

Comparison of Economic and Education Development in Singapore and South Korea

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Abstract

This analysis addresses the developing environment backed by rapidly growing higher education in two countries, South Korea (Korea for short) and Singapore, in which education has roots in Confucianism. The focus lies on the analysis and comparison of the economic development in these two newly industrialized countries (NIC), the progressive changes in research and development and their unique ways towards the establishment of knowledge-based economy. Both countries inherited a poor economic environment after gaining full independence but achieved rapid economic growth. Recently, both countries have been driven by the desire to take a leading role in creating knowledge-based economy, to build competitive advantage within the region and to sustain their high levels of development. Consequently, the governments had great ambitions to invest in research and development. Through the analysis of the development the article aims to reveal comparison of development stages concerning both economy and education with their outcomes and most recent challenges.

KeyWords: Knowledge-Based Economy, Education, Internationalization, Human Capital, Economic Development

1. Introduction

The countries selected for the analysis are characterized not only by scarce natural resources, highly export-oriented economy, and rigid hierarchy in society, but also by a Confucian heritage and a colonial background.

Singapore and South Korea share various similarities. They became fully independent only in the middle of the 20th century (South Korea in 1945, Singapore in 1965), belong to the group of newly industrialized countries and also to the group of fast growing small countries. The two countries share a period of authoritarianism in their political history. In Singapore, People' Action Party (PAP) has been basically from the beginning the only party that Singaporean trusted over the time due to its capability not only to keep pace with global economic development, but also to take countermeasures in crises and recessions. In Korea, during the military dictatorship the democratic movements were repressed and followed by

a clear dominance of a single party. Eventually, at the end of 2000s two parties were able to build majority and provide the president during democratically held elections.

South Korea and Singapore began with the import-substituting industrialization, focused on export oriented industries in their early phase of development. However, Singapore pursued a protectionist economy only for a short time; it had to open its economy rapidly in order to attract foreign direct investments. Their national labour markets consist of workers who improved their skills through diligence and high (also private) investment in education. In this respect, they share common heritage of 'Confucian' culture with other East Asian countries (Lim, 2008). Initially, besides the importance of education, Singapore's one key drivers of development were the country's geographical position and proximity to the world's largest manufacturing region, the openness and political stability and the strategic planning of integration of multinationals into the economy. In Korea, Amsden (1989) underscored the importance of chaebols (giant conglomerates) and salaried engineers whose role was crucial in foreign technology transfer to the country.

Once full independence gained, Singapore followed consequent, but stringent strategy of industrialization (growth-stability) and within a few decades from one of the poorest countries worldwide it managed to reach the level of highly developed countries and to be a country that provides one of the business friendliest environment of the world (World Bank, 2017b); has a leading position in the global competitiveness index in 2017-2018 (World Economic Forum, 2017); has one of the largest research output in the form of patent registration at the US registration office USPTO (USPTO, 2015); has one of the largest number of FTA contracts worldwide (ARIC, 2017); and has an extensive research and development network. Singapore's vision is to form an entrepreneurship based research and development cluster and this vision was reflected in the speech by the former minister of education, Teo Chee Hean, to turn Singapore into a "Boston of the East" (MOE, 2000).

South Korea gained independence in 1945. The country has been divided and the Southern part was occupied by the USA in the post-war era. In all aspects, Korea was a disadvantaged poor country with no mineral resources, destroyed infrastructure and unfavourable environment (both climate and topography) for agricultural development. The following decade was represented by high unemployment rates, unstable economy and politics and by political turmoil. In such an environment, a military coup of 1961 was vital to stabilize the country. The economy eventually could catch up due rapid expansion of education and financial aid from the USA. During the first half of the 1960s reconstruction and import-substitute industries were supported, from the second half of the 1960s to the 1970s the labour-intensive export-industries were in the focus. From 1973 the representative large companies of heavy and chemical industries (HCI) became central elements of the growth strategy (Chau, 2001 and Chang, 1993). In Korea, the high inflation rate and the large proportion of foreign debt requested strict monetary policies. Coupled with other problems, the economy suffered a cool-down and deflation at the end of 1970s (Adelman, 1999). Therefore, long overdue policies were adopted by the governments for the liberalization of politics, trade and financial system. From the 1990s the government realized the necessity for indigenous innovations for further development, but the country had to suffer from a bankruptcy during the Asian financial crisis which also helped to spot structural problems of the economy (Adelman, 1999). South Korea was significantly hit by the Asian financial crisis of 1997-98. Thanks to the long overdue reforms and the IMF rescue package the Korean government implemented regulations to transform its economy into a knowledge-based economy (Suh and Chen, 2007).

This article is divided into two major sections. The first section takes the analysis and comparison of the economic development that emerged in tandem with the changes in economy after the 1960s. In the second section it strives for discovering how economic development drove the education development in both countries. The education will be handled as a gate-opening factor of chronologically phased approach for analysing economy improvement. Although, many authors analysed the emerging economy and challenges profoundly, a few of the trivial and significant similarities of the last decades remained uncovered. This goal is picked up in this article to enable other countries to learn from the lessons provided by the development of the two economies.

2. Literature Overview

The related research output supported scholars to develop and understand structural changes and to reflect on the future challenges and lessons of the two countries. The majority of affiliated research papers and case studies can be split into the following categories of which works in the first lays the focus on historical progress of economic development along with changes in education (Amsden, 1989; Jeon, 1995; Adelman, 1999; Lee, 2006; Lee & Gopinathan, 2008, Tucker, 2012; and Chong, 2014); or on recent reforms and future implications (Yu, 2014) ; on the development of entrepreneurial universities (Wong et al., 2007; Sidhu et al., 2011; and Mok, 2013); and on the technology transfer (Lee and Win, 2004; Kiper, 2012; Mahlich and Pascha, 2012; and Lee and Han, 2013). Only recently, there are research works which consider future issues and aim at the industries which are relevant to sustain development, i.e. industry-academic collaboration for R&D, healthcare and life science. Furthermore, many authors also alerted about the challenge of aging societies in their works (Ramcharan, 2006; and Koh, 2011).

