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2013 Modularization of Korea's Development Experience:

The Development of Vocational High Schools in Korea during the Industrialization Period

2014

MINISTRY OF EDUCATION
REPUBLIC OF KOREA

KDI SCHOOL
KDI School of Public Policy and Management

2013 Modularization of Korea's Development Experience:

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The Development of Vocational High Schools in Korea during the Industrialization Period

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Preface

The study of Korea's economic and social transformation offers a unique window of opportunity to better understand the factors that drive development. Within 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 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, 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 systematically 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 in hopes that Korea's past can offer lessons for developing countries in search of sustainable and broad-based development. In furtherance of the plan to modularize 100 cases by 2012, this year's effort builds on the 20 case studies completed in 2010, 40 cases in 2011, and 41 cases in 2012. Building on the past three year's endeavor that saw publication of 101 reports, here we present 18 new studies that explore various development-oriented themes such as industrialization, energy, human capital development, government administration, Information and Communication Technology (ICT), agricultural development, and land development and environment.

In presenting these new studies, I would like to express my gratitude to all those involved in this great undertaking. It was 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 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 dedicated efforts 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 Professors Kye Woo Lee, Jinsoo Lee, Taejong Kim and Changyong Choi for their stewardship of this enterprise, and to the Development Research Team 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 the KDI School of Public Policy and Management.

April 2014

Joon-Kyung Kim

President

KDI School of Public Policy and Management

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Summary

Korea's vocational education, more than any other educational field, changed dramatically along with the national economic development, and continues to change today. From the 1960s to 1980s, during Korea's industrialization period, vocational education made significant contributions in terms of supplying industrial manpower. Vocational education graduates increased continuously from 47,000 in 1965 to 201,000 in 1980, and to 274,000 in 1990, and their employment share increased from 35.5% to 51.1% and to 76.6%, respectively. In terms of employment among the new graduates, the share of vocational education graduates steadily increased each year, from 24.4% in 1965 to 46.6% in 1975 and to over 50% during the 1980s. During the industrialization period, vocational high schools supplied more labor force than any other educational institution.

This study analyzed three national strategies through which vocational high schools played a pivotal role in supplying manpower during the industrialization period. The first strategy was centralized planning strategy. Korea's vocational education was enforced as an important part of the national strategy for economic development, and along with the Five-Year Economic Development Plans, which started from 1962, a manpower supply plan and policies related to education and training were legislated and executed. Second was the strategy for industry and education cooperation. Especially in the 1970s, when the government pushed for the promotion of the heavy and chemical industry, investment on vocational high schools expanded to produce technical manpower necessary for the heavy and chemical industry, including specialized technical high schools. Last strategy is effective financial strategy. Korea's investment in education shifted from elementary, middle, and high schools (both conventional and vocational), to universities, along with economic development. It is especially important to note that in 1977, when the promotion of heavy and chemical industry was peaking, budgets for vocational education were

increased up to the same level as higher education. Furthermore, resources were acquired from private schools and educational loans from foreign countries.

To examine major policies by periods, the 1960s was when momentum for the manpower development plan was developed as a part of the economic development plan. Although the trend in the public was to worship academics and avoid vocational education, the government created the basis of vocational education system through centralized planning. In the 1970s, President Park Chung-hee strongly pushed for the heavy and chemical industry, and under the leadership of O Won Chul, the leader of Council for Heavy and Chemical Industry, strategies to strengthen vocational education were implemented. As a part of this strategy, the Specialization Initiatives at Technical High School (SITHS) was enforced from 1973. In the 1980s, an economic stabilization policy was implemented after the economic crisis in 1980. Social development, including education, was emphasized along with economic growth. The vocational education system was reorganized. Also, the MOE changed the direction of education from simply responding to short-term industrial demand to increasing the worker's adaptability to the technology changes in the long-term.

This study especially focuses on SITHS during 1970s. These initiatives were an exemplary case representing the close partnership between industrial policy and manpower policy. Through twin policies, the government divided schools into four categories by geographical locations and school characteristics, and prioritized investment in technical high schools that would play a leading role in the process of industrialization. Furthermore, the government expanded the infrastructure of vocational education by establishing the National Technical Qualifications System, enforcing mandatory fields for students in vocational educational institutions, and creating an industry-education cooperation system. We hope that this study will provide many important implications to policymakers in developing countries through various policy examples illustrating the significance of vocational education in the process of industrialization.

2013 Modularization of Korea's Development Experience
The Development of Vocational High Schools in Korea during the Industrialization Period

Chapter 1

Introduction

Introduction

Korea, as one of the High Performing Asian Economies (HPAEs), surprised the world with its rapid economic growth and social development. It has been pointed out that the successful economic growth in HPAEs was supported by its market-friendly economic policies, which accelerated the accumulation and distribution of resources, stable macroeconomic management, and human capital investment through education. Despite these common characteristics, economic development strategies and the outcomes of its implementation appears to be different depending on each country's economic circumstances (World Bank, 1993). In mid-20th century, Korea was one of poorest economies in the world after going through independence, rehabilitation, and wars; however, it successfully transformed itself into an economically powerful nation through industrialization and social development.

One of the reasons that allowed Korea to achieve rapid economic growth despite the lack of natural resources and capital was due to its successful investment in human capital. It is a difficult task for policymakers to foster skilled manpower when industries and technologies have rapidly been upgraded. Policymakers are constantly faced and asked to solve problems such as what kind of skills and capacity level that a newly entering workforce needs to have and how to promote better communication between employees and employers. Fundamentally, policymakers are required to find and determine the optimal mix between the state and the market to solve such problems. Thus, Korea's experience will provide useful lessons to policymakers in developing countries who are dealing with vocational education and manpower policies. Especially, Korea's vocational education policy will be an interesting case since Korea shifted away from relying on import substitutions and primary industry to pushing for industrialization through the growth of light and heavy and chemical industries.

This study focuses on the development stages of the vocational high school system during Korea's industrialization period. Through this study, we hope that readers will enhance their understanding on the structural factors that affected the vocational education system in Korea, and policy dynamics that were involved within the relationships among these factors. Therefore, we expect that policymakers in each country will be able to gather important implications from the Korea's government-led execution and formation of human capital policy, and for Korean policymakers who are dealing with vocational education will gain new perspectives to further improve policy.

According to the Vocational Education and Training Promotion Act, "vocational education and training" is defined to be conducted for students and workers to acquire and improve the knowledge, skills and attitude necessary for employment or performing their duties. Thus, depending on the recipient, it can be divided into vocational education and vocational training. Therefore, in this study, the term 'vocational education' is defined as where a student, not a worker, acquires skills and techniques that one needs to apply in the future labor market. Hence, the subject of this research is limited to vocational education through schools. Moreover, Korea's school system consists of six years of elementary school, three years of middle school or pre-secondary education, three years of high school or post-secondary education, and two or three years of technical college and four-year of university or higher education. This study looks into the vocational education at the high school level.

Korea enforced compressed economic growth under the strong leadership of the government and its economic plans. The Five-Year Economic Development Plans, which started in 1962 with the first plan and completed with the seventh plan (1993~1997), well illustrates Korea's economic development strategies. In 1960s, when the first (1962~1966) and second (1967~1971) five-year economic development plans were carried out, Korea was at the beginning stages of industrialization, based on the light industry to construct a foundation for a self-sustaining economy. In the 1970s, when the third (1972~1976) and fourth (1977~1981) five-year economic development plans were devised and carried out, labor-intensive industries were transformed into technology-intensive industries, and economic policies began to emphasize stability and fairness along with growth. In other words, while industrialization progressed from the 1960s to 1980s, characteristics of economic development plans changed by each periods, and development strategies also evolved along with these changes. In the 1960s, the government pursued industrialization strategy centered on the light industry; in the 1970s, industrialization strategy centered on the heavy and chemical industry; and in the 1980s, the strategy was shifted to focus on the technology-intensive industry. From 1990s, under the vision that Korea will become a leading nation in the knowledge and information society, the New Economic Plan

(1993~1997) was initiated to enhance the global competitiveness by relaxing government regulations and expanding the autonomy of the private sector.

This study analyzes the development of secondary vocational education from the 1960s, when the first economic development was initiated, to the 1980s, when the sixth five-year economic and social development was completed. In other words, this study looks into the socioeconomic circumstances and core policies, which are the background of development of vocational high schools in the sequence of industrialization of the light industry, heavy and chemical industry, and technology-intensive industry. Major policy initiatives during the industrial process were possible through the strong leadership of the government. At the same time, public policies were made adoptive not only to the demand of the market but also to socioeconomic circumstances. Especially, vocational high school policy was affected by the changes in the structure of industry and labor, political environments, and changing roles of the related stakeholders and agencies. By analyzing the dynamics of policy changes and their effects can help us to understand how Korea was able to secure the industry manpower necessary for industrialization within such a short period, and how human capital policies correspond with each stage of industrialization. We expect that Korea's experience will give useful implications to policymakers in developing countries with their technical manpower development and mid and long-term human capital policies.

This research is mainly focused on policy analysis through literature reviews. We collected and reviewed the documents concerning economic development and manpower plans, industrial and educational policies, and memoirs of policymakers at the time. The study also examined the effects or outcome of the policies through administrative data gathered from white papers and annual reports by various organizations. The rest of the chapters are organized as follows. In Chapter 2, we will provide an overview on the development of vocational education from the industrialization period and even after the 1990s, by using quantitative data. In Chapter 3, we will examine the strategies that allowed Korea to implement vocational education policies successfully in the course of industrialization. And in Chapter 4, we will explain the policy background and key policies in the 1960s, 1970s, and 1980s by analyzing the policy process of each period in detail. Lastly, in Chapter 5, we will summarize the findings of analysis and provide implications for other countries.

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Chapter 2

Overview of Vocational Education in Korea

1. Supply of Skilled Workers and Vocational Education
2. Industrial Policy and Vocational High School
3. New Challenges and Positive Changes in Vocational Education

Overview of Vocational Education in Korea

Korea's vocational education evolved dynamically along with the national economic development more than any other educational sectors, and continues to change today. During the industrialization process, vocation education made significant contribution to economic growth in terms of supplying industrial manpower. This is supported by the share of vocational high school graduates among the newly employed, which increased gradually and exceeded over half by 1980. In the 1960s, the government started to establish more vocational high schools and increased the supply of technical manpower. Especially in the 1970s, when the government strongly interfered to promote the heavy and chemical industry, technical high schools played pivotal roles in nurturing industrial manpower necessary for such a promotion; thus, manpower policy, including vocational education, worked in conjunction with one another to form industrial policy. However, with dawn of the knowledge and information era in the 1990s, the number of students choosing to attend vocational high schools drastically decreased, and the government faced critical challenges to coordinate effectively the industry-education cooperation necessary to develop vocational high schools. But there are continuous efforts made by the government to overcome challenges in vocational education through innovative policies, such as the Meister High School, initiated in 2008, and the 'employment first and diploma later' system.

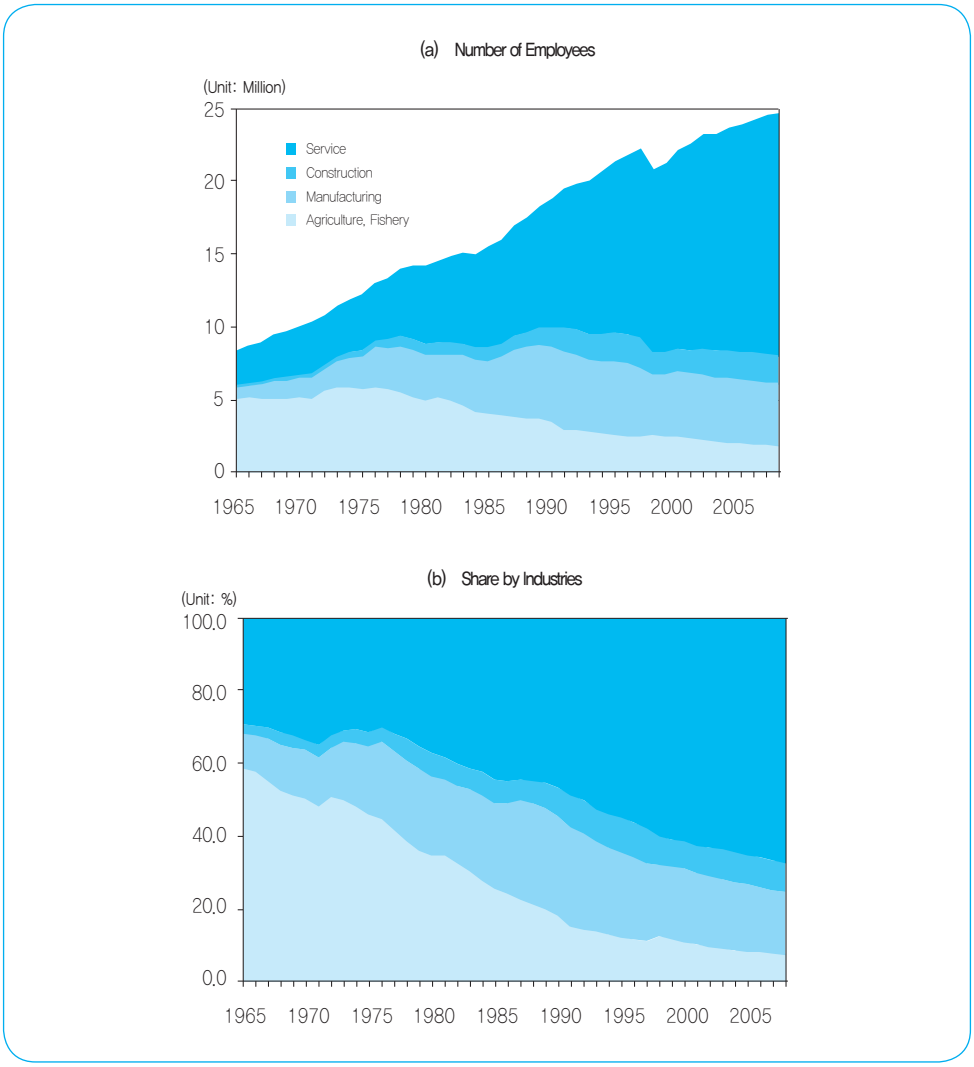
1. Supply of Skilled Workers and Vocational Education

As Korea went through a period of intensive industrialization, its center of economy shifted rapidly from the agricultural sector to the manufacturing and service industries. In order to meet the increasing demands for industrial manpower, vocational education developed dynamically. Along with economic development, the number and share of employees by industries faced drastic changes. The total number of employees increased

from 8.1 million in 1965 to 11.7 million in 1975, and to 18.1 million in 1990. From the mid-60s to late-70s, when the industrialization progressed in full scale, the number of employees in manufacturing and service industry increased significantly. As shown in [Figure 2-1], the number of employees in the manufacturing industry increased by three times, from one million in 1967 to three million in 1978; and the number of employees in the service industry increased by two times, from 2.5 million in 1966 to 5 million in 1980. In terms of total share of employees by industrial sector, the manufacturing industry gradually increased from 9.4% in 1965 to 20.6% in 1980, and to 27.9% in 1989. During the same period, employees in the service industry increased from 29.2% to 27.3% and to 45.5%, respectively. However, after the year 2000, the share of employees in the manufacturing industry has decreased, whereas the share of employees in the service industry has continued to increase.

Meanwhile, various educational institutions such as high schools and universities played an important role by responding to the labor demands, which increased during the process of industrialization. Particularly, vocational high schools contributed more than any other educational institutions, in terms of providing skilled workers needed for industrialization. Compared to general high schools, where most graduates advance to university upon graduation, vocational high school graduates entered the labor market at least two to four years in advance. Although they could not completely satisfy the industrial manpower demand, in terms of supplying new labor forces, vocational high schools contributed more than any other educational institution. These facts are supported through the analysis of administrative survey data and are presented as follows.

Figure 2-1 | Size of Employees by Industrial Sectors



Note: Employees in the service industry from 1965 to 1980 were calculated by subtracting employees in other sectors from the total number of employees.

Source: Economic Activity Census by National Statistical Office (NSO) of Korea, Korea Labor Institute (KLI), 2013 Labor Statistics.

<Table 2-1> represents the number of graduates in secondary and higher educational institutions, and the number of graduates who become employed. High schools include general high schools and vocational high schools, and higher education includes technical colleges, universities, and graduate schools. Data were gathered from surveys of students who graduated in that specific year, consisting of question on their employment and school

advancement. The survey was conducted at the time of each student's graduation, and thus, there may be some differences with employment trends in the actual labor market. However, it is a useful source since it gives us an idea of the overall size of graduates by education level, and the paths taken by graduates, such as employment, advancement to higher education, or joining the military. We can also infer about the educational attainment of students entering the labor market for the first time.

Table 2-1 | Number of Newly Graduates and Employment by Educational Institutions

Year	No. of Graduates, thousand (Employment rate, %)			No. of Employed, thousand (Share, %)						
	Junior High School	High School	Tertiary	Junior High School	Vocational High School	General High School	Technical College	University	Graduate School	Total
1965	190	116	46	22	17	12	4	13	1	68
		(37.5)	(47.6)	(32.7)	(24.4)	(17.8)	(5.8)	(18.4)	(1.0)	
1970	313	145	38	15	32	8	5	18	2	80
		(38.3)	(77.1)	(18.6)	(39.4)	(10.5)	(5.9)	(23.1)	(2.5)	
1975	569	263	57	29	63	13	7	20	3	136
		(39.9)	(62.6)	(21.6)	(46.6)	(9.8)	(4.9)	(14.9)	(2.2)	
1980	773	497	121	31	102	22	13	32	6	206
		(38.8)	(60.7)	(15.2)	(49.3)	(10.9)	(6.3)	(15.7)	(2.7)	
1985	856	642	215	-	143	27	31	50	13	264
		(42.1)	(57.2)	(0.0)	(54.2)	(10.3)	(11.6)	(18.8)	(5.1)	
1990	836	762	283	-	210	48	49	85	15	407
		(51.0)	(62.7)	(0.0)	(51.6)	(11.7)	(12.0)	(20.8)	(3.8)	
1995	819	650	388	-	190	28	91	110	24	444
		(69.3)	(66.6)	(0.0)	(42.9)	(6.3)	(20.5)	(24.9)	(5.5)	
2000	631	765	542	-	150	12	161	123	39	484
		(66.1)	(66.7)	(0.0)	(30.9)	(2.4)	(33.2)	(25.4)	(8.1)	
2005	616	569	635	0	47	6	178	179	60	470
		(52.3)	(72.9)	(0.0)	(10.0)	(1.2)	(37.8)	(38.1)	(12.8)	
2010	669	634	629	0	30	4	98	145	63	340
		(25.9)	(54.1)	(0.0)	(8.8)	(1.3)	(28.7)	(42.6)	(18.6)	

Note: Employment data for middle school graduates are not available in 1985, 1990, and 1995.

Source: Yearbook of Educational Statistics, Annual Series.

In 1965, 190,000 students graduated from middle schools, 116,000 students graduated from high schools, and 46,000 students graduated from higher educational institutions. The employment rate, excluding graduates who advanced to higher education or joined the military from overall graduates, was 36.5% for high school and 47.6% for higher education.[1] Among these graduates, 68,000 students were employed, which was 19.3% of total graduates. When these employees were examined by their school level and type, middle school was the highest with 22,000 (32.7%), followed by vocational high school with 17,000 students (24.4%), university with 13,000 (18.4%), general high school with 12,000 (17.8%), and technical college with four thousand (5.8%).

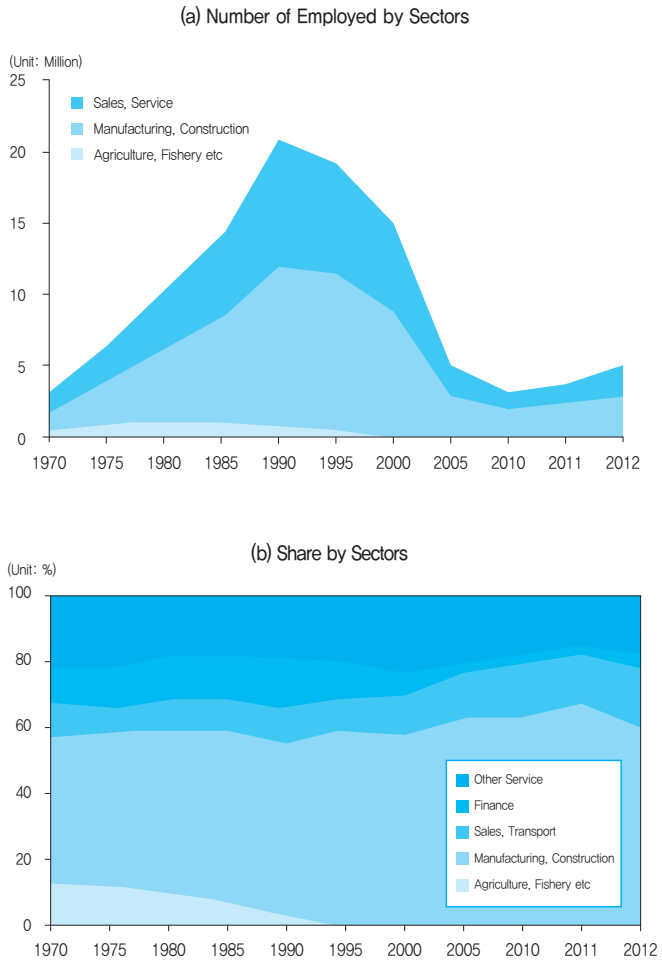
In 1970, out of 496,000 secondary and higher education graduates, 80,000 (16.1%) were employed, and among them, vocational high school graduates were the highest with 32,000 students (39.4%), then university with 18,000 (23.1%), middle school with 15,000 thousand (18.6%), and general high school with eight thousand students (10.5%). Middle school graduates' advancement to vocational high schools increased, and vocational high schools began to take their role as the central institution of vocational education. The share of vocational high school graduates among employees increased from 46.6% in 1975 to 49.3% in 1980, and to 54.2% in 1985. As industrialization progressed in full scale, vocational high schools continuously supplied more than half of the manpower to the labor market. However, in the 1990s, this share gradually decreased, and by the early 2000s, the share had decreased to 30.9%, with vocational high schools accounting for 33.2% of total employment.

[Figure 2-2] shows the size and share of employees of vocational high school graduates by industry. The primary industry, such as agriculture, fishery, and mining, decreased from 14.2% in 1970 to 4.0% in 1990, while the secondary industry, such as manufacturing, construction, and electricity, increased from 43.2% to 52.8% in the same period. The tertiary industry, including sales, transportation, finance, and other services, was stable at around 40%. Among the tertiary industry, the share of employees in finance and the insurance services industry increased from 10.7% in 1970 to 15.2% in 1990, which indicates that many students were employed by the financial sector. Thus, evidence shows that vocational high schools prioritized the supply of manpower in the manufacturing and financial service industries during industrialization.

