for the transport projects that will be conducted in countries with environments similar to that of South Korea.

The country implemented diverse policies and measures in addition to the cases of measures introduced herein, which were formulated and implemented in line with political and economic situations from the 1970s to the 1990s. Compared with other countries, South Korea achieved fast economic growth and experienced various economic and political changes since the 1970s. Diverse laws, systems, and financing methods that were introduced at that time were formulated and implemented in line with such domestic circumstances. Thus, these measures and systems-if intended to be applied to other countries-should be reviewed in terms of the relevant country's politics, economy, geography and space, and the people's sentiment. Also, it should be noted that these Korean cases of measures were implemented in the past, so they should be revised and adjusted if they are to be applied in other countries.

Lastly, in recent years, carbon emission reduction, peak oil, and other energy and environmental issues have become global issues, so South Korea is also requested to change its paradigm of investment in transportation. The domestic transportation sector has added "the achievement of low carbon, green growth" and "realization of intermodalism" to its major policy tasks and it is preparing diverse measures to achieve such goals. These global

issues should be tackled not only by developing countries but also by developed countries. Hence, if developing countries formulate policies for efficient investment in transportation, they should consider these global issues and changes.

Figure 4-1 | Transport Network Plan (Road Network, 2011~2020)

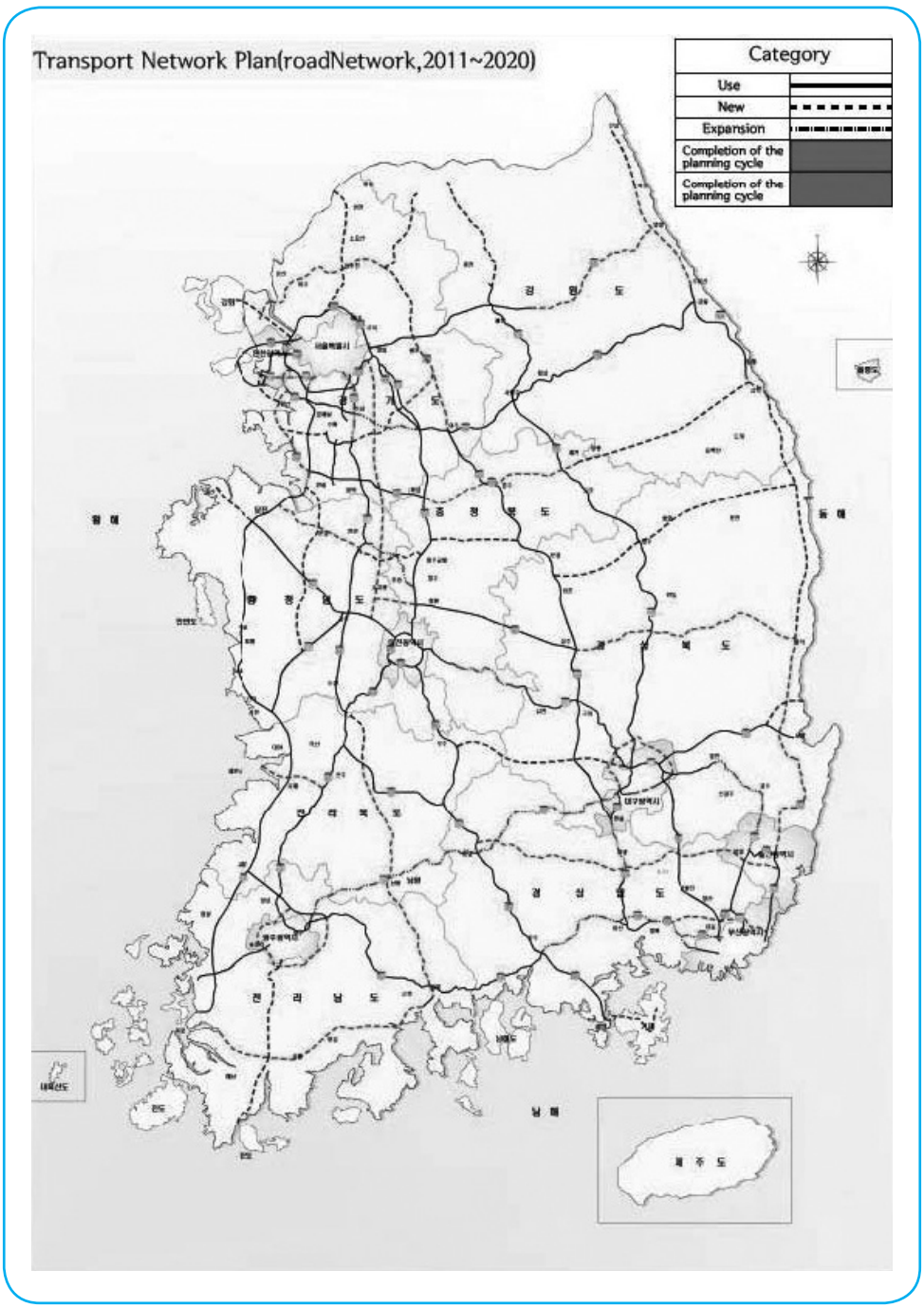
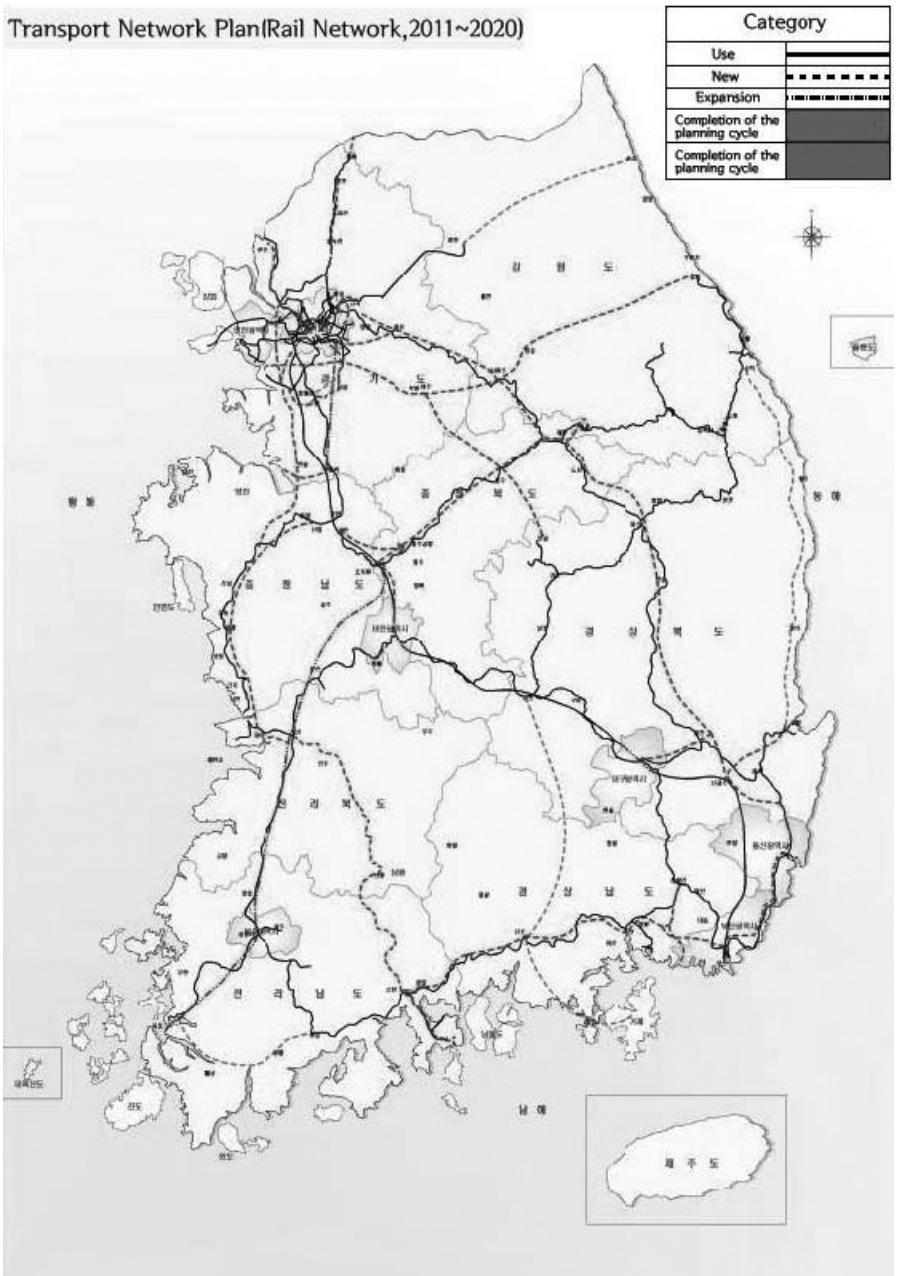


Figure 4-2 | Transport Network Plan (Rail Network, 2011~2020)



