THE DEVELOPMENT OF EDUCATION IN SOUTH KOREA
(ANALYSIS ON THE BASIS OF RELATIONSHIPS BETWEEN HIGHER EDUCATION DEVELOPMENT AND ECONOMIC GROWTH)

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SIGNATURE PAGE

THESIS: THE DEVELOPMENT OF EDUCATION DEVELOPMENT IN SOUTH KOREA (ANALYSIS ON THE BASIS OF RELATIONSHIPS BETWEEN HIGHER EDUCATION DEVELOPMENT AND ECONOMIC GROWTH)

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ABSTRACT

Historically and geopolitically, Korea has been influenced by many other countries. Korea was colonized by Japan for almost 36 years, and then it experienced internal Civil War of separation between Southern and Northern Korea. The Korea was not only completely devastated, but also suffered from the destruction of its social infrastructure in society, economic, culture, and education after the war.

However, South Korea rapidly overcame its lowered economy and underdeveloped education through its willingness to reach development of education with economy growth. Korea has achieved a remarkable record of high and sustained economic growth and human development. China and Singapore have had similar success from linking education and economic development.

These countries would have been inherited the spiritual legacy of cooperating and focusing on momentum of an education sector to solve problems such as regressive economy, lower leveled education condition, and reconstruct a nation.

They eventually improved condition of education and attained economy growth through reforming education and higher education systems. Some regions around South Korea such as Singapore, Eastern region of China would develop mutually education and economy through improvement of higher education, which would show tendency to economic growth at the same time on the basis of education development and human resources in labor markets.

I could find some similar factors to determine the development of education and economy in South Korea, China (eastern part of Gaundong), and Singapore was due to following factors such as social party supports for improving education, industry party
for development, education party and government party’s providing properly financing into education, upraising VET (Vocation Education and Training) connected with STEM & Hi-tech education courses, supplying expenditure of budget on education and higher education related to STEM and Hi-tech technology, providing tremendous ICT courses for students’ learning, and establishing various R&D institutes for education, leaderships, and geographical location.

Furthermore, the most important factor is the government’s responsibility and accountability to improve higher education and to achieve economy growth, then it could maintain and influence on virtuous cycle of education development and economy growth. It is difficult to decide whether education development might have led economy growth or economy growth might have influenced on education development. There needed more detailed researches conducted to find micro-correlation between development of education, narrowly higher education, and economy growth.

Keywords

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CHAPTER 1. INTRODUCTION

1.1 Background of the Study

Individual education achievement has been regarded as a method to enhance personal social and economic status to forward to a higher social hierarchy in South Korea. It has also played roles of people to dedicate themselves to attain their educational goals to become essential members and nurturing national potential power through education development and achievement. Specially, Korean has been influenced on by emotional and traditional education philosophy based on ‘Confucianism’ since ‘Cho-sun dynasty’ had emphasized it as a basic criteria as national kudos. Lee (1993) explained that Confucianism has been an important traditional spiritual pivot of diverse sectors of education, economy, culture, and politics in South Korea.

Korean has been influenced on the basis of fairness and meritocracy by Confucianism. Confucianism became the fundamental testimonial principle of social organization. The government have gradually emphasized the philosophy of Confucianism, which naturally became the main goal of its examination-driven to testify them through educational system. Thus, Korean has regarded education and the civil service examination to pass it as great prestige and the guarantee of social success.

Koreans have believed society's leaders to be the most educated ones with knowledge and dispositions of morality to lead its society. Lee (2006) explained that the Korean education has been regarded as the way to ascend social status of people into the higher classes. Thus, people in South Korea has focused on supporting and investing in education.
Korea was, however, colonized by Japan for thirty-six years (1910-1945) and had a Civil War (1950-1953) between North and South Korea. They suffered from not only Japan’s conquering and the tragedy of fratricidal war, but also experiencing devastated economy, education, and holistic society systems. However, Ministry of Education (MOE, 2008) decided that South Koreans should overcome those devastated situations through the government’s providing quantity and quality of education, setting up a system of individual’s access to education, and enlightening future effective human power who will support expanding general education and higher education in South Korea.

Another country of eastern Asia, People’s Republic of China is located from east to south of Asia and bordered by 14 countries. It consists of 1 capital, 23 provinces, 5 autonomous regions including Guangxi, Inner Mongolia, Ningxia, Xinjiang, Tibet and 4 municipalities Beijing, Chongqing, Shanghai, Tianjin and two-special administrative districts of Hong Kong and Macau (CIA, 2016). Southern east region of China traditionally was a center of producing grains based on the agricultural society. It gradually, however, improved the economy and developed educational systems. Liu & Xu (2006) indicated that the provinces of eastern region economy growth was faster than those of western. And, Ye & Zheng (2003) argued that the western economy insistently influenced on economy growth in eastern regions (Guangdong) of China, even though that of other regions were backward to lower level of economy, with development of education. And, historically, People’s Republic of China has also emphasized Confucianism as a pivot of spiritual philosophy of people.
The development of education and economy growth of eastern region of China, especially the region of Guangdong, is similar to that of South Korea. Its economy was based on agriculture, it was colonized by the British Kingdom for over one-hundred-years, it was characterized of Confucianism, and it rapidly developed and expanded education and the economy at the similar era. Weng et, al (2014) described that economic growth and investments for provincial education have played significant positive roles for higher education expansion and development.

Figure 1. East Asia Map
Source: http://www.beijingrelocation.com/blog/map-of-chinas-provinces/
Another country, Singapore, which was also based on an agricultural society. The main product was natural rubber. And Singapore got independence from Malaysia in 1965. It also had to create a sense of national identity and consciousness among a disparate population of immigrants from diverse countries. Singapore's strategy for development and improvement was essentially to effectively utilize its strategic location and the favorable world economy (Chong, 2014, p638). Chong (2014) also claimed that education in Singapore had been a significant factor to develop systems and economy growth. Higher education related to vocational education in Singapore played a role of supplying labor force to high technic industries.

![Singapore Map](http://citymapv3.newebcreations.com/singapore-in-world-map)

Figure 2. Singapore Map


Those regions (Korea, eastern part of China, and Singapore) in this study have had similar economic base of agricultural societies, spiritual pivotal philosophy of Confucianism, and focused on educational development and achievement. Korea, China, and Singapore governments have been enthusiastically engaged in education and
upbringing human resources with strengthened competitiveness to improve their economy, facing global competition and devastated economic situations.

1.2 The Purpose of the Study

After the independence from Japan and the end of Civil War, the South Korean government struggled to implement education and economy to improve their depreciated situation into a more developed country. At this point, South Korea, China (eastern region), and Singapore had similar economic and educational depressive situations, and undeveloped environments. They, however, eventually attained higher level of educational expansion and economy growth. The purpose of this study is to examine the role of education in achieving economic growth.

In the case of China, enriching and strengthening education systems as a key policy and factor to improve, and educate the labor force with higher skills and knowledge for industries needed to enhance development in China (Banister et al. 2010; British Council, 2015; Stewart 2015). Cai (2011) proposed that transformation of higher education and economy can be regarded as significant factors for development. If higher education would be well enriched, it would produce more competitive human resources and the knowledge in industrialized societies through higher education development.

In the case of Singapore, education and economy sectors have gradually developed based on historical and environmental factors similar to that of South Korea and China (eastern part). So, this study was conducted to find factors to determine the quality of higher education and to study relationships between education development and economy growth in these countries. The reason why these countries were selected was that they
overcame an underdeveloped economy and low levels of education to attain greater education and economic achievements compared to Organization for Economic Cooperation and Development (OECD) nations.

1.3. Research Questions

In order to examine how South Korean education has been developed, the factors that determined the quality of education, and the relationships between the development of education and the economy in South Korea, I researched educational and economic development in South Korea over the past six decades. I also developed two broad research questions.

The first study question was “What were the factors determining the quality of higher education?” I studied in order to posit the factors that have been critical elements to determine the quality of education in South Korea, China, and Singapore, since they have similar culture (based on philosophy of Confucianism and education fever for promotion), historical background (colonized by other countries and overcame low levels of economy), geography (similar geographical location), education development (inclusive higher education), and governments’ supports (financial supports for higher education), etc.

The second study question was, “What was the relationship of the development of education and the economy growth in South Korea, China, and Singapore?”. I also studied this question in order to ascertain the relationship between education and the economy in South Korea, and how does it compare with the experiences of the eastern
region of China, and Singapore, and to propose that the development of the economy is one factor developing the education system in these countries.

In order to answer the research questions, this study needed to find the common factors to determine high quality of higher education in South Korea, eastern region of China, and Singapore. And, to find relationship between education and economy growth, this study sought to find the common factors to develop education and economy growth in those countries. I would propose that the common factors to determine the quality of education, specially, the relationship between higher education development and economy growth among selected countries.
CHAPTER 2. REVIEW OF THE LITERATURE

2.1 Factors to determine the quality of higher education

Human capital is an important factor to determine what effect do influence on the development of a nation in economic growth theory. Lee (2016) explained that human capital could affect directly economy growth as methods to enhance productivity, increase the speed of innovation of technology, and influence on birth of rate and education of next generation, which continuously increase human capital through linking with parents and children.

Some researchers argued ‘theory of dependence’ against ‘human capital theory’. According to the theory of dependence, economy growth is determined whether the country is a centered one or not among countries. Harbison and Myers (1964) published ‘Education, Manpower, and Economic Growth’, which analyzed correlation between each ‘human resources development index’ and economic growth index. Human resources development consisted of number of teachers, scientists and engineers, doctors and dentists, elementary enrollment rate, secondary enrollment rate, tertiary enrollment rate, and science and engineering major of universities etc. Harbison and Meyer (1964) created and researched 75 countries to be classified four levels education developing nations, partial developing nations, education developed nations, and education advanced nations with ‘complex index’ of the most representative education development index. Those four groups of nations were classified on the basis of correlations between ‘complex index’ and ‘GNP’.

Complex Index

= universities enrollment rate x 5 + elementary and secondary enrollment rate
According to ‘Complex Index’, universities enrollment rate is a significant factor to determine economy growth, which means higher education is an important factor to figure out relationship between higher education development and economy growth.

