Joint Project between GVCC and KIET

Chapter 2: An Introduction to Korea's Economy

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Chapter 2. An Introduction to Korea's Economy[1]

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Acronyms

ASEAN	Association of Southeast Asian Nations
CCEI	Centers for Creative Economy and Innovation
FDI	Foreign Direct Investment
FTA	Free Trade Agreement
FYEDP	Five-Year Economic Development Plan
HCI	Heavy and Chemical Industries
KIET	Korea Institute for Industrial Economics & Trade
KITA	Korea International Trade Association
KLIPS	Korean Labor & Income Panel Study
KOSIS	Korea Statistical Information Service
KOSTAT	Ministry of Strategy and Finance: Statistics Korea
KRW	Korean Won
KSCO	Korean Standard Classification of Occupations
KSIC	Korean Standard Industrial Classification
MOE	Ministry of Education
MOEL	Ministry of Employment and Labor
MOLIT	Ministry of Land, Infrastructure and Transport
MOSF	Ministry of Strategy and Finance
MOTIE	Ministry of Trade, Industry and Energy
MSIP	Ministry of Science, ICT & Future Planning
R&D	Research and Development
RCEP	Regional Comprehensive Economic Partnership
SMBA	Small and Medium Business Administration
SME	Small- and Medium-Sized Enterprise
STEM	Science, Technology, Engineering and Math
WEF	World Economic Forum

2. An Introduction to Korea's Economy

The past half century has seen Korea rapidly industrialize, transforming itself from a struggling agricultural economy to become one of the world's most important manufacturing hubs. Today, the country is the fourth largest economy in Asia and is home to some of the most successful global manufacturing conglomerates. This economic transformation has placed Korea amongst the ranks of the world's advanced industrialized nations.[2] Growth has been based on an unwavering commitment by policymakers to the country's manufacturing prowess. Since 2011, the contribution of manufacturing to GDP has been higher for Korea than all other Asian countries and among the top three countries globally with available data (WDI, 2017).[3]

Excellence in manufacturing was initially driven by state-led industrial policy, with five-year plans rolled out continuously through the second half of the 20th century. These plans laid the foundation for the emergence of a handful of globally competitive Korean lead firms, supported by heavy investments in human capital and research and development (R&D). The quality of the labor force is considered one of the most important factors in Korea's economic and industrial success, while the country leads globally in terms of R&D expenditure.

This chapter reviews the policies that impact industrial development in Korea across all industries, and examines how the country's approach to economic development has evolved over the past few decades. The review included identifying key stakeholders, trade, industrial and labor-related policies and programs. Detailed information on key stakeholders is included in the appendix of this report (Table A-2-1. Key Institutional Actors, Korea).

2.1. Korea's Economic Profile

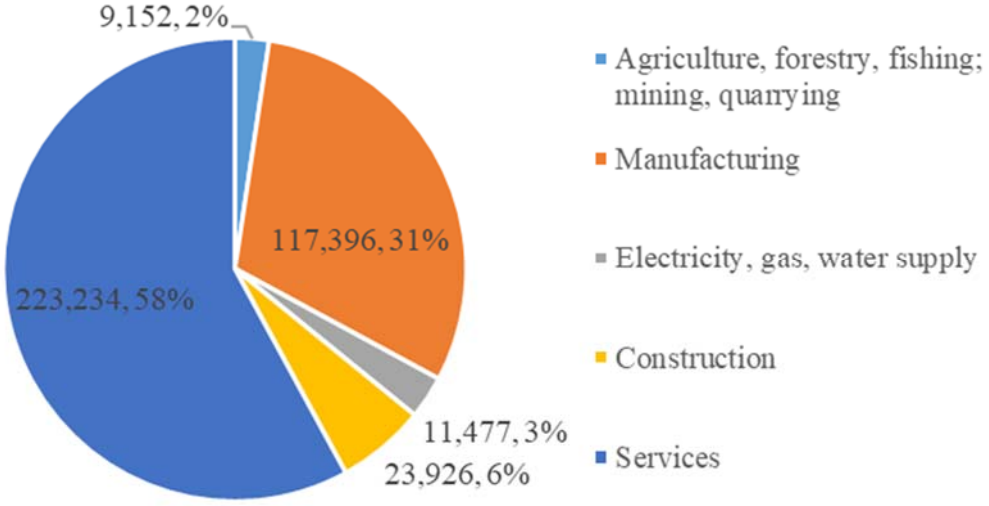
Korea's economic portfolio reflects the activities of the large MNEs operating in the country since the early focus on heavy industries in the 1970s. As shown in

Figure 2-1, Korea's distribution of economic activity based on share of gross value added has remained consistent between 2001 and 2017 with services accounting for 58% followed by manufacturing at 30.5% for the first quarter of 2017 (compared to 59% and 28% respectively in 2001). Notably within services, business activities (including professional, scientific, and technical services and business support services) have increased at a faster rate than the overall average and other service activities.

[2] Korea has consistently been considered a high-income country since 2001. Based on World Bank Income Classifications, GNI per capita in US$ (Atlas methodology).

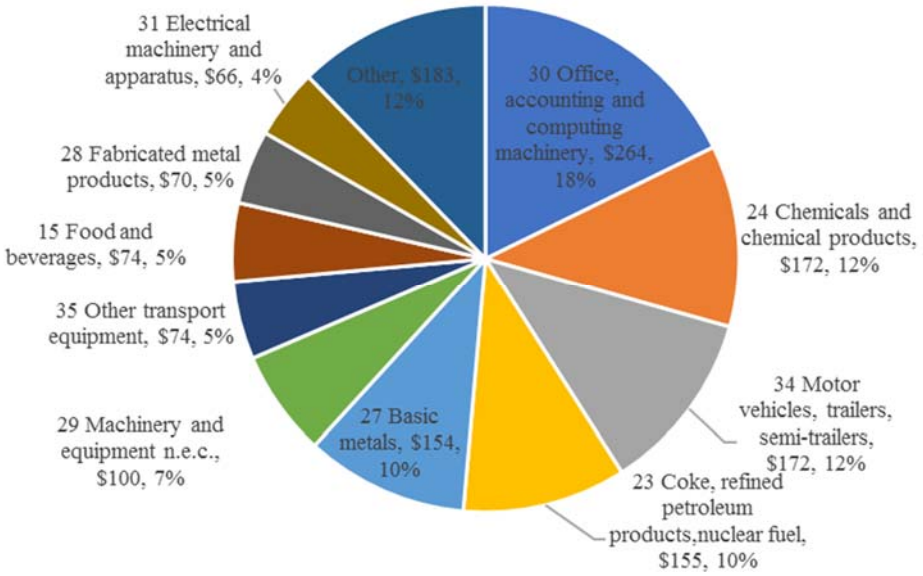
[3] Korea narrowly surpassed China in 2011 (31.4% compared to 31.3%), however Korea's manufacturing contribution has remained steady or increased whereas China's has declined as services increase.

Figure 2-1. Korea's Gross Value Added by Economic Activity, 2017 (1st quarter)



Source: BOK (2001-2017); Value-added in basic prices, billion won

Figure 2-2. Korea's Manufacturing Output ($US, billions) by Industry, 2014

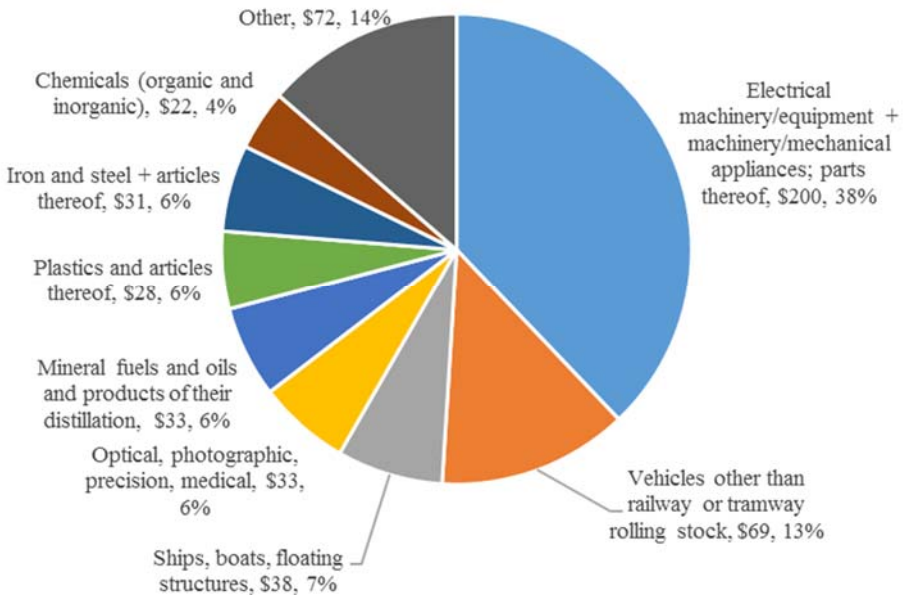


Source: UNIDO (1963-2014); based on INDSTAT2, Rev3.

Korea's manufacturing output in 2014 is driven by electronic components and final products (18%), chemicals (12%), and automotive components and final products (12%) (Figure 2-2). When compared with exports, the main difference is that chemicals are not a top category,

indicating that output is largely for domestic consumption or as intermediate inputs into other exports (Figure 2-3).

Figure 2-3. Korea's Top Exports, 2015



Source: UNSD (2002-2015); Note: values in $US billions and shares represent share of Korea's total exports in 2015; descriptions represent HS02, two-digit codes and pairs of codes.

2.2. Industrial Policy in Korea

Korea has long been known for a state-led industrial development model during its post-war high-growth era. A close and effective relationship between the state bureaucracy and private business, albeit with occasional public revelations of corruption, was a hallmark of Korea's industrial policy for much of the period until the early 1990s (Amsden, 1989; Evans, 1995). Since democratization, the country's approach to industrial policy has shifted from a strong state-led model to one where the private sector plays a more proactive role (Devlin & Moguillansky, 2011; Yeung, 2014). This has been facilitated by the significant growth of private sector capabilities and resources over the past few decades. Yet, the Korean government still plays a key role in facilitating industrial growth, global integration, and post-industrial transformation, with emphasis on a knowledge-driven creative economy, small- and medium-sized enterprise (SME) growth, and advanced and innovative research and development (R&D), although policy instability and inefficient government regulations are often cited as major constraints on the country's global competitiveness (WEF, 2016). This section provides a brief background to the evolution of industrial policy in the country in order to set the stage for later discussions regarding the country's industrial transformation (see Chapter 5).