3. Rising Economies of Korea and Singapore

Both countries have no mineral resources and their only resource was their human capital on that they could establish their economies. In both of the countries people were willing to endure necessity, strong state-guidance and sacrifice for future growth, but the degree of that was different. This resulted also in a significant difference represented by the state-guided development strategies. While the leaders of the city-island opted for growth-and-stability strategy, Korea's military dictator Park Chung-hee decided on growth-first strategy. Accordingly, fiscal-monetary policy tools were kept as loose as possible to maximize investments, with low interest rate, low tax rates, unlimited foreign borrowings (Jeon, 1995). Whereas Singapore's growth did not suffer heavy shocks, the foreign borrowings along with structural challenges in the Korean economy were mainly blamed for the state bankruptcy during the late 1990s.

4.1 Emerging Economy of Singapore from 1959

Singapore was a British colony until 1959. The potentials of the island and the advantages of its location have already been recognized during the pre-WW II period. It was occupied by Japan during World War II and when the British returned to govern the city-state demanded autonomy. It has gradually become independent. Initially, leaders decided to join the Federation of Malaya that later seemed to have been an off-target decision. Nevertheless, this brief period (1963-1965) supported Singapore in the economy transformation in that import-substituting industrialization was pursued to build up the country. Lee Kuan Yew's People's Action Party won the first election in 1959 as it promised economic redistribution.

PAP's capitalist leadership undermined the efforts of political opposition. As opposition became weakened by the systematic imprisonments of its leaders, the political stability envisioned by Lee Kuan Yew improved and supported rapid economic growth. In 1961 the Economic Development Board (EDB) was commenced with the main object to protect and create domestic industries and to attract and guide capital inflows (mainly in form of FDIs) from MNCs into the country. PAP managed to shift flexibly the economy to export orientation by 1968 in order to decrease the unemployment rate (Jeon, 1995). The ruling party also weakened the unions in order to create economic stability to be able to intervene in the economy for growth and stability (Abshire, 2011). Singapore has been called "a corporate state mainly run by PAP technocrats" and "well-run corporation" with special regard to accountability to the public (Ghesquiere, 2007). The citizens accepted the illiberal democracy in exchange for stability and growth.

Foreign direct investments were the engine of growing industry, the major technology source. Besides, Singapore did not have to face till the late 1980s significant competition for FDI from the other growing NICs in the region (Yun, 1997). The professional assistance of EDB, such as professional consultation, finding premises, partners and provision of infrastructure, reduced the time between investment and production significantly (Huat, 2016). The city-state has represented an open economy and attracted capital and manpower into the country. The target in the 1960s and 1970s was to reach full employment and for that the government risked high dependence of on technology transfer from MNCs. Singapore learned not only to rely on MNCs, but also to adopt policies which requested MNCs to upgrade manufacturing process capabilities to produce new and advanced products. The technology transfer from MNCs called for commitment from the government to invest into primary and secondary as well as vocational education and then into tertiary education (Wong, 2011). To mitigate reliance on MNCs and to bolster growth Singapore launched the first Small and Medium-Sized Enterprise (SME) Master Plan in 1989 to assist the emergence of SMEs while MNCs were relocating their lower value manufacturing. As a consequence of the Asian financial crisis in 1997/98, the government unveiled the Second Master Plan (SME21) in 2001, a 10-year strategic plan to build capabilities to improve their competitiveness (Mok, 2013). Additional capabilities were created for innovation.

Singapore adopted the model of free trade advocated by the proponents of neoclassical economics, and has gradually reduced nearly all import tariffs and export subsidies (Soon and Tan, 1993). The country's exchange rate has also been regulated through a mixed float-and-fix exchange rate policy as the Monetary Authority of Singapore uses a float regime that sets the currency to fluctuate within a certain (undisclosed) band. The band allows a certain degree of flexibility through short-fluctuations and the exchange policy is periodically reviewed in order to ensure consistency with economic development (Monetary Authority of Singapore, 2001).

Lan (2001) divided Singapore's development into three phases which can be updated by three additional phases, i.e., rise of service industry, entering knowledge-based economy and demographic slowdown:

- Labour-intensive export oriented light manufacturing (1965-1973):
 - EDB defined the key industries, stipulated the rate of taxes and the incentives provided to the MNCs for their direct investments.
 - The country's unit labour cost was among the lowest in Asia with South Korea.
- Upgrading and diversification (1972-1979):