In higher education, there have been various factors to determine the quality of higher education by many researchers. As the industrial environment has been established in the society, the concept of quality of higher education has been changed in accordance with situation of the society. Many researchers agreed the concept (environments for higher education development) was claimed by Salter and Tapper (2000), and the quality in higher education created from the market’s needs and form governments’ supports, and it consists of four parties such as society, industry, education, and government party.

![Diagram](https://www.emeraldinsight.com/action/showImage)

Figure 3. The University, its environment and those it serves.

Source: [https://www.emeraldinsight.com/action/showImage](https://www.emeraldinsight.com/action/showImage)

In Figure 3, there are critical parties that determine the quality of universities and other higher education institutions. Houston (2007) included four parties (government,
society, industry, and education-universities) interlinked with each other. Industry party is to economic perspectives (employers and economic groups), Society party is to social perspectives (parents and community groups), Education party is to educational perspectives (academic and other education providers groups), and Government is responsible for higher education development. These four perspectives show the relationships among society, economy, education, and government. Higher education could produce the labor force for industry parties (markets) with government and society parties’ supports. It also shows industry, society, and government’s demand could influence on higher education institution party.

Higher education would improve under collaboration with society’s needs and supports, industry’s needs and investments, education’s skills for innovation, and government’s supports and responsibility. Main factors to decide the quality of development for higher education could be categorized such as society (community supports, culture motivation of pivot philosophy), education system (transformational establishing organizations; clustered institutions for higher education), industry (economy growth), and government (financial and policies supports).

2.2 Economy growth and Higher Education development

In 1776, Adam Smith (1776) published “An Inquiry into the Nature and Causes of the Wealth of Nations”, which demonstrated the concept and the role of human capital. Smith (2007, p179) claimed people attain and maintain their talents and capacities through education; that people and their society get benefits from their capacities; and that these talents and capacities make a cost on the individual and society. Becker (1964)
broadened the concept of human capital, while inventing theories and performing empirical research on human capital.

Hicks (1979) indicated that Human capital sectors are important for explaining differences in productivity among countries. Van Leeuwen & Foldvari (2008) agreed that there was overall consensus that the development and improvement of human capital strongly influenced economic growth. O'Brien & Paczynski (2006) explained that human capital through education would manifest the knowledge, capabilities, technics, and characteristics of individuals that allow them to improve their personal, social, or economic growth.

Easterlin (1981) indicated that the spread of education preceded modern economic growth in most countries though the sudden expansion of schooling in some countries was not followed by economic development. Stevens and Weale (2004) graphed with plotting the GDP per capita with the primary school enrollment rates using data from eight countries provided by Maddison (1991), which showed that many researchers have tried to claim a relationship between education and economic growth.

Many researchers studied to find the expression of equations related to education and economic development in many countries to express estimates of education contribution toward economic development. Solow (1956) tried to show expression the model of mathematical equation. He presented the model to show a relationship between education and economic development and expressed that if a country increased and raised the average number of educated people as labor was supplied, the result would be an increasing productivity of its economy. Stevens & Weale (2004) explained that output by economy development is proportional to the quantity of effective laborers who were wee
educated through education.

In order to move up the value chain and rely on higher value-added industries there is need for a highly skilled labor force (British Council, 2015). This has presented a huge issue to the country as the current adult workforce is largely unskilled, reflecting on the low education delivery of the preceding era (Stewart, 2015).

China has been well-aware of the skill shortages and aimed to increase the scale of human capital by investing increasingly in education. As strengthening education serves as a key factor to produce and improve a skilled work labor force and enhance development (Banister et al. 2010; British Council, 2015; Stewart 2015). Higher education and economic transformation can be considered as two dynamic factors influence on each other’s development (Cai, 2011). Enhancements in higher education can produce the knowledge and human resources necessary for economic growth. Therefore, the number of higher education institutions (HEIs), tertiary graduates and transnational partnerships have extremely increased since 2000 in China.

In order to find the relationships between higher education development and economy growth, I needed to find the mechanism that showed the relationship and the interaction between higher education institutions and industry. Kruss, McGrath, Petersen, and Gastrow (2015) proposed ‘Capability Building Process’ for the relationship between higher education competencies and industry growth, which could influence on higher education development and economy growth. Other one Von Tunzelmann (2010) and Von Tunzelmann & Wang (2007) proposed the mechanism that higher education development with high skills and technologies which industries needed and supplied, those institutions would develop and improve their skills through well operation of management to satisfy not only for industries but also for themselves.
In Figure 4, it shows well relationship between higher education development and economy growth, especially technological capabilities were factor figured out as factors to develop higher education (Kruss, McGrath, Petersen, and Gastrow, 2015). They thought the relationships between higher education institution competencies could influence on internal and external capabilities building mechanism, especially, external interface consists of research collaboration (university-industry interaction), industry involvement, graduate placement for industry, and lab services, etc. And universities could create development by industries’ feedbacks, training, and evaluation by itself and industries. They showed the processes was complex, however, innovation systems in industries stresses new complex cultural, social, political, and economical interactions. Higher education was focused on primarily its relation to source of industries’ learning. Higher education development is related to the economy growth through tertiary institutions’ competencies, internal and external capabilities’ building mechanism for its development.
In Figure 5, it shows a conceptualization of the factors and interactive learning in a sectoral system of innovation (SSI) (Von Tunzelmann, 2010; Von Tunzelmann and Wang, 2007). It also provides a framework for flowing the SSI, as on the basis of studying interactions, and the interactive capabilities of the main factor.

In the diagram, knowledge and various information (resources, skills, and experience etc) flows between interactions and actors are important factors to develop higher education and economy. Industries need human resources with skills from tertiary institutions. Skills development and skills supply could improve by higher education strategies and management. Industries’ needs for technologies could influence on higher education (tertiary institutions) strategies and management. The capabilities in technologies could be important factors to lead development of higher education based on
the relationship between industries (the economy) and tertiary institutions (higher education).

Many researchers have studied to find factors to decide the quality of higher education and the relationship between higher education development and economy growth. It might be impossible to think education development under separation of society, education itself, industry, and governments, since these factors have been enriched by education development and education development also has influenced on these factors’ improvement.

In chapter 3, key policies would be proposed that higher education development and relationships between higher education development and economic growth in South Korea. Then, cases of Guandong region of China and Singapore would also posited in higher education sector and economy one.
CHAPTER 3. Education Development in South Korea, China, and Singapore

3.1 Higher Education Development

3.1.1 The Development of Higher Education in South Korea

Education opportunities were much limited in Korea after being conquered by Japan. According to MOE Statistics, at the end of colonial rule, the enrollment rate of elementary students was 64%, and the rate of enrollment dropped to 3.2% for secondary education. Moreover, the enrollment rate for higher education decreased to 0.18%.

There had been entrance exams to advance next education institutions. The government needed high educated people to advance higher education institutions. For example, when even an elementary student wanted to advance a middle school, he or she should take an entrance exam. So, there had been a barrier for people to approach more higher education.

The government (MOE) decided the abolition of entrance exams could give opportunities for students to advance next higher education institutions and learn higher levels of knowledge at higher education institutions. Thus, enrollment rate has gradually increased through people’s passion for education and government’s policies for preparing well educated people to lead next economy growth in South Korea.

Universal enrollment would be generally identified when the rate of enrollment was over 90%, and MOE (2000) indicated enrollment for elementary school education was 90% by 1957, middle school education by 1990, and higher education by 1999 (below the table 1). After reaching universal enrollment rate at each level of education, more than 90% of graduated students would attend the next level of education. Furthermore, more
50% of high schools graduated students entered into higher education in 1995 with economy growth at the same time.

Table 1. The Years of Attainment of Universal Enrollment

<table>
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<tr>
<th>Year 90 percent entered school of a higher level</th>
<th>Year 90 percent of enrollment rate</th>
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<tr>
<td>Elementary to middle</td>
<td>Elementary</td>
</tr>
<tr>
<td>1979</td>
<td>1957</td>
</tr>
<tr>
<td>Middle to high</td>
<td>Middle</td>
</tr>
<tr>
<td>1985</td>
<td>1990</td>
</tr>
<tr>
<td>High to tertiary*</td>
<td>High</td>
</tr>
<tr>
<td>1995</td>
<td>1999</td>
</tr>
<tr>
<td>Tertiary</td>
<td>Tertiary</td>
</tr>
<tr>
<td></td>
<td>2000</td>
</tr>
</tbody>
</table>


In cased of South Korea, they needed to overcome lower levels of economy and education, South Korean should emphasize on more higher education to lead economy growth. So, they set up key policies to achieve education development and economy growth at the same time. The government planned to foster higher educated students to buttress industries and lead economy. The government also established tertiary institutions to meet the needs of societies, higher education systems, and industries.

Kim (2003) classified the institution of higher education into four categories in South Korea; colleges and universities, teacher’s colleges and colleges of education, open and correspondence universities and open universities, and theological colleges, seminaries, and others. He additionally classified key policies of education into free compulsory education, the expansion of secondary education, vocational and technical education, and expansion of tertiary education (higher education). It could educate and arrange human resources to fit for social positions such as teachers, researchers, work force labors, and practical fields workers, etc.
### Table 2. Key policies of education and economy in South Korea

<table>
<thead>
<tr>
<th>Period</th>
<th>Economy</th>
<th>Education</th>
</tr>
</thead>
</table>
| 1960-mid-1970s | 1) Take-off in early 1960s: from import substitution to export-driven, light labor intensive  
                    2) Selective strategic industries in 1970s: export-acceleration, heavy and chemical industries | 1) Expansion/upgrading of primary & lower secondary education  
                    2) Emphasis on TVET (late 1960s)  
                    * manpower planning |
| Mid-1970s-1980s | 1) Structural adjustments from late 1970s: steel, shipbuilding, etc.  
                    2) From imitation to innovation in 1980s: electronic industry | 1) Expansion/upgrading of upper secondary  
                    2) Expansion of tertiary education  
                    3) Strengthening of TVET |
| 1990s-present | 1) Enhancing national competitiveness in early 1990s  
                    2) Knowledge-based economy from mid-1990 | 1) Quality enhancement for K-12  
                    2) Public investment in higher education (e.g., Brain Korea 21*)  
                    3) Lifelong Learning |

Notes: Manpower planning was employed until late 1970s as a tool to link education and training, and the labor market. Brain Korea (BK21) introduced in 1999 is a government competitive/performance funding scheme (1.2 billion USD for seven years) to stimulate R&D training in IT, BT, and other cutting-edge technology areas (MOE, 2008)

In Table 2, the government planned for nationwide development to overcome low levels of economic situations and encouraged education innovation not only for expansion of primary and lower secondary education but for empowerment on vocational education for industries’ work force labors in chemical and heavy industries parts during 1960s and mid of 1970s. It also enriched from parts of steel industries to those of electronics with high technology and expanded tertiary education institutions for providing economy members with well-educated people in 1980s.