KOTI, A Study on the Long-Term Comprehensive Transportation Policy for the 2000s, 1989.
KOTI, A Study on the Policy and Measures for Urban Traffic Clearance, 1990.
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MLTM, MLTM, Railroad Work Handbook, each year.
National Assembly Budget Office, Inspection and Evaluation of the Execution of Major State Projects, each year.
National Assembly Budget Office, Evaluation of Public-Sector Projects, each year.
National Assembly Budget Office, Evaluation of Major Road Projects in the Transportation Sector, each year.
National Assembly Budget Office, Evaluation of Investment Projects for Large-City and Metropolitan Transport, each year.
National Assembly Budget Office, Evaluation of the Implementation System of Key National Transportation facility Development Projects, each year.

APPENDIX 1. Transport Development Process and Policy Recommendation

The Role of the Transport

In the 1950s, South Korea focused on the restoration and reconstruction of roads and railroads constructed by imperial Japan for the purpose of exploiting its colony Korea, which were damaged during the Korean War. In the 1960s, infrastructure construction began in line with the goal of industrialization. In the 1970s, economic revival was pushed as the first state policy, thus leading to the expansion of infrastructure facilities and the development of key road networks for regional development and cargo transport. In the 1980s, urban transport problems began to attract the attention of policymakers.

As the construction and expansion of transport facilitate human and material exchanges, which lead to and reinforce national economic development, transportation facility investments had a tremendous impact on the national economic development well before the 1980s. For example, despite the opposition met before and during the construction of Gyeongbu Expressway in the 1970s and subways in the 1980s, these two projects can be considered transport revolution.

Challenges of Transport Construction and Solutions

The Incheon Bridge construction project was first reviewed in 2000. An execution agreement was then signed with the British AMEC in June 2003, and the construction began in June 2005 and was completed in October 2009. This project was the first privately financed transportation to be controlled by a foreign company, which triggered many controversies over the selection of the project implementer. The implementer was finally determined through many meetings and consultations with the Ministry of Planning and Budget, the Ministry of Maritime and Fisheries Affairs, and the Ministry of Finance and Economy.

The Role of the Transport in the Five-Year Socioeconomic Development Plan and the Comprehensive Public land Development Plan

The Transport Plan-although a subdivision concept of the Socioeconomic Development Plan and the Comprehensive Public land Development Plan and undertakes derived demand-helped boost the national industrial competitiveness and economic growth through the construction of nationwide road and railroad networks. This achievement should be duly noted. Notably, the development of the key transportation network in line with the Comprehensive Public land Development Plan contributed greatly to the growth of the country's manufacturing industries and hub cities. Moreover, the transportation network played a role in regional development, the development of less-developed areas, and in the infrastructure function for economic growth. Although investment in transportation facilities such as railroads, roads,

airports, and harbors intensified until the 200os, connectivity between the transport modes was lacking. Since 2008, MLTM has been implementing projects involving the development of intermodal transportation systems. In the future, more efficient use of the national public land structure is expected and with seamless connection between transport and logistical flow, South Korea's transportation system will attain the transport functions of a developed country.

South Korea's Transport Development Strategy and Policy Recommendation

For transportation expansion, the national topographies, land sizes, spatial structures, etc. should be comprehensively considered. It is therefore very difficult to propose a standard development model. For transportation expansion, however, the following points should be considered:

Scientific demand forecasting for the target transportation axis will avert duplicate development between and within transport modes; Adequate connectivity should be secured considering the characteristics and strengths of the country's transport modes; and Avert falling into the "demand first, supply later" circulation logic of transportation facility demand and supply.

Source: An interview with the president, Korea Real Estate Research Institute, Kang Young-il

APPENDIX 2. Development Process of Transport and Policy Suggestions

Q1. Describe the situation in South Korea before the 1980s and what role did the then transport play in the country's economic development?

(A) The country needed an administration that would pave the way for national development. South Korea was liberated from imperial Japan in 1945. After its liberation, the government was still lacking in experience in running a modern country, but was able to overcome such difficulty with the support of United States Operations Mission (USOM).

However, President Park Chung-hee took power through a military coup in 1961, and materialized his development ambitions in the first five-year economic development plan thus creating a development framework. He considered developing the country into a world-class heavy chemical industry power, and as a part of that scheme, he constructed the Gyeongbu Expressway.

The USA continued to provide technical and financial support to South Korea through World Bank, whose aid peaked in the 1980s. In line with rapid urbanization after the 1970s, urban transport problems became serious, impacting national economic activities and national welfare, which required urgent countermeasures. In the second

half of 1970s, the World Bank expected South Korea to continue having urban transport problems, and thus advised the country to prepare against these difficulties. The project was carried out in 1978 in order to receive foreign borrowings including a research fund of USD 3 million.