Korea's early industrial policy approach, which began in 1962 with the roll out of its first five-year economic development plan (FYEDP) and lasted until 1993, had a tremendous impact on the country's rapid industrialization. Since the turn of the century, industrial policy has been driven primarily at the ministerial level as national plans were dropped. Mostly these policies

have focused on fostering future industries. The impact of these plans on the economy has been more muted than their predecessors. Reasons cited for this include: (1) economic structure was not yet suited for knowledge-based development, and it is difficult to measure progress; (2) there was a lack of coherence and continuity, with focus areas being switched too often (every five years); and (3) areas selected by the planning process were not strategic for the country and had considerable overlap with China, placing the country in direct competition with their considerably larger neighbor (KIET, 2015). Private domestic businesses (instead of FDI or SOEs) were chosen to drive the development of Korea's economy (Yeung, 2014). These have become known as "chaebols" and they are central to the country's economy (see Box 2-1).

Box 2-1. Korea's Unique Industrial Organization: Chaebols & the Economy

Korea's early industrial policy gave rise to the emergence of a group of very strong firms, known locally as *chaebols*. Largely protected in the domestic market until the Asian Crisis in 1997, these companies, today, are typically large, highly diversified conglomerates, with strong family oriented operations (Kim, 2015), and many of them are lead firms in their respective GVCs. These conglomerates are an essential part of Korea's economy, and helped transform the nation.

Table 2-1. Leading Chaebols

Firm	Primary Industry Interests	2016 Annual Revenue, US$ Billion
Samsung	Semiconductors, Electronics (phones, TVs), Electrical Appliances, Hotels, Pharmaceuticals, Shipbuilding	173.4
Hyundai Motor	Automotive	83
SK	Semiconductors; Oil and Gas; Telecomm, Finance	72
LG	Electronics (smartphones, TVs), Electrical Appliances, Cosmetics, Chemicals, Fertilizer	47.9
	Subtotal	376.3

Sources: KSE (2017), Reuters (2017), Forbes (2017)

Nonetheless, along the way, they have come to dominate most sectors (Vaswani, 2017). While this has proven to be a successful strategy for Korea, it has also "put a lot of eggs in one basket." These firms collectively held a nearly two-thirds market share in manufacturing by the end of the 1990s and it is estimated that Samsung accounts for one-fifth of Korea's exports (Tejada, 2017). Another estimate states that sales revenue from the top five chaebols is worth more than half of Korea's entire economy (Vaswani, 2017). Another states that Korea's four biggest chaebol groups – Samsung (SSNLF), Hyundai Motor (HYMTF), SK (SKMTF) and LG (KRX) – account for half the country's stock market value (Reuters, 2017). Having a few large, interconnected companies based on one brand name also goes against the typical business model used in most other countries, as it assumes that one company or country can remain competitive in all activities in the value chain. It also does not align with trends regarding lifestyle and targeted marketing.

This has resulted in significant size disparity between the chaebols and other firms in the industry which have a particularly difficult time competing. The Korean Commission for Corporate Partnership was created in 2010 to help mitigate social conflict between large enterprises (many are chaebol enterprises) and SMEs as the former group had an inordinately large share of the market and thus the power of monopoly and oligopoly. The commission was created to help ease the tension between the two groups, and to find creative ways for the chaebols to assist the growth of the SMEs (Kim, 2015).

There have been many efforts by the Korean government to support SMEs with access to domestic bank loans, SME-designated manufacturing, service sectors that prohibit chaebols from entering, as well as support in technology. Since the 2000s, SME development has been a stated focus of economic development initiatives, with policies being developed through a dedicated administration, the Small and Medium Business Administration (SMBA).

The developmental state of the 1960s and 1970s used authoritarian means to control and discipline private businesses; examples include the threat of tax audits, investigation of illicit accumulation of wealth and corruption, and sometimes North Korean sympathizing activities to investigate and prosecute private businesses that were not in line with the state's five-year economic development plans and industrial policies. The most widely used threat was withdrawal of preferential domestic bank loans if target volume and growth rate goals for manufacturing output and exports were not reached (Kim, 2015). The government held the upper hand in terms of power; it provided access to loans and resources, but curbed the power of private firms with sanctions and licenses. Private businesses needed the state for preferential access to capital and technology, and subsidies went to hand-picked private businesses for heavy and chemical industries (HCI). Government protection allowed business empires to expand into new areas without fear of potential foreign competition or failure. This growth strategy, as would be expected, has led to tight ties between the government and businesses.

Table 2-2. Industrial Planning in Korea: 1962-2016

Time	Primary Policies	Focus/Impact
1962-1966	1st FYEDP: Create a self-reliant economy by transforming from agriculture to industry by securing resources, expanding basic industry and infrastructure, improving the balance of payments (including negotiations for foreign aid), and promotion of technology.	
1967-1971	2nd FYEDP: Focus: exports. Japan's example of export-oriented industrialization (EOI) was adopted because it needed foreign capital for development. Korea focused on light manufacturing due to its rather short history of industrialization, as well as lack of capital, technology, and natural resources, combined with only a relatively well-educated labor force	**Light manufacturing**: textiles, clothing, footwear, plywood, wigs, stuffed toys.
1972-1976 1977-1981	3rd & 4th FYEDP: HCI and rural development were the two primary goals. HCI was selected as a strategy that would help solve many challenges: (1) secure domestic political support by nurturing large private businesses; (2) develop the defense industry; and (3) overcome national security challenges (related to potential threats of a North Korea invasion). To grow in HCI, a large capital base and access to technology was needed. Thus, the 1970s marked the transformation of large private businesses into major conglomerates. Target industries were chosen due to potential for **backward and forward linkages**, multiplier effect for the national economy, and earnings through exports. Emphasis on technology imports.	Six target industries (and firms) selected for **heavy and chemical industries**: (1) iron & steel; (2) non-ferrous metal; (3) machinery; (4) shipbuilding; (5) electrical appliances & electronics (E&E); & (6) petrochemicals.
1982-1986	5th FYEDP: social and welfare services took a greater emphasis and 1980s: Stabilization, liberalization. Development of the electronic sector. From creative imitation phase to innovation	Electronics
1987-1991	6th FYEDP: Government became less involved and the private sector took on more power: (1) industrial targeting changed from picking private businesses/target sectors for heavy subsidies to supporting sunset industries with a finite time limit (three years) with reduced support; (2) developmental and industrial policies took back stage to regulatory policies; and (3) incentives including state-owned banks, policy loans, and industrial licensing (for private businesses) were mostly eliminated.	Industrial and corporate restructuring and competition and regulatory policy

Time	Primary Policies	Focus/Impact
1992-1993	7th FYEDP: Replaced by the FYP for New Economy in 1993. End of official five-year plans.	
1998	"Big Deals" –chaebols reduced diversification across industries to concentrate on two (or three for the largest chaebols) core industries. This led to significant restructuring among firms and divisions.	Redefine and streamline focus areas of chaebols
1999	National Science and Technology Council created to define strategies and programs and to allocate resources (shares hierarchy with National Assembly & Ministry of Planning diluting power). It is composed of representatives of several ministries plus nine representatives from the scientific community and is chaired by the president. Prior to 2006: there is also a focus on 193 products with established high potential.	Science & Technology
2001	2001: Knowledge-based economic development. Move from a capital-driven industrial strategy to one driven by innovation, emphasizing technology and efficiency. Internationalization of small and medium firms.	R&D; SMEs, clusters, training industrial manpower; regional development
2004	National Science and Technology Council is elevated in status. Minister of S&T given Deputy Prime Minister status.	
2009-2013	Government intervention in industrial and corporate restructuring after the global financial crisis is carried out by government financial institutions led by financial authorities. Under a policy environment familiar with favorable and selective financial support for industrial and corporate support, government financial institutions are both a mechanism for realizing industrial policy objectives and a barrier to impede smooth restructuring by the market.	Green growth and convergence between industries
2013-2016	Centers for Creative Economy and Innovation (CCEIs) "Three-year Plan for Economic Innovation" in 2014	Creative economy; Co-growth of large firms and SMEs
2016	Government R&D Innovation Plan (released 2016); Future Growth Engine Comprehensive Action Plan (19 areas, 2016)	

Sources: (Kim, 2015); (KIET, 2015); (Green Growth Committee, 2009).

The most recent efforts towards industrial policy have focused on Korea becoming a knowledge economy and diversifying into more innovation based sectors. In 2016, the Ministry of Science, ICT & Future Planning (MSIP) and Ministry of Trade, Industry & Energy (MOTIE) launched the *Comprehensive Action Plan for Future New Growth & Industrial Engines*.[4] The plan presents core strategies to produce new industries for the creative economy as well as key tasks for the government's three-year economic innovation plan. MSIP and MOTIE decided to facilitate cooperation programs and strengthen policy coordination between the two ministries. They increased the practicality of the plan by supplementing it with technology and business roadmaps for each field. These are detailed in the Future Growth Engine Comprehensive Action Plan: Detailed Information (MSIP & MOTIE, 2016). The plan combined 13 future growth engines and 13 industrial engines into 19 future growth engines, detailing implementation strategies and budgets (see Table 2-3). It calls for comprehensive support for international joint research and establishment of infrastructure, along with technology development, to create an industrial ecosystem that enables shared growth of industries, academia and research institutes. The government intends to invest about $US4.7 billion (5.6 trillion won) by 2020 with a hope the new industries achieve US$100 billion in exports by 2024 (KMTI, 2014-2015).

[4] MSIP and MOTIE developed separate plans, but merged the two to form this one; namely the '15 Rolling Plan' of the 'Action Plan for Future Growth Engines' by MSIP with the participation of about 200 experts and the 'Development for Industrial Engines Project' by MOTIE.

Table 2-3. Future Growth Engine Comprehensive Action Plan Fields, 2015-2020

Industry	Field	Goal
Aerospace	High-performance Unmanned Aerial Vehicle (UAV)	World's No.3 UAV leader
Automotive	Smart cars	
Biotechnology	Smart bio production system	Up to 10 biotech production systems by 2020 (30% improvement in bio-production system technology level, securing 2% global market share)
Clean Energy	New & Renewable Energy Hybrid System Supercritical CO2 Generation System	
Electronics	5G mobile communication Intelligent Semiconductors Intelligent Robots Wearable Smart Devices Smart Internet of Things Big Data	Provide world's first 5G commercial service by 2020. Achieve 2nd largest market share (10%) by 2020. KRW 6 trillion in domestic robot production by 2020. Preempt the global creative and wearable smart device market by 2020 IoT domestic market size of 30 trillion won by 2020 Big data leap to the top 3 by 2020.
Electrical	Multi-terminal high-voltage DC transmission/distribution system	
Healthcare	Personalized Wellness Care	Reaching the world top 5 in the global wellness market based on personal health and lifestyle care by 2020
IT/programming	Realistic Content[5] Virtual (cyber) training system	Develop 10 enterprises by 2020 and 5% of global market share. $10 billion in 20 star enterprises and sales by 2021. Nurturing global "small giants" and generating new markets in the area of virtual training system.
Materials	Composite (convergence) materials	World's 4th strongest materials country through development of creative materials and industrial core materials by 2024.
Shipbuilding	Deep Sea/Extreme Environment Marine Plant (Offshore Plant)	50% localization rate and 30% market share by 2020.
Production Equipment	Advanced (High-Tech) Material Processing Systems	Realization of 4 major powers in high-tech materials processing industry in 2020.
Public Services	Disaster Safety Management Smart System	

Source: MSIP and MOTIE (2016); Industry focus areas by authors.