- As Singapore reached full employment, the next task was to support technology-intensive industries, such as petrochemicals, machine tools, precision engineering, and sophisticated electronics. This step was prepared and supported by vocational education development.
- The government extended its financial and business services.
- Despite of the first oil crisis (1973-1974), Singapore reported a GDP growth of 7.4 per cent per annum for this period.
- Economic restructuring (1979-1984):
 - The government's maintained its pro-active role, and it launched its 'Second Industrial Revolution' to push the economy to favour high-value activities.
 - Policies and interventions followed each other to initiate outward FDI for labour-intensive industries requiring low or no skilled workers, while capturing and assisting activities requiring skilled labour and were characterized by higher productivity.
 - The government incentives reached a next step by considering and identifying the significance of R & D, ICT, and automation.
- Rise of service industry (Menon, 2015):
 - Technologically not yet fully developed Singapore faced a recession based on the continuous catch-up growth in 1985. This recession triggered a fundamental review of industrial growth related policies and subsequent structural reforms.
 - In 1995 the multilateral liberalization of services – based on the General Agreement on Tariffs and Trade – were negotiated and entered into force as the General Agreement on Trade in Services (GATS). By this agreement the scope of tradable service was clearly defined and all WTO members, i.e., also Singapore participates.
 - The government has supported regional trade and outward investment: taping into regional markets, entering collaborations with neighboring countries, constructing industrial parks.
- Entering knowledge-based economy (from 1997):
 - The government adopted policies to further upgrade industry by promoting innovation, research and development and entrepreneurship.
 - Creating fundamentals for entrepreneurial universities and entrepreneurship through corporatization of public universities, i.e., National University of Singapore (NUS) and Nanyang Technological University (NTU) in 2005. Additionally, the government launched the Singapore Management University in the same fashion in 2000 (Mok, 2013).
- Demographic slowdown from around 2011:
 - With the aging society and low fertility rate Singapore irrevocably joined the aging Western societies.
 - The government identified Life Sciences and biomedical researches as sectors for further growth and to sustain economy. To embrace competitive advantage globally and to become a premier hub for Life Sciences in Asia the Biomedical Research Council was established (22).

Figure 1 visualizes the developmental stages over the time with the major crises and how the GDP and GDP per capita at current prices increased all values are given in Singaporean dollars. The GDP numbers are in billions and the per capita GDP in thousands of Singaporean dollars.

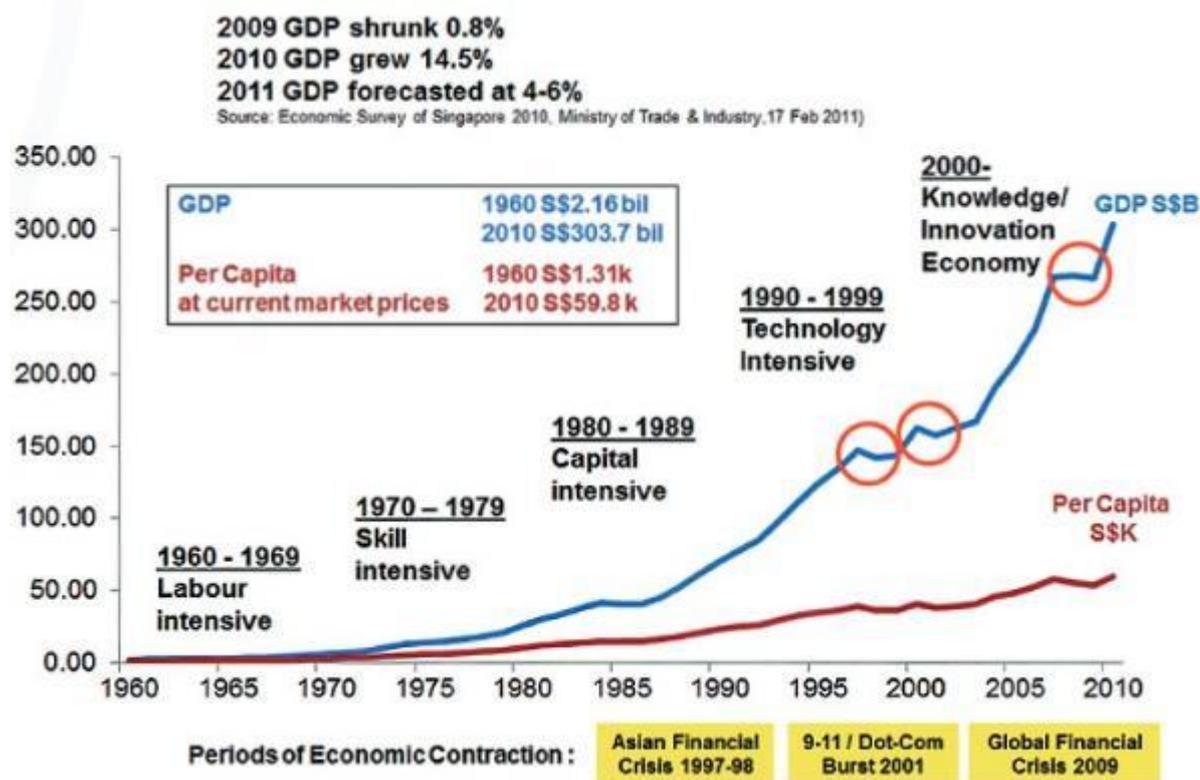


Figure 1: Development of GDP and GDP per capita over from 1960 (MTI, 2017).

Parallel to the economic development in Singapore, South Korea went through a rapid economic growth as well. Similarly to Singapore, where the People's Action Party has ruled the city-state, Park Chung-hee's stable regime largely contributed to the economic development in Korea.

4.2 Developing from the ruins of Japanese occupation

Korea did not only suffer from war during the Japanese occupation. The economy advanced extremely slowly, political instability and cold war created an atmosphere for the Korean War that further widened the gap between the two Koreas. The brutal repression led to a popular uprising in 1960, and political and economic instability remained until the military coup in 1961, when Park Chung-hee, a military general, seized full political power who was the president till his assassination in 1979. Accordingly, the economic recovery only crawled by 1% in average per annum until 1961, although abundant support from the USA and the United Nations was provided (Adelman, 1999). Park relied on technocrats and civil servants to manage the country and he led the country by five-year plans. Similarly to Singapore, the country was dependent on the capabilities of technocrats. Both economies could be called planned economies. Though Singapore's measures are translated as involvement in the economy, Park's policies intervened in it (Jeon, 1995). Moreover, Korea took clear efforts to maintain the time span and manner of planning even beyond Park's regime. During the first 5 years, the country pursued import-substitute industrialization efforts mainly for reconstruction and building of infrastructure and agriculture, yet it was unable to reach sufficient productivity growth in agriculture. The huge unemployment could be combated only by binding human resource in labour-intensive industries (Adelman, 1999). Through the catching up (or converging) period the initial double-digit unemployment rate has melted rapidly. Financial aid for growth strategy was largely obtained from the USA as tax revenues remained poor. The government also mobilized savings by making them up to 50% loanable.

