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Innovation and SME internationalization in Korea and Latin America and the Caribbean

Policy experiences and areas for cooperation

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Editors

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Economic Commission for Latin America and the Caribbean (ECLAC)

This document has been edited by Sebastian Herreros, Keiji Inoue and Nanno Mulder, Economic Affairs Officers of the Division of International Trade and Integration of the Economic Commission for Latin America and the Caribbean (ECLAC). It contains five chapters prepared by the following consultants: Andrew Berry, Won Ho Kim, Jai S. Mah, Joong Hae Suh and Roberto Urmeneta. A draft version of this document was presented at an academic seminar held on 11 April 2016 at ECLAC headquarters in Santiago, where potential areas of cooperation were discussed between the Community of Latin American and Caribbean States (CELAC) and the Republic of Korea. Moreover, a synthesis of these studies was published by ECLAC under the title “Exploring cooperation between the Republic of Korea and the Community of Latin American and Caribbean States (CELAC)” (ECLAC, 2016, LC/W.715). The authors and editors are grateful to the provided financial support for the Republic of Korea under its Cooperation Agreement with ECLAC, and to Andrew Berry and Yuri Park for their support in the preparation of this document.

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Abstract

Economic relations between the Republic of Korea and Latin American and the Caribbean have expanded rapidly since 2000. Bilateral trade in goods increased more than fivefold, while the region has also become an important destination for Korean foreign direct investment. The region's interest in Korea also stems from this country's successful economic and social development experience, as it developed from being one of the poorest countries in the world to a high-income economy within less than six decades. This successful story has been based on the development of an export- and innovation-driven manufacturing sector supported by rising educational standards and high levels of social cohesion. This transition helped to continuously upgrade and diversify its export basket. Another aspect of Korea's development path has been the increasing contribution of small and medium-sized enterprises to the country´s exports, complementing the traditional role of large firms (chaebols). In contrast, most countries in the region have had difficulties consolidating their development models over the past couple of decades. Therefore, there has been little change in the production and export structures of most economies in the region, while the contribution to exports of small and medium-sized enterprises has remained small.

To better understand the divergent trends in Korea and the region, this document reviews the most important innovation and SME internationalization policies in both in three sections. The first section looks at the role of Latin America within Korea's trade and integration strategy. The second reviews policies from both partners related to science, technology, innovation and labor skills. The final section focuses on SME internationalization policies. These reviews are complemented by a synthesis of recent bilateral cooperation initiatives and suggestions to increase these ties further. A key finding of this document is that Korea has advanced much faster in developing its innovation and SME internationalization policies than countries in Latin America, notwithstanding some progress over the last decade. This difference is reflected in better outcomes in terms of the structural transformation towards higher productivity and technology intensive sectors and higher shares of SMEs in exports in Korea.

Introduction

Economic relations between the Republic of Korea (hereafter Korea) and Latin American and the Caribbean (LAC) have expanded fast since 2000. Bilateral trade in goods between Korea and LAC increased fivefold from 2000 to 2011, after which it stagnated. In 2016, Korea's participation in LAC's trade reached 2.3%, with a higher share of imports (3.1%) than exports (1.5%). In comparison, LAC's share in Korea's trade was higher with 4.9% of exports and 3.6% of imports. Korea's imports from LAC are based on a small number of products originating from a few countries that are produced by a handful of large firms. In contrast, Korea's exports to LAC show a highly diversified range of industrial goods. In this context, one of the main challenges for the LAC region is to diversify its export basket. Latin America has also grown in importance as a destination for Korean foreign direct investment (FDI), with a 13% share in Korea's total FDI outflows between 2010 and 2016. Korea's FDI into the region is concentrated in manufacturing sectors such as the automobile industry, electronics, wood and its derivatives, textiles and clothing. Korea's investment in the region has the potential to strengthen and diversify economic relations with LAC partners and allow the diffusion of knowledge and technologies to local suppliers.