1. The employment rate of high school graduates increased gradually after 1965, and rose to 51.0% in 1990 and to 66.1% in 2000; and the employment rate of higher educational institutions rapidly increased from 47.6% in 1965 to 76.5% in 1970. In early 1960s, the government controlled the admission quota and this decreased the size of graduates, and number of jobs increased as industrialization progressed. After this period, the employment rate decreased to 66.7% in 1995 and increased again to 72.9% in 2005. However, the rate decreased to 54.1% in 2010 due to changes in the employment rate survey.

Meanwhile, in the early stages of industrialization, the number of students in higher education was strictly regulated by the technical manpower policy centered on vocational high schools. The number of graduates in higher education decreased from 46,000 in 1965 to 38,000 in 1970, and increased again to 57,000 in 1975. This was the result of intentionally decreasing the quota for university students, in order to promote technical manpower at the secondary education level. As a result, the employment rate of higher educational institution graduates increased from 47.6% in 1965 to 77.1% in 1970. Among the new graduates and of those employed, the share of technical college graduates remained around 10% in the '60s and '70s, but it increased to over 10% in 1985 and grew to 33.2% in 2000, marking a new chapter in vocational education. In terms of universities, the rate remained below 20% in the '70s and '80s and exceeded just above 20% in the '90s. By 2005, it had increased beyond the share of technical colleges. The share of graduate schools was 12.8% in 2005, and still shows an increasing trend.

Figure 2-2 | Employment of Vocational High School Graduates by Industrial Sectors



Source: Yearbook of Educational Statistics, Annual Series.

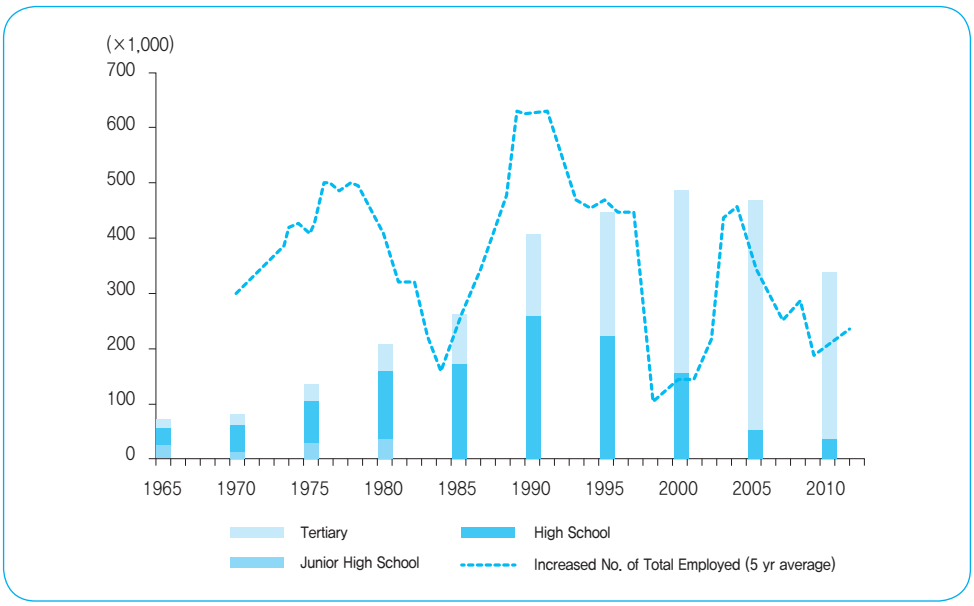
Compared to the increasing number of total employees, to what extent did new graduates meet the exploding demand? To show how much new labor supply via educational institutions exists in comparison to the total new labor supply, [Figure 2-3] compares the annual increase in the total employees (five-year moving average) with the Employment of New Graduates (ENG) of secondary and higher education (excluding advancers, enlisted and unknown). As seen in the figure, with the exception of 1985, ENG does not meet the annual increases in the total number of employees in the economy until 1990. From 1965

to 1970, the total employees increased annually by 301,000 people. On the other hand, the number of ENG was 68,000 in 1965 and 80,000 in 1970. In 1970, the ratio of ENG from secondary and higher education to the annual increase in the total employment was 26.5%. This ratio increased to 32.6% in 1975, 51.8% in 1980, and 65.3% in 1990. However, due to economic downturn in 1984, total employment decreased by 76,000, raising the ratio to 102.6% in 1985 This exception notwithstanding, the number of ERG did not go beyond the annual increases in total employees through the completion of industrialization in 1990.[2]

During the industrialization period from the 1960s to 1980s, the number of ENGs did not surpass the annual increases of total employees. However, compared to other types of educational institutions, vocational high schools produced the most employees until the mid-1990s, and responded to manpower demand coming from industries. Yet, in the 1990s, as the economic growth slowed down and graduates through higher education started to increase, and the size of ENG became bigger than the increase in total employment. As a result, the share of vocational high school graduates in the labor market largely decreased. Thus, vocational high schools played a pivotal role in supplying industrial manpower by employing a significant number of graduates into industrial sites during the industrialization period.

2. It is important to note the students who were categorized as unknown or unemployed in the graduates' survey. Among actual high school graduates, graduates that are identified as unknown of unemployed are 41.5% in 1965, 44.4% in 1970, and 44.4% in 1980, which is higher than the employment ratio. Since then, the enrollment rate largely increased and the rate of graduates who are identified as unknown or unemployed has decreased to 32.5% in 1990 and 10.8% in 2000. Meanwhile, the ratio of graduates in higher education who are identified as unemployed or unknown reached to 42.2% in 1965 and remained 19.9% in 1970, 30.7% in 1975, and 27.2% in 1980.

Figure 2-3 | Annual Increase in the Total Employment and the Employment among New Graduates



Source: Economic Activity Census, Annual Series and Yearbook of Educational Statistics, Annual Series.

2. Industrial Policy and Vocational High School

In the 1970s, the government pushed for the development of the heavy and chemical industry as a part of its industrial policy (Stern et al., 1995). The government selected specific industries and mobilized initiatives such as the exchange rate policy, trade policy, and tax policy. Under the purpose to foster technical manpower that was needed for the heavy and chemical industry, many vocational high schools were newly established or restructured. In that regard, vocational high school played a pivotal role in pushing forward with the heavy and chemical industry, and manpower policy, including vocational high school policy, also played a critical role in supporting industrial policy.

In the 1960s, the Five Year Economic Development Plan was started at a time when technical manpower was needed for the industrialization. The purpose of vocational education policy was to increase the number of vocational high schools needed to supply technical manpower. These schools would allow students to acquire the skills and knowledge necessary for industrialization. Policies focused on holding back plans to construct new general high schools, while expanding on vocational high schools specializing in commerce,

technical, and agricultural education. As can be seen in [Figure 2-4], the number of vocational high schools expanded sharply, while the number of general high schools stayed around 400 from the mid-1960s to the early 1970s. In 1965, there were 312 vocational high schools (44.5%) among a total of 701 high schools in the country. However, the ratio was reversed in 1968 when the number of vocational high schools increased to 425 among total 840 high schools, thereby surpassing the number of general high schools. The share of vocational high schools in 1970s increased up to 54.1%. On the other hand, number of students in 1965 was 172,000 (40.4%) out of total 436,000 high school students, and the number had gradually increased to 275,000 (46.6%) by 1970. But after the high school equalization policy was implemented in 1974, the ratio was reversed again since more general high schools were established and some vocational high schools were transformed into general high schools. In 1974, in terms of number of schools, the ratio of vocational high school decreased to 43.7% and number of students also decreased when compared to general high schools.

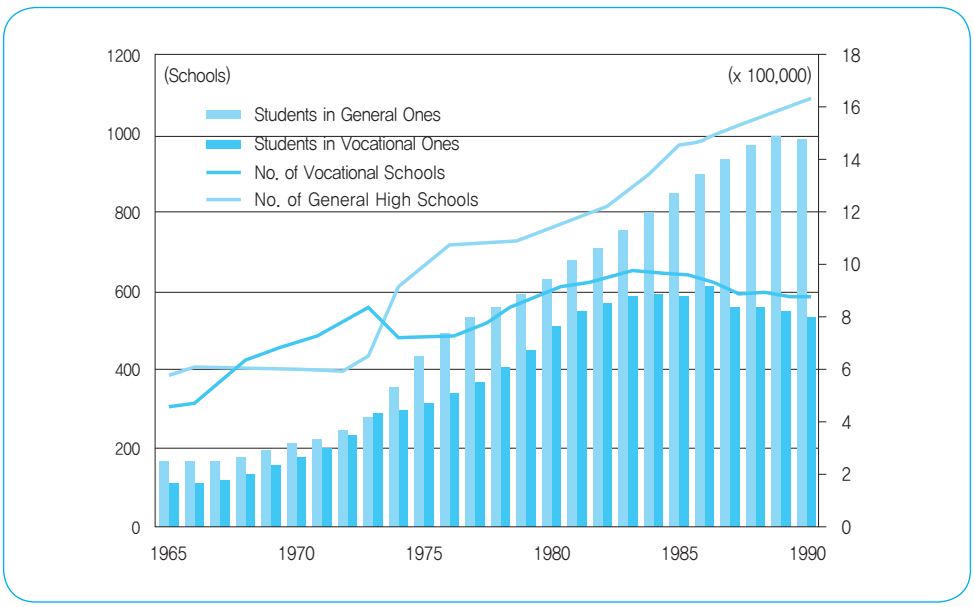
In 1970s, the third and fourth Five Year Economic Development Plans were carried out. Industrial policy for the heavy and chemical industry was enforced, and there was a need to foster technical manpower to deliver the policy. For this demand, through the "Specialization Initiatives on Technical High Schools (SITHS)" in 1973, the government strengthened cooperation between industry and school through curriculum reform along with structural reform. Moreover, the government continued with effort to improve the conditions of vocational high schools and extend scholarship support to induce outstanding students. As a result, ratio of employed to total graduate of vocational high schools increased gradually from 35% in the mid-60s to 61% in 1979. Furthermore, through the college entrance quota policy, the government kept the overall rate of high school graduates' advancement to universities under the 30%, and prevented the labor shortage of skilled workers, while constraining a rise in wages. Vocational education was used to play an important role in enforcing industrial policy in the 1970s, since the institutional framework for vocational education had already been established in the 1960s. Without the expansion of vocational high schools or curriculum development in the 1960s, any attempts to strengthen the vocational education in the 1970s would not have been effective.

In the 1980s, to cope with the substantial side effects of strong industrial policies in 1970s, the government enforced macroeconomic stability and deregulation. Vocational education was also influenced by this shift in economic policy and changed its direction to nurture the basic capacities for future professional technicians, instead of job training for specific industries. In other words, instead of a technical education for jobs upon graduation, educational curricula were devised and strengthened to improve their abilities for life-long learning. Moreover, due to implemented policies such as an increase in the

entrance quota for technical colleges at the end of the '70s and the quota on the number of university graduates, the number of university admitted students increased enormously. By the early '80s, the rate of vocational high school graduates advancing to universities increased and the employment rate remarkably decreased (43.2% in 1983). After 1981, the government regulated the number of university admission quota, enriched vocational high school education; with the continuous economic boom, the ratio of employment among vocational high school graduates increased and reached 80% in the early 1990s.

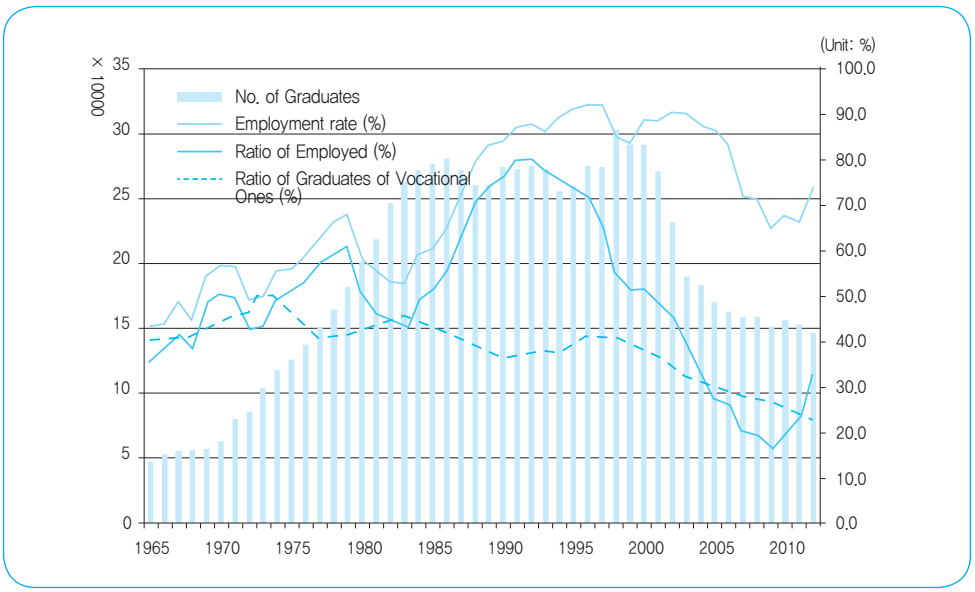
The percentage of vocational high school graduates out of total high school graduates jumped from 40.8% in 1965 to 59.6% in 1973, but decreased to 40.9% in 1977, and 36.0% in 1990. The relative ratio slightly bounced back to 41% in 1998, but continuously decreased to 23% in 2012.

Figure 2-4 | Vocational High Schools by Types and Their Students



Source: Yearbook of Educational Statistics, Annual Series.

Figure 2-5 | Graduation and Employment of Vocational High Schools



Source: Yearbook of Educational Statistics, Annual Series.

<Table 2-2> shows the types of vocational high schools. In 1945, at the time of Korea's independence, there were 58 vocational high schools, composed of 30 agricultural high schools, 22 commercial high schools, 4 technical high schools, and 2 marine and fishery high schools. In the 1950s, the number of agricultural schools increased drastically, and it took almost half of all vocational high schools in 1960 (129 schools, 46.2%). Looking at the number of students, in 1945, unlike the distribution of school types, commercial high school students were almost half of all vocational high school students, followed by agricultural high schools, whose share was 36.2%. This can suggest that commercial high schools were operated in the urban areas where population density was high, and agricultural high schools were operated in rural areas. However, due to the increasing number of agricultural high schools, student ratio was 57.5% in 1952 and 42.1% in 1955, retaining the largest share of students.

In 1960, when the first and the second economic development plans were carried out, the number of commercial high schools increased from 87 in 1960 to 154 (32.2%) in 1970, which took over one third of total vocational high schools. The number of students also increased from 36,600 to 100,600 (36.8%) within the same period. In the meantime, in terms of technical high schools, its number of schools increased from 48 in 1960 (17.2%) to 59 (12.3%) in 1970, and the number of students also doubled from 32,500 (33.1%)

to 68,400 (25.0%). However its ratio to overall vocational high schools has decreased. While industrialization progressed, the proportion of students enrolled in agricultural high schools decreased rapidly from 42.1% to 15.0% during the same period. Moreover, in the 1960s, 'other vocational high schools' with variety of vocational educational courses, and comprehensive high schools where students can learn general courses to advance into universities and job-readiness courses were established as a new type of vocational education system. In terms of number of enrolled students in the 1970s, 22,200, or 8.1% of all vocational high school students, attended 'other vocational schools' and 37,300, or 13.6% of students attended comprehensive high schools.

In 1970, when the third and the fourth economic development plans were carried out amid the beginning of heavy and chemical industrialization, there was a continuous increasing trend in commercial high schools, as the number of schools and students also expanded in technical high schools. The number of technical high schools, 59 in 1970, increased to 100 in 1981, and the number of students increased to 220,300 in 1981, which took over 28.9% of all vocational high school students. Also, the number of enrolled students in commercial high schools increased gradually and its ratio was 45.6% of total vocational high school students, on the other hand, ratio of agricultural high school students decreased to 7.2% in 1981.

In the 1980s, the increasing trend of vocational high schools was eased and secondary vocational education was stabilized. The number of vocational high schools decreased from 614 in 1981 to 587 in 1990, and the number of students increased slightly from 762,600 to 810,700 during the same period. In terms of types of schools, the number of schools in commercial and agriculture fields decreased, but the number of technical high schools increased from 100 to 104. The number of students in commercial high school showed a slight increase to 370,900 (45.8%), while technical high schools showed a decrease to 192,000 (23.7%), and agricultural schools continued to decrease to 40,600 (5.0%) students. On the other hand, the number of enrolled students in comprehensive high schools increased from 81,400 (10.7%) in 1981 to 181,100 (22.3%) in 1990.

Based on the assumption that there would be a labor shortage in the future, vocational high school expansion policy centered on technical high schools and strengthening vocational education in the mid-1990s, and the size of vocational high schools increased for a short time. But due to a decrease in the school population and more students opting for technical colleges, there was a large decrease in the number of vocational high school students.

Table 2-2 | Number of Vocational Schools and Their Students by Types

Year	Total	Agricultural		Technical		Commercial		Fishery & Marine		Other Vocational		Comprehensive	
No. of Schools, (share, %)													
1945	58	30	(51.7)	4	(6.9)	22	(37.9)	2	(3.4)	0	(0.0)	0	(0.0)
1952	160	97	(60.6)	28	(17.5)	23	(14.4)	12	(7.5)	0	(0.0)	0	(0.0)
1955	229	129	(56.3)	42	(18.3)	44	(19.2)	14	(6.1)	0	(0.0)	0	(0.0)
1960	279	129	(46.2)	48	(17.2)	87	(31.2)	15	(5.4)	0	(0.0)	0	(0.0)
1965	312	114	(36.5)	42	(13.5)	100	(32.1)	11	(3.5)	27	(8.7)	18	(5.8)
1970	479	123	(25.7)	59	(12.3)	154	(32.2)	10	(2.1)	56	(11.7)	77	(16.1)
1975	476	69	(14.5)	72	(15.1)	182	(38.2)	9	(1.9)	23	(4.8)	121	(25.4)
1981	614	56	(9.1)	100	(16.3)	232	(37.8)	9	(1.5)	37	(6.0)	180	(29.3)
1985	635	61	(9.6)	102	(16.1)	237	(37.3)	9	(1.4)	32	(5.0)	204	(32.1)
1990	587	55	(9.4)	104	(17.7)	208	(35.4)	9	(1.5)	16	(2.7)	195	(33.2)
1995	762	29	(3.8)	175	(23.0)	248	(32.5)	9	(1.2)	62	(8.1)	239	(31.4)
2000	764	26	(3.4)	203	(26.6)	238	(31.2)	8	(1.0)	75	(9.8)	214	(28.0)
2005	713	31	(4.3)	212	(29.7)	212	(29.7)	8	(1.1)	64	(9.0)	186	(26.1)
2010	692	30	(4.3)	212	(30.6)	190	(27.5)	7	(1.0)	64	(9.2)	189	(27.3)
No. of Students, thousand, (share, %)													
1945	24.9	9.0	(36.2)	2.7	(10.7)	12.6	(50.6)	0.6	(2.5)	0.0	(0.0)	0.0	(0.0)
1952	64.2	37.0	(57.5)	13.5	(21.1)	11.0	(17.2)	2.7	(4.2)	0.0	(0.0)	0.0	(0.0)
1955	112.2	47.3	(42.1)	31.5	(28.1)	29.2	(26.0)	4.2	(3.8)	0.0	(0.0)	0.0	(0.0)
1960	98.5	27.2	(27.7)	32.5	(33.1)	36.6	(37.2)	2.1	(2.1)	0.0	(0.0)	0.0	(0.0)
1965	172.4	42.9	(24.9)	37.0	(21.4)	67.6	(39.2)	3.2	(1.8)	9.4	(5.4)	12.5	(7.2)
1970	273.7	41.2	(15.0)	68.4	(25.0)	100.6	(36.8)	4.0	(1.4)	22.2	(8.1)	37.3	(13.6)
1975	473.0	42.0	(8.9)	123.6	(26.1)	190.2	(40.2)	7.8	(1.7)	20.4	(4.3)	88.9	(18.8)
1981	762.6	55.1	(7.2)	220.3	(28.9)	347.6	(45.6)	10.3	(1.3)	47.9	(6.3)	81.4	(10.7)
1985	886.0	51.8	(5.9)	198.4	(22.4)	380.3	(42.9)	10.0	(1.1)	41.8	(4.7)	203.7	(23.0)
1990	810.7	40.6	(5.0)	192.0	(23.7)	370.9	(45.8)	9.3	(1.2)	16.7	(2.1)	181.1	(22.3)
1995	911.5	21.3	(2.3)	273.7	(30.0)	355.5	(39.0)	6.8	(0.7)	65.7	(7.2)	188.5	(20.7)
2000	747.0	17.9	(2.4)	265.8	(35.6)	272.7	(36.5)	5.6	(0.8)	57.7	(7.7)	127.3	(17.0)
2005	503.1	16.8	(3.3)	187.1	(37.2)	171.9	(34.2)	4.5	(0.9)	33.9	(6.7)	88.9	(17.7)
2010	466.1	16.5	(3.5)	169.8	(36.4)	147.4	(31.6)	3.7	(0.8)	34.2	(7.3)	94.6	(20.3)

Source: Yearbook of Educational Statistics, Annual Series, and Young-Hwa Kim (1990).

Note: ( ) is the share among total vocational high schools.

When we examine the employment rate by types of vocational schools, the case of technical high schools is noteworthy. The employment rate for technical high schools rose sharply in the late 1970s, when the government strongly pushed for industrial policy on the heavy and chemical industry. The rate jumped from 67.9% in 1972 to 85.4% in 1979. But after 1980, due to the significant side effects of the industrial policy, many major heavy and chemical businesses were merged or acquired, and the government enforced policies to stabilize its macroeconomics. Consequently, this had a negative impact on the employment of technical high school graduates, and the rate of employment decreased to 69.7% in 1980 and 62.3% in 1983. But the rate recovered after the stabilization and showed increasing trend to 90% in the early 1990s.

Technical high school graduates were not only beneficiaries of strong industrial policy in 1970s, but also were not employable during the stabilization period in the early 1980s. Other types of vocational schools such as commerce, agriculture, and others also showed decreases in employment rate, but not as much as technical high schools. The employment trend of each type of vocational high schools can be interpreted to opine that technical high schools worked as a direct channel in fostering manpower for industrial policy.