During the second five-year plan of labour-intensive export-oriented industrialization strategy was put into action for economic growth. However, Korea still remained protectionist in a selective way. Import restrictions have been gradually reduced, but the foundations of healthy market economy could not be established thanks to abortion of reform pursuits (Suh and Chen, 2007). The capital accumulation triggered the development into other industrial sectors which needed higher investment. Export incentives, e.g., low-cost loans, tax rebates and tax exemptions, served to raise competitiveness of the industries. The economy grew in average per 9.6% per annum (Adelman, 1999).

Contrary to Singapore, in Korea the industrialization has been driven by large Korean conglomerates even until now, which enjoyed protection from the government. Yet unlike Singapore with its open economy strategy, South Korea has long protected its electronics industries. At the beginning the export industry brought products of labour-intensive light manufacturing industries, but from 1973 the government put efforts to develop heavy and chemical industries (HCI). The share of the exports of HCIs accounted for approximately 40% by 1990, although development of HCIs was just started in mid-1973 (Chau, 2001; and Suh and Chen, 2007). When the country started to grow economically significant funds were provided in the form of financial aids and loans from foreign countries. Those were redistributed to and taken by large companies (chaebols). The large investments in HCI distorted the resource allocation and the sector became overinvested (Suh and Chen, 2007). The governmental support system has provided not only finances, but later in the 1980s and 1990s R&D and educational infrastructure. Since the 1980s the leading role for growth has been taken over by the private sector from the government. The Korean National System of Innovation has undergone intense changes since the financial crisis of 1997. In the 1990s and early 2000s, Korea has been attempting to develop its strategy from catching-up with technologies to technology generation and to effective utilization of emerging technology from abroad (Lim, 2008).

While Singapore relied on attracting MNCs into the country and gradually fostered the emergence of SMEs from the 1980s, Korea focused on developing companies domestically for worldwide competition and favoured the growth of chaebols, instead of creating a balance between SMEs and large enterprises. The weakness of SME sector was due to disadvantageous policies and lack of financial aid (Chau, 2001).

Based on the researches from Adelman (1999), Amsden (1989), Yoon (2001) the following stages of economic development in South Korea can be identified:

- Stabilization, agrarian reform and reconstruction and import substituting industries (1945-61):
 - Initial development also supported by the USA followed by the devastating Korean War
 - The Korean Land Reform allowed a redistribution of land – formerly owned by Japanese farmers and companies – to tenants and landless farm workers. Accordingly, about 62% of farm families benefitted from the reform. Additional asset redistribution took place by selling formerly Japanese-owned properties usually under market price. The measure also helped to fight the inflation.
 - Reconstruction was further delayed due to the Korean War and its subsequent aftermath.
- Export orientation and secondary import substituting industrialization (1962-1979):

- Due to strong intervention in the economy the real growth rate of exports totalled 40% in average during the first five-year plan and the domestic consumption slightly increased.
- In 1961 the Economic Planning Board was established to create, coordinate and enact economic development plans.
- Devaluation of domestic currency was meant to support export, but the primary impact was a worsened trade as raw material price jumped high. The measure increased raw material prices by a significant proportion.
- The government intervened once again, but this time with export promoting actions successfully.
- The entrepreneur government planned for future and steered the economic transition. The government prioritized the heavy and chemical industries and laid the fundamentals for electronics and automobile industries.
- Based on the input-output model supplemented by industry studies of Economic Planning Board the key sectors were announced with their strategic products which were meant to have comparative advantage.
- Stabilizing economy with export orientation (from 1970s):
 - To further stimulate exports a currency devaluation took effect, which needed a follow-up measure, i.e., reduction of interest rates of banking institutions to stimulate investment.
 - Korea's total external debt grew by 59% from 1979 to 1981. The monetary authorities pushed to lower interest rates that eased and supported further borrowing. Austerity came due to high long-term debt ratio, i.e., 72% in 1978 that dropped to 62% in 1982.
 - Significant increase in labour productivity generated growing export figures from the end of 1970s.
 - The government also attempted to take liberalization measures to stabilize inflation, to adjust structures of HCLs, to eliminate monopolistic structures and to support SME growth (Li, 2002).
- Concentration of power in large enterprises (also conglomerates, chaebols) (from 1980s):
 - Korea had the second highest investment rates after Singapore in 1983.
 - In 1984 the ten largest diversified business groups accounted for 67% of total sales. This figure translates into a strong power not only in economy, but also in politics.
 - Liberalization was meant to discipline the large enterprises. Only from 1980s direct foreign investment, trade barriers, industrial licensing, state credit allocation, technology and capital investment, etc. were affected by the gradual liberalization.
 - Large enterprise groups misused and monopolized financial aids as well as cheap bank loans based on their domination that lead to an unhealthy economic structure without SMEs.
 - As profit margins melted large debts of bankrupt chaebols became a burden and pushed the entire country into recession a recession where the IMF was called for bailout. Series of long outstanding reforms followed due to international pressure, fiscal tightening was unavoidable (Suh, 2007).