South Korea eventually innovated society stems as knowledge-based economy and aggressively invested on high technology industries and also encouraged tertiary education institutions to actively educate excellent students who would engage in their economic activities. South Korea has gradually expanded Technical Vocational Education Training (TVET) connected with secondary educational curriculum and encouraged and supported tertiary education institutions to establish high technology institutions in universities such as Brain Korea 21 century (BK21). The government
naturally would empower tertiary education institutions appointed as BK21 to liberally select excellent students and educate them for the society.

The government (1973) also planned to construct innovative technological experiment cluster, which was designed to establish Korea Advanced Institute of Science and Technology (KAIST), industrial laboratories of government and companies in Daeduk laboratory cluster located in middle of South Korea. It was designed to comprehend for conducting R&D (research and development), advancing productivity, and industrializing through incorporating experiment and education.

The government gradually not only induced tertiary education institutions to innovate themselves, aggressively attract excellent students, and positively take R&D projects, but also invested financial on excellent ones to automatically improve their technological skills for economic growth and the nation.

3.1.2 The Development of Higher Education in China (Guangdong region)

In the case of China, the enrollment of higher education, tertiary one, gradually has increased since 1990. The figure 6 shows that the tertiary enrollment rate had tendency to quickly increase after 2000, steadily ascending from 1990.

HEIs’ quickly increasing was due to ‘the project 211’ by the government since 2000s, and Government expenditures on Higher Education (HE) expanded simultaneously, where it first hit 4% of the GDP in 2012 (CIA, 2016). Although China has achieved excellent results through the educational reforms, the rapid transformation from elite to a mass education has also brought along new challenges and problems (Cai, 2011; Wang, 2009; Xiaoying, Abott, 2015). Healey & British Council indicated problems of higher
education in China were higher education model was stereotypical and outdated, shortage of innovation skills and social responsibility, and lack of sufficient materials and resources to support higher education (Healey, 2015; British Council, 2012).

![Graph](image)

Figure 6. The tertiary enrollment

Source: National Bureau of Statistics in China

The region of Guangdong was a rural society based on an agriculture industry, however, it has steadily improved and rapidly shifted into urban region. There have been established various universities and institutions for higher education. China education systems is the largest in the world (British Council, 2015; Wang, 2009). In 1978, China has maintained the economic reforms and open-policy, which provided this policy for China’s higher education. Students not less than 120,000 were attending college or university in 1948. This enrollment of collegian number drastically increased into 37 million students enrolled in 2015, which demonstrates development of education and growth (MOE, 2016; Xinying, 2016).
Since the 1980s, Transitional Education (TNE) has taken its place in the Higher Education (HE) environments and it has developed rapidly since the 1990s (Huang, 2003; Tang & Nollent, 2007). Cai (2011) explained China introduced foreign (Western) models for developing its higher education system, while still retaining the essential characteristics of its own educational culture and system. In 2015, China documented over 2000 approved TNE programs. At that year, 450,000 students were enrolled in TNE and 1.5 million students graduated (Cao, 2015; Hou et al, 2014; MOE, 2013). 4% of enrolled students were from eastern parts of China and most of them were majored in engineering, computing, and management & business related to higher education.

Huang (2013) explained the transformation of the higher education system initiated, largely adopting the Soviet Union model characterized by central planning. China only had 205 higher education institutions and only one on ten thousand (Chinese) people were enrolled in HE (State Council and British Council, 2013). The higher education was severely affected by the cultural revolution from 1967-1976 through which enrollment numbers and quality largely declined. The reform strategies in this period can be classified into two stages (Cai 2011; Huang, 2003).

The government also actively supported eastern parts for development of education and economy growth. It actively led higher education systems of eastern regions to improve the quality of education and educate excellent students for preparing developing economy systems in Guangdong region. Industries in Guangdong region have been gradually shifted from major agriculture into hi-technology industries with high skills and technologies. It was possible for government’s authorization to fulfill the plan for higher education development.
3.1.3 The Development of Education in Singapore

In the case of Singapore, Dixon (1991) indicated that 70 percent of its Gross Domestic product (GDP) derived from entrepot’s product activities. Singapore had a small and limited industrial structures. The heavy industry of shipbuilding was a main industry that was large governmental and public bodies. The small manufacturing sector of industries consisted of assembly of vehicles, marine engineering, light engineering, printing, and processing (World Bank, 2003; Chong, 2014).

By the late 1950s, it remained primarily an entrepot, with 70% of its gross domestic product (GDP) derived from these entrepot activities (Dixon, 1991, p. 158). The country had a small and limited industrial structure. The dominant industry was a kind of the shipbuilding and repairing one, which largely consisted of governmental and public bodies. The small manufacturing sector consisted mainly of light engineering, the assembly of vehicles, marine engineering, printing, and processing (Colony of Singapore, 1955). Alfaro & Ketels (2016) mentioned though employment in the manufacturing sector grew almost two times as much as that of last year in 1961, manufacturing development was slow, and stagnated at about 12% of the GDP in 1960. In the meantime, the baby boom in the early 1950s, as well as the free immigration policy, had resulted in an average annual population growth rate of 4.4% between 1947 and 1957, and the unemployment rate stood at 5%, rising to a high of 9.2% in 1966. It was clear to the government that solving the rising unemployment rate was a matter of high priority.

Fredriksen & Peng (2008) explain that the government became more focused on the need to expand the industrial base. In 1968, the government expressed that year was in terms of shifting in industrial strategy to more export-oriented manufacturing activities.
To support the Export-Oriented Industry (EOI) strategy, and given the lack of natural resources, the development of the country’s human resources was important priority to the government. To achieve this end, a task force was established in order to build an education system that would support the development of a talented and technically trained workforce.

While the country was under British colonial rule, education was used as a tool in order to meet British cultural, social, and political interests and to pacify ethnic groups with political aspirations (Fredriksen & Peng, 2008). An intimate link between education and the economic development of the small city-state have been strongly emphasized since 1965. The government took the conventional path in terms of developing new skills and work attitudes to accommodate new economic strategies. The role of education in the socialization and nation-rebuilding process as in terms of developing a Singaporean identity (Fredriksen & Peng, 2008). National integration through a national education system was seen as the key condition for economic survival. In order to reach these national goals, the government recognized the necessity to provide every child with at least six years of compulsory education—regardless of race, language, sex, wealth, or socioeconomic status (MOE, 2015).

Bilingualism inevitably became a key component in Singapore’s education system, given the multilingual nature of the population. In 1960, learning a second language was made compulsory in all primary schools, and in 1966, the policy was extended to all secondary schools as well. The decision with regards to bilingualism was not just for the achievement of social cohesion in a largely plural society (at least, during the early 1960s). The English language was seen as a primary utilitarian tool in Singapore’s effort
to make the world its marketplace. It was a politically difficult decision, because English—the language of the colonial powers—was met with much hostility. With the increasing demand for English, however, the danger that the young could become deculturized and forget their mother tongues increased. The bilingual policy assured parents that their children would not grow up culturally ignorant. Today, Singapore’s bilingual policy is perhaps the most unique of its kind in the world. It is an Eastern-Western Hemisphere model that allows Singaporeans to attain competency in the use of the English language, the language of the so-called West, as well as in the use of the Chinese language (or other indigenous languages, such as Tamil and Malay), the language of the so-called East. This approach is particularly useful for Singapore’s business internalization strategy.

The years between 1959 and 1965 were significant, even epochal, in the history of Singapore’s education transformation. In May 1959, Singapore was given self-government status, and a Five-Year Plan (1961–65) was implemented in order to boost the education standards of the people. Fredriksen & Peng (2008) indicated that the priority was to provide universal free primary education. The plan consisted of three main features such as equal treatment for the four streams of education—Malay, Chinese, Tamil, and English, the establishment of Malay as the national language of the new state, and emphasis on the study of mathematics, science, and technical subjects.

The philosophy of education aims “conserved equal opportunity for all citizens, established the means of maintaining unity in diversity and instituted a program for training a new generation for the needs of a forward-looking, modern, industrial and technological society” (MOE in Singapore, 1966). Today, this philosophy, broadly
speaking, remains intact. Although the government struggled to provide for vernacular education to students, a major consequence of the transformation of the Singaporean economy was the consistent tendency for parents to strongly enroll their children in English-language schools from 1959 (Goh, C. B. and S. Gopinathan, 2008). In 1959, only 47% of children entering primary grade one was in the English stream, and 46% were in Chinese schools. Twenty years later, in 1979, the English stream enrolled 91% of all children in primary grade one, with only 9% in the Chinese stream and a negligible number in the Tamil and Malay language streams. This dramatic shift was brought about by the free choice of pragmatic parents in response to the nation’s drive toward high value-added industrialization, as well as to an economy where the language of business is English. Out of a population of 1.7 million, the student population stood at nearly 400,000 in 1962. This led to a period of rapid expansion of schools (MOE, 2015).