There are still ongoing debates about the effectiveness of industrial policy to promote the heavy and chemical industry (Stern et al., 1995; Yoo, 1991). However, there have been no studies evaluating the relationship between industrial policy and technical high schools. This report argues that vocational education played an active role in supplying skilled labor for the heavy and chemical industry, based on the finding that the employment of technical high school sharply increased in the late 1970s. Meanwhile, the crash of employment in technical high schools in the early 1980s can be interpreted that the aftermath of the big push of industrial policy rendered negative effects for the graduates at that time. In the long run, however, the human capital embodied in the graduates of technical high schools during the big push for the heavy and chemical industry could contribute to economic growth in the following years, despite the difficulties during the stabilization period in early 1980s.

The ratio of employees from new graduates also shows a similar trend with the employment rate. However, as for commercial high schools, the difference between the employment rate and the ratio of employees was only by 6% in average. In technical high schools, the average of differences between those two numbers showed more than 12%. This is because graduates of technical schools where mostly composed of male students, had more students advancing to higher education or enlisted in the army, whereas graduates of commercial schools, where mostly composed of female students, were more likely to get a job upon the graduation.

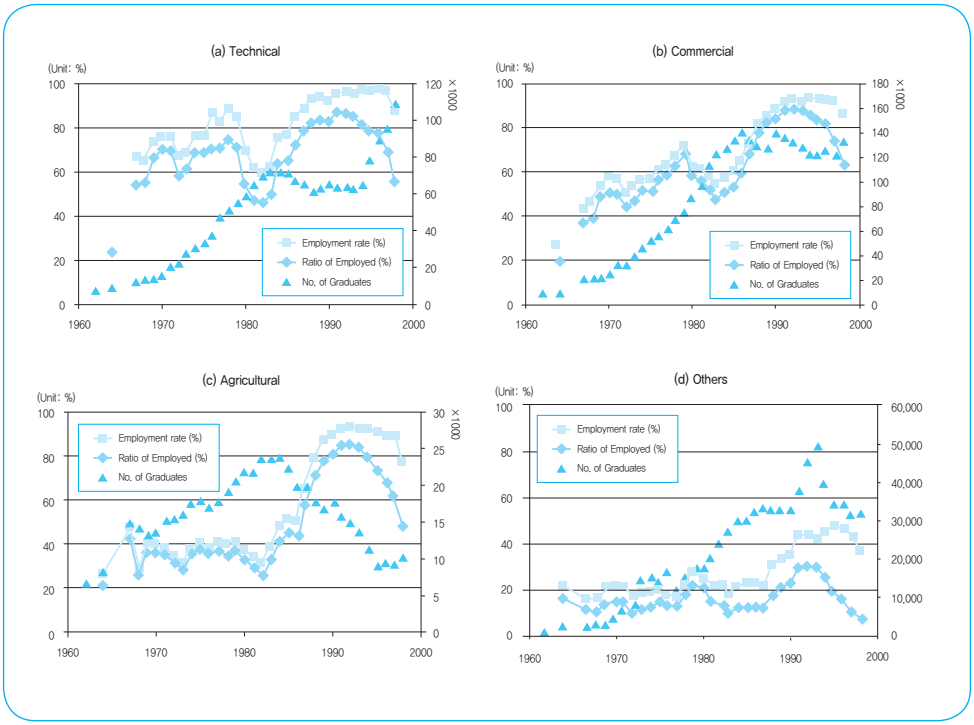
Concerning the employment paths of graduates, those employed through recommendation or introduction by their parents and relatives decreased from 34.8% in 1970 to 21.3% in 1990, whereas the employment share through school recommendations increased from 29.8% to 54.0%. This data explains that the vocational high school in those days not only educated students, but also made major contributions to their employment. Meanwhile, the employment share through field training remained above 15%, and that those through open competition-based recruit decreased from 18.7% in 1970 to 8.5% in 1990. The increasing role of schools in the employment of their graduates can be interpreted as the establishment of networks among vocational schools and industries to help students find their jobs. Furthermore, until 1990, over 80% of students were employed in the fields that they specialized in schools. This also supports the argument that the vocational high schools contributed to industrialization through education and training.

Table 2-3 | Employment of Vocational High School Graduates

	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2012
Graduates of High Schools (a)	115,776	145,062	263,369	467,388	642,354	761,922	649,653	764,712	569,272	633,539	636,724
Graduates of Vocational Ones (b)	47,289	62,854	126,141	201,057	276,535	274,150	259,133	291,047	170,259	156,069	146,522
(b/a, %)	40.8	43.3	47.9	43.0	43.1	36.0	39.9	38.1	29.9	24.6	23.0
No. of Employed (c)	16,674	31,569	63,437	102,812	143,214	210,113	190,148	149,543	47,227	29,916	48,046
Employment Rate (%)	43.4	56.4	56.1	58.2	60.4	84.0	90.9	88.8	86.3	67.7	73.9
(c/b, %)	35.3	50.2	50.3	51.1	51.8	76.6	73.4	51.4	27.7	19.2	32.8
[By industries, %]											
Agriculture, Fishery etc.	-	14.2	13.1	10.2	7.7	4.0	1.9	1.1	0.8	1.1	1.2
Manufacturing	-	43.2	46.5	49.8	52.3	52.8	57.6	57.3	63.0	63.6	60.1
Sales, Transport	-	10.7	7.5	9.6	9.7	9.1	10.1	12.5	13.2	15.8	18.3
Finance, Insurance	-	10.1	11.4	12.4	12.7	15.2	10.8	6.3	2.2	1.6	3.1
Others	-	21.7	21.5	18.0	17.6	19.0	19.6	22.8	20.8	17.9	17.2
[By Path, %]											
School Recommendation	-	29.8	31.6	33.0	41.7	54.0	57.1	51.9	49.2	62.8	60.1
Field Training	-	16.7	20.8	18.1	17.0	16.3	18.9	21.8	25.6	11.2	15.2
Open Test	-	18.7	15.6	12.1	8.7	8.5	7.3	4.4	7.3	8.6	11.8
Relatives and Etc.	-	34.8	32.1	36.7	32.7	21.3	16.6	21.9	17.8	17.4	12.9
[Majors, %]											
Related with	-	84.8	84.6	81.4	85.5	82.8	83.3	76.9	71.6	76.0	75.2
Not	-	15.2	15.4	18.6	14.5	17.2	16.7	23.1	28.4	24.0	24.8

Source: Yearbook of Educational Statistics, Annual series.

Figure 2-6 | Graduation and Employment by Types of Vocational High Schools



Source: Yearbook on Educational Statistics, Annual Series and Young-Hwa Kim (1990).

3. New Challenges and Positive Changes in Vocational Education

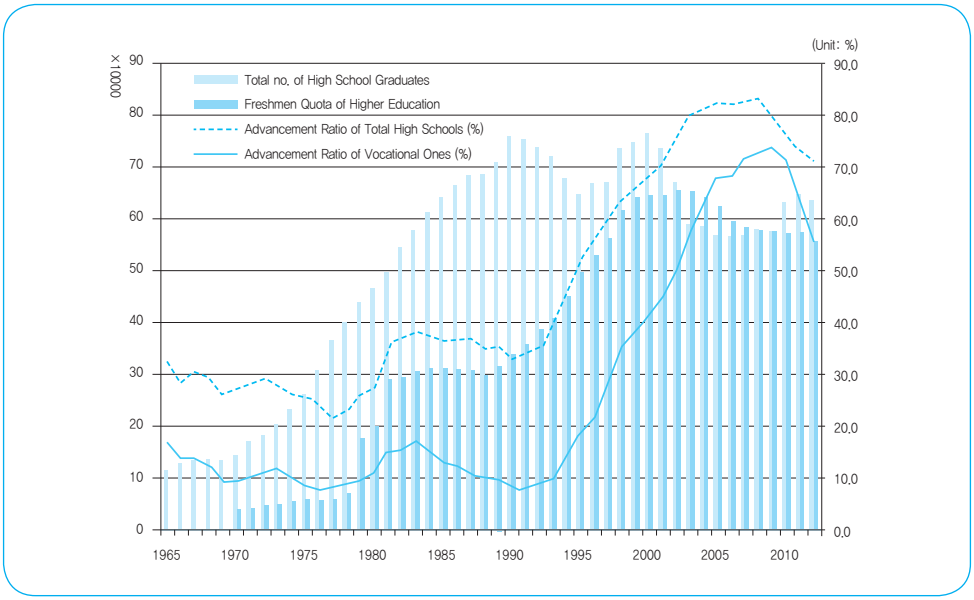
As examined in the previous section, vocational high schools made major contributions to economic growth during the industrialization period from the 1960s to 1980s. However, the transition to a knowledge-based economy in the 1990s encouraged academic education and advancement with the expansion of higher educational institutions, resulted in a lower number of students choosing to attend vocational high schools. The gap of wages and other status between university graduates and high school graduates also discouraged students from choosing vocational education. The centralized planning and coordination system, which had functioned effectively during the industrialization period, also weakened. Meanwhile, the dual labor market structure continued with both long waits for jobs at the big conglomerates and labor shortages for small and medium companies. As the economy

grew, the government was faced with more difficulties in bringing cooperation between industry and education. After industrialization, the era of a knowledge-based economy began in the 1990s and this brought new challenges to Korea's vocational education.

Among all high schools, the share of vocational high schools decreased from 38.1% in 2000 to 24.6% in 2010, and the employment share of vocational high school graduates decreased from 76.6% in 1990 to 51.4% in 2000, and to 16.7% in 2009. On the other hand, the share of students advancing to higher education increased rapidly. The ratio of vocational high school students advancing to higher education increased from 8.3% in 1990 to 42% in 2000 and to 73.5% in 2009. The increase in vocational high school graduates' advancement to higher education also led to increases in overall high school graduates' advancement to higher education. The share of overall high school graduates' advancement to university doubled, from 33.2% in 1990 to 68.0% in 2000 and up to 83.8% in 2008. Since then, the rate decreased to 71.3% in 2012.

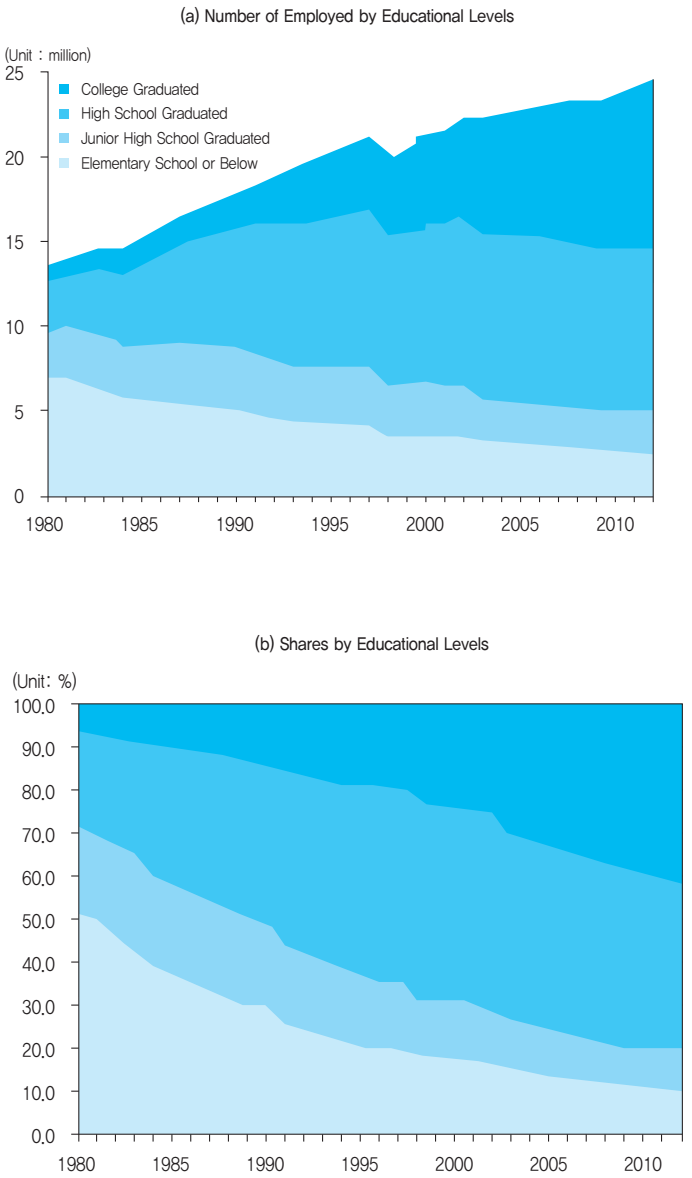
As a result, in 2000, vocational high schools were edged out by technical colleges and universities. By examining the employment share among the graduates by educational institutions, graduates from vocational high schools (30.9%) was less than those from technical colleges (33.2%) in 2000, and graduates from vocational schools (10.0%) was less than four-year university (38.1%) and technical college graduates (37.8%) in 2005. Hence, we can identify that the center of vocational education shifted from vocational high school to higher education. This change can be also explained by the educational attainment of total employees in the economy. By 1980 people with primary education or lower took over more than half of the total, and people with higher education or more were only 6.7%. Those with a middle school education were 20.2% and those with high school education were 21.8%. Those with a high school education (33.9%) exceeded those of elementary school education (33.7%) for the first time in 1987, and the university level was 11.2%. In 2002, the share of high school education was as high as 44.4%, university level education was 26.6%, elementary and pre-secondary education were 15.6% and 13.4%, respectively. And in 2011, the portion of university graduates was 40.0%, which exceeded that of high school graduates, 39.8%.

Figure 2-7 | Advancement Trends of High Schools Graduates



Source: Yearbook of Educational Statistics, Annual Series.

Figure 2-8 | Composition of Educational Attainment of Total Employed



Source: Economic Activity Census, National Statistics Office.

There are many reasons other than expansion of higher education and declining school population that explains the decreasing trend of vocational high schools since the 1990s. One of the reasons was concerned with wages and employment status of high school graduates. Overall, workers who graduated from vocational high schools showed a more unstable path in their skill formation, job experience and employment status in the long term. As they got older and moved into their 40s and 50s, many of them left their jobs and were more likely to become non-wage workers, which appeared to be different with the career path of college graduates. Especially, at age 50, four-year university graduates had average of 25 years of working experience, but vocational high school and technical college graduates spread out between 10 and 25 years. This trend can illustrate that those who do not have a four-year university education are more likely to experience job insecurities and unstable working conditions at a later age. Moreover, graduates of vocational high schools had higher number of job changes than those from general high school or universities, and they were more likely to become self-employed at a later point in their careers. This means that they faced more difficulties in securing their jobs as wage workers, and their career was more unstable as they got older (Mi-ran Kim, 2012).

In terms of promotion within companies, high school graduates had less opportunity to be promoted to the director level or above, compared to college graduates. In most cases, employees with high school diploma were promoted to heads of production line or manager. Among the students who enrolled in high schools in the early 1970s, or born from 1954~1958 and still employed in companies, 69.5% answered that they have experience of being promoted. When we examined them by the level of education, 66.0% of vocational high school graduates responded that they were promoted at least once, while 93.8% of four-year university graduates, 72.4% of technical college graduates, 68.4% of general high school graduates, and 55.1% of those with junior high school or below were promoted. In cases of those who attended high schools in early 1980 or born years from 1964~1968, their overall promotion rate was 73.0%, that of four-year universities was 96.2%, that of technical colleges was 64.7%, and that of general high schools was 42.2%, while that of vocational high schools was 51.7% (Mi-ran Kim, 2012). This generation entered the labor market in the ’70s and mid to late ’80s, and worked in the middle of rapid industrialization. They experienced continuous economic growth, but the promotion rate of vocational high school graduates was lower than that of university graduates. There were promotion systems for technicians or blue collar workers in companies, but their promotions to the higher ranks were not common, and even if they had an opportunity at a promotion, the levels to which they were promoted were not as high.

Until mid-1990, the internal labor markets of big manufacturing companies played an important role in increasing the productivity of skilled workers. However, after the

1997 economic crisis, domestic manufacturing industries relied more on the advanced technology in pursuing their innovation strategies, but the importance of skilled workers at the workplaces weakened. This change undermined the skill formation of graduates of vocational high schools to be skilled technicians in manufacturing workplaces through the internal labor market (Mi-ran Kim, 2012).

The wage gap between high school and university graduates in Korea is not high compared to other developed countries. As shown in [Figure 2-9], the wage of college graduates was 147.3% higher than that of high school graduates in 2011, which was relatively lower than the OECD average, 164.2%. Yet there are findings that the decreasing income gap between high school and university graduates widened again after the mid-1990s (Chul-sung Park, 2012). The widening wage gap by educational attainments was assumed to encourage students to pursue college diplomas, and to discourage them to choose vocational high schools.

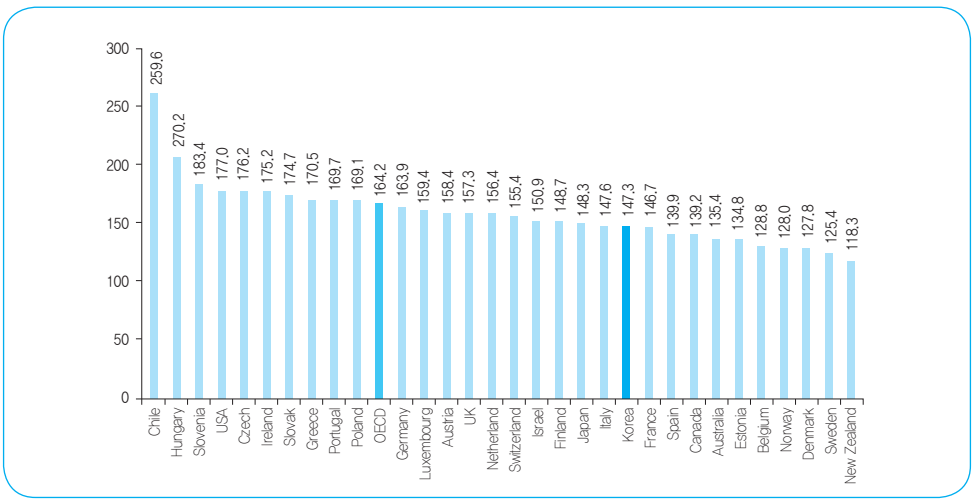
In addition to the wage gap, the leadership of the government, which was a driving force for vocational education development during the industrialization period, has not worked well as a coordinating mechanism since the 1990s. As the economy developed and became more complex, the government's control over private companies faced limitations, exacerbated by the increased pressure of global competition. The seventh economic and social development plan, first announced in 1992, was revised as a New Economy Plan in 1993, which was the last development initiative by the government. During the industrialization period, the central role of the government was to secure the supply of manpower needed for economic development, and to enhance capabilities by improving quality. The strong leadership of the government induced active attention and investment to school education from the businesses and industries.

As the economy expanded, the required skills or specifications for labor were diversified. Especially since the 1980s, industries were transformed toward the high value-added, led by *chaebols*, and as their business grew bigger, the internal labor market became entrenched. The internal labor market in large companies relieved the government from supplying and training for the various industries.

However, the situation was different for small and medium enterprises (SMEs). The number of employees in SMEs was relatively small and stability of employment was weak, thus they could not formulate internal labor market and depend on the technical manpower that were trained outside the company and educated by schools. However, as the role of vocational education at the high school level decreased, SMEs suffered labor shortages. Furthermore, instead of investing their own employees' skill formation, a few conglomerates sometimes used "poaching" strategy to bring skilled labor from SMEs by paying them higher wages. They aimed to gain a free ride instead of investing in human

capital development (Crouch, 2005). Conglomerates scouted skilled workers at SMEs and this took a heavy toll on SMEs (Young-Hwa Kim, 1990). As a result, job seekers to preferred conglomerates to SMEs.

Figure 2-9 | Wage Gap of High School and College Graduates in OECD Countries



Note: Upper secondary or post-secondary non-tertiary education = 100. Data in 2011, but that of Ireland, Portugal, Poland, Luxembourg, Netherlands, Spain, Canada, Norway, Sweden in 2010; that of Finland, Italy, France, Australia in 2009; and that of Japan in 2007.

Source: OECD Education at a Glance 2013. Relative earnings of 25~64 year-olds with income from employment, by educational attainment (2000~11).

There are still ongoing debates about the role and purpose of vocational education in the secondary educational level. To be more specific, people argue over whether vocational education in high schools should focus on training for jobs or preparing for further education. Especially, they argue whether it should be regarded as the stage of completion, or as one of the stages for continuing education. Those who regard vocational schools as the completion stage strongly believe that the mission of vocational schools must be clearly stated among stakeholders, and that the schools have to focus on training future technicians. If students at vocational schools were permitted to advance into higher educations, most students would prepare for college admission, which fails to accomplish the unique mission of vocational high schools, which is to train technicians. They also argue that those technicians must continue to develop their capabilities through various skills training courses or polytechnic colleges, rather than advancing to the academic higher education institutions. However, those who regard vocational schools as one of the stages for continuing education argue that education or training in the secondary school level cannot equip students with the skills

or levels required in the actual labor market, and they also emphasize that the schools have to prepare their students for continuous technology changes in the future. Some argue that the vocational schools have to nurture the capabilities of students to apply the basic and common knowledge they learned in schools, while others argue that they need to train and cultivate future technicians with detailed skills and practical technology (Yeong-chul Kim, 1992). This debate is still ongoing and it still plays an important part of policy formulation and decision-making.

However, there have been new changes in vocational high schools in Korea since 2010. After many efforts to revive vocational education, which ultimately turned out to be futile, Meister High School and the new policy package for vocational high schools, adopted from 2008, has increased the employment of graduates since 2010. There seemed to be changes in people's preference towards vocational education after realizing that the low quality of university education for those who are not academically ready enough could end up with youth unemployment or dismal job prospects much worse than those with a good vocational education at vocational high schools. The government also established a policy goal to promote the employment of graduates from vocational schools on the one hand, and assist their further education after some period of employment through new policies. The different views of further and complete education have been compromised by 'job-first and diploma-later', a new career path for vocational high school graduates (Lee et al., 2012).

The reviving movement of vocational education in high schools can be also interpreted as a new change in the infamous entrance-exam oriented education of Korea. The new path of 'job-first and diploma-later' has developed the aptitudes and talents of students during school days and closely linked the education with decent jobs after their graduation, breaking a rigid path of advancing blindly to higher education. The positive changes in vocational education in high schools promoted and strengthened career counseling in elementary and junior high school levels. To guarantee fair educational opportunity for each student, they should have more diverse learning experiences and more guidance over career choices or advancement. However, for this new change to bear fruit, businesses and the government also should take parts in the movement by abolishing old practices, such as discrimination based on the level of education, and innovate job skills training and a life-long learning system. A close look at how the vocational high schools in Korea will evolve from now on will give another useful implication to vocational education experts and policy makers, as much as it had during the industrialization period.