- Transforming to market-led growth and shifting towards innovation driven stage (from 1990s):
 - The government launched a five-year plan for the New Economy 1993–1997. This turned to an increasing investment in R&D to 3– 4% of the GNP by 1998
 - However, initially the government supported endogenous research it encouraged to increase indigenous researches and also built up the necessary governmental infrastructure by building its research institutions.
 - To become the “Silicon Valley of Asia” the government also established science parks, innopolises, i.e., cities with diverse innovation centres, from 2005.
- Demographic slowdown (from 2010):
 - Korean society belongs to the fastest aging societies of the world. Pressures can be felt both by the education and industry.
 - The employment rate of young generation in Korea is one of the lowest among OECD countries, while women are mainly discouraged by temporary jobs to become involved. The OECD (2016) suggests to integrate Korean women and the young generation into permanent workforce to mitigate the rapid impact of aging.

Figure 2 interprets the above stages of economic development with the reflection on the crises which spans the examined period of time. Similarities among the two economies arise not only in their past growing phases and crises. Also, the most recent slowing in the two economies resemble. In case of both countries the data attained also derived from the sluggish export growth that mainly can be attributed to the economic slowdown in China and other in other large economies in the region (Jung 2016 & Lee 2016). The large dependence – 25% of total exports from Korea and 13% from Singapore to China – denotes a high-level vulnerability in these economies. While Singapore with all the free trade agreements managed to diversify the target of its exports, South Korea remains crucially dependent of the trade with China. Therefore, merely minimal disagreements or recalibration of economy in China may affect the trade and the economic growth in Korea largely (Rich, 2017).

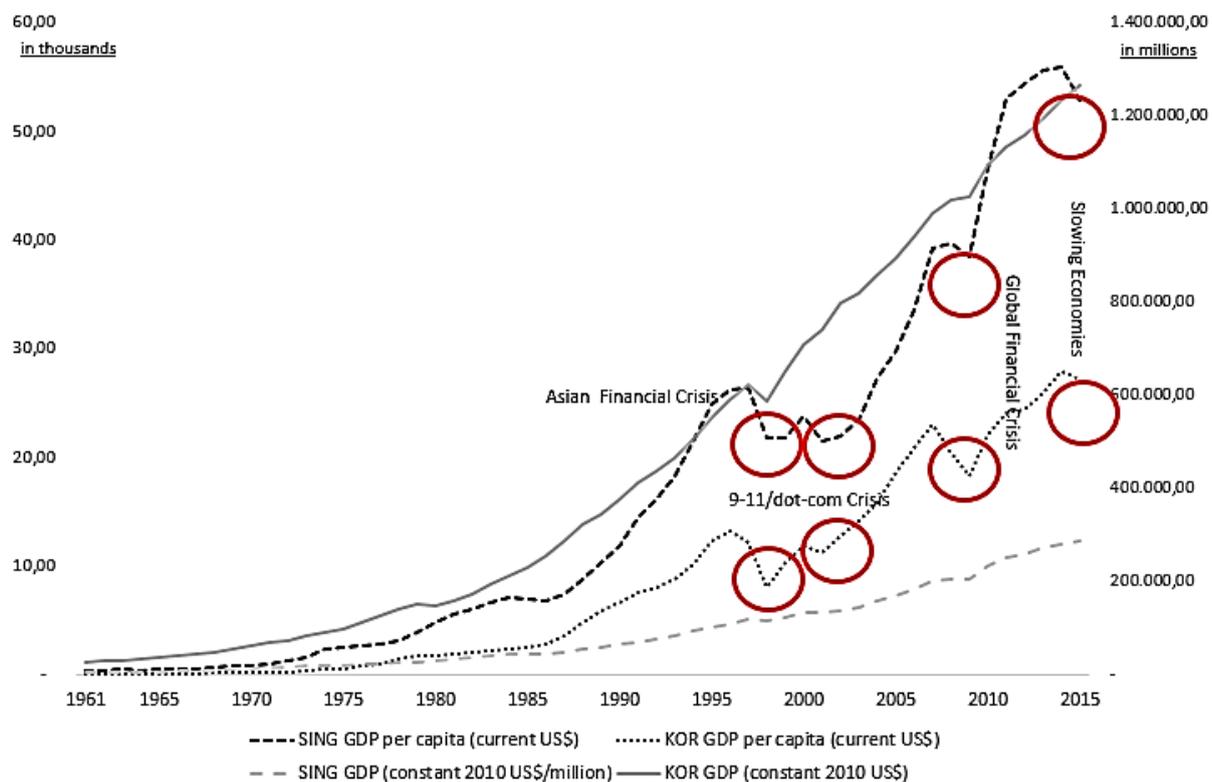


Figure 2: GDP Growth Development of Singapore and South Korea (World Bank, 2017a)

4.3 Composition of Human Capital

The formation of human capital has changed in both countries over the time. The emerging economy presumed a steadily developing human capital. Consequently, it was essential to invest in education both publicly and privately. The high investment in education and training has been characteristic not only for the investigated two countries, but all the other NICs (Taiwan, Hong Kong, etc.). Human capital is generally perceived as a key contributor to increase productivity. Accordingly, the increased quality of human capital contributed to the total factor productivity remarkably in both countries. Still, a clearly observable difference between the two countries represents the composition of workforce. Already in the late 1960s Singapore's government tapped into the female population and encouraged women to participate in the labor market. The city state's leading party PAP also enacted policies to attract foreigners continuously from the 1960s in order to ease the growing pressure on labour market (Chew and Chew, 1995). As Singapore became a fully established economy, further easing of immigration rules was necessary to attract, to retain professionals and to pursue a strategy of brain drain (Gribble and McBurnie, 2015). The government of the city-state has to find the way to reassure the nation through more transparency that easing of rules is necessary. Mandatory language and culture programmes for long-staying foreigners in order to obtain permanent residency with limitations might become the solution to mitigate the recent rise of xenophobia (Csizmazia, 2016). From the beginning Korea could rely on its own human resource as the fertility rate was high, but was forced to embrace immigration policies to attract mainly low skilled workers from the 1990s. The aging problem reached the Korean society as well and the Korean immigration rules have been changing accordingly. Professionals and skilled workers have been welcome to engage in respective employment. While rising general education level accounts for immigrants to fill low skilled and low income vacancies, professionals contribute to the