Alfaro & Ketels (2016) explained higher education in Singapore, the higher education cluster was designed and constructed with the University of Singapore and the Nanyang. These were established in 1980 to be representative of National University Singapore (NUS). The Nanyang Technological University (NTU) was advanced to university status in 1991. They also introduced higher education universities the number of higher education institutions were established, for examples, such as the Singapore Management University, Singapore University of Technology and Design, Singapore Institute of Technology, and the SIM University. MOE (2015) explained the Global Schoolhouse Initiative was established in 2002 not only to educate a more skilled and excellent human resources and workforce but also to take part in the growth of the global higher education, which sector was valued at US$2.2 trillion with 70% of the future demand
coming from Asia. Singapore additionally planned to design its higher education sector to become the “Boston of Asia”. The goal of educational systems was attractive enough to attract 150,000 international students over the world, anticipating various economic spillovers including benefits to retail, tourism, and housing markets, and thus education’s contribution to the economy increased from 3% to 5% by 2015 in the world. In order to reach this goal, the government pursued two key strategies: first goal was to attract world-class universities and top academics to set up centers of excellence and campuses in Singapore, and second one was to improve the quality and diversity of program offerings in local universities and polytechnics (MOE, 2015).

3.2 Relationships between Higher Education and Economy in South Korea

3.2.1 Population, GNI, Unemployment, and Labor Force

Ban (1979) explained the grain markets of Korea was consisted of regions’ main industry was agriculture less integrated than them of China and Japan. Most industries were based on agricultures, which meant farmers would not attend systemized education institutions in the past (Cha, 1998).

Educational development rapidly proceeded and expanded throughout from in1961 to in 1996, with secondary education becoming universal in the late 1980s, and higher education enrollments reaching the levels of developed countries by the 1990s. In 1980s, high rates of GDP growth, steeply increased in the years from 1986 to 1988, at 12 % annually the highest in the world at that time. After that the growth rate gradually decreased, but the economy continued to expand through 1996 at an average rate of 7 % (Eichengreen, et al., 2012). The development of human capital through education could
be an important factor to invest them into more technical and industrialized systems.

Kim (1997) identified a consistent line of interaction between industrial manpower needs and the supply of manpower from the education sector. In order to study the relationship between education and the economy, it is best to research the relationship with the labor force through economic indexes such as population, GNI, unemployment, and labor force. Gross National Income (GNI) is theoretically equivalent to Gross Domestic Product (GDP). However, there is a difference between them. While GNI could include net income from foreign countries, GDP include only income from domestic products.

Table 3. Index of population, GNI, unemployment, and labor force in South Korea

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (Millions)</td>
<td>24</td>
<td>32</td>
<td>38</td>
<td>43</td>
<td>46</td>
<td>46</td>
<td>47</td>
<td>48</td>
</tr>
<tr>
<td>GNI per capita (US $)</td>
<td>80</td>
<td>650</td>
<td>2,324</td>
<td>7,751</td>
<td>10,363</td>
<td>6,843</td>
<td>9,675</td>
<td>12,646</td>
</tr>
<tr>
<td>Unemployment Rate (%)</td>
<td>11.7</td>
<td>4.4</td>
<td>5.2</td>
<td>2.4</td>
<td>2.6</td>
<td>6.8</td>
<td>4.1</td>
<td>3.4 (2003)c</td>
</tr>
<tr>
<td>Labor force (Millions)</td>
<td>8</td>
<td>10</td>
<td>14</td>
<td>19</td>
<td>21</td>
<td>21</td>
<td>22</td>
<td>23 (2003)</td>
</tr>
<tr>
<td>Labor force Participation rate</td>
<td>30.8%</td>
<td>47.6%</td>
<td>59.0%</td>
<td>60.0%</td>
<td>62.2%</td>
<td>60.5%</td>
<td>60.7%</td>
<td>61.4% (2003)</td>
</tr>
</tbody>
</table>


GNI: Gross national income (GNI) is the sum of a nation's gross domestic product and the net income it receives from overseas.

This shows that the population gradually increased from 1960 to 2004, and that GNI, labor force population, and the labor force participation rate also steadily increased. The
unemployment rate tended to decrease. This tendency was at the time of education expansion for supplying opportunities to students at secondary and high schools.

3.2.2 Expansion of Education and Human capital (Labor force)

Table 4. School Enrollment Rate

<table>
<thead>
<tr>
<th>Year</th>
<th>Level</th>
<th>Elementary School</th>
<th>Middle Schools</th>
<th>High Schools</th>
<th>Tertiary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1951</td>
<td></td>
<td>69.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1959</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td></td>
<td></td>
<td>36.6</td>
<td>20.3</td>
<td>5.4</td>
</tr>
<tr>
<td>1980</td>
<td></td>
<td></td>
<td>73.3</td>
<td>48.8</td>
<td>11.4</td>
</tr>
<tr>
<td>1990</td>
<td></td>
<td></td>
<td>91.6*</td>
<td>79.4</td>
<td>23.6</td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td>95.0</td>
<td>89.4*</td>
<td>52.5*</td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td></td>
<td>91.6</td>
<td>90.1*</td>
<td>61.7*</td>
</tr>
</tbody>
</table>


Figure 7. Labor force changes in Korea

Source: The World Bank

The school enrollment rate has increased steadily, especially when the enrollment rate (*) of middle schools (1990), high schools (2000), and tertiary schools (2000) were
tremendously increased since 1990s, on the basis of the table 4 and the figure 7. As the rate of tertiary enrollment increased, the number of employer has steadily increased and labor force population and participation rate also have increased. In Figure 8, a lot of graduates from high and tertiary education have been human capital for economy growth. But, if capacity of accommodating those human capital for appropriate positions, which would be concluded that education conducted for them had not been effectively culminated in their education sector.

The government’s supports and industries’ investments for higher education institutions researches and competitiveness could produce development of higher education and economy growth. It might be appropriate situation to meet industries’ demands and the government’s ambitious plan for developing the education and improving the economy.

At this point, accommodation of socio infrastructure for various resources would be a crucial factor to enhance education and economy growth in a society.

![South Korea - Employment, million people](source: TheGlobalEconomy.com, Korean Statistical Information Service)

Figure 8. The number of employment in South Korea

Source: The Korea Statistical Information Service
<table>
<thead>
<tr>
<th>Year</th>
<th>Elementary to Middle</th>
<th>Middle to High</th>
<th>High to Tertiary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>66.1</td>
<td>70.1</td>
<td>26.9</td>
</tr>
<tr>
<td>1980</td>
<td>95.8</td>
<td>84.5</td>
<td>27.2</td>
</tr>
<tr>
<td>1990</td>
<td>99.8*</td>
<td>95.7*</td>
<td>33.2</td>
</tr>
<tr>
<td>2000</td>
<td>99.9</td>
<td>99.6</td>
<td>68.0*</td>
</tr>
<tr>
<td>2004</td>
<td>99.9</td>
<td>99.7</td>
<td>81.3*</td>
</tr>
</tbody>
</table>


The advancement rate (*) on Table 5—from low level to a high level—has increased annually, and the rate of advancement from high to tertiary by 2000 and 2004 specifically showed that higher education could be an important factor for improving economic growth. It was possible through parents’ and the government’s accountability and responsibility to enhance educational environments and to develop the economy through supplying quantitative and qualitative education supplements for students.

That population (the population over 25 years of age) could take part in economic labor force, which also could be an important factor in terms of deciding that education would mutually influence economic growth. At this point, we would think about the relationships between education development and economy growth. Historically, many population gradually assembled places convenient for a living. The place people have lived in which had several conditions. The place people favored has sufficient materials to make a living, jobs, social fundamental systems were well established. People preferred urban regions have industries, markets, well organized transportation systems, schools, and cultural facilities etc. As people assembled at one area, there would naturally
create various economic behaviors, educations, and cultures. At first, economic behaviors created jobs for labor force to control or handle those, and economy would want artful human resources, which drove education into keeping up with society’s development pace. Otherwise, as education gradually developed in society, new applied results of education would create novel economy sectors. For example, new technology or research about electronics or semi-circuit electronics, which created super high technology industries or companies such as Samsung, Apple, Google and Facebook etc. The point we recognized is too difficult to conclude whether economy growth could influence on education development or education development would more affect economy growth.

Figure 9. Unemployment rate in South Korea

Source: https://www.theglobaleconomy.com/South-Korea/data_unemployment_rate/

However, we empirically could induct that education has been almost everywhere and every time even if economy has grown or not in a society. For example, there have been graduates from universities or higher education institutions in South Korea, and there have progressed institutes and tertiary education systems, however, unemployment rate
did not decrease (between 4%-5%) in comparison to increasing rate of labor force and that of economy growth (Figure 9).

Although education systems have been fortified, skills and technologies have been progressed, those a lot of human resources graduated from higher education institutions have not been employed whether economic situation has been state of being inflation or depression. This means that economic situation always cannot guarantee education development.

But, in other example, lots of labor force from graduated from higher education institutions have been pivotal momentum of China’s economy growth. The education reforms and development have led economy growth in China, which is under going through education and economy sectors.

The South Korean industry sector has called for a highly educated workforce that is able to generate economic growth over the period of industrialization. Responding to the increasing need from industry, in the 1980s, the South Korean government raised the total quota of enrollment in higher education (J. Hwang, 1980; Y. Kim, 1979). Higher education related to technology and STEAM (we generally call STEM, but STEM+A (liberal arts); STEAM named in South Korea) has expanded due to the increased industrial needs for a highly-skilled workforce (B. Hwang, 1990).

The table 6 demonstrates that the attainment rate of education of the population gradually increased in accordance with higher levels of education. This rate of attainment outstandingly increased in the 1990s, and the expansion of education opportunities could contribute the growth of the economy while burgeoning economic indexes. It shows that higher education students have gradually increased with economic growth.
### Table 6. Distribution of Educational Attainment of Population over 25 years old (Unit: %)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary graduate and below</td>
<td>73</td>
<td>55</td>
<td>33</td>
<td>23</td>
</tr>
<tr>
<td>Middle school graduate</td>
<td>12</td>
<td>18</td>
<td>19</td>
<td>13</td>
</tr>
<tr>
<td>High school graduate</td>
<td>10</td>
<td>19</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>Junior College graduate</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>University graduate and over</td>
<td>4</td>
<td>7</td>
<td>12</td>
<td>16</td>
</tr>
</tbody>
</table>


Mentioned above with the tables’ data, including education and economic indexes, many elements could expand both education and the economy, which were verified with data related to the economic and educational expansion of enrollment, schools’ advanced rate, education, etc.