Chapter 3

National Strategies for Strengthening Vocational Education

National Strategies for Strengthening Vocational Education

This chapter analyzes three national strategies that supported vocational education to play a pivotal role in supplying technical manpower during the industrialization period. The first was a centralized planning strategy. Korea's vocational education was enforced as a significant part of the national economic development strategy, and along with the Five-Year Economic Development Plan, manpower development plans and policies related to education and training were drafted and executed. Second was the strategy for industry-education cooperation. Especially in the 1970s, when the government pushed for the promotion of the heavy and chemical industry, investment on vocational high schools expanded to produce technical manpower that were necessary, including the Specialization Initiatives of Technical High Schools (SITHS). Last was an effective financial strategy. Korea's investment priorities in education shifted from elementary schools, middle schools, vocational high schools, general high schools to universities along with economic development. It is especially important to note that in 1977, when the promotion of the heavy and chemical industry peaked, budgets for vocational high schools were increased to the almost same level as higher education. Furthermore, resources were acquired partly from private schools and through educational loans from foreign countries.

1. Centralized Planning Strategy

Korea's vocational education was carried out as an important part of the national development strategy. Along with the Five-Year Economic Development Plans, manpower development plans were devised to suggest overall direction and policies to foster manpower. The Five-Year Economic Development Plans were written and planned under the direction of the Economic Planning Board (EPB) where policymakers gathered various opinions from each ministry, which were then fused into one plan. The Manpower Development Plan, one

of the detailed plans for the Five-Year Economic Development Plans, was devised under the supervision of Ministry of Education (MOE) along with Ministry of Labor (or Ministry of Employment Labor) and the Ministry of Science and Technology. Also, the centralized administrative and legal system for education, which started to take a proper form from the 1960s, became the enforcing mechanisms of the Manpower Development Plan.

EPB was established to take on the responsibility of drafting economic development plans and related policies with other ministries, under the direct supervision of the president. EPB reflected the president's opinions and devised economic development plans, and encouraged relevant ministries to enforce these policies to achieve plan goals (Gwang-ha Kang et al., 2008:68). The most significant function of the EPB was to devise economic development plans. Seven five-year economic plans have been introduced since 1962 and the details of the policy can be seen in <Table 3-1>. For individual plans, specific goals were suggested and included policies that need to be implemented.

Establishment of economic plans is significant because it improves the effectiveness of government organization. Furthermore, economic development plans became a means by which to bring the public together, by suggesting detailed goals, mechanisms and announcing the future direction of the economy. In the process of establishing economic development plans, the government reviewed past economic conditions, and in the process of gathering future development strategies, government officials' capacities were increased, and by suggesting the overall guidelines on resource allocation and direction of development, government induced activities or private entities in the way economic plan intended (Gwang-ha Kang 2008:70~72).

At the same time, more detailed plans were devised to achieve economic development plans. In particular, manpower development plans were created and announced sporadically to supply manpower that was needed to achieve economic development. The first Five-Year Technology Plan (1962~1966) and technology human resource supply plan (The first Five-Year Manpower Development Plan: 1962~1966) was established to supplement the first Five-Year Economic Development (1962~1966). Since then, words such as manpower and human capital started to appear in economic plans, science and technology plans, educational plans, and vocational training plans, and its importance was often emphasized. At the time, the concept of human capital was not widely used as it is today, and it was discussed mainly in terms of supplying manpower in the field of science and technology. Until the second plan, EPB was in charge, and from the third plan, the Ministry of Science was in charge of devising the plan (Yun-tae Kim, 2002). For a more detailed supply of manpower, policymakers gathered future prediction on demand and prepared a supply

plan that met those needs. Through the second economic plan, the definition of engineers, technicians, and craftsmen became clear.[3]

The first Manpower Development Plan emphasized the admission quota for engineers, adjusting enrollment quota for universities in science and engineering, increasing the number of graduates in technical high schools (thereby improving quality and quantity), implementing in-plant vocational training, and the importance of the military in securing technical manpower. The second Manpower Development Plan focused on repressing the quantifiable expansion of educational institutions and increasing the quality of education for an effective investment, strengthening the quality of education in science and technology, supporting the expansion of vocational training and providing vocational guidance and job security, and further strengthening of the manpower management system.

The third Manpower Development Plan was devised in the early 1970s, and it included expanding and strengthening university and graduate school education, reinforcing a skill-learning system, improving elementary and middle school education, securing specialized manpower in medicine, teaching and marine technology, policies to support and distribute manpower, and investment policy in manpower development. Compared to the manpower development policies in 60s, more detailed and developed policies were introduced in this period, and these policies showed consistency with previous plans. In line with the third plan, the fourth Manpower Development Plan was devised to increase graduate schools for fostering scientists, expand specialized universities to secure engineers in the field of the heavy and chemical industry, systemize technical schools to promote middle-level engineers, establish technical universities, improve and expand the National Technical Qualifications System, enhance working conditions and workplace safety, and expand activities for job security (Yoon-Tai Kim, 2002).

3. 1) Engineers refer to those "who utilizes high level technical supervisors to systemize the structure, equipment, organization, and the process or supervises the overall design and plan of production facilities," and scientists are those "who researches and studies physics, chemistry, math, and biology to broaden new knowledge or to contribute to the industry and social development." They either graduated from four-year universities with a degree in natural sciences and engineering, or have national certificates issued by the government. 2) Technicians are in the field between engineers and craftsmen, and they are referred to as those "who carry out from how to produce, plan, calculate the costs, write specifications, prepare production work, and test finished goods based on the design by engineers." They are either graduates of junior college of natural sciences and engineering (including vocational high schools), completed two years or more at the college of natural science and engineering, or have national certificates by the government. Also, if vocational high school graduates worked more than three years in the relevant field, then they were categorized as technicians. 3) Craftsmen refer to those who are in the workplace and require three years or more of working experience in the technical field and more than six months of systematic training, and people who utilize specialized tools to carry out the work. For example, their work includes deciphering blueprints, adjusting operating machines based on an individual's judgment, and choosing proper tools for the working process.

In the 1980s, due to the growth of technology-intensive industries, securing human capital with capacity to adapt to industry changes was necessary. To meet the trends at this time, scientists focused on expanding both the quantity and quality of education, and amplified the Korea Advanced Institute for Science and Technology, graduate schools in science and engineering. The government also increased technical trainings abroad and invited experts from overseas. Due to an increase in the number of university students in the 1970s, the lack of supply for engineers were resolved. The policy promoted the quality of engineers, and the government continues to work on the issue of supply and demand by profession. Also, policymakers predicted that there would be lack of skilled technician in the future and reflected this concern by focusing on quantity expansion and the training of skilled technicians by promoting technical universities, strengthening technical high schools, and expanding vocational training. The sixth Manpower Development Plan aimed to foster and secure high-level scientists and technicians who would lead technical innovation and expanded the supply of the research labor force with doctorate degrees in the field of engineering (Yoon-Tai Kim, 2002).

Table 3-1 | Major Contents of Five-Year Economic Development Plans

Category	1st Plan (1962-1966)	2nd Plan (1967~1971)	3rd Plan (1972~1976)
Goals (Growth Rate/ Record)	1. Fix socioeconomic cycle (low income → low investment → low productivity → low income) 2. Structuring foundation for self-sustaining economy (7.1 / 8.5)	1. Modernization of industrial structure 2. Expedite in establishing self-sustaining economy (7.1 / 9.7)	1. Harmonization between growth, stability, and balance 2. Realization of self-sustaining economy 3. National land planning, equal regional development (8.6 / 10.1)
Major Policies	1. Fix imbalance in national economy structure caused by increase in agricultural productivity 2. Secure the source of energy supply 3. Expansion of social overhead capital and key industries 4. Utilize unused resources 5. Improving international balance of payments 6. Technology promotion	1. Self-sufficiency of food, forestation, development of fishery resources 2. Creating basis for industrialization (chemical, steel, machinery) 3. Expedite $700 million export and import substitution (improve international balance of payments) 4. Increase employment, control expansion of population 5. Diversification in agriculture, stabilization of rural household incomes 6. Promotion of science and management technology, increase productivity through manpower development	1. Self-sufficiency of staple grains 2. Improve the living environment of fishing and farming villages 3. Improvement of international balance of payments 4. Accelerate industrial structure through construction of heavy and chemical industry 5. Improvement in science and technology and manpower development 6. Expand the balance of social overhead cost 7. Effective development of land resources and optimal distribution of industries and population 8. Improvement in social security and national welfare
Development of Industrialization	Organizing foundation for industrialization	External-oriented industrialization	Export-oriented; Construction of heavy and chemical industry

Category	4th Plan (1977~1981)	5th Plan (1982~1986)	6th Plan (revised) (1987~1991)
Goals (Growth Rate/ Record)	1. Realization of self-sustaining growth structure 2. Increase equality through social development 3. Technology innovation and improvement in efficiency (9.2 / 5.5)	1. Improvement of international balance of payments through economic stability 2. Increase in income through stable growth 3. Improvement in national welfare through balance (7.6 / 7.9)	1. Securing fairness and improve economic management 2. Balanced economic development and improvement in people's lives 3. Open economy, push for internationalization (8.3 / 10.0)
Major Policies	1. Procure investment sources 2. Achieve international balance of payment 3. Restructuring industries and improve international competitiveness 4. Expansion of employment opportunity and manpower development 5. Expansion of Saemaeul Movement 6. Improving living environment 7. Increase investment in science and technology 8. Improving economic management and system	1. Shed away from inflation economy 2. Recover the competitiveness of heavy and chemical industry 3. Modify agricultural policy 4. Overcome energy limitation 5. Improve financial system 6. Reestablish government function and rationalize financial management 7. Establish competition system and enforce open policy 8. Promote education, manpower development, and science and technology 9. Settle on new labor-management relationship 10.Expansion of social development	1. Improve fairness of tax burden 2. Regulate real estate investment, improve the land system 3. Enforce financial liberalization 4. Intensive regulation on economic power and strengthening fair trade system 5. Settle the relationship between labor-management 6. Structural improvement in agricultural development 7. Relax shortage of housing for urban working class 8. Improve the quality of educational environment 9. Balanced regional development, promote local industries 10. Protect merchants and modernization of retail 11. Trade policy under the surplus of international balance of payments 12. External economic policy in the era of globalization
Development of Industrialization	Technology-intensive industrial development	Promote industrialization model of developed countries	Realization of technology migration through reform of industrial structure

Source: Young Hwa Kim (1990). EPB (1988).

However, Korea's educational system and manpower development plans could not be implemented systemically to schools in every region, due to lack of enforcing mechanisms. In particular, educational policies in the post-war period focused on expanding the quantity of educational institutions and related infrastructure, and because of non-interference by the government, an increase in the number of private schools was the result. In the mid-1960s, universities were authorized, which led to the 'University Boom', with quantitative increases. The Decree on Standards for the Establishment of Universities and Colleges in 1955, the Decree on Standards for Private Middle and High School Facilities in 1959, and

the Decree on Standards for Elementary School Facilities in 1960 were legislated; however, these policies still did not resolve the issue of educational quality.

The Act on Special Cases concerning Education (1961.9.1) was prepared by the Supreme Council for National Reconstruction, a governing body of the military government. This became the foundation for the government's oversight on private schools. This Act was legislated to "strengthen the regulations on private schools, which is a non-profit corporation, and clean up corruption in the educational sector due to lack of regulations, and promote the quality and order of people's education." The Act included regulations on establishing a Special Advisory Committee on Education Reconstruction, assigning the right to readjust the number of classes and students, abolishing and combining schools and courses to reorganize existing schools, mutual replacement between schools in compulsory education, establishing a two-year College of Education and including performance scores when university professors were hired, prohibited the labor movement and collective action of teachers and decreased their retirement age by five years, and implemented the national examination system upon receiving university degrees. Succeeding policies such as the Special Law on Middle and High School and University Enrollment, the Decree on the University Exit Exam, the Decree on Standards for School Organization, the Decree on Standards for the Establishment of Kindergarten Facilities, and the Decree on Disciplinary Action on Private School Teachers were enacted (MOE, 1998:744).

After the Act in 1961, laws related school education was introduced to modify various laws and regulations. To meet to the national policy at the time, various Promotion Acts such as the National Sports Promotion Act (1962), the Industrial Education Promotion Act (1963), the Act on the Promotion of Education in Islands and Remote Areas (1967) and the Science Education Promotion Act (1969) were legislated. Also, legislation related to the hiring of teachers and school curriculum, such as the Teachers' Certification Act, the Promotion of Public Educational Officials Act (1964), the Liberal Arts and Vocational High Schools Curriculum Act (1966), the School Health Act, the School Curriculum Act, the Official Approval on Writing of Curriculum Books (1967), the Establishment of Teachers' College Act, the Decree on Standards for School Equipment and Utilities, the National Standardized Preliminary Test Act (1968), the Presidential Decree on the Implementation of Student Military Education, the Decree on Standards for Establishment of School Facilities (1969), the Decree on Standards for Expansion of University Facilities (1970), the Regulation on Wages for Educational Officials, and the Regulation on Personnel Management of Educational Officials (1972) were newly enacted. Planning for local education administration was ceased due to the Act on Special Cases Concerning Education, but from 1964, the Local Education Autonomy Act was enacted to give sole right to the local government (MOE, 1998:745).

In the 1970s, various educational laws were continuously modified. In 1971, the Local Education Finance Subsidy Act was enacted and the central government granted part of the funds to establish and run schools to the local government. This contributed to decreasing the educational budget gap between regions, but it has brought both positive and negative effect in the development of local education. National regulations on education was accelerated due to the High School Equalization Policy (1974), and further strengthened by the Decree on Standards for School Accreditation (1976) and the Decree on Standards for Various Schools (1977) (MOE, 1998:746).

When policies are created, however, there are often difficulties in the implementation process, and how well the policies are enforced is important in its outcome. In the 1970s, policies to promote the heavy and chemical industry were introduced, but the government had to overcome many difficulties in order to successfully implement the policy. Among many obstacles, the issue of manpower supply was most difficult to solve, even more than capital financing or securing technology. In the process of resolving these issues, the government introduced policy entrepreneurship (Schumpeter, 1956:2000; Mintrom & Vergari, 1996). Korea's technical high school policy is an exemplary case among many, since vocational education took a leap in a short-period through central policy planning.

Specialization Initiatives on Technical High Schools (SITHS), started in 1973, divided schools into four categories depending on its geographical locations and characteristics, and the government invested heavily into schools that would work to improve their effectiveness. However, in the process of implementation, oppositions by schools which did not receive benefits and those who were negatively affected by the policy revolted. But President Park demonstrated his strong political leadership and resolved the issue. President Park showed his strong support for SITHS by providing 35 precision machines to mechatronics high schools. Park also made sure that if a student were to earn a Precision Measurement Certificate while he or she was in school, the government would provide a grant to the school, which would then be provided as a 100,000 Korean Won scholarship per year. Also, despite the opposition by the residents, President Park moved Chonbuk National University's College of Engineering to Jeonju, and with the existing university facility, he established the Chonbuk Mechanical and Technical High School in 1975. Due to his strong will, support by private organizations increased.

On the other hand, the fifth plan in the 1980s, and its strategy to strengthen vocational education, failed due to a lack of cooperation between the Ministry of Education and the Ministry of Science and Technology. The policy also lacked horizontal consistency (Yun-tae Kim, 2002). The policy to foster technical manpower was related to education, science and technology, labor, and the economic ministries. But each ministry had different views, while the government did not have a focal point, which meant that none of the ministries

would take the lead on the policy. Especially from the third plan, policies were created by the Ministry of Science and Technology, and not by EPB, which further weakened cooperation between the ministries.

2. Strategy for Industry-Education Cooperation

In order for vocational education to be successful, cooperation between education and industry is essential. Without gaining feedback from industry the educational sector, cannot supply a productive workforce; by blindly accepting requests by industry, the educational sector cannot produce the manpower required by the nation. In Korea, under the support and attention of the government, the cooperative relationship between industry and education was established and sustained. First, the Promotion of Industrial Education Act was enacted in 1963. The law states that its purpose is to "enhance the quality and quantity of technical manpower that are needed to carry out the Five-Year Economic Development Plans, and furthermore, foster technicians who can contribute to the growth of the whole nation." With advice from the minister of education, the government established the Central Industrial Education Council within the Ministry of Education, and asked for participation from industry players.

In 1973, through the modification of legislation, vocational high school students were obligated to participate in field practice for a certain period of time while they were in school. The minister of education requested the heads of the central administrative agencies to designate the companies for field practice and report back to the minister of education. The legislation also establishes cooperation with industry in detail, and in order to enforce this policy, the Industrial-Academic Cooperation Team was formed under the Science and Technology Education Division within the Ministry of Education. This team was in charge of industry-education cooperation, educational plans on the heavy and chemical industry, and management of the Central Industrial-Academic Council. The cooperation between the two also came in the form of industry supported funds to schools, equipment and materials, furniture for students' dormitories, and scholarships; and schools, by accepting the requests of industry, produced technicians that would meet to the industry demand and secure jobs for their graduates (MOE, 1988:427~429). Furthermore, according to the Regulation on Exception to Military Service Act of 1973, the government excluded technicians who are working in industries that are essential for a country from obligatory military service. Even if a person did not serve the military, provided that he had more than five years of working experience in the same company, he was transferred to the reserve force and excluded from being enlisted (Young-Hwa Kim, 1990:79).

Also, the National Technical Qualifications Act was enacted (1973.12.31) to standardize the level of skills and techniques required by industry, which had a significant impact on vocational education in schools. The purpose of the legislation was to "establish an appropriate qualification system by unifying standards and the names of technical qualification, and contribute to improving the social status and quality of technical manpower who can contribute to economic development by creating sound management and operation of the system." The implementation of the National Technical Qualification System not only forced schools to provide quality vocational education, but it also contributed to positive changes in the public's view about technicians and vocational skills.

Along with the various stages of industrialization, the purpose of, and curriculum in, Korea's secondary education changed dramatically. In other words, the public's demand on education and the industry's demand on fostering manpower did not always match. Accordingly, the purpose and curriculum of Korea's vocational high schools changed along with changes in the socioeconomic circumstances, development stages of the industry, and political leadership.

After Korea's independence and reconstruction, people's passion for education has increased. In particular, the demand for academic education in universities continued to soar past vocational education. The traditional Confucian culture of respect in academics was strongly present in Korea, and prejudice against the manufacturing and commercial industry as an occupation was still prevalent. Partly due to this academic bias, entrance examinations for middle school and general high schools were fierce, and the public generally eschewed a vocational education. In the 1950s and 1960s, before educational curricula were established or were in their primary formative stages, the government did not strictly enforce vocational education. Instead of fostering vocational education schools, the government campaigned to promote the importance of vocational education. Also, the government regulated vocational high schools to run 30% less on specialized subjects, and comprehensive high schools were implemented to operate two-track program within them, where one prepared for jobs and the other prepared for a university education.

Meanwhile, after the new government was established and economic development plans were enforced, the purpose of education and curriculum contents also transformed. The second educational curriculum, started in 1963, emphasized a curriculum centered on real life and experience, differentiating it from previous curriculum programs, which focused on academics. It created separate curricula for the liberal arts and vocational high schools, and indicated that the purpose of vocational high school education was to secure technicians needed for economic development. And to differentiate from general high schools, the number of specialized subjects in vocational high schools were increased. The third educational curriculum adopted the academic centered curriculum and whole-

person education to supplement problems involving experience based curriculum, but job-readiness education was further strengthened through obligatory field experience and the examination for national engineer certificates at vocational high schools. This period was when the education sector actively accepted the needs of industry to supply the manpower necessary for economic development.

Table 3-2 | Major Contents of Curriculum Reforms

Category	Background and the Direction of the Reform	Major Contents
Before the Curriculum (1945~1955)	o Avoidance of Vocational Education - Emphasized the importance of technology and vocational education - High schools with more than 30% specialized courses were categorized as vocational high schools	o Reorganization of Vocational Education System o One Skill for Every Student o Implementation of Comprehensive High Schools ('54)
1st Curriculum (1955~1963)	o The Five-Year Vocational Technical Education Plan ('57)	
2nd Curriculum (1963~1973)	o Curriculum Centered on Life and Experience o Separated Liberal Arts and Vocational High Schools - Secure skilled technicians that are needed for the economic development and provide education which meets to student's capacities	o Announcement of Vocational High School Curriculum Reform ('63) o Industrial Education Promotion Act ('63) - Increased Regulation on the Portion of Specialized Courses
3rd Curriculum (1974~1981)	o Curriculum based on Academia, Strengthened Whole-person Education o Restructuring Curriculum to Foster Vocational High Schools and Technical Manpower (specialized policy on technical high schools)	o Strengthening of Industry-Education Cooperation, Mandatory Field Training o Implementation of National Technical Qualification Act o Expansion of Experiment and Practice Facilities in Vocational High Schools o Test Operation between Vocational High Schools and Technical College

Category	Background and the Direction of the Reform	Major Contents
4th– 5th Curriculum (1981~1988, 1988~1992)	o High school Curriculum Reform followed by Acceleration in Industrialization o Realization of 7.30 Educational Curriculum Reform, Decreased Number of Subjects, Reduced the Level of Difficulty o Foster Excellent Technicians with Good Personality and Skills	o Reinforce Vocational Education, Curriculum Reform - Unifying Curriculums in Liberal Arts and Vocational High Schools - Reduced Practice (60% → over 50%) o Abolished Mandatory Technical Certificate System and Preferential Treatment in Entering University of the Same Field
6th Curriculum (1992~1997)	o Foster Human Character who can Prepare for the 21st Century o Concerns on the Shortage of Industrial Manpower	o Improving Educational Conditions of Vocational High Schools o Expand the Capacity of Vocational High Schools o Vocational Education in General High Schools o Implementation of 2+1 System in Technical High Schools ('99)

Source: Resived from Yeong-ryul, Choi et al. (2009).

However, due to changes in government in the early 1980s, education policy also faced a considerable change. Philosophy on education was revised and policies to reduce the heavy burden on entrance exams were enforced. Policy measures, including prohibiting private tutoring, a decreasing number of subjects, abolishing school examinations, and lowering the level of difficulty, were announced. And the fourth curriculum reflected these measures and added efforts to reduce academic bias. The goal of vocational high schools changed from simply fostering technicians to raising talent with personality and skills. In order to achieve this goal, curricula in the liberal arts and vocational high schools were collaborated, reduced field training for vocational high schools, and abolished the national technical examination. This was to strengthen general education in vocational high school education, and can be seen as a reaction to the previous period's policy, which fully accommodated the request of the industry. In the 1960s and 1970s, the government decreased general education and compelled students to go into vocational education. However, the people's demand for general education and college advancement increased, thereby overwhelming the college entrance exam system; and this is reflected in problems such as the heavy increase in private tutoring and mass production of repeat applicants to universities. In response, the government expanded opportunities for university education and generalized secondary education curriculum to meet people's demands.