development towards knowledge based economy (Park, 2017). This step also can be attributed to the rapid aging problem to a large extent. Park (2017) also denoted that low-skilled workers arrived on tourist visa and simply overstayed from the mid of 1990s and in 2002 the unauthorized workers constituted 70% of the total foreign labour force in Korea. Consequently, it was necessary to adopt policies to open the labour market and to mitigate pressure on it. Nevertheless a large proportion remained unauthorized as they established their existence and also have families in Korea. Thus, while Singapore has a highly heterogeneous ethnic and cultural background, Korea has been long proud of homogeneity and therefore the need for foreign workforce puts a challenge on policymakers.

Both governments have played a proactive role in guiding education for the transforming economy and selecting and promoting strategic sectors over the entire time of development. By and by, the initial low-wage manufacturing industries were replaced by industries which required skilled workers and professionals. Initially, both governments adopted policies to construct fundamental trainings and to provide basic education. Although, in both countries the education is compulsory up to age 14 and to finish middle school, the social pressure is enormous to progress even to tertiary education.

4. Progress of Education to Serve Growth

Both emerging economies called for education that has developed in tandem with their economies. The education has contributed to the rapid rise of economies of the two countries, the national economic production, political stability and eventually to development of knowledge economy (Lee & Gopinathan, 2008).

<i>Period</i>	<i>South Korea</i>	<i>Singapore</i>
<i>From 1960s to early 1970s</i>	labour-intensive light industries to significantly reduce unemployment	labour-intensive light industries to reach full employment
<i>From mid of 1970 to early 1990s</i>	“kisuribgug” – nation building on skills development, leading secondary students to vocational route (HCI)	vocational training to increase productivity, chemical, petrochemical products expansion of R&D activities
<i>From early 1990s</i>	expend R&D capabilities to technology-intensive industries semi-conductors, ICT, and automobiles	expansion of R&D to biotechnology, process control and automation equipment, optical and electro-optical applications
<i>From mid of 2000</i>	concept of regional innovation systems (Innopolis), knowledge-based economy	knowledge-based economy, regional R&D center, orientation towards SMEs
<i>From mid of 2010s</i>	Focusing on local start-ups, initiative from chaebols	Focusing on global and local start-ups, introducing venture capital

Table 1: Sources: Wong & Singh 2008; Kim 2012; Pinheiro & Pillay 2016; Jung & Mah 2013; Kwong 2001; Min (2017a); Yahya (2017); Jhoo (2017); and Kang (2017).

In countries with Confucian influence the education has been recognized as chance to advance in the stringent social hierarchy. It led to education fever and to being afraid of falling out of the society (gyoyuk yeol in Korea and kiasu in Singapore) in both countries (Lee 2006,

Kwon 2015, Christensen 2015). In both economies the demand for skilled labour followed the phases from the stage of converging economies knowledge-based economies. Table 1 shows how the focus of the National System of Innovation in the two countries evolved over the time. The development needed to be matched also by the education, i.e., the education has also emerged and undergone stages in tandem with the economic development.

As both countries share a Confucian background, it was analysed by many scholars if this is responsible not only for the growth, but also for the problems in the modern age history in the education system as well as of structural unemployment of the two countries. The comparison of the recent development shows many similarities between the two countries, but it would be far-fetched to blame the Confucian heritage for problems in the higher education of both countries.

5.1 Way to Global Schoolhouse

Both government recognized during the early stage of development that the key for their development will be the flexible shift of their education system based on the demands of future industry sectors over the time. While in the 1960s and 1970s the most important was to provide elementary education to the mass, the shift continued towards the higher education.

The government in Singapore recognized the need to draft a strategic plan to make progress in the economy. At first, there seemed to be little need for teaching in English. Nevertheless, policymakers faced growing pressure from parents and reacted with widening the availability of English as a medium of instruction (EMI). However, EMI contributed rapidly to growth in the economy, bilingualism efforts seemed to be too early in a society that still struggled with a huge proportion of illiterates and an overheated demand for primary teachers (Tucker, 2012). The nation-building has become one of the major goals of education in the 1960s. However, the most important was to build a skilled labor force, the strategic project of nation-building assisted the national self-awareness and became a fundamental element after the colonial time both in Singapore and also in South Korea. In 1968 the Technical Education Department was set up to keep pace with the industrialization and in 1973 the Industrial Training Board was established to centralize and coordinate vocational education (Chong, 2014). A centralized national curriculum was implemented.

According to the report prepared by the Education Minister Dr. Goh in 1979 the exaggeration of bilingualism led to inefficiencies in education (Tucker, 2012). As a result, he proposed in the New Education System an assessment test on language proficiency at the end of grade four and based on the results the students could continue their education in four different streams. The curriculum was standardized and much higher standards were introduced than before to facilitate the shift from labour-intensive industries, where productivity could not be increased any more, to skilled- and capital-intensive industries as other countries of the region started to catch up. The industry transformation requested additional education from the people, who became laid off. Consequently, the government initiated programmes to embrace the older generation. Eventually, the demand of high-value-added industries could be satisfied, but vocational training seemed to be no longer popular to the nation, especially to parents. The demand for higher education and for white-collar positions has increased rapidly.