2.3. Trade and Investment Policy

Trade and investment policy formulation is driven by MOTIE and the Ministry of Strategy and Finance (MOSF). Other supporting functions for trade and investment are provided by various public organizations in close relationship with government ministries and administrations.

[5] Technology-based ICT-induced human senses and cognition, engaging next-generation content that provides a similar experience with real emotion and space to expand.

Korea's international trade relationships have significantly changed in recent years as the country rapidly expanded ties with its major trading partners through bilateral and regional trade agreements. Bilateral free trade agreements (FTAs) considerably increased. Most agreements have been effective since 2010. Currently, Korea has FTAs with Chile, Singapore, India, Peru, Turkey[6], Australia, Canada, China, New Zealand, Vietnam, and Columbia. Korea also has a FTA with its top exporting partners, China, the U.S. and European Union. These three markets accounted for 47% of Korea's exports and 38% of imports in 2014 (WTO, 2016). It also has a regional FTA with the Association of Southeast Asian Nations (ASEAN). This indicates the country's strong trade linkages with some of the world's largest markets (see Table A-2-2. Korea's Trade Agreements and Preferences).

In addition, Korea is in talks for several potential regional FTAs, including the Korea-China-Japan FTA, which would integrate three major Northeast Asian markets, the Regional Comprehensive Economic Partnership (RCEP), which includes China, Japan, Australia, New Zealand plus ten ASEAN countries, and the Korea-Central America FTA, whose negotiations were concluded on November 2016 (MTIE, 2016). Korea has also considered joining the Trans-Pacific Partnership (TPP), although the deal's future is now uncertain as a new U.S. administration has withdrawn from it.[7]

While Korea is currently only eligible to receive GSP benefits from Australia, Belarus, Russia, Kazakhstan, and Norway, GSP preferences played an important role in initially expanding exports. Under the system, the country expanded its exports to major advanced economies, notably the US and European Union, with preferential tariffs. In 1987, Korea's exports through GSP accounted for 15 percent of its total exports, and 90% of GSP exports were to the U.S., EU and Japan (Yonhap News, 2010). As its economy grew, Korea graduated from the GSP systems. In 1988 it graduated from the EU GSP, in 1989 from the US, along with the other Asian tigers, i.e., Singapore, Hong Kong and Taiwan (UNCTAD, 2010), and most recently from Canada's GSP in 2015.

Now Korea aims to contribute to economic development and trade expansion in least-developed countries (LDCs) through its preferential tariff system. Started in 2000, the country's GSP scheme grants preferential tariffs to 48 LDCs: 14 in Asia, 33 in Africa, and one in Central America.[8] As of 2012, it covers 95% of the Harmonized System (HS) six-digit classification. Korea has also eased the GSP value-added rule; the minimum threshold for the input value of the exporting country was lowered from 50 to 40% of the free-on-board (FOB) price of the final product in 2011 (UNCTAD, 2013).

Import tariff rates

[6] Korea's basic and goods FTAs with Turkey has been effective since 2013, and service and investment agreements was ratified in 2015.

[7] In addition, there are several FTA negotiations that have stalled: Indonesia (since 2014), Japan (since 2008), Mexico (since 2008), and Gulf Cooperation Council (since 2009, including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates).

[8] See

Table A-2-2. Korea's Trade Agreements and Preferences for the entire list of beneficiaries.

In 2014, Korea was the world's 9th largest importer in merchandise trade (WTO, 2015, p. 44). The country's import tariff level is higher than those of many advanced economies with a similar size of imports, and its Asian competitors such as Japan and China. According to World Bank statistics (Table 2-4), Korea's weighted mean applied tariff rate[9] was 4.8% in 2015, more than three times higher than Japan (1.4%) and even higher than China (3.4%). The US and large European economies have much lower import tariffs (less than 2%). While still comparatively high, applied tariff rates have gone down over the last decade from around 7% in 2005-07.

Table 2-4. Weighted Mean Applied Tariff (%), Selected Countries, 2005-2015

Country	2005	2010	2011	2014	2015
Korea	7.0	7.2	6.5	5.2	4.8
Japan	1.9	1.3	1.3	1.2	1.4
China	4.9	3.7	3.6	3.2	3.4
Germany	1.7	1.6	1.1	1.5	1.6
France	1.7	1.6	1.1	1.5	1.6
Netherlands	1.7	1.6	1.1	1.5	1.6
United States	1.7	1.6	1.6	1.6	1.6

Source: World Bank (2017)

Foreign investment and special economic zones

While Korea's inward FDI has been on the rise, it is still small relative to the size of the country's economy. As of 2016, Korea's inward FDI (stock-based) amounted to 13.2% of the country's GDP.[10] The percentage is low, compared to some other advanced economies where foreign investment plays a much bigger role in the economy.[11] From 1990-2007, FDI's share of GDP was less than one percent (0.7%) (Devlin & Moguillansky, 2011). Recent efforts to help attract more investment include the amendment of the Foreign Investment Promotion Act to simplify FDI registration procedures (UNCTAD, 2017, p. 100).

To attract foreign investment, three types of special economies zones (SEZs) are in operation in Korea: foreign investment zones (FIZs), foreign economic zones (FEZs) and foreign trade zones (FTZs). As summarized in Table 2-5, they share a common goal of increasing Korea's involvement with other countries through investment or trade; however each one has a different mechanism to achieve this. FIZs mainly focus on bringing in foreign firms to an industrial complex or cluster, FEZs have a wider regional development aim and seek to leverage the presence of foreign investors in a wide range of industries, from manufacturing to services, including hospitals, logistics, education, broadcasting, and financial services. Meanwhile, FTZs are dedicated to support export-oriented firms, both foreign and domestic, and enable constituent firms in designated areas to engage in international trade without being subject to customs duties. Eligibility to locate in each type of zone varies, as do the benefits (however, some benefits are common across all three as they are based on FDI-related laws). Also, different institutions are responsible for granting SEZ status and managing each type of zone (see the Appendix for maps

[9] Weighted mean applied tariff is the average of effectively applied tariff rates weighted by the product import shares corresponding to each partner country.

[10] The historical high since 2005 was in 2013 at 13.9%.

[11] Inward FDI, for instance, accounts for 78% of the Netherlands's GDP, 57% in the UK, 31% in the US and 19% in Germany's, according to a UNCTAD statistics.

of FIZs, FEZs, and FTZs). Some benefits are renewable based on the amount of investment and employment created.

Even though Korea has several SEZ options, they have not been the primary locations for foreign investment. In 2004-2014, just 7 percent of firms (749 firms) and 21 percent of a total inflow FDI ($95 billion) were through the SEZs; FIZs led the other two types in both categories (Yang, 2016, pp. 31-32).

Table 2-5. Comparison of FIZ, FEZ and FTZ Regimes in Korea

		Foreign investment zone (FIZ)*	**Free economic zone (FEZ)**	**Free trade zone (FTZ)***
Purpose		Foreign capital inducement, transfer of advanced technologies, job creation	Foreign capital inducement, international competitiveness enhancement, and balanced regional development	Foreign capital inducement, trade promotion, regional development
Eligibility		Foreign-invested firms (min 30% of equity); foreign investment over KRW 100 mil.	Foreign-invested businesses; manufacturing, logistics, hospitals, education facilities, foreign broadcasting, financial service institutions, etc.	Export-oriented domestic or foreign businesses; foreign-invested business; wholesale businesses mainly for import/export; integrated logistics businesses
Related Authority	Designation	Mayor or provincial governor**	MOTIE**	MOTIE
	Management	Industrial complex management authorities	FEZ management authority	MOTIE
Tax Reduction	Qualifications	Manufacturing: US$10 mil or higher Tourism: US$10 mil or higher Logistics: US$5 mil or higher R&D: USD 1 mil or higher		
	Corporate income tax	100% for three years; 50% for the next two years		
	Local tax	Up to 15 years		
	Customs duty	Exempted for five years	Exempted on capital goods for five years	Customs duty withheld (imported goods; capital goods)
Location support	Rent	Approx. 1% of the site value; 75-100% reduction	Approx. 1% of the site value; 50-100% reduction	Approx. 1% of the site value; 75-100% reduction
Year the program started		1994	2002	1970
Locations		24	8	7

Notes: (*) Industrial complex-type; (**) Foreign Investment Committee's deliberation required
Source: KOTRA (2016, pp. 61, 74-75)

2.4. Human Capital: Workforce Development, Education and Labor

The quality of the labor force is considered one of the most important factors in Korea's economic and industrial success. This has been driven by the government's strong commitment to education over the years, through the Ministry of Education (MOE) and the Ministry of Employment and Labor (MOEL). In 2016, Korea had 27 million people in the workforce, with an unemployment rate of 3.7 percent (Statistics Korea, 2016). Korean workers have been known for their diligence and strong work ethic while also working long hours.

In recent decades, workforce composition has significantly changed, potentially influencing the human capital element of the future national economy, and the country's potential to take advantage of new technologies. The total population continues to grow, but the growth rate is stagnating given that fertility rates have hovered around 1.2 for the last five years. Korea, as one of the countries with the world's lowest fertility rates, is confronting an aging workforce with a dwindling number entering the labor market. As post-war baby boomers are retiring with a longer period in post-retirement than their previous generation (due to longer life expectancies), the changing population structure puts constraints on the national social welfare system, with an increasing number of elderly people depending on fewer younger workers. The country's aging index has skyrocketed, from 71 to 99% in 2011-2016. This places increased pressure on the country to seek opportunities to substitute capital for labor to maintain its competitiveness.

Table 2-6. Labor Force Indicators, 2011-2016

By the structure of population	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Total population ('000)	49,937	50,200	50,429	50,747	51,015	51,246
Percent distribution (%): 0-14 years old	15.6	15.1	14.7	14.2	13.8	13.4
Percent distribution (%): 15-64 years old	73.4	73.4	73.4	73.4	73.4	73.4
Percent distribution (%): ≥ 65 years old	11.0	11.5	11.9	12.4	12.8	13.2
Dependency ratio (Total)	36.3	36.2	36.2	36.2	36.2	36.2
Aging Index	71.0	76.1	81.5	87.0	93.1	98.6
Total Fertility Rate	1.244	1.297	1.187	1.205	1.239	n.a.