The South Korean government wanted only foreign borrowings excluding research fund, but that arrangement, after all, boosted the country's research capabilities. KOTI, which was established in the process of implementing World Bank projects, has thus far played a big role as the country's transport think tank.

In the 1990s, as the country made remarkable economic developments, it no longer needed loans from the World Bank. In 1991, the country repaid all of its debts. At that time, the World Bank offered more borrowings to South Korea because the country has well repaid previous loans and reaped bigger results using the loans, and relevant foreign experts were sorry that they could not visit the country more often and drink soju.

Q2. What difficulties and episodes for overcoming them could you tell us regarding the implementation of large SOC construction projects such as the Gyeongbu Expressway?

(A) The Korean government asked KIST, the only think tank in 1978, to formulate a master plan for railroad network, sea transport, and aviation facilities. However, KIST had nearly no experience and experts in this field. Aside from few experts, there were no engineers who could interpret for foreign consulting groups. In 1966 when the World Bank's advisory group came to South Korea to plan the country's expressway, Gyeongin Expressway, an interpreter hired by the Construction and Transportation Ministry had a good command of English but did not know technical terms, so I helped him with this. A few days later, the interpreter did not show up and I was asked to interpret. My spoken English was poor, but I could communicate with the advisory group officials using technical terms, satisfying them like Koreans do not know the Chinese language but can communicate with Chinese using written Chinese characters.

Of five foreign consulting groups recommended by the World Bank, Barton Aschman, a Chicago-based transport research consulting group, and Urbitran run by Korean-American Dr. Lee Bum-jung, were selected to jointly conduct research. I, together with Dr. Hwang Yong-ju, the then director of KIST Regional Development Institute, finalized the ongoing mass cargo transportation system, and joined in and helped complete the project of formulating a plan for improving Seoul Transport. Afterwards, in 1986, our research team was launched into KOTI, and I was chosen to be the Vice President. I led the formulation of urban transportation plans for the five major cities including Busan, Daegu, Gwangju, and Daejeon, and I conducted several studies on the improvement of cargo transportation systems and public transportation systems as well. Research reports were submitted to the government. Some foreign technical team members were lacking in their abilities. Notably, the chief researcher

from the American company, accompanied by his three family members, planned to stay in South Korea for one year, but he lacked experience and leadership, thus he had to be sent home. His position was replaced by the company's Executive Vice President Mike Powils. Mr. Powils was attracted heavily by Korean culture and performed his research excellently.

Q3. At that time, what was the role of the government or the role of transport-related public corporations, authorities, and research institutes? How was their role division?

(A) It is crucial for the development of urban transport to expand roads and railroads and to systematically operate these facilities. However, at that time, the relevant authorities focused on expanding facilities, but took less interest in transport operation and were lacking in technical functions. This is true for today. Large cities including Seoul have no departments responsible for transportation plans, and even particular sections responsible for transport safety.

I emphasized that these technologies would greatly improve transport services without costing much by establishing transport operation functions. I began to undertake TSM designs with low costs. This development has probably regarded TSM as a low-cost measure, leading it to receive less attention and resulting in a lack of research and technical services in this area. Notably, TSM projects require cooperation with the police, which municipalities tend to avoid, preventing the development of the country's transport operation technology. As a result, huge national congestion costs are incurred, and South Korea is ranked the first in traffic accidents among OECD countries, a big setback for the country.

Logistics and financial businesses earn wealth faster than manufacturing businesses involving the construction of factories and the introduction of machines for the manufacture of products. Likewise, as software is not less important than hardware for electronics engineering, software including planning and operation is not less important than facilities for transportation systems. Therefore, transport does more than having more automobiles and passing vehicles faster, and it should be regarded as a service essential for pursuing the people's happiness. To that end, the government should realize the importance of transportation planning and operation technologies and should introduce such functions.

Q4. What position did the transport hold in the economic development plans or comprehensive public land plans? What was its role, and how did its role and position change according to changing times?

(A) The country's remarkable economic development began to take shape through President Park Chung-hee's outstanding leadership and judgment. This fact would not be disputed. However, a considerable part of the five-year economic development plan and comprehensive public land development plan, which were led by him, had

already been prepared by the Chang Myon administration. At that time, I was working with one of the few design firms, most of which were engaged in the formulation of comprehensive public land development plans.