In 1965 the cohort ratio stood merely at 3% for university admission and 2% for polytechnics admission, these numbers soared to 22% and 39% respectively. The government established universities and assisted their transformation to serve a gradually rising cohort

participation rate (CPR) from 21 % in 2003 to 25% in 2010 (MOE, 2003) and to 30% in 2015 and eventually explored the impact to increase CPR to 40% by 2020 (MOE, 2012). From the 1990s the government also promoted collaborations between universities and polytechnics. A careful balance between the admission to universities and to polytechnics is crucial in order to foster human capital for employment and to avoid mismatch between labour market and graduations. Education reforms were launched to restructure the higher education sector to foster autonomy for increased accountability. The key principle of the higher education reform based on the report 'Fostering Autonomy and Accountability in Universities', released in 2000, was to give autonomy to both national universities, NUS and NTU, and to introduce a systematic accountability framework, a quality assurance system for the universities (Lee & Gopinathan, 2008).

The latest milestone in higher education development of the city-state – Global Schoolhouse project – to create a knowledge centre was announced in 2002 prompted by the Asian financial crisis of 1997/98. As part of the project the Singaporean government launched a world-class universities program in 1998 with the aim to take central and proactive role in building the knowledge economy also by also attracting foreign universities and research institutions, researchers and talents the city-state. The strategy of brain drain started (Gribble and McBurnie, 2015) as the government introduced generous bonded scholarships with the condition that the beneficiaries work in Singapore for a period of several years (Lee, 2014; Liu, 2014; Gribble and McBurnie, 2015).

Singapore adopted regulations to accommodate offshore campuses of renowned higher education institutions. Non-local degree programs play an important role in shaping tertiary education, and private institutions have increasingly regarded them as a revenue-generating industry. The rapid growth of immobile students has been noticed by the overseas HEIs from the UK. The British Council observed that the number of enrolled international students in the UK is "unsustainable in the longer term," and suggested that HEIs should build overseas partnerships and branch universities (Bone, 2009). Unsurprisingly, overseas HEIs established by British HEIs had the second largest number of students in Singapore, outnumbered only by Malaysia. During the academic year of 2012/2013, their number stood at 50,025, having greatly increased from 20,845 in 2007/2008 (HESA, 2014).

As a result, the national universities received competitors from abroad. They were challenged to implement a quality assurance system and to search for alternative financial sources, i.e., to urge them to collaborate with players from different industries to develop and apply knowledge in research centres.

Tucker (2012) pinpointed that the system remained meritocratic, i.e., the options for students are very limited and they are always a function of the performance at the given point, when selection is carried out and the students will be ranked. Once a student is admitted to a polytechnics he or she may not have a chance for an academic career. Therefore, and also for other reasons, there are many students, who even today leave the country for an academic education and return to Singapore after successful completion of university education. Both *Straits Times* and *The New Paper* have articles which report about a substantially growing number of students flocking abroad for higher education. The figures of British Council denoted a doubling of the total number of Singaporean students enrolled in UK universities to 8,145 in 2015 from 4,115 students in 2009 (Min, 2017b). Meanwhile, the number of Singaporean students enrolled in US educational institutions last year grew to 4,727, the highest in 10 years (Davie, 2016). There is a latent danger that these students may not return, but remain in the country, where they could accumulate knowledge and graduate. The

government may be forced soon to adopt a new regulation that allows even later to change among the four streams, if the student shows the ability to improve or the student wants to abort progress in higher education.

5.2 Evolving education towards internationalization

Similarly to Singapore, the South Korean economy required a continuously emerging education towards knowledge based economy. While in Singapore the qualitative expansion has been prioritized before quantitative expansion, the latter, i.e., massification, occurred up to the 1990s and foreran the qualitative improvement started in 1995 in South Korea. The development in education can be categorized in the same fashion like by the OECD study on Singapore (OECD, 2016), i.e., survival-driven in the 1960s, efficiency-driven from the 1970s, ability-based in the 1980s, and most recently demand-oriented value-driven phase from the 5.31 May Plan in 1995 that includes the first internationalization goals, i.e., efforts towards demand orientation.

Kim (2002) pinpointed two remarkable features of South Korean education: the egalitarianism and the zeal for education. When the education system evolved, the provision of equal opportunity, i.e., egalitarianism, became a basic goal of the system. Nevertheless, the investment was necessary in books and school equipment. Therefore, the majority of poor families were unable to participate in education. Besides, the number of students in a single classroom was extremely high that led to loss in education quality (Amsden, 1989). Zeal for education has traditionally been one of the priorities in the Korean society. It was also reinforced by the Japanese colonial experience.

The launch of series of five-year economic development plan in 1962 influenced the building of education system largely. The first two five-year plans focused on the development of light manufacturing industries and consumer electronic goods industry. Although the official primary goal was to foster human capital for the industrial development, curriculum was designed to teach anticommunism, moral and discipline in the 1960s and 1970s (Kim, 2002). To keep the cost for education minimal, the Park regime restricted the number of teachers and classrooms through the introduction of entrance examination to select students on secondary level. The restriction of resources prompted the investment into private schools and also universities. Private schools started to assume a crucial role in education. The extreme competition due to entrance exams eventually contributed to underplay the role of vocational training and drove students to academic ways in the first place (Kim, 2012). Vocational training suffered also from rapid changes in curriculum. This resulted in poor introduction and low quality of technology teachers. To support vocational training a Vocational Training Law was enacted in 1966 to contribute to the education system and in 1974 the participation in in-plant training was mandatory to all manufacturing companies with 300 or more workers. The number of vocational training centres and junior colleges increased rapidly after 1970 (Chau, 2001).