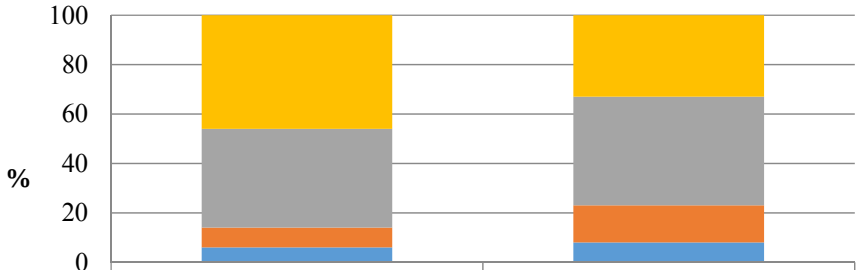
Note: n.a.: not available
Source: Population: Statistics Korea (2016); Statistics Korea (2011-2016): Total Fertility Rate.

Education

Korea is known for its well-established education system as well as a high level of education attainment. The country's school system is structured as follows: primary (six years); secondary (lower-secondary and upper-secondary for three years each); and tertiary (four years) education. Education to the ninth grade (lower-secondary) has been mandatory since 2002. Graduation rates from primary and lower-secondary schools are almost 100 percent.

When compared to the OECD average, Korea excels in educational attainment. As of 2015, 46 percent of Koreans 25-64 years old finished tertiary education and 40 percent completed upper-secondary or post-secondary schools. Combined, 86 percent of the Koreans left the formal education system with a high school diploma or above. The comparable OECD average was 77 percent in 2015, with a lower ratio of colleague graduates than in Korea (see Table 2-7).

Table 2-7. Educational Attainment of Aged 25-64, South Korea and OECD, 2015



	South Korea	OECD
Tertiary	46	33
Upper secondary or post-secondary non-tertiary	40	44
Lower secondary	8	15
Primary or less than primary	6	8

Source: OECD (2016a)

When students graduate from a lower-secondary school, they can choose from several different types of high schools. While many opt for general high schools, others go to vocational schools, which offer specialized education in various areas such as agricultural, technical, commercial, fishery and marine, and home economics, among others. Technical and commercial schools are the two most popular specializations, accounting for 86 percent of vocational high school graduates in 2016 (**Error! Reference source not found.**). While the government has launched several laws and initiatives to support vocational school education, many students are still unwilling to enroll due to deep-rooted prejudices (e.g., they are only for students from poor families), as well as a strong preference to get a college education. The number of graduates from vocational high schools has decreased for three years in a row, and remains lower than 20% that of university programs (see Table 2-8).

Table 2-8. Vocational High Schools Graduates, by Subdivision, 2014-2016

Specialization	**2014**		**2015**		**2016**	
	Graduates	**%**	**Graduates**	**%**	**Graduates**	**%**
Technical	48,162	45.6	45,631	45.2	45,302	45.1
Commercial	43,882	41.6	41,173	40.8	40,919	40.8
Home Economics	7,274	0.9	7,865	7.8	7,878	7.9
Agricultural	5,451	5.2	5,473	5.4	5,350	5.3
Fishery & Marine	843	0.8	799	0.8	849	0.8
Others	-		-		39	0.0
Total	**105,612**	**100**	**100,941**	**100**	**100,337**	**100**

Source: MOE (2014-2016)

Higher education plays a key role in educating people with proper knowledge and skills for the Korean economy and industry increasingly based on advanced technology and requiring higher human capital potential. While the percentage of high school graduates entering college declined from 83% to 71% from 2007-2015 (MOE, 2015a), more Koreans leave schools with a college diploma, compared to the OECD average, as shown above. Korea's top colleges are competitive with globally established higher education institutions. According to the latest rankings (QS,

2016), four Korean colleges were ranked within the world's top 100 universities: Seoul National University (35th), KAIST (46th), POSTECH (83th), and Korea University (98th).

As shown in Table 2-9, approximately 45% of college graduates majored in Science, Technology, Engineering and Math (STEM) fields in 2015, with the largest share coming from engineering (25%). The percentage has been slightly on the rise in recent years. Indeed, the government has encouraged more college graduates in STEM majors by allocating greater resources to those fields of education to meet the industry's high demand. Meanwhile, graduates with humanities and social sciences majors have a difficulty finding a job, indicating a mismatch between student qualifications and skill demand in the market.

Table 2-9. College Graduates by Major, 2012-2015

Majors	**2012**		**2013**		**2014**		**2015**	
	Graduates	**%**	**Graduates**	**%**	**Graduates**	**%**	**Graduates**	**%**
Humanities	52,241	9.2	50,925	9.2	50,051	9.0	53,128	9.2
Social Sciences	163,014	28.8	157,552	28.4	155,559	27.9	159,040	27.6
Education	32,526	5.7	32,590	5.9	32,199	5.8	32,823	5.7
Arts & Physical Education	71,681	12.7	70,612	12.7	71,574	12.8	73,407	12.7
Engineering	138,930	24.5	136,067	24.5	135,797	24.4	141,717	24.6
Natural Sciences	58,861	10.4	58,328	10.5	59,564	10.7	62,138	10.8
Medical & Pharmacy	49,071	8.7	49,068	8.8	52,490	9.4	53,770	9.3
*STEM Subtotal**	*246,862*	*43.6*	*243,463*	*43.8*	*247,851*	*44.5*	*257,625*	*44.7*
Total	**566,324**	**100**	**555,142**	**100**	**557,234**	**100**	**576,023**	**100**

Note (*): total of engineering, natural sciences, and medical & pharmacy graduates.

Source: MOE (2015b); since 2012, MOE provides data on college graduates by major including all types of schools (junior college, university, general graduate school, university of education, industrial university, miscellaneous school, polytechnic college). This covers more types of schools than data prior to 2012 (see below for comparison).

One of the key challenges in Korea's higher education is how to respond to a declining student population for college education. In the past, many high school graduates and a high rate of college entrance supported the growth of higher education. However, as the birth rate continues to fall, some universities and colleges increasingly find themselves with fewer applicants, which could undermine those schools' financial stability. In response, the government is seeking to overhaul the higher education system, which could mean some troubled institutions end up closing. If the current demographic trends continue, the country's higher education is expected to undergo a major structural change in the coming decade.

Minimum Wages and Compensation

In 2017, the legal minimum wage per hour is 6,470 won (US$5.77). It has increased steadily (7-8% each year) over the past four years.[12] An international comparison shows that the annual minimum wage is still slightly lower in Korea, compared to other advanced industrialized economies, as shown in Table 2-10, although wages are virtually on par with those of Japan. Also, in hourly compensation costs for the manufacturing workforce, Korea still belongs to the lower end compared to other developed economies, but the gap has narrowed in some cases.

[12] See Table 2-19 in the Appendix.

Table 2-10. Hourly Compensation Cost and Minimum Wages, International Comparison

Country	Hourly Compensation US$ (Manufacturing)			Min. Wage /Annual (US$)
	2002	2008	2015	2015
Korea	10.2	16.8	22.7	13,668
Japan*	21.5	27.5	23.6	14,347
United States	27.4	32.8	37.7	15,062
United Kingdom	22.0	33.9	31.4	16,994
Germany	27.1	46.8	42.4	24,782
Mexico	5.6	6.2	5.9	1,911
Australia	17.4	35.3	38.8	21,464
France	23.0	41.6	37.6	19,841

Note (*): current annual minimum wage is for 2014 instead of 2015.

Sources: OECD (2015b): Real Minimum Wages; OECD (2015a): Average annual wages; The Conference Board (2015) International Comparisons of Hourly Compensation Costs in Manufacturing.

2.5. Research and Development

Research and development (R&D) has been central to Korea's economic development policies and the positioning of its large firms amongst global leaders over the past few decades. Today, Korea is one of the world's most R&D intensive countries with amongst the highest R&D expenditure as a share of GDP (Deloitte, 2016; WDI, 2017). The country has ranked in the top five highest spenders on R&D for the past decade (WDI, 2017). Manufacturing accounts for 90% of this expenditure (OECD, 2016b). For much of the past two decades, R&D policy has been decentralized with each Ministry pursuing its specific agenda, although prioritization of R&D projects has been carried out by through centralized bodies, including the National Science and Technology Council. As policymakers have shifted their focus towards the creative economy, there have been further attempts to streamline this approach.

The private sector accounts for 75% of R&D spending in the country and of this, the lion's share is accounted for by a small group of very large corporations. A 2006 survey of 12,000 firms with in-house research suggests that large enterprises accounted for 78% of business R&D expenditure (the top five firms[13] representing 45%). Korean firms also rank high globally for R&D spending as a proportion of total revenue (3.4%). As such, the focus of R&D activity in the country is narrow, driven as it is by the commercial strategies of these companies and the product and service markets in which they operate. The government comparatively contributes 23%, with just 0.7% coming from universities and foreign investors alike (OECD, 2016b). Much of the publicly-funded research in the country typically focuses on projects with clear commercial implications, or is spent in public research institutions whose performance is questionable (OECD, 2016b).

Due to manufacturing's dominant share of R&D, these broader national trends are reflected in the sectors' R&D figures. R&D expenditure is concentrated in a small number of manufacturing firms and industries. Large firms accounted for two thirds of R&D spending, while smaller and medium-sized ones made up just one-third. About three-quarters of business-sector R&D is

[13] Samsung Electronics, LG Electronics, Hyundai Motors, Hynix Semiconductors and GM Daewoo Auto and Technology.

carried out in high and medium-high technology manufacturing industries; out of these three-quarters, 80% was concentrated in two sectors, ICT and automobile, one of the highest rates for OECD countries (Mittelstädt & Cerri, 2008).

R&D expenditure in the services sector, on the other hand, is comparatively very low. In 2001 and 2002 the proportion of service-sector enterprises engaged in innovation activity was 25%, well below the EU average of 40% (Mittelstädt & Cerri, 2008). By 2015, the services sector only accounted for 7% of national public and private R&D spending (OECD, 2016b).

Table 2-11. Korea's R&D Investment Trend

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Government R&D budget	7.8	8.9	9.8	11.1	12.3	13.7	14.9	16.0	16.9	17.8	18.9
Total R&D expenses	24.2	27.3	31.3	34.5	37.9	43.9	49.9	55.4	59.3	-	-
(Relative to GDP, %)	2.63	2.83	3.0	3.12	3.29	3.47	3.74	4.03	4.15	-	-

Source: KIET (2015), TBL5.2 p. 306, source: e-country index (www.index.go.kr); Unit: trillion won

ADB ranked Korea second (behind Japan) among Asian countries, and third overall on its 'Creative Productivity Index' – its measure of the efficacy with which countries transform creative inputs into outputs such as patents per capita, published scientific papers and export sophistication. But despite these accolades, Korea still spends more on importing intellectual property (IP) than it makes from exporting its own (Ellis, 2014). Korea had a deficit for IP use of -US$4.39 billion, whereas Japan had an IP royalty surplus of US$9.5 billion.