#### 3.2.3 Relationship between Higher Education and Economy Growth

Baum & Payea (2004) examine the benefits for individuals and communities or societies from state investment in higher education. The results of their research state that higher levels of education were correlated with higher income, and that the income gap between the labor force with secondary education and the labor force with higher education had increased over time. They argued that college graduates contributed to society by increasing public monies, including higher tax revenue, as well as in ways that were not easily quantified, such as lower needs for social support programs, lower rates of confinement, and higher levels of civic participation.

In case of South Korea, Moretti (1999) explained that a 1% increase in the share of graduates from universities in the labor force raised wages of graduates from secondary
education, high schools, drop-outs by 1.3%, wages of high-school graduates by 1.2%, and 
wages of college graduates by 1.0%. Moretti’s study claimed that there are additional 
benefits of higher education to society in advanced economies, as well as directed 
benefits to an individual.

Asteriou & Agiomirgianakis (2001) investigated the relationship between human 
capital and economy growth. The GDP had influenced on higher education enrollment, 
though primary and secondary education had been little influenced on economic growth-
GDP. Table 7 shows studies that dealt with the relationship between higher education and 
economic growth at the level of country.

Table 7. Overview of studies on relationship between higher education and national economic growth

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Methodology</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asteriou &amp; Agiomirgianakis (2001)</td>
<td>Greece</td>
<td>Cointegration test, Causality test</td>
<td>No effect of higher education on economic growth, Positive effect of GDP on higher education</td>
</tr>
<tr>
<td>Cheng &amp; Hsu (1997)</td>
<td>Japan</td>
<td>Time series analysis</td>
<td>Bidirectional causality between higher education and economic growth</td>
</tr>
<tr>
<td>Self &amp; Grabowski (2003)</td>
<td>Japan</td>
<td>Vector auto regression analysis</td>
<td>Positive effect of higher education not in the prewar but in the postwar period</td>
</tr>
<tr>
<td>G. J. Kim (2004)</td>
<td>South Korea</td>
<td>Cross-section and time series analysis</td>
<td>Positive effect of higher education on economic growth</td>
</tr>
<tr>
<td>Huang, Jin, &amp; Sun (2009)</td>
<td>China</td>
<td>Cointegration test, Vector error correction model, Granger causality test</td>
<td>Long-term cointegration relation between higher education and economic growth Lagging effect of higher education on economy</td>
</tr>
</tbody>
</table>


In the table 7 and Figure 10, Lee (2012) explained that the result of the study was a 
positive effect of higher education on economy growth in South Korea and China. The 
number of graduates showed a positive effect on their GDP per capita. The greater 
tertiary enrollment increased in higher education, the larger GDP per capita that they 
could produce and create through higher education at the tertiary level in South Korea.
Lee (2012) found that the contribution of number of graduates in higher education (tertiary level) on GDP per capita was an effective relationship in terms of South Korean economic growth. On the basis of that research, she insists that higher education and expansion and economic growth have positive relationships in South Korea, and also explains that the impact of higher education was slightly higher in South Korea. However, we could see only tendency of GDP and tertiary enrollment’s increasing, we absolutely could not conclude higher education would directly influence on economy growth or not.

Figure 10. Growth in Tertiary Enrollment and GDP per capita in South Korea 1970 to 2010

In South Korea, the science major group in South Korea had the least effect on all economic sectors, including the industry sector. The reduced effect of the science major group on economic growth may be attributed to the sudden and sharp decline of the number of graduates in the 2000s. Lee (2012) claimed that the humanities major group did not play a central role in South Korean economic growth, but that it did show a
certain amount of consistent contribution over all sectors of the GDP, and the effect of humanities major group shows that humanities, languages, and arts majors do have a path to contribute to the economic growth in their society, even though South Korea focused on vocational education.

Kim (2001) indicated that the present Korean society takes a serious view of academic attainments and cliques when being recruited and promoted in public or private organizations. Also, academic attainment is a significant factor not merely in terms of choosing an occupation, but also to determine social position, income, and marriage. In other words, it is an essential means by which to obtain a desirable socioeconomic position in contemporary Korean society (KEDI, 1992).

Educational enthusiasm had greatly influenced educational policies and systems, in particular the quota policies for college entrants and the college entrance examination systems. The demand for higher education has always exceeded the supply since 1945. In order to manage this phenomenon, the Korean government has controlled the number of college entrants and has continually improved the college entrance tests. Despite these efforts, the policies and systems did not adjust to the demand and supply of higher education, nor did it reduce the advancement of high school graduates. These situations were caused by a zeal for education that has been formed from the traditional practice of Confucian education and the socioeconomic factors of modern society. Although educational enthusiasm differed between the social classes and economic levels, the Korean still demonstrate an extremely high a zeal for higher education (Kim, 2003).
3.3 Cases of the eastern region of China and Singapore

3.3.1 Higher Education

In the case the eastern region of China, Lewin et al., (2016) explained China has improved its economy, resulting in the 2nd largest place of economy quantity in the world, and China’s economy has been lower-skilled labor force, with lower-cost production. However, as hi-technology has been a major role of increasing economy growth, the eastern region of China rapidly shifted to its strategies focusing on raising higher skilled human capital knowledge-based industries through higher education (Cai, 2011; Stewart, 2015). In the eastern region of China was invested as a special economic zone in Guangdong and Fujian located to next to Hong Kong and Taiwan, which gradually shifted its industries based on agricultural production to high technical industries and opened its economic area to foreign education and economy.

Guandong region has recently invited foreign scholars to teach students at higher education institutions. It has tendency that excellent students advance higher education institutions related to the STEM sector and graduated work forces has been big momentum to change economic conditions from agriculture-based society to hi-technology-based one. At this point of view, higher education development and economy growth could be a virtuous circulation of relationship between them.

In the case of Singapore, which is located in Southeast Asia and is spread over 697 square kilometers with about 5.6 million people. The ratio of the size to the population of Singapore renders third densest country in the world. Singapore’s economy depends mostly on manufacturing industries and service sectors. At first, Singapore’s main industry was rubber production based on an agriculture, it gradually has broadened
economy sectors from 1st industries to 3rd ones. Economy has improved from natural manufacturing industries to technology and service ones, which was possible to support and invest education to be high quality of education (Singapore statistics, 2015).

Singapore higher education also has been innovated on the center of two higher education institutions, University of Singapore and Nanyang Technical University, which would play an important role in local districts. And higher education could develop with a lot of funding, grants, and faculty & staff’s supports resulted to accommodate researchers, attract graduated employment, and establish R&D centers.

It also invited foreign scholars, language professors, to teach language, English, students, which would result international competitiveness improvement in economy. Singapore was basically based on rubber or light manufacturing industries, the government’s policy of enriching English language to people could higher education development.

### 3.3.2 Relationship between Higher Education Influence on Economy Growth

Even though the simple description of a correlation between input and output may magnify the effects of higher education, their study shows that the societal benefits of higher education attract less attention than the individual benefits, which means that higher levels of education are related to a higher income and a higher level of economic growth within a society.

Guandog region was originally based on the agriculture and Singapore was on the basis of light manufacturing industries, however, Guangdong gradually sifted general higher education (including liberal subjects), and Singapore eventually developed high
poly-technics and language parts. Both of them have invited excellent scholars from foreign countries.

Figure 11. Annual enrollment of Higher education institutions in China

Source: [https://www.weforum.org/agenda/2017/04/](https://www.weforum.org/agenda/2017/04/)

Figure 12. Number of graduates from STEM changes in China

*NOTE: EU-Top 8 is the eight European Union countries with the most bachelor's degree awards in 2014: UK, Germany, France, Poland, Italy, Spain, Romania, and the Netherlands.*

*Indicators 2018: First University Degrees in S&E Fields, Chapter 2.*
The figure 11 of higher education enrollment, the figure 12 shows that STEM of the higher education has explosively increased since higher education reforms were conducted at the time of 1990s in China. The enrollment of STEM in China is twice as many as that of U.S, which verified the fact that China has planned and conducted projects to invest and develop higher education, specific sector of STEM, resulted that many excellent and talented students applied to STEM and studied to assimilate themselves into technological industries around universities.

In Figure 13, most top 10 highest paying jobs after graduate are almost related to STEM of higher education in China. It means higher education, specific STEM graduates from high technology institutions are leading its economy and resulted industries are looking for high educated and skilled labor force from higher education. Thus, the government and universities have educated talented potential students to be members of economic labor force. If well raised labor force could improve their societies to be more developed with their skills and high valuable knowledge related to industries for promoting economy growth.

Figure 13. Top 10 highest paying jobs in China
There were different factors to improve higher education development and economy growth in South Korea, Guangdong region of China, and Singapore. In South Korea, higher education development was due to the government’s policies, students’ efforts, and parents’ supports to overcome lower levels of economy situation in past. South Korean have gradually developed higher education systems for everyone to easily approach education from bottom level of education system to upper level of one. Higher education development and economy growth was possible due to harmonious collaboration with the government, society (parents), education systems, and industries participation.

In Guangdong region of China, it was a society based on agriculture. However, higher education development was due to the government’s initiativelly lead society, industry, and education with its plan. Higher education institutions and industries automatically were established with the government’s plan. So, there were industries and tertiary institutions automatically established in Guangdong region.

In Singapore, the government gave authorization to higher education institutions (Univ. of Singapore and NTU) and made higher education institutions to improve their education environments with international standards learning such that it invited foreign excellent scholars, specific to focus on learning English. Singaporean put into strategies and got output through local community tertiary institutions. Higher institutions’ role was an important factor to lead education development in case of Singapore.

There would be the relationship of virtuous circulation to push and pull each other one. If one country would develop its systems, there should be accompanied with innovation and change at those systems. Members of a country need to prepare strategies
for various changed social environments whether economy growth could lead higher education development or not. Especially, the nationwide efforts of society, people, and the government should be focused on modifying current education and economy environment into higher education development and improvement.