Meanwhile, in the '90s, the view that cooperation between industry and education needs to be strengthened again expanded around economic ministries. People were worried that there would be lack of manpower in manufacturing workplaces, and began to push for strengthening vocational education in secondary education. The curriculum reform in 1992 reflected these concerns and expanded vocational high schools and vocational education in general high schools. And for technical high school students, the government implemented 2+1 system where a student studies in school for two years and works for one year. Not only did the reform reflect the needs of the industry, it seemed to turn from a curriculum that emphasized the public's demand on general education and college advancement, moving it in the opposite direction.

Changes in curriculum are usually more pronounced for technical high schools. Depending on the changing view in education, the ratio between general education (common subjects) and vocational education (specialized subjects) in technical high schools changed. The portion of specialized subjects, which was around 30% when the vocational high school curriculum was first devised, increased to 60% in the 1960s and to 75% in the 1970s, when job-readiness was emphasized. Moreover, within specialized subjects, field experience, rather than theoretical studies, was stressed. On the other hand, in the 1980s, the government increased the general subjects, separated them into common and selective subjects, and largely decreased vocational subjects. Furthermore, extracurricular activities, which applied to general high schools, was also implemented in vocational high schools so that students could strengthen their basic capabilities as a professional. Yet in the 1990s, the number of common subjects decreased and specialized subjects were strengthened.

Table 3-3 | Curriculum Reform in Technical High Schools

<table>
<tr><th>Categories</th><th colspan="2">2nd
(1963~73)</th><th colspan="2">3rd
(1974~81)</th><th>4th
(1981~88)</th><th>5th
(1988~92)</th><th>6th
(1992~97)</th></tr>
<tr><td>Common Subject</td><td colspan="2">88~100
(45~50%)</td><td colspan="2">68~90
(30~40%)</td><td>Core: 72~84
Elective: 10~38</td><td>Core: 78
Elective: 48</td><td>Core: 70
(34%)</td></tr>
<tr><td rowspan="2">Specialized Subject</td><td rowspan="2">112~122
(55~60%)</td><td>Theory: 14~76
(13~62%)</td><td rowspan="2">114~154
(60~75%)</td><td>Theory: 42~84
(37~55%)</td><td>Core: 28~40</td><td rowspan="2">82~122</td><td rowspan="2">Core: 106
Elective: 12
(58%)</td></tr>
<tr><td>Experiment: 72~108
(64~88%)</td><td>Experiment: 72~126
(63~82%)</td><td>Elective: 54~94</td></tr>
<tr><td>Extra-Curricular</td><td>-</td><td>-</td><td>-</td><td>-</td><td>12</td><td>12</td><td>16
(8%)</td></tr>
<tr><td>Total</td><td colspan="2">204~222</td><td colspan="2">204~222</td><td>204~216</td><td>204~216</td><td>204</td></tr>
</table>

Source: Resived from Yeong-ryul, Choi et al. (2009).

As mentioned, cooperation between industry and education went through many changes. In Korea, more than in any other country, students' and parents' demands for advancement to higher education were tremendously high. Without the strenuous efforts by government to push forward for education-industry cooperation, it would have been difficult for vocational education to take firm root in Korean soil. Under this circumstance, Korea's strategy for education-industry cooperation can provide many useful implications to developing countries.

3. Effective Financial Strategy

Although determining investment priority is an important part of any development strategy, it is often difficult due to limited resources. As noted by the World Bank (1993), Korea invested first in the primary education, then to secondary education, and after primary and secondary education were in place, the government invested in higher education. In this study, we will focus on the investment priority of vocational education, which had not been pointed out by the World Bank. As we can see in <Table 3-4>, Korea's priority in educational investment changed from primary and secondary education to vocational education and to higher education. Thus, we need to acknowledge the fact that in the process of increasing investment in education, there was a distinct period where vocational education was once set as a top priority between secondary and higher education. Until 1973, the share of educational investment in primary and secondary education increased above 88%. The Korean government prioritized its investment in primary education by providing free compulsory education, and then invested in expanding secondary school facilities and its school management.

Table 3-4 | Size and Composition of Educational Budget by Year

Year	GDP (hundred million won)	Central Government Education Budget	Elementary, Middle School	High School	Vocational Education	b/a (%)	c/b (%)	d/b (%)	e/b (%)
	a	b	c	d	e				
1967	12,593	307	276	21	7	(2.4)	(89.9)	(6.9)	(2.3)
1968	16,298	419	370	28	15	(2.6)	(88.2)	(6.8)	(3.6)
1969	21,302	562	504	28	11	(2.6)	(89.7)	(5.0)	(1.9)
1970	27,751	769	695	45	18	(2.8)	(90.4)	(5.8)	(2.4)
1971	34,345	981	887	51	28	(2.9)	(90.4)	(5.2)	(2.8)
1972	42,411	1,142	1,021	67	35	(2.7)	(89.4)	(5.8)	(3.1)
1973	54,990	1,174	1,039	72	39	(2.1)	(88.6)	(6.1)	(3.3)
1974	78,454	1,489	1,293	90	54	(1.9)	(86.8)	(6.0)	(3.6)
1975	104,778	2,226	1,920	144	103	(2.1)	(86.2)	(6.5)	(4.6)
1976	144,108	3,454	3,057	205	124	(2.4)	(88.5)	(5.9)	(3.6)
1977	185,020	4,807	4,036	361	302	(2.6)	(83.9)	(7.5)	(6.3)
1978	249,447	6,164	5,080	475	346	(2.5)	(82.4)	(7.7)	(5.6)
1979	320,494	8,849	7,115	960	527	(2.8)	(80.4)	(10.9)	(6.0)
1980	391,096	11,509	9,416	1,136	571	(2.9)	(81.8)	(9.9)	(5.0)
1981	493,057	14,646	12,052	1,373	746	(3.0)	(82.3)	(9.4)	(5.1)
1982	566,768	19,164	15,965	1,938	721	(3.4)	(83.3)	(10.1)	(3.8)
1983	666,851	21,748	18,267	2,125	756	(3.3)	(84.0)	(9.8)	(3.5)
1984	765,235	22,753	19,382	2,041	843	(3.0)	(85.2)	(9.0)	(3.7)
1985	856,991	24,924	21,458	1,967	897	(2.9)	(86.1)	(7.9)	(3.6)
1986	1,002,541	27,690	23,614	2,361	1,053	(2.8)	(85.3)	(8.5)	(3.8)
1987	1,179,382	31,239	26,671	2,654	1,170	(2.6)	(85.4)	(8.5)	(3.7)
1988	1,405,248	37,043	31,851	2,934	1,322	(2.6)	(86.0)	(7.9)	(3.6)
1989	1,586,201	43,446	37,423	3,430	1,576	(2.7)	(86.1)	(7.9)	(3.6)

Source: Yearbook of Educational Statistics, Annual Series.

Meanwhile, as it can be observed in [Figure 3-1], the budget share for vocational education changed drastically over time; in the 1960s, the share did not go beyond 4%, but by the late 1970s, it had increased to 6%. In the same period, the budget share for higher education did not increase as much, and stayed around 5~7.7% and expanded to 10.9% in 1979, which shows that the investment in higher education started to rise in the late 1970s. Thus, the budget for vocational education reached almost the same level as the budget for higher education. It is important to pay attention that while investment in higher education increased, investment in vocational education also increased. After some period of high investment in vocational education, the budget decreased to 4%, yet the investment in higher education increased drastically, widening the gap with vocational education.

The government's lack of resource was mostly supplemented by the establishment of private schools. The portion of private schools was highest in higher education, and in the 1960s, when the university enrollment quota was regulated, investment in private secondary education gradually increased. In 1965, among 701 high schools and 42,600 students, 316 (45.1%) schools and 21,600 thousand (50.7%) students were attending private schools. There were 107 (15.3%) private vocational high schools and 67,000 (15.7%) students attended the schools. In 1973, the number of private vocational high schools increased to 248 and its share was 24.4% of total high schools. Due to the High School Equalization Policy in 1974, the expansion of general high schools was enforced and a part of private vocational high schools was changed to general high schools. The number of private vocational high schools decreased to 304 (21.7%) in 1981 and to 313 (19.5%) in 1985. The ratio of enrolled students in private vocational high schools increased to 15.7% in 1965, to 27.3% in 1973, and gradually decreased to 25.5% in 1980, 21.9% in 1990, and to 18.4% in 2000.

However, from the 1970s to 1990s private vocational high schools supplemented government's lack of resources and educated more than 20% of overall high school students, contributing significantly to Korea's educational development and labor supply. The share of private vocational high school students, including general high schools, increased from 50.7% in 1965, to 60% in 1981, and to 61.9% in the early 1990s. Not only in vocational education, but even in general high school education, private schools played an important role in Korea's secondary education.

After grant aids were severed from 1967, the government acquired loans from international communities. On June 1969, the first educational loan came into an agreement and projects on facility expansion started. At the time, $1.5 million was provided as an educational loan under the agreement between the International Development Association (IDA) and the Korean government. The official name of the agreement is the Development Credit Agreement (Education Project) between the Republic of Korea and International Development Association. The Agreement states that the role of the government should be

for the development of agricultural, commercial, and technical education in high schools and vocational high schools, securing school facilities and teacher training facilities and hiring overseas specialists as necessary. And the agreement clearly states the purpose of the loan and its plans, and the names of educational institutions that are either to be established or expanded. In short, the agreement mentions replacements for three technical high schools and the expansion of six others, the expansion of two comprehensive high schools, five agricultural-technical high schools, four commercial technical schools, one higher educational school, construction and additional equipment to the Department of Agricultural Education at Seoul National University, provisions of science equipment for the science teacher training departments at three national universities in Seoul, Kyungbuk and Kongju, and provisions to dispatch 26 experts as a part of technical assistance for the development of agricultural education. The project was scheduled to be completed by June 30, 1974.

Since then, 11 educational loan projects have been implemented, and in the beginning it was used for vocational education and vocational high schools. Later, it would be used to foster higher education and advanced technology, in relations to science and technology. In the beginning of industrialization, the strategy was to increase the productivity of unskilled labor, and later, the strategy shifted to supplying skilled labor in a high-tech industry. According to an a study, the internal rate of return on educational loans recorded over 5,000%, which indicates that the efficiency of the investments was very high. Educational loan projects are highly evaluated as it contributed to foster and supply human capital for the nation's economic development (MOE, 2000).

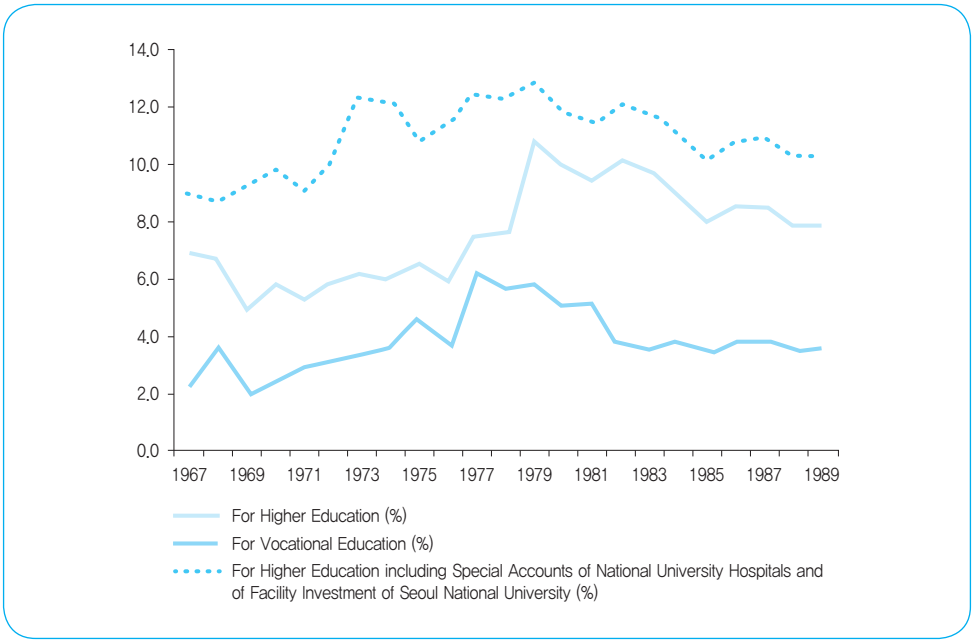
Separately, in 1972, the Korean government received $2.5 million as a loan from the United States Agency for International Development through the agreement on educational development, and started to implement educational research projects such as developing elementary and middle school curriculum, teaching methods, and school management. At the time, with close cooperation with international development organizations, Korea was able to expand the necessary facilities that were needed for the vocational education and invited overseas specialists. These experiences were then expanded to other parts of the education sector.

Table 3-5 | Description of Projects Supported by IDA in 1969 under the Educational Loan

Level of Schools	School Type	No. of Schools	School Name	Others
Vocational High School (27)	Technical	9	Seoul Puk, Pusan, Anyang, Taiback, Choongnam, Mokpo, Ulsan, Chinju, Soonchon	Rebuilt in '71 (Pusan, Mokpo, Ulsan)
	Comprehensive	2	Youngju, Kunsan	Constructed in '71
	Agricultural-Technical	5	Sosa, Kangneung, Janghang, Nonsan, Kimhae	Constructed in '72
	Agricultural	7	Suwon, Yoju, Boeun, Jeongeup, Bosung, Kimchon, Kongju	Constructed in '72
	Commercial	4	Kyunggi, Kyungnam, Inchon, Taegu	Constructed in '72
Vocational Technical Schools (5)	Higher Technical Schools	4	Kyunggi, Pusan, Chungju, Taejon	Constructed in '71
	Higher Agricultural Schools	1	Chinju	Constructed in '72
National University (4)	Agricultural	1	Seoul National University in Agriculture	Constructed in '71
	Education	3	Seoul National University, Kyungbuk University, Kongju University	Equipment Only
Total		36		

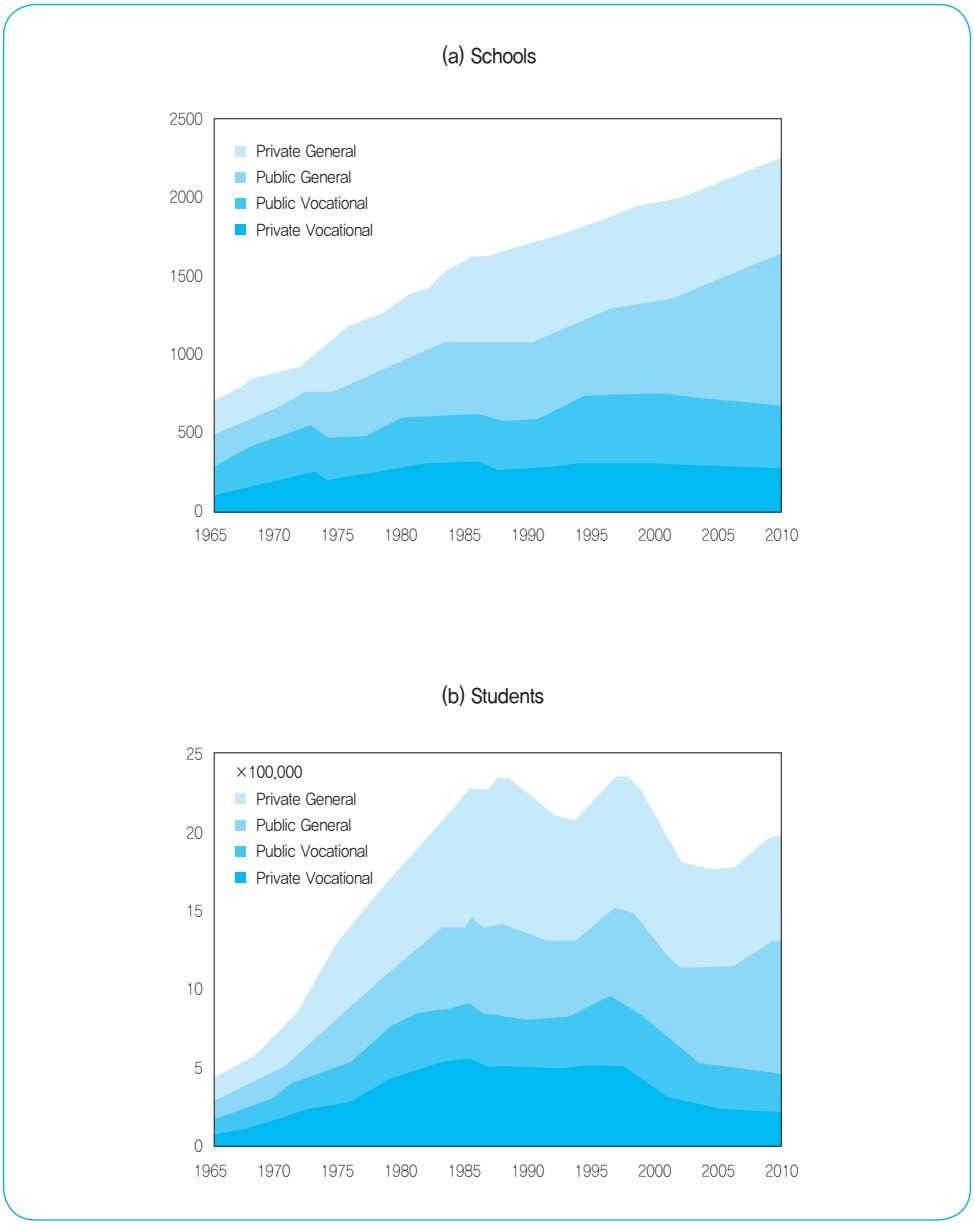
Source: IDA Educational Loan Agreement (1969).

Figure 3-1 | Budget Share of Vocational Education and Higher Eduction



Source: Yearbook of Educational Statistics, Annual Series.

Figure 3-2 | Number of Schools and Students by Establishments



Source: Yearbook of Educational Statistics, Annual Series.

2013 Modularization of Korea's Development Experience
The Development of Vocational High Schools in Korea during the Industrialization Period

Chapter 4

Key Policies in Vocational Education by Periods

Key Policies in Vocational Education by Periods

This chapter looks into the evolution of vocational education policy in Korea during its industrialization period. The 1960s was a period when the movement for the manpower development plan started as a part of Korea's economic development plan. The government created the basis of a vocational education system through central policy planning, despite a strong bias for an academic education. In the 1970s, President Park Chung-hee pushed for the heavy and chemical industry, and under the leadership of O Won Chul, the leader of the Council for Heavy and Chemical Industry, strategies to strengthen vocational education was galvanized. As a part of this strategy, the Specialization Initiatives for Technical High School (SITHS) was enforced from 1973. In fact, SITHS and the industrial policy were twin policies to promote the heavy and chemical industries in Korea. SITHS divided schools into four categories by geographical locations and school characteristics, and prioritized investment in technical high schools that would play a leading role in the process of industrialization. In the 1980s, the economic stabilization policy was implemented after the economic crisis in 1980, and social development, including education, was emphasized along with economic growth. During this period, the vocational education system was reorganized. Also, the MOE changed the direction of vocational education from simply responding to short-term industrial demands, to increasing workers' adaptability to changes in technology in the long-term.

1. 1960s

1.1. Manpower Plan as an Important Part of Economic Plan

In the 1960s, there was a severe shortage in jobs, and the government was faced with serious unemployment problem. Also, there was lack of a systematic way of educating and training for vocational and technical content. At the time, Edgar C. McVoy, a manpower planning specialist at the U.S. Department of Labor, visited Korea from April to May in 1965 under the support of the United States Agency for International Development (USAID). In 1965, McVoy submitted a report on 'Manpower Development and Utilization in Korea' and this brought the attention of the Korean government with matters related to manpower along with its Five-Year Plan. This report points out that Korea was facing a serious unemployment problem, but there were shortages in engineers and technicians and also a lack of training programs to foster them.

> Korea's land and natural resources are limited, but it has abundant human resources. It is not only enough of supply, but a country in a stage of economic development, its human resources are well developed. In terms of its education and human capital development level, Korea maybe with developed countries, but in terms of national income per capita and labor ratio of primary industry, it is still placed with developing countries. Korea's manpower has adaptability and is just right for the training, and is dexterous and is used to working long hours. Unemployed are around 6~10% of the total labor force and underemployment can effect up to 50% of the labor force. There are more than 3 million people who do not have any means of living… There are some people with national certificates and can be employed in professional occupations, but they do not have the right knowledge and skills that is needed for the job, thus they lack in quality. Except for a few large companies, there is almost no systematic on-the-job training within the company (McVoy, 1965; Yun-tae Kim, 2002:53).

In the 1960s, the Confucian tradition of four classes of society was still deep rooted in the public, and hierarchical ranking in workplaces were still in place. Thus, people had a strong demand for education, but many avoided vocational education and rather wanted to advance to universities. This sentiment in the public led to the problem of lack of supply in productive manpower that was needed for industrialization. Speeches and writings by government officials in charge of educational sector within the National Reconstruction Supreme Commission during this period reflect their concerns.

> …If we look at our education in the previous years, we have leaned towards only one part of the education, which is centered on entering schools, and education based on memorization. Therefore, in order to change the direction of our wrong way of education,

> we need to expand our education based on strengthening practical knowledge, reforming curriculum, and expand educational facilities for more practical education (Chang-kyu Son*, 1961:113; cited from Yun-tae Kim, 2002). * Head of Social, Culture, and Education, National Reconstruction Supreme Commission
>
> We need five experienced technicians per one scientist or engineer, and recognizing that technicians are fostered through secondary vocational education, vocational education has a very significant relationship to economic growth…vocational education at the secondary education level has a very significant meaning because it will sustain the minimum technical human resources to increase national productivity… Education by vocational high schools will help in fostering technical manpower for the primary industry… Technicians who are the basis of economic development will take on most of nation's technical labor force and contribute to the national economic growth; thus, vocational education is a foremost important education, and it is deeply connected with the economic growth… (Sae Woong Jung**, 1962:93; cited from Yun-tae Kim, 2002) ** Member of Social, Culture, and Education, National Reconstruction Supreme Commission

The newly established government in 1961 emphasized modernization and economy-first policy, and promoted economic growth policies under its strong leadership. The government emphasized productivity as a basic target towards industrialization and stressed the importance of saving to secure investment funds, and at the same time tried to induce foreign capital. Although Korea had an abundant labor force, but lacked capital; thus it needed to secure investment funds. To induce foreign capital, the government prioritized restoring the relationship with Japan and dispatched troops to Vietnam under the request of the United States.