The Korean economy also shifted rapidly from light industries to heavy and capital-intensive industries. The third five-year plan (1972-76) included the promotion of HCLs and the Park regime launched a campaign to re-educate and retrain people (Amsden, 1989). The curriculum of vocational and technical education turned to become more discipline oriented and science and technology were in the focus of education. Only the fifth five-year plan (1982-1986) implied the focus of stability of economy and society. Eventually, from the 1990s diversification in education was necessary as economy also became diversified (Kim, 2002).

The university enrollment expanded in fast pace. While the number of enrollment stood at 38,400 in 1953, it grew to 1.15 million in 1994 (Chau, 2001). The fast massification of education compared to Singapore's approach had its price. The vocational training could never play a central role in training. Similarly to parents in Singapore, the pressure also drove the education shift towards higher education. Korean parents pressured children to study, although at the end many of them had to pursue further education after graduating from colleges.

Although, the two countries pursued the same goals during the last 50 years, the development of their education systems differ largely. Even today after the entrance of foreign overseas campuses of renowned private universities, the share of publicly or mixed private-publicly funded universities remained significant compared to Korea, where the major share was picked up by private universities. Also among the OECD countries the Korean education system represents a stakeholder structure that is highly different from any other of the OECD countries. About 86% of the higher education institutions were in private hands and about 77% of university students were enrolled in these institutions in 2016 (KEDI, 2016). As a direct response to the severe impact of the Asian financial crisis (1997-98) the government shifted focus towards knowledge-based economy and introduced the Brain Korea 21 (BK 21) I-II as well as the Study Korea and World-Class University (WCU) projects. Globalization guided and influenced the regulations in South Korean education system as well. Initially, policies were enacted to expand higher education by loosening enrolment quota policies. Internationalization policies were launched to convert Korea into an academic center in East Asia with renowned scholars from all over the world to continue their research activities in Korea to contribute to the country's knowledge generation (Cho & Palmer, 2012). The latest establishment during the Park Geun-hye administration was introduced as the 'University for a Creative Korea' project in 2014 (Green, 2015).

Both countries need to find a solution for the problem of their aging society. They realized that they can attract students mainly from the region to study and work there. While bonded scholarships are offered in Singapore, the Korean government runs the 'Study in Korea' project and offers different kinds of scholarships, even for foreign exchange students. Another major difference is represented by changing figures referring to students going abroad to study. Although both countries struggle with aging, the number of Korean students going abroad has declined and hit a 12-year low (Song, 2017). Meanwhile, a growing number of students from Singapore still pursues studies abroad.

5. Conclusion

In this article, the main goal was to identify similarities and differences in economic and education development of two countries, Singapore and South Korea, through an analysis. The selected countries developed their economies from light industries to knowledge based economies within half of a decade. Both economies run through a progress with similar industries. The education was directed to take action and assist the nation with knowledge on anticommunism, nation-building efforts and technological knowledge that changed together with the evolving industries. It is noteworthy that their proximity (Singapore could become a logistic hub, and Korea received an assisting role for Japanese conglomerates at the beginning of industrial take-off), a stable political and economic environment (provided by Park Chung-hee's regime in South Korea and by the PAP's quasi one-party system) contributed to their development.

Whereas Korea could largely rely on its large population and build its human capital, Singapore was forced to adopt regulations for free market economy and also relied on the influx of labour force. The target for Singaporean leaders was to reach full employment rapidly and therefore incentives were given to MNCs to set up their manufacturing sites in the city-state. As wages increased and the labour in other countries became available at a lower wage, manufacturing industries moved. To control the shift in economy the PAP led government launched programmes to re-train and re-educate the working population and vocational schools were in central position to cultivate and create human capital that was needed in more sophisticated chemical industries and precision engineering. The selected growth-with-stability based on the "half socialist, half capitalist" principle led to a healthy and stable economic development that overcame crises easier than the economy in South Korea (Jeon, 1995).

However, Singapore early identified that English will become a key factor in development, the education in English led to inefficiencies in a country in which large proportion of society were employed in manufacturing industries. The significance of English language education revealed itself once Singaporean leaders saw that further development lies in attracting talents to the country, in gradually increasing cohort participation rate in higher education, in promoting SMEs, in assisting start-ups, and in developing collaboration between universities and companies to build research and development synergies. Still the education system needs further modifications to keep Singaporeans to continue their life in the country. Unsolved issues and challenges regarding the growing number of Singaporean students and the xenophobic tendencies need more attention from the government.

The South Korean regime launched series of economic five-year plans to catch-up with developed economies rapidly. The country was willing to guide a growth-first capitalist development and insisted on loose fiscal-monetary controls to maximize investment. The mismanagement favoured chaebols (large conglomerates). Agriculture and SMEs could not benefit from the financial assistance provided from the government. Moreover, SMEs have been exploited by the chaebols. At the same time, high inflation and lack of social redistribution characterized the country during the Park's regime. Large debts, long outstanding economic reforms dumped the country into a recession and a bankrupt situation, where aid was needed. A systematic approach towards knowledge based economy took place triggered basically by the financial crisis of 1997-98. South Korean governments imagined and launched projects to support further development in developing and internationalizing higher education, supporting industry-academic collaborations. Most recently, governments attempt to assist SMEs and start-ups. If the approach of the two countries to progress towards knowledge economy is compared, South Korea's development falls obviously somewhat behind Singapore's.

Based on the analysis there seems to be a lack of comparison regarding the two countries' research and development, industry-academic collaborations (including SMEs) and policies which serve and promote the research and development in order to raise the number of patent outputs, but also to increase the quality of them. Further analyses may provide deeper insight and also lessons to learn from the countries.

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