The interest of LAC for Korea also stems from this country's successful economic and social development experience. Within six decades, Korea developed from being one of the poorest countries in the world to a high-income economy. They achieved this by developing their export- and innovation-driven manufacturing sector supported by rising educational standards and high levels of social cohesion. This transition has allowed the country to continuously upgrade and diversify its export basket. Initially the country switched from exporting labor intensive manufacturing goods (mainly textiles) to capital intensive industries including steel, chemistry, automotive, shipbuilding and electronics. More recently, the country has sought to build on its high levels of education, science and innovation to pursue a model based on specialized knowledge-intensive goods and services. Throughout all of Korea´s development phases, exports have played an important role, not only as a means of earning foreign exchange, but also as a mechanism for learning and creating new productive capacities. Another characteristic of Korea's development path has been the increasing contribution of small and medium-sized enterprises (SMEs) in the country´s exports, complementing the traditional role of large firms (chaebols).

The general success of Korea's development model, and the specific roles that innovation and SME exporters have played, provide many interesting lessons for LAC. First, it is an example of how a developing country can achieve income levels equal to that of advanced countries within a relatively short time period. Second, this country's fast development has shown the importance of the central

role of the government in developing and implementing medium to long-term strategies that have continuously transformed the economy. Third, Korea has demonstrated a pragmatic approach to the design and implementation of public policies, which often have deviated from dominant paradigms in industrialized economies.

For their part, most countries in Latin America and the Caribbean have had difficulties consolidating their development models over the past couple of decades. Consequently, there has been little change in the production and export structures of most countries in the region, notwithstanding the commodity super cycle between 2003 and 2013. This is partly because the region has invested little in science, technology, innovation and education, which would have contributed to raising productivity levels and fostering structural change towards activities with higher value added and knowledge content. Another challenge is the large disparities between SMEs and large firms in terms of exports, productivity and value added. Regional exports are dominated by a few highly-productive large firms that generate high levels of value added but little employment. Conversely, SMEs in the region employ a higher share of the workforce but participate less in regional exports and have lower levels of productivity and added value. Therefore, increasing and diversifying LACs production and export base remains a necessity to sustain the recent progress in reducing poverty and inequality.

In this context, LAC would benefit from increased cooperation with Korea in areas such as innovation and SME internationalization. These are important topics in the United Nations 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs). Science, technology and innovation (STI) is at the heart of structural transformation and encourages the emergence of new sectors, production networks and businesses, especially those related to sustainable development. Currently, the region spends little on R&D in relation to its gross domestic product (GDP) of which the majority is funded by the public sector. In contrast, Korea has the second highest R&D expenditure (as a percentage of its GDP) in the world after Israel. Furthermore, it is the private sector that represents the largest source of R&D funding in the country.

SME internationalization strategies represent another area of mutual interest as they are a vehicle to improve productivity. SMEs account for the largest share of employment in both LAC and Korea. However, SMEs in LAC register much lower productivity levels than large firms compared to those in Korea. The productivity of SMEs can be improved through direct or indirect exports. The participation in export related activities contributes to their formalization, access to credit, transfer of technology, innovation efforts and development of labor skills. In 2015, SMEs represented approximately 20% of the total value of Korea's exports, compared to only around 6% of the total value of LAC exports. The success of Korea is a result of a wide range of public and private initiatives to support SMEs, including preferential financing, export incubators programs, and an extensive network of trade promotion abroad with more than 120 offices.

Based on reviews of the most important innovation and SME internationalization policies from both Korea and LAC, this document aims to provide potential areas for future bilateral cooperation. Since 2004, the Korean government has been sharing their innovation and SME internationalization policy experiences with individual LAC countries. They have implemented Knowledge Sharing Programs (KSPs) and Development Experience Exchange Partnerships (DEEP) to disseminate their knowledge. KSPs are led by the Korea Development Institute (KDI) and DEEP by the Korea International Cooperation Agency (KOICA). In addition to bilateral cooperation, Korea aims to intensify its collaboration with CELAC on key elements for sustainable development, with a focus on the internationalization of SMEs.

A key finding of this document is that Korea has advanced much faster in developing their innovation and SME internationalization policies than LAC countries, although the region has made some progress over the last decade. This difference is reflected in better outcomes in terms of the structural transformation towards higher productivity and technology intensive sectors and higher shares of SMEs in exports. Policy makers, private sector representatives and academics will appreciate the reviews of policies from both the region and Korea as well as recommendations on how both can step up their cooperation to improve and deepen these policies. The document has three parts. The

first part looks at the the role of Latin America within Korea's trade and integration strategy. The second reviews policies from both partners related to STI and labor skills. The final part focuses on SME internationalization policies. Both the second and third parts review some bilateral cooperation initiatives and provide suggestions for bilateral cooperation.