Meanwhile, in late 1961, the First Five-Year Economic Development Plan (1962~1966) was drafted to rectify all the vicious cycle and build the foundation for a self-sustaining economy. The first five-year plan faced difficulties due to poor harvest, the currency reform in 1962, and the high target for savings and public revenue; thus it was revised in 1964 to meet the conditions of the time. Many international and domestic experts, who had expressed deep criticism against the previous plan, were surprised to see the progress, and the people who participated in the process and the public-at-large saw hope for the future and restored confidence in the government's ability to carry out economic plans. The second economic development plan, which was created under the goal of modernizing industrial structures and expediting a self-sustaining economy, was completed successfully by far exceeding the targeted economic growth rate, which allowed the economy to develop momentum. Due to the successful completion of the second five-year plan, both policy experts and the public had confidence in its government and for the potential of the Korean economy itself (Yoon-Tai Kim, 2002:47; Jeong-taek Lim, 1981:21~22, Byeong-rak Song, 1986:418~420)

In the early 1960s, the overall labor supply in Korea was abundant, but the supply of highly-skilled technical human resources fell well short of what was required to carry out the economic development plan. Indeed, fostering and securing technical human resources was prioritized over investment in physical capital. There was an urgent need for economic development and the modernization of science and technology, but the government realized that fostering and accumulating human resources cannot be achieved overnight; thus, the government had to devise a long-term human resources supply plan. Establishment of the EPB in 1961 served as an opportunity to carry out human resources policy and economic plans. EPB was in charge of devising plans, adjusting policies, managing budgets, foreign capital, and statistics. The Deputy Prime Minister would be solely responsible for the organization. The Board was not only useful in making economic plans, but was also very effective in successfully achieving its goals (Gwang-ha Kang, 2000:25~26, 38~39; Yoon-Tai Kim, 2002:49).

In January 1962, EPB's Technology Management Division devised the First Five-Year Human Resources Development Plan (1962~1966). To create a self-sustaining economy by structuring the foundation for industrialization, the policy focused on securing technical human resources that were needed to complete the First Five-Year Economic Development Plan, For the industrial development and improvement in productivity, it promoted improvements in the quality of its technological competence. Government officials predicted the manpower demand and prepared a supply and demand plan. First, they evaluated school systems, student allocation, the quality of professors and training facilities at universities that specialize in science and engineering to figure out the status of manpower training institutions, including the vocational high school system. They also analyzed the status of vocational education in industrial complexes and considered the role of army to obtain technical manpower and training (Sang-keun Jeon 1982:122~131).

The First Five-Year Manpower Development Plan was strongly led by the government. In the process of creating the policy, the government established rationality through a series of analysis, developed models to predict supply and demand, and cooperated with related ministries. However, they failed to get feedback from diverse sectors of society by limiting the participation of the public and related organizations. The Manpower Development Plan became the foundation for Korea's science and technology policy and provided an opportunity to establish the Ministry of Science and Technology in March 1967. Based on the Science and Technology Promotion Act, legislated in January 1967, Clause 7, the Manpower Development Committee was created to deliberate the government's important manpower development policy, and according to the Revision of the National Government Organization Act, the Ministry of Science and Technology was established in April to carry out overall manpower development plans and policies. To reasonably enforce the

manpower development plan, the Ministry kept a close relationship with the EPB, and with its close cooperation with other related ministries, it formulated the manpower supply and development plan, modified, controlled and exchanged related information (Yoon-Tai Kim 2002: 51~52).

The First Five-Year Technology Plan was devised in 1962 along with the Manpower Development Plan and it focused on securing engineers and technicians. Based on this policy, to secure technical human resources that were needed to enforce the Five-Year Economic Development Plan, engineers were supplied through the implementation of an engineering quota for companies and with an adjustment in the number of students per major in science and engineering universities. Technicians were fostered through an increase in the number of technical high schools and its admitted students, improved curricula, and by establishing vocational guidance services in individual technical high schools. Six thousand students were trained in a two-year course and also fostered through in-company trainings. In 1966, the Second Five-Year Technology Promotion Plan was established, and based on the predicted manpower supply and demand of scientists and engineers, technicians, and skilled workers, it was clearly pointed out that there was a need for vocational education to meet the demand for technicians and skilled workers (Yeong-ryul Choi, 2009:26~27).

In the earlier days, reports related to human resources and consultation by experts from overseas contributed to the collection of education and manpower related statistics and had a great impact in formulating human resource policy in Korea. When the Korean government conducted the survey on the employment of technical human resource in 1963, the government received great help from advisors at the U.S. Statistics Office. In particular, the report by McVoy from USAID on 'Manpower Development and Utilization in Korea' increased the attention of the Korean government on the manpower problem in relations to the Five-Year Economic Development Plan. Continuous research, enactment, technical assistance, and effectiveness in the administration made it easy for the government to deal with many issues evolving around manpower, which were related to economic development and industrialization. Moreover, the report by E.D. Hollander, advisor of the Nathan Commission, on manpower policy for Korea's economic development (1965.10.4); Richard R. Zoeckler, USOM's manpower expert's visit to Korea between 1965 and 1968; the American expert at the ILO, P.C. Tolson; and the Japanese expert M. Masatuku, provided consultations on Korea's manpower supply and demand and it contributed greatly to carrying out human resource supply and demand policy and human resource policy, along with the Five-Year Economic Development Plan.

1.2. Foundation of Vocational Education

After Korea gained independence and until the mid-1960s, the socio-economic situation in Korea was very weak; thus vocational education and training policy could not easily be enforced. In the late 1940s, agricultural, industrial, commercial and marine and fisheries vocational schools existed, but did not have any standards for its curriculum, lacked professional teachers, and the experiment infrastructure was inadequate. In the late 1950s, the "Five-Year Plan on Vocational Technical Education" was drafted to foster technical manpower that was needed for the nation's rehabilitation, and designated vocational high schools as an educational institution to foster technical manpower (Yeong-ryul Choi et al., 2009:20).

In 1957, the "Five-Year Plan on Vocational Technical Education (1958~1962)" was established to support agricultural, industrial and marine and fisheries education and focused on increasing facilities for vocational high school and colleges. The plan was to expand the number of facilities, retrain teachers, and improve the public's perception of vocational education. In the 1950s and 1960s, the public's avoidance to vocational education worsened and the government had difficulty in fostering technical manpower. At that time, due to traditions and customs, vocational education and liberal arts education were operated separately. As a result, vocational high schools that were established in certain regions could not satisfy the needs of students wanting to advance to university.

As a solution, the MOE implemented a comprehensive high school system in 1954 and operated experimentally. Under the legislation, separation of schools, between male and female and general and vocational, was switched from conditions of duty to conditions for permission. Thus, Pyeongtaek Comprehensive High School was first established in 1957, and apart from general high schools, it provided various courses that students can choose to take depending on their aptitude and interest. Besides the courses they were required to take in order to advance to university, students were able to select subjects from agriculture, industrial and commercial courses. Also, the curriculum was operated on a credit basis and it diversified students' choices. This type of curriculum management puts emphasis on the student's aptitude and personality, and the reform also reflected the trend in developed countries, including the United States. Since then, until July 1968, there were 60 schools that were transformed or newly established as comprehensive high schools, 33 of them were public and 27 of them were private (MOE, 1998).

However, due to a lack of understanding on the purpose of comprehensive high school, a considerable number of comprehensive high schools changed to general high schools. Although there were students who preferred to advance to university and there were some who preferred to seek employment, they were all attending the same school and this could have created some friction. Also, the school's education was mainly focused on university advancement and this weakened vocational education. Eventually, the comprehensive high school system was a new school system that benchmarked the U.S. school system, but the policy was evaluated as unsuccessful. Since then, vocational education at the high school level was operated separately from general education, which prepared students for university advancement.

After the military government came into place, vocational education was treated separately from general education and policies to promote vocational education was suggested. An exemplary policy is the Vocational Education Promotion Policy announced in 1963. It included six measures. First was to establish more vocational schools to foster technicians in a short-time so that they can contribute to carrying out the First Five-Year Economic Development Plan, and create the Vocational Technical Training Institute as an affiliation within companies. Second, in order to increase the quality of teachers in the field of vocational education, retrain teachers in agricultural, industrial, and marine and fishery disciplines. Third, create a vocational education council within the MOE and support the practical training fee for students in industrial and marine and fishery high schools, and extend their hours of practical training and place more teachers on practical training. Fourth reorganize four vocational high schools into five-year professional schools as central institutions in fostering engineers. Fifth, to successfully promote the First Five-Year Economic Development Plan, secure technical manpower that is needed, and pass the Industrial Education Promotion Act through the Supreme Council. Lastly, publicly announce the vocational high school curriculum and policy direction of vocational high schools (Young-Hwa Kim, 1990:73~74).

The vocational high school curriculum was legislated on February 15, 1963. The vocational high school curriculum is significant because it decided on the purpose of education, purpose of each course, and teaching contents, and provided the direction of vocational education. The educational purpose of all vocational high schools were set to prioritize the fostering of middle level technicians and skilled workers who will work in the related industrial field, and creating a curriculum focused less on general subjects and increased hours of practical and experimental training, and allow some of the courses to be substituted with field training. In terms of allocating time per subject, the government forced schools to allocate 30% of the total time into practical subjects until 1963, but from 1964, the government allowed them to allocate more than 50% of the total time and especially in

technical high schools, more than 55% of the total time was allocated to practical subjects. Even within practical subjects, more than 60% of the time was allocated into practical training.

The policy at the time describes the purpose of technical high schools as follows: increase the practical abilities of students in the technical field, so that they can contribute to the national development as middle level technicians and skilled workers. First, foster students' abilities to become technicians and skilled workers based on basic knowledge and practical training. Second, acquire knowledge that is needed to become technicians and skilled workers and raise them with the attitude that they will develop and improve industrial technology. Third, understand the relationship between industry and the national economy, have self-awareness as a technician, and develop attitudes that could contribute to the national development. As observed in the purpose, the policy is focused on supplying necessary manpower for the development of the nation and society; however, it neglected individual values and general education (Yeong-chul Kim, 1992; Sung-soo Cho et al., 1989).

The Industrial Education Promotion Act was legislated on September 19, 1963, and includes the promotion of vocational education by central and local government, providing expenses for experiments and practice, qualifications and treatments of teachers, and creating scholarships. It also included the establishment of the Central Industrial Education Council and to reflect the opinion from the industry into the curriculum, the government invited experts from industries to participate in the Council.

Meanwhile, the Five-Year Science and Technology Promotion Plan (1967~1971) was announced in 1967 to foster manpower in science and technology that is needed to carry out the second economic development plan. The plan was devised to foster scientific thinking and creativity, promote science in daily life, expedite technology innovation and scientific inventions, and cultivate abilities and qualities as a productive technician. Major contents included expanding industrial vocational high schools to increase the supply of technical manpower, increase the enrollment quota of universities in science and engineering, establish industrial related majors in agricultural high schools, enact guidelines for experiments and practice, and promote industry-education cooperation.

2. 1970s

2.1. Twin Policies to Promote Heavy and Chemical Industries: Industrial Policy and Vocational Education Policy

The government continued to push forward with export-oriented growth policy in the 1970s. However, policymakers predicted that export centered on the light industry, which is labor-intensive, will face its limits soon, and during the third Five-Year Economic Development Plan period, the government pushed for industrial upgrading by promoting the steel, shipbuilding, machinery, and chemical industries. Pohang Iron and Steel Company, established in 1973, expanded in 1976, and Kori Nuclear Power Plant, established in 1978, were symbolic achievements of the heavy and chemical industry during this period.

As the business activity of the private sector became more active and the economic structure developed, the fourth economic development plan emphasized the role of market mechanism. The plan was designed to realize a self-sustaining growth structure under the slogan of growth, balance, and efficiency, promote balance through social development, and improve efficiency by innovative technology (Yoon-Tai Kim, 2002:80). The fourth economic development plan was prepared in the mid-1970s with long-term prospects. By the request of the EPB, the Korea Development Institute (KDI) suggested Korea's long-term economic and social prospects and policy direction through the report 'Long-term Economic and Social Development: 1977~91'. Responding to the widely perceived consensus that the plan could not be successful without the cooperation and participation of the public and private sectors from here and abroad. KDI wrote the report covering 21 areas of Korea's major economic and social development issues in the 1980s through cooperative study amongst domestic and international experts, including those from the private sector.

The planning strategy started to change from a top-down approach to a bottom-up approach. The fourth plan was written by 22 working groups and compared to other plans, various issues from different sectors were dealt with comprehensively. In the process of writing, many academia, industry, media, and other private experts participated in the process, and even foreign experts contributed. Participation of civilians expanded through the Planning Committee, Economic Planning Coordinating Committee, Economic Planning Council, Economic Policy Council, and Evaluation Committee (Gwang-ha Kang 2000:73; Yoon-Tai Kim, 2002:82-83; Byeong-rak Song, 1986:421). By encouraging the public's participation in the process of economic planning, the government integrated mid and long-term perspectives.

In the education sector, fostering professionals who can adapt to the changing technology and society in the future became just as important as supplying short-term production labor.

Education that could contribute and lead economic growth was emphasized; but there were concerns that education was excessively responding only to economic development, which could lead to an absence of talent. At the end of the 1960s, the slogan of MOE (Minister O Byeong Kwon, 1968.5~1969.4) was 'Education for Modernization and Promotion of Production Education', whereas in the early 1970s (Minister Chong Chul Hong, 1969.4~1971.6) promoted improving quality of education, school system reform, and national creativity. The establishment of the Korea Educational Development Institute (KEDI) on August 1972 can be seen as a reflection of the rising status of educational sector. From 1969 to 1972, under the Prime Minister's Office, Long-term Comprehensive Education Planning Council created a long-term educational plan (1972~1986) and this became the root of the educational reform plan in Korea. In 1978, KEDI announced 'Issues and Prospects of Educational Development (1978~1991)'. Moreover, as a part of the national manpower supply plan, KEDI researched and announced 'Prospects of Long-term Manpower Supply (1977~1991)', and in the 80s and 90s, they presented medium and long-term educational reform plans, and played an important role by collecting voices from the educational sector (MOE, 1998).

While embracing these concerns from the educational sector in the 1970s, the government strongly pushed for industrial policy and manpower policy. In the 1970s, to bring industrialization forward, President Park Chung-hee strongly pushed for policy on heavy and chemical industry and created a special organization named the Heavy and Chemical Industry Council and O Won Chul, Senior Advisor to the President at the Blue House, took the leadership role. He devised the development plan for the heavy and chemical industry, including Changwon Machinery Complex, steel, shipbuilding, electronic, machinery, and petrochemical industries, and in the process he supervised and took responsibility for the overall plan. He had the authority to select projects related to the development of the heavy and chemical industry, decide on the limit of foreign capital, and allocate the National Investment Fund (Yoon-Tai Kim, 2002; Won-Chunl O, 2002; S. Y. Park, 2012).

Although he received positive support from related ministries due to the powerful support by President Park, he still faced difficulty promoting and fostering manpower. Facilities and machineries that were needed for the heavy and chemical industry can be bought easily from overseas with money, but securing skilled technicians, who can manufacture goods, was not easy. At last, he enforced his power at the MOE and formulated measures to improve Korea's technical education system. As a part of this measure, MOE established the Specialization Initiatives for Technical High Schools (SITHS)(Sang-keun Jeon, 1982:143~144; Yoon-Tai Kim, 2002).

2.2. Specialization Initiatives for Technical High Schools

SITHS started from 1973, and it divided technical high schools into four categories depending on its geographical location and characteristics. Investments in schools was focused on what would work as a pioneer in the field in order to maximize efficiency. This policy was introduced because the educational level of technical high schools at the time was not suitable to develop technical manpower, and it would take a lot of time and finances to increase and equalize the educational level of all technical high schools. Thus, the government rejected one-size-fits-all approach and conformed financial allocation and investment to technical high schools, and differentiated the allocation of finance by considering geographical conditions of industries and labor demand. Through this policy, the government tried to increase the efficiency with limited time and resources, and improve the level of overall technical high schools at the same time.

Starting with the mechanical technical high school, which was established in 1973 as an experimental school in fostering precision workers, the government created five-year measures to promote technical high schools and divided them into four categories -mechanical technical high schools, experimental schools, specialized schools, and generalized high schools, and provided them with different educational purposes and curriculums. Mechanical technical high schools fostered precision workers that were needed for the machinery industry and defense industry; specialized technical high schools fostered skilled technicians in electronics, chemicals, construction, iron and railroad; experimental technical high schools was established to satisfy the demand of special manpower such as certified technicians who were sent overseas, and initiated a desired management system for technical high schools that served as an example and was disseminated to general technical high schools (schools were designated by each city and province); and general technical high schools had the responsibility of fostering various certified technicians in the general industrial sector by adapting to the local conditions (Yeong-chul Kim, 1992; Young-Hwa Kim, 1990; Yoon-Tai Kim, 2002; MOE, 1980).

2.2.1. Mechanical Technical High School

The mechanical technical high schools were operated based on practical skills rather than theoretical learning. The ratio between general subjects to specialized subjects was 3:7 and the ratio between theoretical learning and practice within specialized subjects was 3:7. Besides general courses on machinery, subjects on the precision sector such as precision measurement and quality control were added, and students had to complete 800 hours of practical training in final touching, lathe, welding, grinding, using machinery tools, and safety in workplaces. During the second and third year, students received 1,600 hours of practical application and special precision training. Thus, when students graduated from

mechanical technical high school, they had at least 2,400 hours of practical training. Through this practical training, students acquired the skills of precision workers and the number of students earning precision licenses increased gradually.

Meanwhile, machinery technical high school students were given various benefits. More than 50% of students received the benefit of tuition discounts, acquired certificates and licenses in the field, won prizes at national competitions, and if having achieved high-level function were granted general scholarships. If students acquired precision licenses while they were in school, they received 100,000 won per year as a scholarship provided by the President.

Mechanical technical high schools also contributed in securing precision workers for the defense industry. Also, the educational program won three times at the International Vocational Training Competition (1977~79), and gave the students a strong sense of confidence that if they tried they can achieve anything. The specialization policy of mechanical technical high school was effective and efficient in the short-term due to the strong supervision, attention, and policy focus. This showed that with the strong support of the government, the effect of policy can be maximized. Characteristics of technical high schools aligned with vocational education expedited the execution to the labor market, but in terms of general education, it derived negative side effects (Yeong-chul Kim, 1992; Young-Hwa Kim, 1990; Yoon-Tai Kim, 2002; MOE, 1980:202).

2.2.2. Experimental Technical High School

Experimental technical high schools were selected to supply workers overseas, and establish the desired management system of technical high schools that could be disseminated to general technical high schools. In 1976, one school per city and province were selected based on their facility, and a total of 11 schools were operated (in 1979, entrance quota of 9,306). In these experimental technical high schools, they were required to establish machinery, electronics, and civil construction courses, and other courses were offered based on the needs from the local community. The ratio between general subjects and major subjects, and theoretical and practical training within major subjects, was 4:6. The experimental technical high schools were effective due to facility, teachers, practice fee, improved curriculum, innovative training, industry-education cooperation, and students' enthusiasm for education. The experimental technical high schools played the role of providing a desirable model of technical high school operation and worked as a catalyst in vitalizing technical high school education. In 1976, all of the graduates, 2,140, were employed, which exceeded the planned number of 1,500 (Jung-jo Lee, 1978:14), and showed that the effect of education in experimental technical high school was effective (Yeong-chul Kim, 1992; Young-Hwa Kim, 1990; Yoon-Tai Kim, 2002; MOE 1980:202).

2.2.3. Specialized Technical High School

Aside from mechanical technical high schools, specialized technical high schools were selected to foster technical manpower in specific fields such as electronics, petrochemical, construction, iron, railroad, electricity, and metal. In 1977, three schools were designated, including Busan Electronic Technical High School, and five schools were added in 1978, including Gimhae Construction Technical High School and Guempa Chemical Technical High school and Daejung Metal Technical High Schools in 1979; thus there were a total of 10 schools (with enrollment quota of 5,710) designated as specialized technical high schools. Specialized technical high schools were obligated to establish subjects of interest in the relevant year, select subjects to operate depending on the need of the local community and school conditions, and other courses were modified to be more effective. To foster the growth of specialized technical high schools, 50% of experiment facilities in schools, total dormitory construction costs, and experiment facilities outside of schools were provided by the government to public technical high schools, and supported partial costs for experiment facilities in private schools (Yeong-chul Kim, 1992: Yeong-hwa Kim, 1990; Yun-tae Kim, 2002; MOE, 1980).

Table 4-1 | Trend of Specialized Technical High Schools in Late 1970s

Field	Schools	Majors
Electronics	Gumi Electronic Technical High School	Information Technology, Electronics, Telecommunications
	Busan Electronic Technical High School	Machinery, Automobile, Information Technology, Electronics, Telecommunications
Fostering Middle-Level Skilled Worker	Kumoh Technical High School	Machinery, Plate Welding, Metal, Electronics
Construction	Jeonju (construction) Technical High School	Machinery, Maintenance, Electronics, Architectural Drawing, Construction, Civil Construction
	Kimhae Construction Technical High School	Machinery, Maintenance, Electronics, Architectural Drawing, Construction, Civil Construction
Steel	Pohang Jecheol Technical High School	Machinery Maintenance, Steel, Steelmaking, Rolling, Electronics
Metal	Daejung Technical High School	Metal Refining, Metal Heat Treatment, Metal Mold Casting, Metal Material
Chemical	Kumpa Technical High School	Chemical Apparatus, Chemical Process, Chemometric
Railroad	National Railroad High School	Railway Machine, Railroad Electronics, Train Operation, Railway Service, Railroad Engineering
Electricity	Sudo Electric Technical High School	Electricity Generation, Engines for Electricity, Substations, Transmission and Distribution, Electronic Application
Mining	Hankuk Technical High School	Mining, Mining Machinery and Electronics, Mining Engineering, Flotation
Aviation	Jungseok Aviation Science High School	Avionics, Aviation Machinery, Aviation Maintenance

Source: Yeong-chul Kim (1992:38), Sung-soo Jo et al. (1989:226).

2.2.4. General Technical High School

General technical high schools were established to foster and supply various technicians in the field; however, due to less attention from the government, financial support of 55 schools (in 1979, enrollment quota 36,300) was only 36.5 billion won from 1977 to 1979.

Although the government announced that they will strengthen financial support to promote general technical high schools, but with only 40 specialized technical high schools (19 mechanical technical high schools, 11 experimental technical high schools, 10 specialized technical high schools), it was difficult to equalize the level with limited time and resources. To promote excellence within technical high schools, the government regulated the new establishment of technical high schools, except for the entrepreneurs. Instead, the government encouraged active participation of entrepreneurs in school management (Yeong-chul Kim, 1992; Young-Hwa Kim, 1990; Yoon-Tai Kim, 2002; MOE 1980:203).