In chapter 4, I prosed four parties to find the relationship between higher education development and economy growth based on the model of the relationship between university and environment model Houston (2007) created for higher education development. It consists of four perspective parties such as society, education, industry, and government party. And these four parties could influence on higher education development and economy growth in form of a virtuous circulation between the education party and the industry one.
CHAPTER 4. ANALYSIS OF RELATIONSHIP
BETWEEN HIGHER EDUCATION AND ECONOMY GROWTH

As mentioned, according to the theory Houston (2007) proposed, I would analyze relationships between higher education development and economy growth on the basis of society party, education party, industry party, and government party.

Society party includes local communities, parents, and culture. Education party includes literally education system. Industry party includes employer, and academic discipline. And government included comprehensively responsible roles for implementing higher education and economy growth.

4.1 Society Party

4.1.1 Culture Characteristics

Cultural Background of South Korea, China (Guangdong regions), and Singapore is oriental tradition based on philosophy of Confucianism to emphasize people to be leaders with dispositions of morality and talents through education, geographical one of them was strategical location between hinterland and sea. Moreover, most parents of students focused on supporting their children to study more higher education to promote their economic status to higher hierarchy class. Because those regions were based on agricultural industries and parents of students experienced lower level class, they wanted their children to be higher class through education.

In the figure 14, South Korea, East of China, and Singapore are strategically located on the major sea route on the way to sea and continent (South Korea and China) or .one
between China and India (Singapore). Korea (before separating between North and South) was a major route for trading between Japan and China or other countries on the continent.

South Korea is located between China at an Asian continent and Japan on Pacific-Ocean, so the location of South Korea is an effective route to access from hinterland to sea or counter forward. Historically, Korea was invaded and conquered almost 1,000 times by numerous countries, which had been attracted by Korea’s geographical advantages of the fact that people naturally gathered and made communities as regions as urbans. China and Singapore have various historical background.

Figure 14. East Asia Map (2014)


Many people lived there and produced various products to exchange and utilize them
in the markets and made education institutions to transfer knowledge and skills, and these were driving force to develop and improve their societies. Many education systems needed to maintain and progress the society in keeping up with their customs, tradition, and even skills of high technologies from past to present.

4.1.2 Parents Supports

There are a lot of parents’ supports for their children to advance into higher education institutions. The most important thing of parents’ supports is tuition. Tuition fee for higher education institutions is about 10 million won (approximately US $9,000) per year and national university 5 million won (approximately US $4,500). Tuition fee of private universities is about twice that of the national university. In general, parents pay the tuition for education in South Korea. However, parents’ expenditure on their children education is a big issue except for higher education tuition. If parents would educate their child to finish the course for 12 years of an education track, it would cost almost $200,000 per one student. However, parents generally would pay for children’s tuition fee including private tutoring fee. It is natural for parents to pay for even their children’s higher education fee in South Korea.

4.2 Education Party and Industry Party

4.2.1 Providing ICT for Higher Education

Providing ICT technology for education is important factor to improve economy shown in the figure 15. Indexes of ICT revenue gradually increased with higher education related to STEM and technologies burgeoning since 1990s in Singapore. Alfaro & Ketels (2016) indicated the development of economy was possible with higher education’s
burgeoning and the government’s supporting materials and resources on education.

(Unit: US $billion)

Figure 15. ICT industry revenue in Singapore
Source: Singapore Department of Statistics (2016)

In the figure 15 and 16, countries well networked for ICT have tendency to develop not only education and but also economy and industries related to high technological industries. The more countries well networked, the higher well systemized those countries’ education systems. In case of China (eastern part; Hong Kong and Guangdong regions), network for ICT has been not only well installed and higher education has been but also comparatively higher developed than other regions in China.
Figure 16. Networked Readiness Index (2007)

4.2.2 Higher Education and Economy

In the figure 17 and the figure 18, they show that Singapore steadily invested and supported its education, the budget on education has annually burgeoned. Especially, the budget rapidly increased after 1990s, which was the time when government did plan to expand higher education related to ploytechnics and STEM. The government established technological cluster to conduct research and development with universities and polytechnic institutes.

(Unit : US$)

![Figure 17. Total expenditure on education in Singapore](source)

In Singapore, the tertiary students majoring in engineering or technology are more than that of liberal arts and social science, which was possible to provide effective human resources with high skilled at the similar time when higher education related to STEM was expanded to support its economy. The more developed related to technology of education, the more advanced related to high technological industries.

Furthermore, graduated from tertiary education institutions advanced to fields of
STEM industries in Singapore. It could strengthen industries’ basic basement and lead economy growth. It was possible due to the government’s passion for taking a responsibility to improve education and economy, higher education institutions’ active participation for development of higher education, and industries’ influential innovation for getting international standards of technologies in Singapore.

![Graduates from University First Degree Courses (2014)](image)

Figure 18. Graduates from university first degree courses in Singapore (2014)
Source: Singapore Department of Statistics (2016)

In the case of China (Guangdong region), main industry was an agriculture in the past, this area gradually shifted its industries into innovative high technology and recorded the most applied to patents with growing high technological institutes shown in Figure 19.

In Figure 20, though Guangdong region was based on agricultural society, educational received rate was ranked 7th in China. This might indicate relationship between development of education and economy growth. In these data, we can induce the fact that this region (Guangdong region) was based on the industry of agriculture, it has changed its industry on the basis of technology related to hi-technic industries on the basis of higher education in its region.
4.2.3 Market for accommodating human resources

In order to satisfy demand and supply of education and economy, there would be markets established to hire human resources from education institutions. The figure 21 shows the unemployment rate of highest and lowest countries. At this figure, I could find
a point of view that higher education always cannot guarantee economy growth in practical economy. Take for example of Spain, the tertiary enrollment of it was 89.48% in 2015 (UNESCO, 2015), however, unemployment of it has been 17.1% since 2015. Otherwise, in the case of Switzerland, tertiary enrollment was about 57% in 2015, its unemployment has been 3%. Moreover, tertiary enrollment of Cambodia was 13.4%, but its unemployment has been 0.1% regarded as the lowest in the world. At this point, there is dilemma relationship between development of education and economy growth. Education development would lead economy growth or economy growth would lead education development.

Figure 21. Countries with the highest and lowest unemployment rates (2015-2017)
Cuba has the world’s second highest literacy rate for children over fifteen, and sixth highest rate of school enrollment. Education index of Cuba has been a top priority since 1960. However, the country ranks 95th in GDP per capita in the world. These evidences indicated higher education always guarantees economy growth (Studwll, 2013). Although a lot of excellent educated human resources of education development, it is useless if there have not been appropriate markets to accommodate them in society.

Economy development could produce education development. In South Korea, economy has gradually improved in accordance with industrialization shift from first industry to third industry. As economy has grown to shift industries, education systems have been modified and applied in accordance with economy growth. When heavy industry was emphasized, tertiary education institutions prepared and educated human resources to adapt themselves into it. Education systems have provided human resources for economy demands to keep up with economy changing trends.

4.3 Government

4.3.1 Budget for Education

The Korean government struggled to increase its education budget for the proportion of the overall annual budget. The education budget amount has gradually increased every year, and the MOEHRD budget’s burgeoning was higher than the overall increase rate of the entire government’s budget. The percentage of the MOEHRD budget out of the entire government budget was 19.9% in 1985, then rose to 22.8% in 1990, and afterwards has remained at 20.4% in 2000, 19.5% in 2001, and 19.6% in 2002 (MOEHRD, 2002).

The government policy to secure 5% education budget vis-a-vis GNP has especially
facilitated the rapid increase in the total amount of the education budget since 1995 (MOEHRD & KEDI, 2002b).

Table 8. Government Budget and Education Budget

<table>
<thead>
<tr>
<th>Year</th>
<th>Government Budget (A)</th>
<th>MOE Budget (B)</th>
<th>B/A *</th>
<th>Total public educational expenditures</th>
<th>Ration to GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>0.2</td>
<td>0.1</td>
<td>5.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1955</td>
<td>28</td>
<td>2</td>
<td>9.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>42</td>
<td>6</td>
<td>15.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>95</td>
<td>15</td>
<td>16.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>446</td>
<td>78</td>
<td>17.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1975</td>
<td>1,587</td>
<td>228</td>
<td>14.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>5,804</td>
<td>1,099</td>
<td>18.9</td>
<td>2,732</td>
<td>5.6</td>
</tr>
<tr>
<td>1985</td>
<td>12,275</td>
<td>2,492</td>
<td>19.9</td>
<td>4,600</td>
<td>5.5</td>
</tr>
<tr>
<td>1990</td>
<td>22,689</td>
<td>5,062</td>
<td>22.3</td>
<td>8,524</td>
<td>4.6</td>
</tr>
<tr>
<td>1995</td>
<td>54,845</td>
<td>12,496</td>
<td>22.8</td>
<td>19,215</td>
<td>4.8</td>
</tr>
<tr>
<td>2000</td>
<td>93,937</td>
<td>19,172</td>
<td>20.4</td>
<td>31,087</td>
<td>5.4</td>
</tr>
<tr>
<td>2005</td>
<td>134,470</td>
<td>27,982</td>
<td>20.8</td>
<td>49,525</td>
<td>6.2</td>
</tr>
</tbody>
</table>

Source: MOEHRD Statistical Data (2005)

The ratio (*) of the entire government budget to MOE budget for education, in Table 8, has increased, and the ratio has reached 21% by 2005. This meant that the government enriched and empowered education to advance and progress for the future generation with a budget allotment that was one-fifth as much as the entire nation’s budget, which showed that the government would take responsibility for the enrichment and improvement of education.