Chapter one by Won Ho Kim deals with Korea's trade policies in general and its strategy towards Latin America. The expansion of free trade arrangements (FTAs) in the 1990s forced Korea to change its previous focus on multilateral negotiations. Since the financial crisis of 1997-1998, it caught up quickly to become one of the world's most active negotiators of FTAs. Korea chose Chile as its first country to negotiate an FTA, as its complementary trade patterns would produce few negative effects within its economy, and because of Chile's rich experience in negotiating bilateral agreements. This FTA entered into force in 2004. Korea learned much from this first FTA negotiation, especially regarding the importance of domestic consultations.

From 2011 onwards, Korea signed FTAs with several other countries in LAC. The Korea-Peru FTA, which entered into force in 2011, became the "gold standard" among Asia-Latin America FTAs in terms of coverage, liberal rules of origin, and comprehensive intellectual property rights. Colombia was the third country in LAC to negotiate an FTA with Korea, inspired by the experiences of Chile and Peru. However, this bilateral agreement was met with great resistance within Colombia, mostly from the automotive producers and farmers. It entered into force only in July 2016. In 2015, Korea opened negotiations with six Central American countries: Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama. This was the first FTA between a group of countries and an Asian economy. The final agreement was signed in early 2018 and included all Central American countries except Guatemala. Moreover, Korea is currently negotiating an FTA with Ecuador.

While Korea has been expanding its market share in Latin America over recent years, it has not yet signed FTAs with its largest trading partners in the region: Brazil and Mexico. When Korea proposed a joint study in 2003, Mexico announced an FTA moratorium on any new FTA negotiation. In Mexico, the steel, automotive, textile and electronics sectors all opposed such an agreement. Similarly, an analysis of a possible Korea-MERCOSUR FTA in 2007 showed a potentially negative impact on Korea's agricultural sector and MERCOSUR's automobile and auto parts industry. This outcome contributed to the interruption of the bilateral negotiations.

Chapter two by Andrew Berry examines innovation and skills policies in Latin America and the Caribbean. Moreover, it suggests ways in which cooperation with the Republic of Korea may assist the region in this area. Innovation is at the heart of the United Nations Sustainable Development Goals (SDGs) and most governments' development strategies. It is one of the main mechanisms for increasing productivity, diversifying economies, raising living standards and reducing poverty. Within an increasingly digitalised world, it is essential that countries remain abreast of new technologies and provide a strong foundation for innovation and skills development. However, Latin America and the Caribbean as a region is trailing behind developed countries and is at risk of falling further behind.

The chapter investigates policies of Latin American countries to promote innovation and skills development. It looks at the 'national innovation system' (NIS) framework, which allows a holistic approach to examining how countries organize, develop, implement and assess innovation policies. The chapter also assesses the level of regional and international cooperation in those areas. It shows that the region's national innovation systems are heterogeneous, with some countries closing the gap with leading economies while others lag behind. Factors that hinder progress in this area include low levels of investment in R&D,[1] lack of coordination between the private sector and public institutions, and low numbers of researchers and graduates in technology and science. Moreover, most R&D in the region is funded by the public sector, whereas in countries like Korea the business sector is the largest contributor. This is partly due to the lack of strong financial incentives for the private sector in the region to invest in

[1] Brazil is the only country in the region that spends more than 1% of GDP in R&D.

R&D. Moreover, only a small share of public R&D focuses on applied research carried out in collaboration with the private sector and oriented towards business applications.

Innovation in the LAC region is impeded by the lack of quality education that continues to lag behind advanced countries and in turn impacts the number of skilled workers. Moreover, progress in tertiary science and technology education is slow: in 2012, the total number of engineering and technology PhD students in the region amounted to only 2,477 out of a total of 21,923 PhD graduates (11%). Thus, progress towards knowledge-based economies is hampered by a persisting mismatch between human capital development and the demands of businesses.

Although several countries in the region are currently seeking to improve their NIS structures, many institutions involved in innovation policies are insufficiently coordinated, resulting in an overlap of responsibilities and an inefficient use of funds. A key issue is the lack of government feedback mechanisms that monitor the implementation of policies and their success rate. In addition, there is insufficient research on future demands of the private sector to ensure that education systems adapt to meet their requirements. Therefore, countries need to further strengthen their NIS so that these facilitate the development, implementation and monitoring of STI policies. In particular, greater efforts are needed to increase efficiency and ensure that policies are designed and implemented with the unification of all actors within an NIS.