When the average educational spending of high schools is compared by its affiliation, we can observe that investment in technical high school was much bigger than investment in commercial and general high schools. The study by Yun-tae Kim et al. (1997) analyzed the educational spending in general, commercial, and technical high schools in three regions, Seoul, Busan, and Daegu. Educational spending means total expenses invested in education and includes public, private educational spending, and opportunity costs. In 1977, in terms of the size of annual public educational spending per one high school student, spending in technical high school was highest with 182,158 won, commercial high school was 128,300 won, and general high school was 128,173 won. There was not much difference between general and commercial high school, but public educational spending per student in technical high school was 1.4 times higher than general high school. Among the total public educational spending, school operation cost was 63,913 won for technical high school (35.1% of total), 17,975 for commercial high school (14.0%), and 13,449 won for general high school (10.5%). School operation cost for technical high school was 3.5 times higher than commercial high school, and 4.6 times higher than general high schools, and commercial high school was relatively higher than general high schools, which indicated that the government's investment in vocational education was relatively high. In terms of private educational spending, general high school students spent 98,323 won per year, commercial high school students spent 82,141 won, and technical high school students spent 70,695 won. Meanwhile, opportunity cost was converted from the total wage of middle school graduates for three years, which is 1,736,028, in annual average.

Table 4-2 | Comparison of Annual Educational Spending by High Schools (1977)

Category	Technical High Schools	Commercial High Schools	General High Schools	Vocational Training
Public Education Spending	182,158	128,300	128,713	478,598
Private Education Spending	70,695	82,141	98,323	91,360
Subtotal	252,853	210,441	227,036	569,958
Opportunity Cost	578,676	578,676	578,676	578,676
Total cost (won)	831,529	789,117	805,712	1,148,634

Source: Adopted from Yoon-Tai Kim (1977).

Note: Total education cost is recalculated by the author.

It can be said that SITHS is the basis of the vocational education policy in the 1970s, but the establishment of National Technical Qualification System is also notable in this period since it became an infrastructure of vocational education. The National Technical Qualification System was enforced from 1975 based on the National Technical Qualification Act which was legislated in 1973. It was created to foster outstanding technicians and engineers where they were needed in the industrial sector centered on heavy and chemical industry, and provide benefits to those with certificates.

By enacting the legislation on the National Technical Qualification System, qualifications related to the technology that have a close relationship with industries, such as machinery, metal, chemical and electricity, were divided into skills and technologies, and once examiners passed the test, they received the certificate. Also for those who proved to be qualified had to register with the Ministry that was in charge of the examination that year, and the Ministry issued certificates to them. In terms of their economic and social status, the national and local government maintained the optimal level and pursued ways to protect their social status and employment, and when the government granted permission to start businesses in the relevant field, people with certificates were given priority. Furthermore, if a person obtained the certificate unfairly, then their license was cancelled, and if a certified technician damaged or harmed others or if they lend their certificate to others and violated their right to be responsible, then the license was either cancelled or suspended for a certain amount of time; thus, the government strictly controlled the quality of technical licenses.

At the time, technical qualification was divided into two categories: technologies and skills. In technologies, the level was divided into three parts: professional engineer, engineer 1, engineer 2. In skills it was categorized as follows: professional skilled worker, skilled worker 1, skilled worker 2, and assistant skilled worker. Only those who passed the written examination was eligible to take the practical examination. The National Technical Qualification System had a big impact on the vocational and technical education. It increased the practical and experiment education up to a certain level, created an environment conducive to studying in schools, expedited equalization between public and private teachers and facilities, and contributed in improving social perception of technical high schools (Yeong-chul Kim, 1992:39).

In the 1970s, policies to strengthen industry-education cooperation was enforced. Industry-education cooperation was emphasized from the late 1960s, and it was proposed as an important aspect in the long-term overall educational plan, and started to be institutionalized from the early 1970s. The Industrial Education Promotion Act was amended in February 1973, obligating vocational high school students to a field experience in the industrial site. The Act was revised "in order to foster technicians and skilled workers who can contribute to economic development and export expansion, facilities in schools cannot fulfill the practices that students' need; thus, they need to be trained in industries with outstanding facilities". The Act also allowed related ministries to designate the industrial site for student's field training and announce them, and industries that were designated were obligated to cooperate in the training, and this stipulated the participation of industries. With the enactment of the enforcement ordinance (1973.6.5), the field training system in agricultural, industrial, fisheries, and marine high schools, and technical colleges and universities took concrete form. Students in agricultural and industrial related majors were obligated to take 2~6 months of field training, and marine and fisheries majors were obligated to take 4~12 months of field training (Yeong-chul Kim, 1992:40; MOE, 1998:359).

Thus, policies to expedite the National Technical Qualification System and industry-education cooperation was a necessary infrastructure to foster talents that are needed by industries through vocational high schools. In 1977, while industrialization was in progress, the industry's reactions to graduates of vocational high school was very positive. Business owners perceived the practical ability of technical high school graduates to be overall above average. Also, many business owners acknowledged that students were applying their learnings from technical high schools in the field, and only 13% felt that they didn't; therefore, many recognized that the school's education helped in the field (Yoon-Tai Kim et al., 1977).

3. 1980s

3.1. A Shift in Education Policy During the Economic Stabilization

Due to the second oil shock in 1979, there was a sudden increase in money supply in the late 1970s, and political instability caused by the sudden death of President Park Chung-Hee increased the price of fuel. The world economy was in depression, protectionism policy in every country heightened, and due to an increase in labor cost per unit in companies, international balance of payments weakened in 1979. In 1980, the growth rate of gross national product recorded a minus for the first time, the current account deficit reached $5.3 billion, and Korea faced a serious economic crisis. Accordingly, the government changed its policy direction from growth-first to strong stability (Gwang-ha Kang, 2000:66). In the early 1980s, the government prioritized economic stability and also enforced active social development to solve many social issues that were derived in the process of growth. Compared to previous plans, the fifth economic plan was different and its name changed from economic development plan to Five-Year Economic and Social Development Plan. In other words, the word 'social' was added to the economic plan. From the 1980s, the government shifted its focus from the economy-first development to overall social development.

If we look at the development strategy of the fifth plan, the government prioritized price stability, vitalization of market economy, openness for improvement in efficiency, and implementation of social development. Due to unequal distribution of opportunities, weak satisfaction of basic needs and lack of facilities for the public, which resulted from the process of economic development, relative poverty became higher and slowed down sustainable economic development. The government actively enforced social development to resolve these issues. In terms of private economic activities, instead of government intervention, the government promoted competition to vitalize the market economy, and to fulfill the basic demand for education, housing, and health. The government actively intervened and operated a comprehensive and consistent policy on technology and manpower development, social overhead capital and social development (Gwang-ha Kang, 2000:87~89, 97~98; Yoon-Tai Kim, 2002:114).

Meanwhile, the fifth (1982~86) and sixth (1987~91) Five-Year Manpower Development was devised under the supervision of the Ministry of Science and Technology and a committee of experts was created to adjust to the contents of manpower plans and collect various opinions from the public. The committee created the policy with long-term prospects on manpower supply. By dealing with the socioeconomic circumstances, the government proposed the direction of manpower development and this worked as an action plan to achieve technology development in the year 2000. In the process of establishing the policy,

the government encouraged the participation of experts in industry, academia, and research fields, emphasizing the need to have public agreement (Yoon-Tai Kim, 2002:114).

In this period, it had moved away from labor and skill-intensive to technology intensive. The fifth Manpower Development Plan responded to this demand and focused on securing technical manpower with a high level of creativity, technology, and theoretical knowledge. The sixth Manpower Development Plan was consistent with the fifth plan and contained detailed policy goals and means. To respond to the rapid development of modern science and technology and support the changes of a highly industrialized society and information-based society, the plan focused on securing and fostering a high level of creative manpower in science and technology that can produce new theories and lead technological innovation (Yoon-Tai Kim 2002).

In 1980, the National Emergency Measure Committee announced the 7.30 educational reform. The explicit purpose of the reform was to stabilize Korea's education and relieve the burden of private tutoring, but the direction was shifted to solving problems in education and educational development from focusing on the technical role of education for economic development. For example, through curriculum reform, the government lowered the burden on studies and changed the student evaluation from grading to descriptive evaluation. The government increased the investment on education and solved the issue of overcrowded classes, and improved educational conditions by introducing the two-shift system in elementary schools, and compulsory education for middle schools was implemented. In 1982, as a part of special purpose tax, educational tax was newly created to secure an extra educational fund. In the 1960s and 1970s, during industrialization there was a strong perception that education needs to supply the manpower that was needed for national development, but as economic development started to show some progress in the 1980s, interest in educational development started to rise (Young-Hwa Kim, 1996:190).

Changes in the underlying principle for educational policy had a big impact on vocational education. Industrial and science education policy in the 1980s can be summarized by the adjustment in the industrial structure and changes in industry policy centered on high-tech industry. It emphasized basic science education and increasing the number of universities in science and engineering to foster manpower in science and technology. Accordingly, policy to divide technical high schools was abolished, and the purpose of vocational education in high schools shifted from fulfilling short-term manpower demands to preparing for long-term manpower demands.

3.2. Restructuring of Vocational Education

MOE terminated the SITHS, which started from 1973, abolished experimental technical high schools, and combined mechanical technical high schools and specialized high schools, and organized schools into two types – general technical high schools and specialized technical high schools. In terms of course selection, regardless of school type, school principals could decide on which course to implement by considering school circumstances, and principals of the government's public funding on facility investment in technical high schools changed from differential assistance to equal assistance. There are three reasons to why specialization policy on technical high school was drastically modified.

First, skilled workers that were fostered during the 1970s based on the needs of short-term technical manpower, lacked in comprehensiveness and judgmental skills, and even if they worked in a related field, they were criticized with having a lack of necessary capacity. Due to a rapid decline in manpower overseas, diversification in corporate structure and types, and continuous development of technology, there was a need for manpower that could adapt to these changes. In other words, SITHS in the 1970s focused on investment in mechanical technical high schools and specialized technical high schools to meet the needs of short-term manpower supply, whereas the 1980s, emphasized a long-term manpower supply by fostering technicians with multiple skills and adaptability to face rapid technological changes.

Second, SITHS, which divided technical high schools into four categories, selected schools and prioritized investment in them, but other vocational high schools felt that they were being alienated and brought dissatisfaction to the government. The policy shifted from a selection and concentration strategy in the 1970s to an equality one in the 1980s.

Third, technical manpower development in mechanical technical high schools and specialized technical high schools were in competition with the vocational training centers, operated by the Ministry of Labor, thus, the differentiation of function between organizations became an issue (Yun-tae Kim, 2002). In the fifth Five-Year Economic and Social Development Plan, the government wanted to strengthen vocational education and vocational training, and at the same time, respond to the manpower supply in industries and improve the ability of employees. To strengthen vocational training, the government established five public vocational training centers and aimed to sustain vocational training in workplaces. To support this, the government increased tax support and finances on businesses that invested in manpower development, and for effective management and support of manpower development, the government established the Korea Vocational Training Management Corporation to oversee vocational training and skills examination, which was enforced with the establishment of a four year vocational training university

(Yeong-ryul Choi, 2009:40). Thus, in the process of strengthening vocational training, vocational education largely focused on fostering talents with the ability to adopt to changing technology, rather than responding to the short-term manpower demand.

As the government modified SITHS, MOE restructured vocational education, which covered the educational curriculum for vocational high schools, industry-education cooperation, and financial support.

The fourth curriculum reform in 1981 increased the share of general subjects in technical high schools and drastically decreased the share of specialized subjects, downsized the total number of subjects from 191 to 151, similar courses were merged and abolished which stopped the division of subjects, and emphasized theories and basic education. These changes were based on the premises that technical high schools would teach basic abilities and adaptabilities and specific skills can be obtained from industries. In other words, the government changed its policy direction by recognizing technical high school education as a part of continuous education, instead of relying too much on special subjects, focused on strengthening well-rounded education. The fifth curriculum reform in 1989 was established to respond to the socioeconomic changes and satisfy the needs to strengthen international competitiveness and high quality of education. Therefore, it included details of the future industrial development outlook and basic contents such as semiconductor and office automation, which are needed for the development of high-tech industry that was emphasized in the sixth economic development plan.

After the changes in vocational high school policy, industry-education cooperation transformed from where industry financially supported technical high schools to produce technicians and graduates of technical high schools who are employed in industries, to industry-education cooperation being a part of educational activity and asked the schools and industries to share some of the responsibility. Accordingly, the policy relaxed the requirement on technical qualification of vocational high school graduates and largely decreased preferential treatment in entering universities in the same sector (Young-Hwa Kim, 1990).

The MOE wanted to expand the national subsidy on private technical high schools and allocate experimental facilities provided by foreign loans to private technical high schools. However, more than $40 billion, including foreign loans and IBRD loans in the 1970s, was invested annually into vocational high schools, but the investment on experiment and practice decreased drastically in 1980, from $16 billion in 1980 to just above $10 billion in 1987 (Young-Hwa Kim 1990:86). To solve the issue of shortage in experimental facilities due to limited revenue, the Ministry changed its investment strategy from investing only in selected schools to investment in joint experimental facilities. From 1982~1987, joint

experimental facilities, affiliated with technical high schools, were operated in Seoul, Daegu, Daejeon, and Busan area; from 1988~1989, additional facilities were established in the Incheon and Jeonbuk area.

In the 1980s, changes not only occurred in technical high schools, but also in commercial and agricultural high schools. As many businesses entered the global market from 1984, commercial high schools created majors such as business, accounting, information processing, trade, and developed information processing and business management skills and strengthened education on English and second foreign languages. To enhance education on information processing, commercial high schools in the entire country installed personal computers for students, and assistant instructors were allocated in each school's computer labs. Agricultural high schools were transformed to be a leading institution in the development of rural areas, and from the 1980s their educational direction was changed to fostering landed farmers. Industry affiliated schools, which was established in the 1970s, gradually increased as it entered into the 1980s (Yeong-ryul Choi, 2009:40).

The government planned to establish an open university for those who missed an opportunity to be educated in higher education or who dropped out, and for continuous education after the university education. Kyunggi Open University was first founded in 1982. To enter the open university, students must be high school graduates with one year or more experience in the industry, and if a student graduated from technical college and has more than one year of working experience, they can be transferred as a junior. The purpose of the open university was to foster competent technicians who already have working experience in the field or are working in the field, but missed an opportunity to study in school due to familial or economic circumstances. Thus, the open university tried to accommodate students through various operations such as running four semesters per year, offering classes during the summer and winter, night classes, and full-time classes. The tuition was half of the tuition of public universities and students who completed 140 credits and passed the graduation exam was granted a bachelor's degree. At this time, open universities, along with technical colleges, have the same status as a regular higher educational institution and contribute to the development of middle level workers (MOE, 1998:564~565).

On the other hand, MOE, along with the fifth Five-Year Economic and Social Development Plan, gathered 'Science and Technology Education Plan (1983~1986)' on October 1982. The Plan was to promote basic science education in elementary and middle school, technical education in technical high schools and technical colleges, and science and technology education in universities and graduate schools. In elementary and middle school education, strengthening education for gifted and talented students, making science compulsory, shifting classes to be more centered on practices, and special educational

system for students with talents in science was emphasized. From March 1981, MOE selected seven research schools and prepared an educational system for talented students in science. In 1983, Gyeonggi Science High School was first established and until 1991, there were a total of nine science high schools in Korea.

Furthermore, to carry out effective basic science research with limited research funding, the government expanded specialized research institutes within universities from 1979. Depending on the university's research environment and geographical location, universities selected a sector which they need the most support and established a research institute, and the government invested in these research institutes with research funds and gave them large research projects. This policy was successful in the sense that it created a research environment in universities, expedited specialization of the research sector in universities, fostered manpower in basic science due to vitalizing graduate school education, and increased cooperation with international academia (MOE, 1988:532~533). <Table 4-3> shows what was discussed in this chapter by periods.

Table 4-3 | Socioeconomic Circumstances and Major Vocational Education Policies by Periods

Periods	Economic Development Plan	Socioeconomic Circumstances	Economic Development Strategy	Manpower Policy	Major Educational Policies	Vocational Education
1950s		Vicious cycle of poverty; Destruction of industrial basis			One-for-one education; Established high school curriculum (including vocational high school) ('55)	Implementation of comprehensive high school ('54); The Five-Year Vocational and Technical Education Plan ('57)
1960s	1st (62~66)	Vicious cycle of poverty; Destruction of industrial basis; High unemployment rate	Structuring basis for industrialization; Unequal growth; Export-oriented economic growth	First Technology Promotion Plan ('62); securing technicians and engineers	Expansion of compulsory education	Industrial Education Promotion Act ('63); Vocational high school curriculum with more than 55% of specialized subject ('66)
	2nd (67~71)	Beginning of development on light-industry; Impoverished conditions in rural area; High unemployment rate	Structuring basis for industrialization; Unequal growth; Export-oriented economic growth	Second Technology Promotion Plan ('66); Ministry of Science and Technology, KIST ('67), Vocational Education, Industry-Education cooperation, KAIST ('71)	The Charter of National Education ('68); Science Education Promotion Act ('68); Middle School Equalization Policy ('69)	The Five-Year Science and Technology Education Plan ('67~'71)

Periods	Economic Development Plan	Socioeconomic Circumstances	Economic Development Strategy	Manpower Policy	Major Educational Policies	Vocational Education
1970s	3rd (72~76)	Development of light-industry; 1st Oil Shock	Enhancement of industrial structure; External-oriented growth; Harmonization between growth and stability	Establishment of brain development system; Securing specialized manpower; National Technical Qualification System ('74)	Long-term educational plan ('72); KEDI ('72); High School Equalization Policy ('74)	Vocational education for heavy and chemical industry ('73); Mandatory field training; specialization of technical high schools; mandatory qualifying examination for vocational high school
	4th (77~81)	2nd Oil Shock; Increasing demand for equal development between urban and rural	Promotion of technology-intensive industry; External-oriented growth; Equal growth	Training for scientific technician; Fostering skilled technicians; Creating conditions to develop technical manpower; Stabilize labor-management relations	Long-term manpower supply plan ('77); Future prospects on educational development ('78); Reorganization of technical colleges and increasing enrollment quota ('78)	Benefits in advancing to same sector ('77); increasing enrollment quota for technical colleges ('78); Abolishing preferential treatment in entering universities
1980s	5th (82~86)	Price instability; Increasing demand for democracy and welfare	Foundation for stability; Fostering knowledge-information industry; Equal growth	Preferential treatment to science and technology manpower; Establishment of science high schools ('83~)	University graduation quota system ('80); Prohibit private tutoring, abolish examinations; Establish Open University ('82); Establish foreign language high schools ('85)	Abolish technical qualification system in vocational high schools ('81); Abolish specialization initiatives on technical high schools
	6th (87~91)	Achieve democracy; Vitalization of labor movements; Disclose problems of economic development by the government	Sophistication in industrial structure; Free and competition; Openness and internationalization; Balanced growth	Secure high science and technology manpower; Reinforce vocational education; Supply plan for industrial manpower ('90)	Science and technology education; Long-term plan ('86); Vitalization of career path education ('90)	Plan to expand vocational high school share 50%; technical high school share 45%('90)
1990s	New Economy Plan (93~97)	High cost, low efficiency; Launch of WTO regime; Rapid globalization; Beginning of knowledge and information society	Low cost, high efficiency; Establish free and fair economic order		5.31 Economic Reform ('95)	Technical high school-industry 2+1 ('94); Expansion of vocational high schools; Vocational education in general high schools

Source: Various documents. Summarized from the contents above.

Chapter 5

Conclusion

Conclusion

It is important to note that Korea's vocational education largely contributed to the supply of industrial manpower during the industrialization period from the 1960s to the 1980s. This evidence is provided through the data where the employment share of vocational high school graduates increased gradually and even went over half by 1980. The continuous supply of industrial manpower greatly helped upgrade the industrial and technological capacity of the Korean economy. Consequently, in the 1960s, through the promotion of the light industry and export-oriented strategy, the government could secure the industrial capacity that was needed for the heavy and chemical industry. In the 1970s, the government implemented the big push toward the heavy and chemical industry, and later it was transformed into a high-value added industry. If, after the early 60s, Korea's education was expanded around general high school education and higher education, without an emphasis on vocational education strongly linked to economic development, than the successful transformation of the Korean industry toward a high-value added industry and the impressive growth of the Korean economy, widely acknowledged throughout the world, would not have been possible.

Due to an increase in high school vocational education, graduates of vocational high schools gradually increased from 47,000 in 1965 to 201,000 in 1980 and to 274,000 in 1990. In the same period, their employment share increased from 35.3% to 51.1% and to 76.6%. This size of employment was higher than any other educational institutions during industrialization. The employment share of vocational high school graduates was 24.4% in 1965, so it was lower than middle school graduates' employment share (32.7%), but it increased gradually to 46.6% in 1975 and 54.2% in 1985. The employment share of higher educational institutions such as technical colleges, universities, and graduate schools was lower compared to vocational high school graduates; it was 25.2% in 1965, 22% in 1975,

and 36.6% in 1990. Thus, during industrialization, vocational high schools produced the most labor force compared to other educational institutions.

Development of vocational high schools during industrialization is different by sectors. Although the overall number of vocational high schools increased from 279 in 1960 to 479 in 1970, and to 614 in 1981, there are some differences between sectors. The size and share of agricultural high schools decreased, while the number of schools and size of commercial and technical high schools increased. The number of technical high schools increased from 42 in 1955 (18.3%) to 72 in 1975 (15.1%), during the industrialization period centered on heavy and chemical industry, and increased to 104 in 1990 (17.7%), after the industrialization was completed. In the same period, the number of students increased from 315,000 (28.1%) to 1,236,000 (26.1%) and to 192,000 (23.7%). After Korea gained independence, the size and number of students in commercial high schools was small compared to agricultural high schools, but it was expanded with industrialization. The number of schools increased from 44 in 1955 (19.2%) to 182 in 1975 (38.2%), and to 248 in 1995 (32.5%), and in the same period, the number of students increased from 292,000 (26.0%) to 1,902,000 (40.2%) and to 3,555,000 (39.0%). Especially, after the 1970s, the number of schools and students largely increased. Employment rate of technical and commercial high school students, which was below 40% in the early 1960s, drastically increased to 90% in the early 1990s.

This study points out three major national strategies that played a central role in supplying industrial manpower through the expansion of vocational education centered on vocational high schools when the public avoided vocational education and preferred advancing to universities.