The Korea Construction Technical Group with which I was working had already started its formulation of the five-year comprehensive development plan for the Gyeonggin Region, so the project began before the Park Chung-hee-led military coup. The plan included the Gyeongin Canal development plan and satellite city development plans involving Neungok as a pilot town. Also, our company earned orders for the Yeongsan River basin comprehensive development plan among five river basin comprehensive development projects and eventually came to formulate plans for land and water transport, irrigation, and tourism. At that time, a work order to formulate plans for transport and tourism, which at that time were new to us, seemed to be drafted by an advisor for the Construction and Transportation Ministry who was sent by USOM. At our company, there were no engineers for transport or tourism planning, which were new to us at that time. Finally, the project was assigned to me, the youngest staff, and I had to make a report by referring to foreign references.

Also, I was engaged in the master design for Seoul-Suwon Expressway construction requested by Gyeonggi Provincial Office, and was surveying routes. This project had also been long prepared by the Gyeonggi Office. However, the Park Chung-hee-led Gyeongbu Expressway plan was decided to push through, so our plan was discontinued, and our design drawings and surveying results were collected by the Construction Ministry to be disposed of. Roads, which were constructed later, involved many straight lines involving tunnels, bridges, and elevated civil engineering works in contrast to our plans to use curved lines making the most of the given topographies. For faster construction, military equipment was mobilized, and the central government was positively involved, making the project possible.

Q5. South Korea's representative land transport can be said to be roads and railroads. What was the role of roads and railroads according to the changing times, in which areas did they conflict with each other, and how were such conflicts addressed?

(A) South Korea had to implement transportation policies focused on automobiles, so its initial investment in transport was concentrated on roads. In the initial stage of economic development, mainly road paving was performed. Afterwards, SOC investment continued, activating the construction of national roads and expressways, raising the country's current expressway density to the world's top level together with that of Germany. However, investment in railroads was neglected, and thus only some railroad double track, electrification, and trunk railroad improvement works were conducted, leading the total operating railroad length to decrease. It was only in the 2000s that railroad length began to surpass that before the country's liberation.

In 2008, railroad and road planning work was placed under the responsibility of Officer of Transportation Policy, creating a framework for carrying out these projects. However, there was an unbalanced development of railroads and land transportation systems, and this affected public transportation. This downgraded the efficiency of the transportation system and did disservice to the people.

Q6. Can you tell us about any memorable system changes or events in implementing transport projects?

(A) Huge development projects involving a total project cost of over KRW 50 billion or national funds, had to receive preliminary feasibility study by KDI since 1999, and this was a very wrong policy. Prior to that, the Construction and Transportation Ministry reviewed the feasibility of master design, and relevant officials were seen as not objectively reviewing the feasibility due to ambitions to realize projects. Thus, the projects had to be reviewed by the Budget Ministry.

The fundamental problem lied in the fact that the Construction and Transportation Ministry was excessively focused on construction, while neglecting software involving planning functions. In actuality, a review of road plan reports reveals that a considerable number of them cite traffic congestion as the necessity of projects in the planned road segments.

Although KDI led the projects, all that was necessary was that preliminary feasibility studies should prove that road construction would ease congestion and create sufficient benefits. It was a big mistake to neglect the previous comprehensive analysis of transport situations including demand. Transport should not be misconceived simply as a service of automobile passage.

Currently, Road Departments or KDI are not capable of analyzing transport situations to improve transportation systems. Preliminary feasibility studies should shift from an analysis of automobile passage in a limited transport axis to be able to formulate and implement comprehensive transport improvement plans, which should be carried out by the department responsible for planning national transportation networks.

Q7. Lastly, in light of the country's experience in its development, what would be the main strategies or cautions for underdeveloped or developing countries including ASEAN countries to heed in implementation of transportation projects, as well as other diverse helpful policy suggestions?

(A) South Korea, looking back on its past development history, initially adopted the planning functions of the USA and the World Bank, and learned their knowhow to foster its own leadership and professionalism. In this process, the country developed its economic power, continued to raise finances, nurtured research functions, and thus became a technologically independent country. The country can now even export technologies. What played a big role here was the leadership in the adoption of right

policies, supporting economic power and professional technological power. This all comes from the power of the Korean people.

Thus, if we support underdeveloped or developing countries in their development, we should awaken the mindsets of their political leaders, provide economic, technical support for some time, allow the people to enjoy the benefits of economic development, and help them create a sustainable development model. In doing so, as we already repaid our borrowings from the World Bank in advance, we should help them repay our debts to create a win-win relationship.

Source: Interview with Professor Shin Boo-yong at Department of Construction Environment Engineering, KAIST

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