### 4.3.2 Public Expenditure on Education

Table 9. Public expenditure on Education

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Expenditure(won)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>18,486</td>
<td>30.0%</td>
</tr>
<tr>
<td>Middle</td>
<td>8,362</td>
<td>16.7%</td>
</tr>
<tr>
<td>High</td>
<td>9,651</td>
<td>19.3%</td>
</tr>
<tr>
<td>Junior College</td>
<td>3,306</td>
<td>6.6%</td>
</tr>
</tbody>
</table>
The importance of higher education has been considered to influence the progressive future of the nation, thus the government and public would actively support higher education. Table 9 shows that the Korean government invested about 33.3% of its entire public expenditure to higher education. And, parents of students at higher education would supported about 66.7% of remainder for higher education.

Yeom (2016) indicates that the rapid growth of higher education in South Korea has demonstrated various changes in its speed, scope, and system within a very short period of time. In 30 years, higher education enrollment rates increased more than six-fold from 11.4% in 1980 to 70.1% in 2010. The system of higher education resulted an elite system through the 1970s, and then changed into a massification stage during the 1980s and through the 1990s, finally becoming a universal system in the 2000s in South Korea. The rapid changes in the characteristics of South Korea higher education provided an unprecedented case.

### 4.3.3 Government Responsibility

The government established national R&D centers in the 1970s in order to develop an information for nationwide development. The Korean Educational Development Institute (KEDI) was found to research the development of education, the Korea Institute of Curriculum and Evaluation (KICE) was established to evaluate and assess the curriculum of education and to measure for nationwide test for students to have ability to take course programs in universities, the Korea Research Institute for Vocational
Education and Training (KRIVET) was established for a national research institute for the vocational education and training (VET) and the enhancement of the public’s vocational competencies, and the Korea Education & Research Information Service (KERIS) was established for achieving several targeted goals of education, science, and technology that develops, proposes, and educational policies in South Korea.

The MOE (known in the past as MOEHRD) established various research and development institutes mentioned above for education progress and oriented toward higher education through R&D, planning, development projects, and evaluation. Current perspectives on higher education achievement are due to the high quality of education investments and support by the government and public’s concern for enriching the education system. In order to enrich educational issues with modified higher education development, the government has lifted various R&D institutes in order to evolve current issues and challenges into making appropriate fundamental education institutes as bases for higher education systems.

In Singapore, the government committed to steadily invest financial supports into R&D sector. In the figure, Singapore government has consistently invested and provided financial supports for the development of technology clusters, which were established at the University of Singapore and the Nanyang University in 1990s (Alfaro & Ketels, 2016).

The investment in 2014 was increased nine times as much as that in 1990, which is possible that the government encouraged to support for higher education. Singapore’s local universities clusters has improved their sectors with collaboration with foreign universities such as Columbia University’s School of International and Public Affairs, the
In Singapore, the government committed to steadily invest financial supports into R&D sector. In Figure 22, Singapore government has consistently invested and provided financial supports for the development of technology clusters, which were established at the University of Singapore and the Nanyang University in 1990s (Alfaro & Ketels, 2016). The investment in 2014 was increased nine times as much as that in 1990, which is possible that the government encouraged to support for higher education. Singapore’s local universities clusters has improved their sectors with collaboration with foreign universities.

4.3.4 Leaderships

Idiosyncratically, one of common characteristics of three countries in the development of education and economy was that strong leaderships could propel and
drive projects to improve and enhance education, economy, culture, and society into higher level of ones.

South Korea, China, and Singapore was established and based on agricultural society in the past, have experienced common spiritual philosophy such as ‘Confucianism’, which drove people to regard education as the way to enhance themselves and their society, and they had common situation to overcome and implement.

There were strong leaderships, the president Park, Jung Hee in South Korea, the chairman Deng Xiaoping in China, and the prime minister Lee, Kuan Yew in Singapore. When they were inaugurated as a leadership of their country, they propelled innovation to change outdated manners, regulations, and policies. For example, the president Park, in South Korea, encouraged and enforced South Korean to focus on economy through education and skills with a plan of ‘Economy Development in Five years’, and economy actually developed during his regime. Deng, Xiaoping deregulated a traditional economy to be opened to western economy, because China was established on the basis of Communism. And Lee, Kuan Yew eliminated holistically corruption pervaded in their society, and innovated systems of Singapore. He also made clusters for researching in the level of higher education, actively invested and supported for economy growth through education, culture, and politics’ innovation.
5.1 Research Questions

Even though higher education has gradually progressed in South Korea, China, and Singapore through the government’s support and public concern, human qualities are required in a knowledge and information-based society. Analysis criteria Houston (2007) indicated are basis to determine factors to develop education. There are still some factors that could improve the quality of higher education. In this study, I answered the first question “What were the factors determining the quality of higher education?”, and the second question, “What was the relationship of the development of education and the economy growth in South Korea, China, and Singapore?”.

5.1.1 Common Factors to determine the quality of Higher Education

Table 8. Common factors to determine higher education

<table>
<thead>
<tr>
<th>Factors</th>
<th>Common Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Party</td>
<td>Society Party</td>
</tr>
<tr>
<td></td>
<td>Culture</td>
</tr>
<tr>
<td></td>
<td>Community</td>
</tr>
<tr>
<td></td>
<td>Parent supports</td>
</tr>
<tr>
<td></td>
<td>Private budget</td>
</tr>
<tr>
<td></td>
<td>Industry Party</td>
</tr>
<tr>
<td></td>
<td>Human Resource</td>
</tr>
<tr>
<td></td>
<td>Markets</td>
</tr>
<tr>
<td></td>
<td>R&amp;D</td>
</tr>
<tr>
<td></td>
<td>Global market</td>
</tr>
<tr>
<td></td>
<td>Future employee</td>
</tr>
<tr>
<td></td>
<td>Education Party</td>
</tr>
<tr>
<td></td>
<td>Hi-technic Cluster</td>
</tr>
<tr>
<td></td>
<td>TVET</td>
</tr>
<tr>
<td></td>
<td>Program or projects for industrialization (Such as STEM BK21)</td>
</tr>
<tr>
<td>Government</td>
<td>Budget on Education</td>
</tr>
<tr>
<td></td>
<td>Public Expenditure on Education</td>
</tr>
<tr>
<td></td>
<td>Leaderships</td>
</tr>
<tr>
<td></td>
<td>Raising Hi-technic skills</td>
</tr>
<tr>
<td></td>
<td>Responsibility (providing materials or resources; tangible or intangible ones)</td>
</tr>
</tbody>
</table>

In the table 10, cases of South Korea, China, and Singapore showed that incorporating factors of society, economy, education, and government is needed to
develop higher education. Society party would indicate cultural philosophy, geographical characteristics, and community supports etc. Industry party would consist of important factors to improve economy, maintain capacity of accommodating human resources (future employees), influence on education, markets, and R&D. Education party would also indicate hi-technic cluster (institutes and laboratories with industries’ cooperation), and programs or projects for higher education. And government’s responsibility, financial supporting, and leadership. Efforts the government made to invest expenditure of budget on education for developing education. These performances of the government are its responsibility and accountability for the development of education.

Figure 23. GDP per capita comparison of China
Source: Penn World University of Groningen, UK; The economist

The figure 23 shows that GDP rapidly increased in 1990s when the government initiated and established ‘higher education institutions’ cluster’ and raised them to contribute their skills and technologies to improve economy. Though it might be unintentionally, the time of ‘higher education enrollment rate burgeoning’ was as same as that of GDP’s increasing in South Korea, China, and Singapore. Even in 2004,
Singapore’s GDP already exceeded that of U.S, Japan, China, and Hong Kong, etc. Singapore’s universities performed their researches, collaborating projects and pursuing partnerships with various foreign universities and institutes (Alfaro & Ketels, 2016).

(Unit : %)

![South Korea - R&D (research and development) expenditure](https://www.theglobaleconomy.com/South-Korea/Research_and_development/)

Figure 24. R&D expenditure in South Korea


In South Korea (in Figure 24), the government has steadily invested more on R&D sector to highly produce technologies through education institutes for economy growth. In order to achieve educational goals for setting up of fundamental bases for higher education, the government committed to increase the educational budget.

China also have increased its quantity of expenditure on R&D since 1990s (in Figure 25). It means that every country considered high technology industries related to higher education consisted of VET, and STEM as basic resources to develop high-tech
industries. South Korea, China, and Singapore ranked sequence 5th, 1st, and 4th in section of high technology exports quantity in the world in 2016 (UN, 2016)

![China - R&D (research and development) expenditure](image)

Source: TheGlobalEconomy.com, The United Nations

Figure 25. R&D expenditure in China

Source: The Global Economy.  
[https://www.theglobaleconomy.com/South-Korea/Research_and_development/](https://www.theglobaleconomy.com/South-Korea/Research_and_development/)

As mentioned, large population as human resources have been demanded for the development of economy regardless of any social condition. These three countries (South Korea, China, and Singapore) are bordered sea and main route to easily access between continent and sea. In cases of three countries, they were traditionally established and influenced on the basis of an agricultural and oriental cultural society. However, they have experienced western economy, education, culture, and politics.

They could rapidly develop or innovate traditional systems such as education and economy, and attain education development and economy growth through potential human capital, the government’s supports, their legacy to maintain traditional spiritual value based on ‘Confucianism’ etc. These countries could accommodate a lot of human resource with highly educated through education development and economy growth.
These characteristics could be applied into limited socioeconomic conditions, which was possible to meet conditions under the government’s responsibility or accountability, the industry innovation, the zeal for higher education, and the setting up infrastructure for society etc. Whereas, even though there are lots of educated excellent human capital, if social conditions mentioned were not appropriately provided, that society could not be expected to develop economy. For example, foreign labors annually have increased in South Korea (Figure 26). It is an astonishment of the fact that most those foreign labors were highly educated human resource (teacher, engineer, and lawyer etc) in their countries. Although education has been developed or innovated itself, it could be fugacious future for them. Higher educated human capital could not have an opportunity to even demonstrate their knowledge or skills through education in their countries. The capacity of accommodation for accommodate human capital could be one of an important factor to influence on development of education.