Box 2-2. Korea's Core Technologies Policy

In Korea, the "Act on Prevention of Divulgence and Protection of Industrial Technology" (KLRI, 2016a) plays a central role in ensuring core technologies, developed by government funding, remain strictly controlled. It was first issued as Act No. 8062, Oct. 27, 2006, and the current version is Act No. 14108, Mar. 29, 2016. Articles 9-11 on national core technology, pertains to the list of products developed using Government R&D where the government must give permission to export or offshore.

Table 2-12. Korea: National Core Technology Areas, 2007-2016

Area/Number	2007	2010	2011	2012	2013	2015	2016
Total	**40**	**49**	**50**	**58**	**55**	**47**	**61**
Electronics & Electrical (E&E)	4	5	5	8	11	11	11
Car/Railroad	8	8	8	8	8	7	8
Steel	6	6	6	6	6	6	6
Machines/Robots	--	--	--	--	--	--	9
Shipbuilding	7	7	7	7	7	7	7
Nuclear Power	4	4	4	4	4	3	5
Telecommunications	6	11	12	17	14	8	8
Space	5	5	5	5	2	2	4
Biotechnology	--	3	3	3	3	3	3

Source: KLRI (2016b)

The purpose of the Act is to protect industrial technology by preventing undue divulgence to strengthen the competitiveness of Korean industries and contribute to national security and development of the national economy. Defined in Article 9, a "national core technology" has high technological and economic value in the Korean and foreign market or enables high growth potential for its related industries, and could exert a significant adverse effect on national security and the development of the national economy if it is divulged abroad. In 2007 there were 40 technology areas and 61 in 2016. Electronics and electrical is the area with the highest number (11), whereas areas such as cars/railroads, steel and shipbuilding have maintained the number throughout the time frame. New areas include machines/robots and biotechnology.

2.6. Other Areas Supporting Economic Growth

Corporate taxation

Tax rates play an important role regarding foreign and domestic investments. In Korea, national taxes are collected by the National Tax Service (tax office) and the Korea Customs Service (customs office) to finance the central government. There are four types of direct taxes: income tax, corporate income tax, inheritance tax, and gift tax (KOTRA, 2016, pp. 102-103).
For businesses, the most relevant is corporate income tax, which is levied on the income of businesses. The tax rates, as listed in Table 2-13, vary by the amount of corporate income. Additionally, 10% of the corporate income tax is imposed as a local corporate income tax. While it is not simple to compare tax rates internationally, Korea's top rate of 24.2% for the highest bracket (including corporate local income tax) is slightly lower than the average of OECD countries (24.8%) but higher than the global average of 23.6% in 2016, according to the KPMG Corporate Tax Rate Table (KPMG, 2016).

Table 2-13. Basic Tax Rates for Corporate Income

Tax bracket	**Corporate income tax rate**
≤ KRW 200 million	10%
> KRW 200 mil ≤ 20 billion	KRW 20 million + 20% of amount exceeding KRW 200 million
> KRW 20 billion	KRW 3.98 billion + 22% of amount exceeding KRW 20 billion

Source: KOTRA (2016, p. 105); incomes greater than KRW 200 million pay a fixed and variable amount.

Access to finance

Access to affordable finance is important for entry and upgrading, as firms need to have working capital available to purchase intermediate inputs and for longer-term investments in machinery and equipment. The country's financial institutions, notably the Bank of Korea (BOK) and the Korean EXIM Bank, play an important part in providing access to capital for domestic and foreign businesses. Interest rates in Korea fluctuated during the economic crisis, but have gone down over the last decade. The BOK base rate, which is a basis for the interest rates banks charge on loans, dropped from 5% in 2007 to 1.25% in 2016 (Table 2-14).

Table 2-14. Bank of Korea Base Rate, 2007-2016

Year	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Rate (%)	5.00	3.00	2.00	2.50	3.25	2.75	2.50	2.00	1.50	1.25

Source: BOK (2007-2016a)

Reflecting this trend, bank interest rates on various forms of corporate loans have gone down, especially over the last five years. In 2015, the average interest rates for corporate loans were 3.7% per annum, nearly half of the 2008 rate (Table 2-15).

Table 2-15. Interest Rates on Bank Loans, Annual Percentage, 2007-2015

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
Corporate loans, overall	6.60	7.17	5.65	5.56	5.86	5.49	4.74	4.39	3.69
Large-size firms	6.09	6.79	5.61	5.25	5.50	5.18	4.46	4.10	3.40
SMEs	6.72	7.31	5.65	5.68	6.00	5.66	4.92	4.60	3.87

Source: BOK (2007-2016b)

Exchange rates

Korean firms' export performance is strongly affected by exchange rates in major currencies, notably the US dollar, Japanese yen, and European Union euro. A weak dollar or euro against the Korean won (KRW) undermines Korean exporters' price competitiveness in a respective import market and *vice versa*. Also, a weak Japanese yen against the US dollar or euro can affect Korean firms competing with Japanese firms in the U.S. or EU market because it relatively improves Japanese firms' price competitiveness in a respective market compared to that of Korean exporters. Table 2-16 shows KRW exchange rates to major currencies in 2011-2016.

Table 2-16. Korean Won Exchange Rates to US Dollar, Japanese Yen and Euro, 2011-2016

	2011	2012	2013	2014	2015	2016
USD (won/1$)	1,108.1	1,126.9	1,095.0	1,053.2	1,131.5	1,160.5
JPY (won/100 yen)	1,391.3	1,413.1	1,123.4	996.2	934.6	1,068.2
EURO (won/1 euro)	1,541.4	1,448.2	1,453.6	1,398.8	1,255.2	1,283.3

Source: BOK (2011-2016)

Infrastructure

Korea is considered to have overall well-developed infrastructure. According to the *Global Competitiveness Report* by the World Economic Forum (WEF, 2016), the country ranked 10th in the world out of 138 countries in terms of the quality of infrastructure. Korea is particularly strong in railroad and fixed telecommunication (WEF, 2016, p. 224). The Ministry of Land, Infrastructure and Transport (MOLIT) is in charge of matters pertaining to this area.

Table 2-17. Korea: Quality of Infrastructure, 2015

Items	Score (1-7)	Rank
Infrastructure (overall rating)	6.0	10
Quality of overall infrastructure	5.6	14
Quality of roads	5.6	14
Quality of railroad	5.5	9
Quality of ports	5.2	27
Quality of air transport	5.7	21
Quality of electricity supply	6.2	29
Available airline seat kilometers (millions/week)	2,631.0	18
Mobile-cellular telephone subscriptions (per 100 population)*	118.5	64
Fixed telephone lines (per 100 population)	58.1	4

Source: WEF (2016); Note (*):is greater than 100 in countries where people have multiple phones or subscriptions.

2.7. Comparison with China

Economic Planning in China

China has been shaping its significant strategies on economic development in five-year development plans since the first plan was released covering 1953-1957, and the country is now within its 13th five-year plan (2016-2020). Table A-2-4 in the Appendix for a short description of each plan.

- **National Level:** the National Development and Reform Commission (NDRC) writes the FYP. The FYP is approved at/by the National People's Congress.
- **Provincial Level:** The People's Congress of four special municipalities (Beijing, Shanghai, Chongqing, Tianjin) and provinces approve their own FYPs which are drafted based on the goals of the national FYP and the provincial stage of development (e.g., Beijing issued the 13th FYP on March 24, 2016).
- **City Level:** Cities issue their own FYPs based on provincial level goals and their own development conditions (e.g., Wuhan, capital of Hubei, issued its 13th FYP in Jan. 2017).

What it is: China's five-year plans outline national economic and social development goals with special emphasis on arranging key infrastructure projects, managing the distribution of productive forces, and analyzing the private sector contributions to the national economy (Galloway 2011).

Background: When the PRC was established in 1949, it took about two years to start economic rehabilitation and to bring the economy under central control. With embryonic government agencies to start the process of central planning, China looked to the Soviet Union for inspiration. China began its first five-year plan in 1953.

Process to create: Every FYP, which is based on the evaluation of outcomes of the previous FYP, takes two years to prepare and write up. The first step is to finish and approval guidelines of the five-year plan. Once every five years, the party's decision-making Central Committee holds a plenum to draw up guidelines for the draft of the five-year plan before planners from central government ministries and agencies and regional governments begin to work out detailed targets and policies. The second step is to write up and pass the final document. Under the direction of the party-approved guidelines, the State Council is responsible for the draft of the final document, which is tabled and debated at the annual session of the National People's Congress in the spring of the following year.

Content of the plans: The document, which generally is about 100 pages, lists the government's main policy goals, including **qualitative aims** such as promoting coordinated regional development and social harmony. It also contains dozens of **quantitative targets**, such as ones for economic growth, exports, direct foreign investment and job creation. A budget is made every year during the plans.

China and Korea Comparison

While Korea's five-year planning process started approximately a decade after China, the scope of the plans has been quite similar although the approach has been different. Both countries

placed an early emphasis on developing 'heavy industries'; however, in China this focused more on material inputs (iron and steel) and infrastructure/construction markets whereas Korea focused on commercial sectors (shipbuilding and automotive) earlier on. Both countries also used light industries to increase export opportunities, but Korea's foray in light industries was much shorter than China's. Both countries placed an emphasis on electronics (with Korea nearly a decade before China), although in the 2000s China made a significant push to grow the broader 'information industry' with a strong emphasis on the service side of IT-development. Over the last decade, China's and Korea's plans share many of the same focus areas and layout (for example, Korea identified 19 future growth engines in 2016, and China outlined nine manufacturing industries and seven new targets in 2011). China has also placed focus on creating and fulfilling domestic market demand, but this strategy has less application for a country the size of Korea.

Three areas of importance in China's plans that differ from Korea include continued introduction of new industries (including service industries) with specific targets for each, continued focus on *strategically* engaging with foreign entities (inward investment, outward investment, exports, and R&D), and business and consumer adoption of IT products and services. Whereas Korea has focused on creating a few global lead firms in select industries (electronics, automotive), China engaged in GVCs by effectively and efficiently coordinating supply chains across multiple industries for foreign lead firms, often via Hong Kong or Taiwanese investors. This supply chain integrator model was an early manufacturing-based version of the platform technology providers referenced in the first chapter. While notable platform providers in 'Industry 4.0' today are often B2C or C2C service providers, the concept of building a company around 'convening different groups' originated in manufacturing by intermediaries that brought together firms from different segments of the value chain (B2B) (for example, Li & Fung is the most recognized example). Given that many of China's companies across industries have been accustomed to working with a platform model for decades, this perhaps makes for an easier transition to developing and adopting new business models.

References

Amsden, Alice H. (1989). *Asia's Next Giant: South Korea and Late Industrialization*. New York: Oxford University Press.