First is centralized planning strategy. Korea's vocational education was carried out as an important part of economic and national development strategy and the overall direction and policies were suggested and carried out through the Manpower Development Plan, which was devised in accordance with the Five-Year Economic Development Plans.

In the process of industrialization, supply of technicians and engineers that are needed for production can often lead to market failure. Especially, in the earlier days of industrialization in Korea, parents and the public sympathized with the need of productive labor, but many strongly avoided their children or themselves from receiving vocational education and working in production related industries. Businesses also tended not to invest in their workers training and education before they entered the workforce. To redress this market failure, the government utilized an economic planning organization, and through the EPB, it actively intervened in the process of skill formation and human capital accumulation. EPB worked as a centralized planning organization by coordinating the manpower needed by industry and meeting their needs in educational institutions.

From 1962, the EPB established seven five-year industry development strategies and development plans to foster skilled and technical manpower that were needed for industrialization. In the earlier days of industrialization, it pushed for industrialization based on the light industry and to foster technical manpower, and instead of repressing general education in secondary and higher education, it expanded educational facilities centered on vocational high schools. Therefore, the number of middle school graduates who were able to receive vocational education through vocational high schools and enter into the labor market increased. In the 1970s, to foster quality technical manpower that was needed for the heavy and chemical industry, the government enforced SITHS. The policy categorized technical high schools into mechanical technical high schools, experimental technical high schools, specialized technical high schools, and generalized technical high schools, and by specializing their purpose and functions, the government tried to increase the quality of vocational education.

Second is the strategy for education-industry cooperation. In the 1970s, when the heavy and chemical industry was promoted as a part of industrialization policy, many technical high schools were restructured or newly established to foster industrial manpower that was needed in the industry and investment in technical high schools was prioritized. Korea's experience in the 1970s, where the government promoted technical high schools to foster talents that were needed for a certain industry can provide many important implications in relations to industrial policies and vocational education policies in developing countries.

Third is effective financial strategy. In education, effective mobilization and distribution of resources is an important choice for developing countries in the industrialization stage where very limited resources have to be allocated between competing sectors. Korea's investment in education changed its priority from elementary school, middle school, vocational high school, general high school, to universities, as the country experienced economic development. Of particular note is that the government increased the budget for vocational education to the same level as the budget for universities in 1977, when the big push for heavy and chemical industry was strongly enforced. The shortage in government resources was covered by private schools and educational loans from overseas.

As it did with the general high schools and higher education, private schools played an important role in secondary vocational education. More than 40% of technical high schools and more than 60% of commercial high schools were private. Not only from domestic resources, but the government mobilized resources and experiences from international organizations such as the World Bank. By utilizing both domestic and foreign loans, the government expanded its investment in technical high schools, higher educational institutions in technical education, and teacher training facilities.

A detailed policy example from Korea's vocational education which can give many implications to policy makers in developing countries' is the SITHS during the period when the government enforced the development of the heavy and chemical industry.

SITHS in 1973 divided technical high schools into four categories by its geographical location and school's characteristics, and prioritized the investment into the technical high schools that would take a leading role. Starting from mechanical technical high schools in 1973, created to foster precision workers, to Five-Year Technical High School Promotion Plan in 1976, the government divided technical high schools into four categories - mechanical technical high schools, experimental technical high schools, specialized technical high schools, and generalized technical high schools. Each of them was promoted with different educational goals and curriculum. Compared to commercial and generalized high schools, the government highly invested in technical high schools, and at the same time, it established necessary policies that expedited industry-education cooperation and the implementation of the National Technical Qualification System. The infrastructure that was needed to foster talent needed by the industry was also provided to vocational high schools.

Korea's experience sheds light on the importance of vocational education for the rapid industrialization of developing countries. Korean vocational high schools could significantly contribute to the supply of industrial manpower for speedy industrialization through national strategies, such as a centralized planning strategy, strategy for industry-education cooperation, and an effective finance strategy. In particular, during the 1970s, the big push toward the heavy and chemical industry would not be possible without SITHS.

Ashton, D. and Green F. (1996), *Education Training and the Global Economy*, Edward Elgar Publishing

Ashton, D. and Green F. (1999). *Education and Training for Development in East Asia*, London: Rutledge

Ashton, D., Green F., Sung J., and James, D. (2002), "The Evolution of Education and Training Strategies in Singapore, Taiwan, and S. Korea: A Developmental Model of Skill Formation", *Journal of Education and Work* 15(1), 5-30

Bosch, G., and Charest, J., (2008), "Vocational Training and the Labour Market in Liberal and Coordinated Economies", *Industrial Relations Journal* 39(5), 428-47

Cho, Sung-soo, Park Jung-joo and Ra, Young-Sun (1989), *History of Korea's Vocational Education*, Korea Vocational Training Management Corporation Vocational Training Institute (in Korean)

Choi, Yeong-ryul et al. (2009), "Sharing Korea's Vocational Education and Training Experience: Establishing Korean Vocational Education and Training Model", *Korea Vocational Training Management Corporation* Research no.2009-23-1-1 (in Korean)

Choi, Kang-sik and Cho Yun-ae (2013), "Skill Biased Technology Advancement and Employment", *Korea Institute for Industrial Economics and Trade* Issue Paper 2013-318 (in Korean)

Choi, Jihee et al. (2010), "Vocational Education and Training Institutions in G20 Member Countries (I): Best Practices in Selected Countries", *Korea Institute for Industrial Economics and Trade* Research no.2010-15 (in Korean)

Crouch, C. (2005), "Skill Formation Systems", in *The Oxford Handbook of Work and Organization*, Chapter 4: 95-114

Green, F., Ashton, D., James, D., and Sung, J. (1999), "The Role of the State in Skill Formation: Evidence from the Republic of Korea, Singapore, and Taiwan," *Oxford Review of Economic Policy* 15(1), 82-96

Hall, A., and Soskice, D. (2001), "An Introduction to Varieties of Capitalism," In Hall, A. & Soskice, D. (eds.), *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage* Oxford: Oxford University Press

Hawley, J.D., and Paek, J. (2005), "Developing Human Resources for the Technical Workforce: A Comparative Study of Korea and Thailand",*International Journal of Training and Development* 9(1), 79-94

Jeon, Sang-keun (1982), *Korea's Science and Technology Policy: Testimony from a Policymaker*, Seoul: Jeongwoosa (in Korean)

Jeong, Taek-soo (2008), *History of Vocational Skills Development System*, Korea Vocational Training Management Cooperation (in Korean)

Kang, Gwang-ha (2000). *The Five-Year Economic Development Plan: Evaluation on its goals and execution*, Seoul: Seoul University Publication (in Korean)

Kang, Gwang-ha, Lee Yeong-hoon and Choi Sang-oh (2008), *Policy Decision Making System during Korea's Rapid Growth: Economic Planning Board and Policy Enforcing Mechanisms*, Korea Development Institute (in Korean)

Kang, Sung-won and Ok Jun-pil (2000), "Study on the Development of Specialized High Schools, " *Korea Research Institute for Vocational Education and Training* Research no. 00-6 (in Korean)

Kim, H. (2004), *Korea's Development under Park Chung Hee: Rapid Industrialization*, 1961-79, London: Routledge Curzon

Kim, K. H. (2001), *Vocational Education System in Korea*, Korea Research Institute for Vocational Education and Training RM 01-8

Kim, Mi-ran (2012), "A Study on the Socio-economic Performance of the Investments in Vocational Education", *Korea Research Institute for Vocational Education and Training* Research no. 2012-17 (in Korean)

Kim, Yeong-chul (1992), "A Study on the Development of Vocational Technical Education System", *Korea Education Development Institute* Report no. RR 92-41 (in Korean)

Kim, Young-hwa (1990), "Education, the Labor Market, and the National Economy: Responses of Schooling to Changes in the Industrial and Labor Market Structure in Korea", *Korea Education Development Institute* Report no. RR 90-15 (in Korean)

Kim, Yoon-Tai, Jeong Jin-hwan, Kang Seung-kyeu, Noh Jong-hee and Kang Moo-sup (1977), "A Study on the Effectiveness of Industrial and Commercial Education", *Korea Education Development Institute* Report no. RR-64 (in Korean)

Kim, Yoon-Tai (2002), "Analysis and Evaluation of Human Resource Development Policies in Korea: 1962-2002," *Korea Research Institute for Vocational Education and Training* Research no.02-38 (in Korean)

Kim, Young-hwa (1996), "The Role of Education in the National Development (I)," *Korea Education Development Institute* Report no. RR 96-5 (in Korean)

Kis, V. and Park, E. (2012), *OECD Reviews of Vocational Education and Training: A Skills beyond School Review of Korea*, Paris: OECD Publishing

Lee, Ju-ho et al. (2012), P*ositive Changes: The Education, Science & Technology Policies of Korea*, Seoul: Korea Economic Daily Inc.

Lee, Y. (2000), *Technical and Vocational Education and Training in Korea*, Seoul: Korea Research Institute for Vocational Education and Training

Lee, Y. (2004), *Employment Trends and Workforce Development* Policy in Republic of Korea, Tokyo: Asian Development Bank Institute

Lim, Jeong-taek (1981), *Reflection on the Five-Year Economic Development Plans*, Seoul: Korea Development Institute (in Korean)

McVoy, E. (1965), *Manpower Development and Utilization in Korea*, Washington D.C: U.S. Department of Labor

Ministry of Education (1978), *Leaders of the Nation's Modernization*, Seoul: Ministry of Education (in Korean)

Ministry of Education (1980), *30 Years of Education*, Seoul: Ministry of Education (in Korean)

Ministry of Education (1988), *40 Years of Education*, Seoul: Ministry of Education (in Korean)

Ministry of Education (1998), 5*0 Years of Korean Education* (in Korean)

Ministry of Education (2000), "Evaluation on the Completed Educational Loan Projects," Policy Report (in Korean)

O, Won-chul (2002), *Economic Construction in Korean Style, Vol.1-7*, Seoul: Hankyung Economic Policy Research Institute (in Korean)

O, Won-chul (2009), *The Korea Story: President Park Jung-hee's Leadership and the Korean Industrial Revolution*, Seoul: Wisdom Tree

Organization for Economic Cooperation and Development (2007), *Jobs for Youth*: Korea, Paris: OECD Publishing

Paik, S. J. (1998), *Educational Development in Korea: An Analysis of Investment and Development Strategies*, Korea Educational Development Institute RR 98-02

Paik, S. J. (2012), *Role of Private Schools in Korea's Educational Development: Modularization of Korea's Development Experience*, KDI School of Public Policy and Management

Park, Chul-Sung (2012), "Analysis on the Korea's Wage Structure for 30 Years: Evolving after 2000 (Draft)," Conference Paper (in Korean)

Park, J., Lee, G., and Son, B. (2011). *Role and Function of National Technical Qualification System in the Development of Vocational Ability: Modularization of Korea's Development Experience*, KDI School of Public Policy and Management

Park I. (2007), "The Labour Market, Skill Formation and Training in the Post-Developmental State: The Example of South Korea", *Journal of Education and Work* 20(5), 417-435

Park S. Y. (2012), "The Political and Institutional Basis of Korea's Skill Formation System", *Journal of Education and Work* 26(3), 291-308

Ra, Young-Sun and Kang Soon-Hee (2012), *2011 Modularization of Korea's Development Experience: Vocational Training System for a Skilled Workforce*, Korea Research Institute for Vocational Education and Training

Ra, Y. and Shim, K. (2009), *The Korean Case Study: Post Experience and New Trends in Training Policies*, Washington D.C.: World Bank

Song, Byeong-rak (1986), *Korea Economic Theory*, Seoul: Parkyoungsa (in Korean)

Stern, J. J., Kim, J. H., Perkins, D. H., and Yoo, J. H. (1995), *Industrialization and the State: The Korean Heavy and Chemical Industry Drive*, Harvard Institute for International Development and Korea Development Institute

Stevens, M. (1999), "Human Capital Theory and UK Vocational Training Policy", *Oxford Review of Economic Policy* 15(1), 16-32

Suh, Sang-sun (2002), "Footmark of Korea's Vocational Training System – Focused on the Behind Story of the Industrialization Process", *Korea Chamber of Commerce and Industry* (in Korean)

World Bank (1993). Main report. Vol. 1 of The East Asian miracle : economic growth and public policy. A World Bank policy research report. Washington, DC : The World Bank. http://documents.worldbank.org/curated/en/1993/09/698870/east-asian-miracle-economic-growth-public-policy-vol-1-2-main-report

Yoo, J. (1990), "The Industrial Policy of the 1970s and the Evolution of the Manufacturing Sector in Korea", *Korea Development Institute* Working Paper No.9017

Table 1 | Educational Level of Employees by Year

Year	Total Employed	Below Primary	Middle School	High School	University	Below Primary	Middle School	High School	University
	(Thousand)					(%)			
1980	13,683	7,025	2,759	2,986	914	51.3	20.2	21.8	6.7
1981	14,023	6,997	2,869	3,199	959	49.9	20.5	22.8	6.8
1982	14,379	6,567	3,113	3,590	1,110	45.7	21.6	25.0	7.7
1983	14,505	6,267	3,148	3,904	1,185	43.2	21.7	26.9	8.2
1984	14,429	5,712	3,086	4,274	1,357	39.6	21.4	29.6	9.4
1985	14,970	5,650	3,165	4,620	1,535	37.7	21.1	30.9	10.3
1986	15,505	5,525	3,262	5,056	1,662	35.6	21.0	32.6	10.7
1987	16,354	5,516	3,458	5,546	1,834	33.7	21.1	33.9	11.2
1988	16,869	5,345	3,498	5,963	2,063	31.7	20.7	35.3	12.2
1989	17,560	5,327	3,533	6,407	2,293	30.3	20.1	36.5	13.1
1990	18,085	5,264	3,532	6,814	2,475	29.1	19.5	37.7	13.7
1991	18,649	4,738	3,566	7,537	2,808	25.4	19.1	40.4	15.1
1992	19,009	4,553	3,427	7,853	3,176	24.0	18.0	41.3	16.7
1993	19,234	4,311	3,266	8,200	3,458	22.4	17.0	42.6	18.0
1994	19,848	4,280	3,329	8,592	3,647	21.6	16.8	43.3	18.4
1995	20,414	4,182	3,328	8,969	3,936	20.5	16.3	43.9	19.3
1996	20,853	4,087	3,361	9,197	4,208	19.6	16.1	44.1	20.2
1997	21,214	4,084	3,521	9,248	4,361	19.3	16.6	43.6	20.6
1998	19,938	3,574	2,874	8,741	4,749	17.9	14.4	43.8	23.8
1999	20,291	3,574	2,934	8,892	4,891	17.6	14.5	43.8	24.1
2000	21,156	3,590	3,031	9,325	5,209	17.0	14.3	44.1	24.6
2001	21,572	3,517	2,947	9,573	5,535	16.3	13.7	44.4	25.7
2002	22,169	3,454	2,963	9,846	5,907	15.6	13.4	44.4	26.6
2003	22,139	3,190	2,680	9,574	6,695	14.4	12.1	43.2	30.2
2004	22,557	3,088	2,676	9,749	7,044	13.7	11.9	43.2	31.2
2005	22,856	3,033	2,627	9,791	7,406	13.3	11.5	42.8	32.4
2006	23,151	2,973	2,605	9,774	7,799	12.8	11.3	42.2	33.7
2007	23,433	2,932	2,511	9,778	8,212	12.5	10.7	41.7	35.0
2008	23,577	2,833	2,413	9,654	8,676	12.0	10.2	40.9	36.8
2009	23,506	2,717	2,329	9,486	8,975	11.6	9.9	40.4	38.2
2010	23,829	2,594	2,342	9,618	9,275	10.9	9.8	40.4	38.9
2011	24,244	2,516	2,380	9,645	9,704	10.4	9.8	39.8	40.0
2012	24,681	2,478	2,355	9,727	10,120	10.0	9.5	39.4	41.0

Source: Economic Activity Census, National Statistics Office.

Table 2 | Employment Status of Vocational High School Graduates by Industries

Categories	Agriculture, Fisheries, Mining		Manufacturing, Construction, Electricity		Sales, Service			
						Sales, Transportation	Finance, Insurance	Others
	Number	%	Number	%	Number	%	%	%
1970	4,487	14.2	13,649	43.2	13,433	10.7	10.1	21.7
1975	8,284	13.1	29,523	46.5	25,630	7.5	11.4	21.5
1980	10,516	10.2	51,194	49.8	41,102	9.6	12.4	18.0
1985	11,009	7.7	74,966	52.3	57,239	9.7	12.7	17.6
1990	8,395	4.0	110,839	52.8	90,879	9.1	15.2	19.0
1995	3,538	1.9	109,547	57.6	77,063	10.1	10.8	19.6
2000	1,612	1.1	85,649	57.3	62,282	12.5	6.3	22.8
2005	368	0.8	29,745	63.0	17,114	13.2	2.2	20.8
2010	323	1.1	19,025	63.6	10,568	15.8	1.6	17.9
2011	503	1.4	23,841	66.8	11,354	15.3	1.4	15.1
2012	600	1.2	28,887	60.1	18,559	18.3	3.1	17.2

Source: Yearbook of Educational Statistics, Annual Series.

Table 3 | Employment Rate of Vocational High School Graduates by its Sector

Year	Technical			Commercial			Agricultural			Fishery and Marine			Others		
	A	b	c	a	b	c	a	b	c	a	b	c	a	b	c
1962	7.5			11.2			6.6			0.5			1.4		
1964	9.0	24.3	31.7	10.1	19.5	26.7	8.4	21.7	26.7	0.6	19.6	23.9	2.3	16.7	20.9
1967	13.0	54.2	66.9	23.9	37.1	43.5	14.9	42.7	48.2	0.9	32.8	40.6	3.0	12.1	16.1
1968	13.8	56.1	65.5	24.0	40.1	46.3	14.3	26.3	29.0	0.9	25.1	30.8	3.2	10.4	16.4
1969	14.3	66.5	73.2	25.1	48.0	53.2	13.4	36.0	40.8	0.8	55.0	60.7	3.4	14.1	20.8
1970	16.0	71.0	76.5	27.4	51.2	57.5	13.8	36.5	40.0	0.9	46.1	52.1	4.7	14.9	21.2
1971	21.2	70.4	77.0	35.5	50.5	57.0	15.3	34.9	38.2	1.2	41.5	45.1	6.9	14.4	21.1
1972	22.9	59.1	67.9	37.1	44.6	50.2	15.8	31.6	34.8	1.2	35.0	38.7	8.8	10.9	15.5
1973	28.8	61.7	68.8	43.0	47.0	52.5	16.1	28.7	31.3	1.3	44.6	48.4	14.8	11.9	17.9
1974	31.4	69.4	76.4	51.8	51.0	56.2	17.6	35.5	37.9	1.5	64.3	69.5	15.2	13.0	18.9
1975	33.5	69.4	76.6	58.3	51.6	56.5	17.9	37.7	40.7	1.7	63.7	69.9	14.6	15.0	19.6
1976	37.8	71.3	85.9	63.6	56.1	60.4	17.1	36.4	38.8	2.2	62.8	70.1	16.5	13.2	17.2
1977	48.4	71.7	82.7	68.8	59.1	62.3	17.8	37.2	41.3	2.7	51.2	62.6	12.6	13.5	15.7
1978	51.6	75.8	88.4	75.4	62.9	66.4	19.1	35.3	39.7	2.8	52.8	65.3	15.5	17.8	21.2
1979	55.8	71.5	85.4	85.1	67.9	71.6	20.5	37.1	40.9	3.0	55.0	66.0	17.7	22.7	27.5
1980	59.5	55.1	69.7	98.5	58.6	62.2	21.8	32.9	37.3	3.1	54.0	64.7	18.1	21.1	25.1
1981	64.9	47.5	62.1	107.7	55.7	61.2	21.7	29.8	34.3	3.2	38.3	46.6	20.5	14.9	21.3
1982	69.9	46.8	58.9	125.4	52.3	58.2	23.6	26.4	31.4	3.2	48.3	61.0	23.7	13.6	21.6
1983	72.3	49.3	62.3	136.4	48.4	54.7	23.7	32.5	39.2	3.3	40.6	52.6	27.1	10.9	18.4
1984	72.1	63.6	75.8	142.5	51.1	57.4	23.8	41.3	48.1	3.4	49.3	62.4	29.6	12.2	21.3
1985	71.6	65.7	76.2	148.3	54.0	59.3	22.5	45.0	51.4	3.5	54.8	67.9	30.6	13.3	22.7
1986	67.8	71.9	84.4	155.5	59.4	64.3	19.9	44.2	50.5	3.3	65.4	76.7	32.4	13.5	22.6
1987	65.9	78.1	88.8	149.0	68.4	72.4	19.9	58.0	65.0	3.0	74.7	84.3	33.5	13.0	21.8
1988	62.4	83.2	93.3	143.9	77.4	81.2	17.7	71.3	79.5	3.2	74.2	84.3	33.0	18.3	30.0
1989	63.6	84.0	93.9	142.7	82.2	85.4	16.8	78.6	87.1	3.3	80.7	91.0	33.4	21.0	33.1
1990	65.5	83.1	92.5	154.5	84.6	87.3	17.6	81.2	89.3	3.5	83.9	92.7	33.1	23.2	34.6
1991	64.0	87.4	95.4	151.5	88.5	90.6	15.8	85.1	92.4	3.3	84.1	92.7	37.7	29.4	42.9
1992	64.0	87.3	96.3	147.5	90.4	92.9	15.0	85.8	93.1	3.1	86.7	96.5	45.0	31.1	44.0
1993	63.4	85.2	95.9	143.3	88.8	92.0	13.7	84.7	92.5	2.9	82.4	89.7	49.2	29.7	42.8
1994	65.0	81.4	97.5	136.8	86.2	92.9	11.4	79.6	92.2	2.5	77.7	88.5	39.5	25.9	45.1
1995	78.7	78.8	97.0	134.8	83.8	92.8	9.2	74.1	91.1	2.0	80.8	93.7	34.4	19.5	47.4
1996	89.3	77.8	97.7	139.7	81.1	92.7	9.5	69.1	89.6	1.9	80.0	93.2	34.3	16.2	47.3
1997	95.5	68.7	96.4	135.3	74.7	92.3	9.4	62.2	89.6	2.2	73.8	97.3	31.6	11.0	43.5
1998	109.7	55.7	88.2	147.8	63.7	86.0	10.2	48.1	78.0	2.5	51.7	71.4	32.2	7.9	37.2

Note: a) Number of Graduates (thousand), b) Share of employment (%) = Employed/Graduates, c) Employment rate (%)=Employed/(Graduates-Advanced-Enlisted).

Source: Yearbook of Educational Statistics, Annual Series.

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