![Total number and portion of foreign workers in South Korea](image)

Figure 26. The number of portion of foreign labors in South Korea

Source: Hani.co.kr http://english.hani.co.kr/arti/english_edition/e_international/766834.html
5.2 Relationship between Development of Education and Economy Growth

5.2.1 Factors to determine high quality of Development for Higher Education

The rapid development and expansion of education in South Korea was largely accounted for through the integrated application of historical backgrounds in the Korean educational historical legacy, government and public support including financial supports, geographical location, leaderships and sociocultural and socioeconomical (capacity of accommodating or utilizing human capital resources) factors of society, industry, education, and government party to determine the future of higher education on the basis of economy growth.

Relationship between education development and economy growth is issue like ‘chicken-egg dilemma’; which is first, the chicken or an egg? Education development could lead economy growth or economy growth would produce education development. However, although higher education development could not lead economy growth. For example, higher education enrollment rate of Spain is high, though, its unemployment rate is higher than lower one of it. Economic condition would be changed in accordance with education situation, whereas education phenomena could be affected by economic situation. Thus, economy growth could lead education development.

In the past, factors to determine the quality of higher education development could be limited on the basis of comparatively simpler that those of present systems. The development of education could lead the growth of economy, otherwise, the growth of economy could lead the development of education. However, there have been diverse technologies and skills applied into industries, which needed higher education for developing them. Even though higher education, in special parts of engineering and
science to produce work force through TVET and tertiary institutions, have developed, if industries related to higher education have not improved and developed, it would be a situation like that a lot of products customers would not demand in the market. That is, appropriate development of economy could lead education development societies and industries would demand. Higher education could be influenced on by industries’ environment of innovation (Krus, McGrath, Petersen, and Gastrow, 2015). And high technologies could be important factors between actors and institutional contexts, and industries would lead development of education in especially leading higher education of technologies (Von Tunzelmann, 2010; Von Tunzelmann and Wang, 2007). Skills on the basis of higher education-relation to technological industries-could be supplied for development of industries. That is, economy growth could lead higher education development and create markets to accommodate human resources from educational institutions.

5.2.2 Discussion

As mentioned previously, there are many factors to determine the quality of higher education. However, the development of education systems or highly educated human resources through higher education always cannot guarantee economy growth. Education systems have steadily developed, innovated, and modified in accordance with current streaming of public and society’s demands, and it had produced various highly skilled and educated candidates for economy development. The innovation and reform of education, however, could not always be applied into economy, counter wise, education
has been innovated and modified (of course fundamental concept of education sustains) relying on society’s demands and conditions.

At first, I thought that the development of education and economy growth could mutually influence on each other with a virtuous cycle, though, society’s demands, however, demands and conditions of economy in a society could be main factor to determine the quality of education more propelled higher education, because higher education have developed and improved itself when economic conditions have been prosperous. Even though higher education would have been improved, economic conditions could have been depressed. However, if economic situations would have been devastated, education systems would have been influenced by that. Moreover, more detailed studies need to be conducted so that considerable social and economic growth are is evidenced to be due to education, as well as advanced higher education. Many researchers have studied education development and economy growth, they generally concluded education development would lead economy growth on the point of view of education. However, a lot of studies will be conducted to find out amplified factors to determine development of higher education, and factors will be reinforced application into education.
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Economics, 14, 565-580.


http://data.worldbank.org/


APPENDIX

Table 9. Index of population, GNI, unemployment, and labor force

Source: TheGlobalEconomy.com, The World Bank

Source: TheGlobalEconomy.com, The World Bank
Table 10. School Enrollment Rate

South Korea - Primary school enrollment

South Korea - Secondary school enrollment

Source: TheGlobalEconomy.com, UNESCO
Table 11. Government Budget and Education Budget

Source: TheGlobalEconomy.com, UNESCO
Figure 27. Ratio of Lower Secondary Teachers’ Salary to GDP Per Capita (2015)

Source: TheGlobalEconomy.com, The World Bank

Economy Growth

Source: TheGlobalEconomy.com, The World Bank
### Natural Resources

<table>
<thead>
<tr>
<th>Item</th>
<th>National Total</th>
<th>Eastern Provinces</th>
<th>Central Provinces</th>
<th>Western Provinces</th>
<th>Northwestern Provinces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of Land (10,000 sq km)</td>
<td>942.0</td>
<td>914.0</td>
<td>91.5</td>
<td>102.8</td>
<td>76.8</td>
</tr>
<tr>
<td>Population</td>
<td>139372.0</td>
<td>54183.9</td>
<td>29.2</td>
<td>3806.7</td>
<td>27.0</td>
</tr>
<tr>
<td>Employment</td>
<td>18108.4</td>
<td>9921.1</td>
<td>47.1</td>
<td>2314.2</td>
<td>126.8</td>
</tr>
<tr>
<td>Registered Unemployment Rate in Urban Area (%)</td>
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<td>3.4</td>
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### National Accounting

| Gross Domestic Product (100,000 yuan)       | 558849.0       | 222289.9          | 37.2              | 117709.5          | 20.0                   |
| Primary Industry                          | 59579.0        | 19393.6           | 36.6              | 1504.8            | 28.6                   |
| Secondary Industry                        | 248094.4       | 152980.1          | 18.5              | 82053.3           | 21.6                   |
| Industry                                  | 23859.4        | 14828.5           | 60.7              | 5788.9            | 24.1                   |
| Tertiary Industry                         | 262033.2       | 151560.2          | 59.8              | 6507.6            | 17.2                   |
| Per Capita Gross Domestic Product (yuan)   | 41906          | 62045             | 3857              | 34849             | 34856                  |

### Domestic Trade

| Total Retail Sales of Consumer Goods (100,000 yuan) | 237829.9       | 145153.1          | 62.3              | 60308.9           | 24.8                   |
| Foreign Trade                               | 41009.9        | 39289.9           | 89.7              | 21975.3           | 6.7                    |
| Imports                                    | 19899.9         | 18771.6           | 92.1              | 1759.3            | 8.7                    |

### Government Finance

| Local Governments Revenue (100,000 yuan) | 60311.2        | 37676.6           | 62.3              | 12055.5           | 21.4                   |
| Local Governments Expenditure (100,000 yuan) | 119743.0       | 47396.5           | 39.6              | 25436.5           | 17.9                   |

### Agriculture

| Output of Major Farm Products (10,000 yuan) | 55515.0        | 145093.1          | 23.3              | 17094.2           | 29.7                   |
| Gross Cotton Stock                       | 129.9          | 136.9             | 21.7              | 125.8             | 10.9                   |
| Woolen Coarse Goods                      | 3357.0         | 332.7             | 25.7              | 1010.8            | 8.5                    |

### Industry

| Output of Major Industrial Products       | 28954.9        | 7258.0            | 37.8              | 655.6             | 2.7                    |
| Concrete                                   | 241913.6       | 85429.3           | 36.7              | 6666.7            | 27.2                   |
| Steel                                     | 77951.1        | 43920.4           | 33.9              | 16208.8           | 21.0                   |
| Electricity                                | 39375.9        | 22112.8           | 39.1              | 11392.2           | 21.2                   |
| Iron and Steel Products                     | 15745.6        | 13029.7           | 64.3              | 117.5             | 7.8                    |

### Tourism

| Length of Railways (km)                  | 99314.6        | 21286             | 25.8              | 23202             | 22.5                   |
| Length of Highways (km)                  | 430618.0       | 507616.9          | 28.7              | 1177339           | 27.0                   |
| Tourist Accommodation                      | 1044.0         | 32979             | 30.7              | 28187             | 26.8                   |
| Total Passenger Kilometers (100,000 persons) | 27271.7        | 7793.0            | 30.5              | 6705.6            | 31.0                   |
| Total Freight Kilometers (100,000 tons)   | 198933.9       | 73815.4           | 44.5              | 36411.8           | 24.2                   |

### Telecommunication Services

| Total Business Revenue (100,000 yuan)     | 18432.2        | 8772.0            | 53.3              | 3648.9            | 18.3                   |

### Education

| Regular Institutions of Higher Education | 2491.9         | 909.0             | 26.5              | 810.0             | 24.5                   |
| New Enrollments of Undergraduate and College Students (100,000 persons) | 699.9         | 274.1             | 39.2              | 1018.0             | 24.2                   |
| Graduates of Undergraduate and College Students (100,000 persons) | 20881.1        | 872.3             | 39.4              | 673.1             | 27.3                   |
| Graduates of Undergraduate and College Students (100,000 persons) | 238.7          | 257.0             | 44.4              | 150.8             | 28.2                   |

### Health Care

| Number of Health Care Institutions (unit) | 2184.9         | 1059.0            | 49.1              | 610.0             | 28.3                   |
| Medical Personnel                         | 30199.0        | 31254.0           | 32.4              | 272123            | 20.0                   |
| Licensed Physicians and Dentists (100,000 persons) | 339.1         | 303.3             | 60.4              | 178.3             | 24.8                   |
| Hospitals                                 | 24710.0        | 32751             | 44.4              | 9700.0            | 22.0                   |
| Number of Hospital Beds (100,000 beds)    | 10123.0        | 2238.4            | 60.1              | 1656.0            | 26.8                   |
| Mortality Rate                            | 672.9          | 172.0             | 27.6              | 113.6             | 26.8                   |
| Birth Rate                                | 26966.0        | 32472             | 21.2              | 22736             | 22.1                   |
| Per Capita Net Income of Rural Households (yuan) | 6896.0        | 12052             | 387.7             | 8237              | 85.8                   |

Note: As the sums of some indicators are different from the national total, while calculating the percentage of national, central, western and northeastern provinces to all country; the denominator is the sum of 31 provinces, autonomous regions and municipalities.
2-7 Total Population by Urban and Rural Residence and Birth Rate, Death Rate, Natural Growth Rate by Region (2014)

<table>
<thead>
<tr>
<th>Region</th>
<th>Total Population (CO 000 persons)</th>
<th>Urban Population</th>
<th>Rural Population</th>
<th>Birth Rate (%)</th>
<th>Death Rate (%)</th>
<th>Natural Growth Rate (%)</th>
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(a) Data in the table are estimates from the 2014 National Sample Survey on Population Changes. The national total population was adjusted on the basis of sampling errors and survey errors. Similar adjustments were not made to regional figures.

(b) The military personnel were included in the national total population, but not included in the population by region.