BOK. (2001-2017). GDP and GNI by Economic Activities (seasonally adjusted, current prices, quarterly). In B. o. K. (BOK) (Ed.). Seoul, South Korea: Bank of Korea (BOK).

---. (2007-2016a). Bank of Korea Base Rate. In B. o. Korea (Ed.). Seoul, South Korea: Bank of Korea (BOK).

---. (2007-2016b). Interest rates on bank loans, annual percentage. In B. o. K. (BOK) (Ed.). Seoul, South Korea: Bank of Korea (BOK).

---. (2011-2016). Foreign Exchange Rate. In B. o. K. (BOK) (Ed.). Seoul, South Korea: Bank of Korea (BOK).

CTB. (2016). The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China (2016-2020). Beijing, China: Translated by: Compilation and Translation Bureau (CTB), Central Committee of the Communist Party of China. pp. 219. http://en.ndrc.gov.cn/newsrelease/201612/P020161207645765233498.pdf.

Deloitte. (2016). 2016 Global Manufacturing Competitiveness Index: Deloitte Touche Tohmatsu Limited. https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Manufacturing/gx-global-mfg-competitiveness-index-2016.pdf.

Devlin, Robert and Graciela Moguillansky. (2011). *Breeding Latin American Tigers: Operational Principals for Rehabilitating Industrial Policy* Santiago and Washington, D.C.: ECLAC and the World Bank

Ellis, Jack. (2014). Korea leads the world on R&D spend, but is still a net importer of technology, *IAM-Media* (Vol. April 10, 2017).

Evans, Peter B. (1995). *Embedded Autonomy: States and Industrial Transformation*. Princeton, NJ: Princeton University Press.

Forbes (2017). Korea's 50 Richest People: 2017 Ranking. Forbes, from www.forbes.com/korea-billionaires/list

Frederick, Stacey. (2017). Participation and Upgrading in the Apparel and Electronics Global Value Chains (GVCs): A Multi-Layered Approach: China Country Case.

Green Growth Committee. (2009). Green Growth National Strategy and Five-Year Plan (2009-2013): Summary, pp. 70. http://www.greengrowth.go.kr/download/0713-1summary.pdf.

Invest Korea. (2016a). Complex-type Foreign Investment Zone (FIZs). Seoul, South Korea: Invest Korea.

---. (2016b). Free Economic Zones (FEZs) in Korea. Seoul, South Korea: Invest Korea.

KIET. (2015). Research on Industrial Policy of Developed Countries after Global Financial Crisis, pp. 351. December.

Kim, Eun Mee. (2015). Korea's Evolving Business–Government Relationship. Helsinki, Finland: United Nations University World Institute for Development Economics Research (UNC-WIDER). pp. 17. www.wider.unu.edu/publication/koreas-evolving-business-government-relationship.

Act on Prevention of Divulgence and Protection of Industrial Technology, Act No. 14108, Mar. 29, 2016 C.F.R. (2016a).

National Core Technology List, (2016b).

KMTI. (2014-2015). 19 Future Growth Engines Boost Creative Economy: Korean Machine Tool Industry (KMTI). pp. 19-22. www.industrykorea.net/BCS_Com/Project/Design/150414-19%EB%8C%80%EB%AF%B8%EB%9E%98.pdf.
KOTRA. (2016). Doing Business In Korea. Seoul: Korea Trade-Investment Promotion Agency. http://openknowledge.kotra.or.kr/handle/2014.oak/8454.
KPMG. (2016). Corporate tax rates table. from https://home.kpmg.com/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html.
KSE. (2017). Top 50 Companies by Market Capitalization. from http://finance.naver.com/sise/sise_market_sum.nhn?sosok=0.
Mittelstädt, Axel and Fabienne Cerri. (2008). Fostering Entrepreneurship for Innovation: OECD. pp. 129. http://www.oecd-ilibrary.org/docserver/download/227624785873.pdf?expires=1498072627&id=id&accname=guest&checksum=55519551EB6402C8FB585CAFF9EC74EA.
MOE. (2014-2016). KESS--Vocational Education Specialized High Schools by Subdivision In K. E. S. S. K. Ministry of Education (MOE) (Ed.). Seoul, South Korea: Ministry of Education (MOE).
---. (2015a). KESS -- Education Statistics Analysis Seoul, South Korea: Ministry of Education.
---. (2015b). KESS -- University Undergraduates in Specific Disciplines, 2011-2015. Seoul, South Korea: Ministry of Education.
MSIP and MOTIE. (2016). Future Growth Engine Comprehensive Action Plan: Detailed Information Ministry of Science, ICT & Future Planning (MSIP) and Ministry of Trade, Industry & Energy (MOTIE). pp. 850.
MTIE. (2016). Free Trade Agreements in the World [전세계 FTA 체결현황]. from http://www.fta.go.kr/main/situation/fta/world/.
MWC. (2015). Minimum wage rate, 2010-2015. Sejong-si, South Korea: Minimum Wage Commission (MWC).
OECD. (2015a). Average Annual Wages In O. f. E. C.-o. a. D. (OECD) (Ed.). Paris, France: Organisation for Economic Co-operation and Development (OECD).
---. (2015b). Real Minimum Wages. In O. f. E. C.-o. a. D. (OECD) (Ed.). Paris, France: Organisation for Economic Co-operation and Development (OECD).
---. (2016a). Education at a Glance. In O. f. E. C.-o. a. D. (OECD) (Ed.). Paris, France: Organisation for Economic Co-operation and Development (OECD).
---. (2016b). *OECD Economic Surveys: Korea 2016* (Vol. 2016): OECD Publishing.
Peng, Li. (1996). Report on the Outline of the Ninth Five-Year Plan (1996-2000) for National Economic and Social Development and the Long-range Objectives to the Year 2010 (Excerpts), pp. 27. http://www.china.org.cn/95e/95-english1/2.htm.
QS. (2016). QS World University Rankings: Quacquarelli Symonds Limited.
Reuters (2017). South Korea's New President Vows to Take on the Country's Huge Family-Run Conglomerates. 4, from http://fortune.com/2017/05/22/south-korea-antitrust-samsung-hyundai-chaebol-regulations-oversight/
Rongji, Zhu. (2005). Report on the Outline of the Tenth Five-Year Plan for National Economic and Social Development (2001), pp. 12. http://www.gov.cn/english/official/2005-07/29/content_18334.htm.
Statistics Korea. (2011-2016). Total Fertility Rate. In K. N. S. P. Statistics Korea (Ed.). Daejeon, South Korea: Statistics Korea.

---. (2016). KOSIS -- Population by Census, 2011-2016. Daejeon, South Korea: Statistics Korea.
Tejada, Carlos. (2017). Money, Power, Family: Inside South Korea's Chaebol. *New York Times*. February 17 from https://www.nytimes.com/2017/02/17/business/south-korea-chaebol-samsung.html?_r=2.
The Conference Board. (2015). International Comparisons of Hourly Compensation Costs in Manufacturing. In T. C. Board (Ed.). New York: The Conference Board.
UNCTAD. (2010). Generalized System of Preferences: Handbook on the Scheme of the United States of America. New York and Geneva: UN Conference on Trade and Development. http://unctad.org/en/Docs/itcdtsbmisc58rev2_en.pdf.
---. (2013). Handbook on the Preferential Tariff Scheme of the Republic of Korea in Favour of Least Developed Countries. New York and Geneva: UN Conference on Trade and Development. http://unctad.org/en/PublicationsLibrary/itcdtsbmisc75_en.pdf.
---. (2015). Generalized System of Preferences List of Beneficiaries Geneva, Switzerland: United Nations Conference on Trade and Development. http://unctad.org/en/PublicationsLibrary/itcdtsbmisc62rev6_en.pdf.
---. (2017). World Investment Report: Investment and the Digital Economy. Geneva: United Nations Conference on Trade and Development (UNCTAD).
UNIDO. (1963-2014). Industrial Statistics Database: INDSTAT2-ISIC Rev3 (2016 edition). Vienna, Austria: United Nations Industrial Development Organization (UNIDO).
UNPAN (2005,). China: Summary of the Tenth Five-Year Plan (2001-2005) – Information Industry. United Nations Public Administration Network (UNPAN), 25, from http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan022769.pdf
UNSD. (2002-2015). Korea's World Exports (HS02, AG2). In U. N. S. D. (UNSD) (Ed.), *UNComtrade*. New York, NY.
Vaswani, Karishma. (2017). Is real reform possible at South Korea's chaebols? *BBC News*. April 24, p. 8. from http://www.bbc.com/news/business-39690629.
WDI. (2017). World Development Indicators Database. Washington, D.C.: World Bank.
WEF. (2016). The Global Competitiveness Report, 2016-17. Geneva, Switzerland: World Economic Forum. http://reports.weforum.org/global-competitiveness-report-2015-2016/.
World Bank. (2017). Weighted Mean Applied Tariff Rates, *World Development Indicators*: World Bank.
WTO. (2015). World Trade Statistics 2015. Gevena: World Trade Organization.
---. (2016). Trade Profiles - Korea, Republic of. *WTO Statistics Database* from http://stat.wto.org/CountryProfile/WSDBCountryPFView.aspx?Country=KR&Language=E.
Yang, Geum-Seung. (2016). A Performance Analysis of Special Economic Zones in Korea and Agenda for Investment Facilitation [한국 경제특구의 성과분석 및 투자활성화 과제]. Seoul: Korea Economic Research Institute.
Yeung, Henry Wai-chung. (2014). "Governing the market in a globalizing era: Developmental states, global production networks and inter-firm dynamics in East Asia." *Review of International Political Economy, 21*(1): 70-101.
Yonhap News. (2010). Korea turning from GSP beneficiary to donor [한국 '특혜관세 수혜국에서 공여국 변신']. *Yonhap News,* . April 1 from http://www.yonhapnews.co.kr/bulletin/2010/03/31/0200000000AKR20100331207700002.HTML.

Appendix

Table A-2-1. Key Institutional Actors, Korea

Name	Abbreviation	Focus	Est.	Description	Website
Ministry of Trade, Industry and Energy	MOTIE	Trade, industry, commerce and energy	2013/ 1948	Top priority is creating new value and future growth engines for Korean industries, while overcoming export difficulties by helping pioneer new and promising markets overseas. Focusing on establishing a good environment to do business and create jobs through regulatory reform as well as a stable and safe energy supply and demand system. Started as the 1948 as the Ministry of Trade and Industry (MTI).	http://english.motie.go.kr/
Ministry of Strategy and Finance	MOSF	Macroeconomic policy, budget	2008	Main tasks: macroeconomic policy formulation, policy coordination, taxation and budgeting, fiscal planning and management, public institution oversight, international finance, and multilateral/bilateral economic cooperation	http://english.mosf.go.kr/
Ministry of Foreign Affairs	MOFA	Foreign affairs	1948	Establishes and carries out foreign policies, economic diplomacy and economic cooperation, takes part in international economic communities, administers treaties and international agreements, protects and supports overseas Korean nationals, promotes cultural cooperation, and analyzes international affairs.	www.mofa.go.kr/ENG
Ministry of Education	MOE	Education	1948	Guides national education and establishes sound education policies with goal to produce talent that generates creative ideas and knowledge.	http://english.moe.go.kr/
Ministry of Employment and Labor	MOEL	Labor	1948	Responsible for establishing and coordinating employment and labor policies, employment insurance, vocational skills development training, equal employment, work-family balance, labor standards, workers' welfare, industrial relations adjustment, cooperation between labor and management, occupational safety and health, industrial accident compensation insurance, and other employment and labor-related affairs.	www.moel.go.kr/english
Ministry of Land, Infrastructure and Transport	MOLIT	Infrastructure	1948	Responsible for strengthening residential stability of low- and middle-income households, creating a strongly competitive and regionally balanced territory, providing efficient, safe and convenient transport services, and implementing regulatory reform to create jobs and improve national competitiveness.	http://english.molit.go.kr/
Ministry of Science, ICT and Future Planning	MSIP	Science, ICT, Planning	2013	Established as part of a government reorganization; spreads the vision for the creative economy based on a spirit of creativity and challenge. It supports its foundations by making continuous innovations in the fields of science, technology and ICT and aims to boost growth through convergence.	http://english.msip.go.kr/english/main/main.do
Korea Institute of S&T Evaluation and Planning	MSIP: KISTEP	S&T	1999/ 1987	Early foundations date back to 1987 when established as CSTP, an affiliated organization of KIST. In 1993, reorganized and renamed it STEPI, and since 1999 it has been known as KISTEP. It became a part of MSIP in March 2013.	www.kistep.re.kr/en/index.jsp
Small and Medium	SMBA	SMEs	1996	Primary goals: creating jobs through promoting start-ups and venture companies' growth, enhancing technological competitiveness to create new growth engine	www.smba.go.kr

Name	Abbreviation	Focus	Est.	Description	Website
Business Administration				for the future, supporting SMEs management through providing funds, human resources and market, encouraging invigoration of economic base to promote mutual growth, and generating policy environment friendly for SMEs.	
Bank of Korea	BOK	Central Bank	1950	The primary purpose is the pursuit of price stability. The Bank sets a price stability target in consultation with the Government and draws up and publishes an operational plan including it for monetary policy. Performs typical functions of a central bank: issuing banknotes and coins, formulating and implementing monetary and credit policy, serving as the bankers' bank and the government's bank. BOK undertakes the operation and oversight of the payment and settlement systems, and manages foreign exchange reserves.	www.bok.or.kr
Export-Import Bank of Korea	KEXIM Bank	Trade support	1976	Facilitates the development of Korea's economy and enhance economic cooperation with foreign countries through the provision of financial supports for export and import transactions, overseas investments projects, and the development of overseas natural resources	https://www.koreaexim.go.kr
Korea Employers Federation	KEF	Employers' organization	1970	Focused on building harmonized industrial relations and economic development. KEF's goals are restructuring the labor market structure to be future-oriented, contributing to job creation through balanced development in manufacturing industry and service industry, enhancing competitiveness of industrial relations to be a higher level, and becoming an economic organization to lead changes and innovations of companies.	www.kefplaza.com
Korea Federation of SMEs	Kbiz	Employers' organization	1962	Aims to improve the economic status and support equal opportunities for Korean SMEs. Addressing a rapidly changing global economy through making proposals on government policies, while providing support for SMEs to enhance competitiveness. As supporting SMEs' overseas marketing by participating in foreign exhibitions, dispatching overseas business delegations, and providing information concerning FTAs.	https://www.kbiz.or.kr
Federation of Korean Trade Unions	FKTU	Workers' organization	1960	Committed to implementing important global issues such as climate change, green jobs and sustainable development in close cooperation with the International Trade Union Confederation (ITUC), the Trade Union Advisory Committee to the OECD and the Global Union Federations (GUFs). Also promoting the role of labor diplomacy by strengthening solidarity and regular exchanges with workers' national centers across the globe.	http://fktu.or.kr
Korean Confederation of Trade Union	KCTU	Workers' organization	1995	In its efforts and struggles to realize its values and principles, the KCTU is committed to the political empowerment of working people and workers participation in the institutions of decision-making in all spheres of the political, social, and economic life. Committed to realizing the reunification of Korea on the basis of the principle of national sovereignty, independence, and peace.	http://kctu.org/

Sources: Ministries' and organizations' websites (see above)

Table A-2-2. Korea's Trade Agreements and Preferences

Regional Agreements	Bilateral FTAs	Generalized System of Preferences (GSP) Beneficiary Status	GSP status granted in Korea
EFTA (Sept. 2006 in effect; Jan. 2005 negotiation started); ASEAN (Sept. 2009 in effect; Feb. 2005 negotiation started); EU (Dec. 2015 in effect; May 2007 negotiation started)	Chile (2004); Singapore (2006); India (2010); Peru (2011); United States (2012); Turkey (2013, basic and goods trade agreements); Australia (2014); Canada (2015); China (2015); New Zealand (2015); Vietnam (2015)[14]; Columbia (2016)	Australia, Belarus, Kazakhstan, Norway (GSP only, not GSP+), Russian Federation.	48 least developed countries (see Note)

Note: EFTA (European Free Trade Association; 4 countries; Iceland, Liechtenstein, Norway, and Switzerland); ASEAN (Association of Southeast Asian Nations; 10 countries; Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam); EU (European Union; 28 countries; Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom);

The beneficiaries of Korea's GSP scheme include: ***Asia*** (14): Afghanistan, Bangladesh, Bhutan, Cambodia, Kiribati, Lao People's Democratic Republic, Myanmar, Nepal, Samoa, Solomon Islands, Timor-Leste, Tuvalu, Vanuatu and Yemen; ***Africa*** (33): Angola, Benin, Burkina Faso, Burundi, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, Sudan, Togo, Uganda, United Republic of Tanzania and Zambia; ***America*** (1): Haiti.

Sources: FTAs -- http://fta.go.kr/main/situation/kfta/ov/

GSP – UNCTAD (2015).

Table A-2-3. Korea: Hourly Minimum Wages, 2010-2017

	2010	2011	2012	2013	2014	2015	2016	2017
Hourly minimum wage (KRW)	4,110	4,320	4,580	4,860	5,210	5,580	6,030	6,470
Increase rates (%)	2.8	5.1	6.0	6.1	7.2	7.1	8.1	7.3

Source: MWC (2015)

[14] Reason to have a separate FTA with Vietnam beyond the ASEAN agreement: According to the government FTA website, the Korea-Vietnam FTA provides a higher level of investment liberalization and investor protection than the ASEAN FTA. Also, it contains clauses regarding cooperation in cultural service, with a higher level of IPR protection, reflecting the increasing bilateral trade of cultural content. It was motivated by the Japan-Vietnam FTA (2009), which put Korean firms in a disadvantageous position over the Japanese in the Vietnamese market.

Table A-2-4. China's Five-Year Plans (FYP): General Economic Development: 1953-2020

Name (Leader)	Description	Time	Focus/Impact
1st FYP (Mao)	To concentrate efforts on the construction of 694 large and medium-sized industrial projects, including 156 with the aid of the Soviet Union, to lay that the primary foundations for China's socialist industrialization; to develop agricultural producers' cooperatives to help in the socialist transformation of the agriculture and handicraft industries.	1953-1957	Heavy industries: iron, steel, coal mining, cement production, electricity generation, machine building; agriculture
2nd FYP: Great Leap Forward (Mao)	(1) Continue focus on heavy industry, (2) consolidate and enlarge the shares of collective ownership and ownership by the people; (3) further boost industry, agriculture, handicrafts, transportation and commerce; (4) cultivate talent, strengthen scientific R&D to fill needs of economic and cultural development.	1958-1962	Heavy industries, agriculture; national defense
3rd FYP	Strengthen national defense, and endeavor to make breakthroughs in technology; support agriculture; enhance infrastructure, continue to improve production quality, increase production variety and quantity; build an economy of self-reliance, and develop transportation, commerce, culture, education and scientific research.[15]	1966-1970	National defense; infrastructure; agriculture; **science and technology**
4th FYP	Goal: average annual growth rate of gross output value of industry and agriculture 12.5%; 130 billion yuan budgeted for infrastructure construction within five years (US$62.5 billion).	1971-1975	Infrastructure; commodities
5th FYP: (Xiaoping)	Actual timeframe for the 5th FYP was three years, 1978 to 1980.[16] Two key differences are the introduction of the one child policy and market reforms that initiated a gradual movement away from the Soviet-style command economy. **Outcome:** GDP growth rate 6.5%[17]. In April 1979, formally put forward new principles of readjustment, reform, rectification and improvement.[18]	1976-1980	One child policy Allowed FDI (1979) Set up SEZs (1980)
6th FYP[19]	Mandatory targets for production and investment were removed. **Goals:** 2). Keep supply and quality of consumer products in line with growth of purchasing power and changes in consumption structure; keep market prices stable. 3). Cut down material consumption, particularly energy, and keep production in line with the availability of resources. 4). Encourage and implement enterprise technological updating, with energy savings as a priority, and gather capital necessary to strengthen key projects 5). S&T research and promote application of new technologies; 8). Develop trade, make effective use of foreign capital and actively introduce advanced technology to meet domestic needs. 9). Control population growth, 10). Strengthen environmental protection efforts. **Outcomes:** Total investment in fixed assets for publicly-owned enterprises reached **530 billion yuan (US$254 billion).** Foreign trade and technological exchange entered a new phase. China rose from the No.28 global exporter in 1980 to No.10 in 1984.	1981-1985	Light Industries (incl. **T&A**); national defense; first FYP that took economic and social development simultaneously into consideration
7th FYP	4) Adapt to the changing structure of social demand and the demands of economic modernization, and to further adjust the industrial structure; 5) Regulate fixed asset investments, readjust the investment structure, and speed up the construction of the energy, communications, telecommunications and raw materials industries; 6) Shift focus to	1986-1990	Product quality; improve technology of existing firms

[15] www.china.org.cn/english/MATERIAL/157608.htm
[16] http://dangshi.people.com.cn/GB/151935/204121/205062/12925543.html
[17]http://baike.baidu.com/item/%E7%AC%AC%E4%BA%94%E4%B8%AA%E4%BA%94%E5%B9%B4%E8%AE%A1%E5%88%92
[18] www.china.org.cn/english/MATERIAL/157615.htm
[19] www.china.org.cn/english/MATERIAL/157619.htm

Name (Leader)	Description	Time	Focus/Impact
	technical updating, reforming and extending of existing enterprises (instead of new ones); 7) Further development of science and education; 8) Open further to outside world, combining domestic economic growth with **expanding external economic and technologic exchanges**.[20] **Outcome**[21]: GDP growth rate 7.9%. International trade $115.4 billion, surpassed expected $84 billion.		
8th FYP	Optimize industrial structure; strengthening agriculture, basic industry and infrastructure, improve processing industry; give priorities to science, technology and education. Transform economic development through quality of labor and technological progress. Increase exports, introduce advanced technology; **make use of FDI efficiently and rationally.** Develop costal regions' economy.[22] **Outcome: Total investment in fixed assets during this time was 3.89 trillion yuan (US$606 billion).** More than 1,100 cities at county level were opened to the outside world; 13 bonded zones and other zones set up.[23]	1991-1995	**Electronics** (especially ICs in large scale and computer), tourism, construction; significant transportation infrastructure investment; EPZs
9th FYP[24]	Called for the introduction of private property and corporation laws (Galloway 2011). The nine major principles are as follows (Peng, 1996) energetically promote a shift in the mode of economic growth by making higher economic returns the focus in our economic work; help forge close ties between science, technology, education and economy; give top priority to agriculture in national economic development; **focus on the reform of SOEs as being central to economic restructuring**; open up to the outside world; integrate the market with macro-control holistically and give proper guidance, **protection** and full play to the initiative of the various parties concerned; stick to coordinated economic development among different areas and gradually narrow the gaps between them; **Outcomes**[25]: Most key SOEs were converted into corporations. Reform of the foreign trade system progressed, and an export-oriented economy grew rapidly. China's total exports: **US$249.2 billion in 2000**, a rise of 67% over 1995.	1996-2000	Agriculture, machine-building, **electronics**, petrochemicals, automobiles, construction. Light industry and **textiles** for domestic demand, **expanding exports**. Improve product quality, increase variety thus enhancing product competitiveness (Peng, 1996).
10th FYP: Western and Central Region Development	In 2001, China joined the WTO. Main policies: (1) develop infrastructure (transport, hydropower plants, and telecommunications), such as the "West-East Gas Pipeline" and Qinghai-Tibet Railway (Beijing to Tibet); (2) adjustment of industrial structure; and (3) deepening the reform and increasing openness of the economy to entice **foreign investment to the western region.** **Focus**[26]: Achieve an average annual economic growth rate of 7%; increase the number of urban employees and surplus rural laborers transferred to the cities to 40 million each, thereby controlling registered urban unemployment rates at about 5%. **Optimize and upgrade the industrial structure**, and strengthen China's international competitiveness. Improve the national economy and social IT levels. Kick-start the operations of more infrastructure facilities. **Bring the development disparity between regions under effective control**, and raise levels of urbanization. Raise R&D funding to more than 1.5% of	2001-2005	**Information Industry;** covers two broad sectors, telecommunications and IT/electronics. Information industry will grow three times the rate of the national economy. **In 2005:** value added will be >7% of GDP; **electronics and IT products will be 30% of total exports;** Info

[20] www.china.org.cn/english/MATERIAL/157620.htm
[21] www.hprc.org.cn/gsyj/jjs/jjszht/201211/P020121129394287501115.pdf
[22] www.ndrc.gov.cn/fzgggz/fzgh/ghwb/gjjh/200709/P020070912638554392927.pdf
[23] www.chinadaily.com.cn/china/2013npc/2011-02/23/content_16261368.htm
[24] www.chinadaily.com.cn/china/2013npc/2011-02/23/content_16261367.htm
[25] http://en.people.cn/features/lianghui/2001030600A185.html
[26] www.china.org.cn/english/MATERIAL/157629.htm

Name (Leader)	Description	Time	Focus/Impact
	GDP, and strengthen sci-tech innovation capabilities, thereby speeding up technological progress (Rongji, 2005).		industry to become the leading industry, and China's largest (UNPAN, 2005,).
11th FYP:[27, 28] (Jiabao)	National economy is expected to grow at an annual average rate of 7.5%. Breakthroughs in reform and institutional building of areas such as administrative governance, SOEs, taxation, finance, S&T, education, culture and public health. Opening to the outside world and domestic development will be further balanced. **Promote development by relying on the expansion of domestic demand, take the expansion of domestic demand, especially consumption, as a major driving force.** Shift economic growth from relying on the input of capital and substance factors to relying on S&T advancement and human resources.	2006-2010	Focus on **strengthening industry,** rather than increasing scale. Strengthen **service industries. Self-innovation** and training of talent are also prominent[29]
12th FYP (Jintao)	Restructure economic strategies and emphasize technological advancement and innovation as the pivot of economic development. One of the top priorities is to accelerate the building of a resource-saving and eco-friendly society through stepping up environmental protection efforts. The share of the service sector in China's GDP should rise to 47% in 2015.[30] **One child policy repealed** GDP to grow 7% per annum in real terms. Major breakthroughs in seven strategic new industries (called for utilization of national resources to capture the frontiers in these industries). **Strategic New Industries:** (1) energy savings and environmental protection, (2) **New Generation of IT**[31], (3) biology, (4) high-end equipment manufacturing, (5) new energy, (6) new materials, and (7) energy-powered automobiles.	2011-2015	**Key Manufacturing Industries** (Gang and Liping 2013): (1) Equipment making; (2) Shipbuilding, (3) Automobiles; (4) Metalmaking and Building Materials; (5) Petrochemicals; (6) Textiles and Light Industry; (7) Packaging & Paper; (8) Electronic information; (9) Construction.
Made in China 2025 Plan & Internet Plus Plan	**Internet Plus Plan:** Capitalize on China's huge online consumer market and optimize manufacturing, finance, healthcare, and government; aimed at building up the country's domestic mobile Internet, cloud computing, big data, and IoT sector firms and creating global competitors by **assisting domestic firms' expansion abroad.** Accelerate transition to higher-value-added, intelligent manufacturing by focusing on emerging industries. Government fund: 40 billion yuan for emerging industries (US$6.4 billion)[32]	2015	Innovation and upgrading in emerging industries, such as high-end equipment, **ICs,** biomedicine, cloud computing, mobile Internet, and e-commerce.
13th FYP (Jinping)	Continues shift from 11th FYP **away from infrastructure and export-led growth and toward more consumption-led, higher-value-added growth. Innovation-driven developmen**t. Seeks to use innovation to accelerate efforts to move manufacturing up the value-added chain, reestablish China as a global center of innovation and technology, and ensure long-term productivity. By 2020, increase global innovation rank from 18 to 15, raise R&D spending as a percent of GDP from 2.1 to 2.5,	2016-2020	**Higher-Value-Added Manufacturing**. Reiterates support for "Made in China 2025" and "Internet Plus" initiatives as

[27] www.gov.cn/english/special/115y_index.htm
[28] http://en.ndrc.gov.cn/newsrelease/200603/t20060323_63813.html
[29] www.chinadaily.com.cn/bizchina/2006-03/07/content_585089.htm
[30] http://english.gov.cn/12thFiveYearPlan
[31] Chinese firms should catch up with the world frontiers in technology and applications and build up their own capacity and networks for all major new generation IT breakthroughs.
[32] Li Keqiang, Report on the Work of the Government (Third Session of the 12th National People's Congress, Beijing, China, March 5, 2015. http://online.wsj.com/public/resources/documents/NPC2015_WorkReport_ENG.pdf

Name (Leader)	Description	Time	Focus/Impact
	the number of patents filed per 10,000 people from 6.3 to 12. Expand **Internet usage**; increase fixed broadband household penetration ratio from 40% in 2015 to 70% in 2020 and mobile broadband subscriber penetration ratio from 57% to 85% by 2020.[33] Aligns with the broader push to leverage interconnectivity and data from the Internet to optimize manufacturing, finance, healthcare, and government (CTB, 2016). Improve rural Internet access to increase China's consumer base.		key policies to move up the value-added chain.

Sources: authors; based on Frederick (2017); other sources within table.

Figure A-2-1. Complex-type Foreign Investment Zones (FIZs)

1 Jisa Foreign Investment Zone
2 Dalseong Foreign Investment Zone
3 Dangdong Foreign Investment Zone
4 Oseong Foreign Investment Zone
5 Jangan High-tech Foreign Investment Zone 1
6 Jangan High-tech Foreign Investment Zone 2
7 Ochang Foreign Investment Zone
8 Inju Foreign Investment Zone
9 Cheonan Foreign Investment Zone
10 Iksan Foreign Investment Zone
11 Daebul Foreign Investment Zone
12 Gumi Foreign Investment Zone
13 Pohang Foreign Investment Zone
14 Changwon Foreign Investment Zone
15 Busan Mieum General Industrial Complex
16 Cheonan Foreign Investment Zone 5
17 Sacheon Foreign Investment Zone
18 Gumi (Parts) Foreign Investment Zone
19 Woljeon Foreign Investment Zone
20 Munmak Foreign Investment Zone
21 Jincheon-Sansu Foreign Investment Zone
22 Songsan Foreign Investment Zone 2
23 Nat'l food industry complex
24 Chungju Foreign Investment Zone

Source: Invest Korea (2016a); www.investkorea.org/en

[33] Xinhua, "China to Invest 1.2 Trillion Yuan in Information Infrastructure," China Daily, January 13, 2017.

Figure A-2-2. Free Economic Zones (FEZs) in Korea

FEZs	Sector focus
Chungbuk FEZ (CBFEZ)	Information technology, bio-medical, complex aerospace
East Coast FEZ (EFEZ)	High-tech green material, tourism and leisure, logistics and business service
Yellow Sea FEZ (YESFEZ)	Advanced technology, added-value logistics
Saemangeum-Gunsan FEZ (SGFEZ)	Knowledge creative and eco-friendly, future-oriented new industry, tourism and leisure
Daegu-Gyeongbuk FEZ (DGFEZ)	Knowledge-based industry
Gwangyang Bay Area FEZ (GFEZ)	Future new industry, cultural tourism, steel, petrochemical, parts and materials, logistics, tourism
Busan-Jinhae FEZ (BJFEZ)	Port logistics, advanced technology, international business and resort.
Incheon FEZ (IFEZ)	Business information technology-bio-technology, logistics, tourism, business service & finance, tourism & leisure, advanced industries

Source: Invest Korea (2016b); www.investkorea.org/en

Figure A-2-3. Free Trade Zones (FTZs) in Korea

FTZs	Sector Focus
Masan FTZ	Electric and electronic, precision equipment, metal, textile & clothing
Yulchon FTZ	New material and information technology, fine chemical and steel
Daebul FTZ	Shipbuilding and new and renewable energy
Gimje FTZ	High-tech industry
Gunsan FTZ	Automobiles, metal and machinery
Donghae FTZ	Displays, machinery and chemical
Ulsan FTZ	Shipbuilding, offshore plants, automobiles and machinery

Source: Invest Korea website (http://www.investkorea.org/en)