At the Academic Seminar 'Exploring strategies for economic cooperation between the Republic of Korea and Latin America and the Caribbean', held in Santiago, Chile in April 2016, Korea and the Community of Latin American and Caribbean States (CELAC in Spanish) stated their objectives for closer cooperation. Korea defined three goals: increase bilateral trade in high value-added sectors, create a common market with free movement of goods, people and capital, and share the Korean development experience with the region. This plan includes three pillars: economic cooperation in high value-added industries, building physical and institutional infrastructure, and a cooperative partnership for development. CELAC (through its pro tempore presidency, then held by the Dominican Republic) stated that cooperation should prioritise areas that contribute to the achievement of the SDGs. From its perspective, economic cooperation with Korea should aim to raise the value-added of products and services exported by the region and to advance its integration into global value chains. Specifically, drawing on its own experience, Korea could assist in the sustainable development of SMEs in the region.

Berry proposes several initiatives in which Korean cooperation could assist the region to improve its performance in innovation and skills development, including:

- Supporting the creation of innovation clusters, techno parks and "innopolis."
- Helping countries in the region to create new financing mechanisms for the incorporation of new machinery and technology of SMEs.
- Helping to co-finance and provide technical assistance to entrepreneurs in agriculture, mining, electronics, the automobile industry, tourism and machinery production.
- Developing knowledge management systems.
- Helping to reduce STI gaps with advanced countries by developing partnerships in key export sectors such as bio-drugs, radioisotopes, satellites, vaccines, bio-kerosene, nano-materials and advanced manufacturing.
- Offering internships at Korean institutes for LAC engineering and high-tech graduates.

The author also puts forward specific recommendations for Korea to cooperate with the region's specialized bodies in innovation and skills development. Thus, cooperation with the Ibero-American and Inter-American Network on Science and Technology Indicators (RICYT) could expand their capacity to conduct research on NIS design, share NIS best practices, conduct STI analysis and

diagnosis as well as produce STI indicators. Meanwhile, cooperation with ECLAC could foster dialogue on NIS development with the region's different economic integration mechanisms.

Korean cooperation with the South American Council of Science, Technology and Innovation (COSUCTI) and the Commission for the Scientific and Technological Development in Central America and Panama (CTCAP) could encourage local innovation centers in South and Central America, respectively, to promote high tech projects on nanotechnology, megatronics and electronics. The centres could also include training on patents and other intellectual property rights. Cooperation with the Latin American and Caribbean Collaborative ICT Research Federation (LACCIR) could strengthen its collaboration with Korean universities, including through scholarships and internships, as well as encourage regional universities to conduct free basic STI courses to entice a greater number of high tech students. Finally, cooperation with the Regional Fund for Agriculture Research (FONTAGRO) could strengthen the latter's impact and promote the development of similar consortiums in key industries such as mining, electronics and tourism.

Chapter 3 by Joonghae Suh considers the role of science and technology in Korea's economic development. The Korean government has long recognized that strong STI policies are imperative for successful industrialization. Hence, over the last five decades, the country has successfully advanced their domestic STI policies. The Korean experience offers general lessons for policy makers responsible for trade, technology and education development in developing countries. First, the Korean government supported the internationalization of private enterprises by adopting an outward-looking development strategy. Domestic businesses were then put under mounting pressure to innovate and, thus, responded by investing heavily in R&D. In the early 1980s, the government launched R&D programs and provided additional incentives to boost domestic innovation. These incentives helped enterprises create their own innovative capabilities, which resulted in a significant output of patents a decade later. By developing technological competence, domestic businesses have been able to survive amongst international competition and achieve prominence in high-tech industries around the world.

In addition, Korea's approaches to education and technology illustrate both the pragmatism and the discipline required by developing countries to build a knowledge economy. Education is a key element that gives rise to an individual's basic knowledge, which is an essential building block for technological learning. Therefore, governments should assume full responsibility for taking the necessary measures to promote human resource development. For example, investing in education in the way Korea did in the 1960s and 1970s is crucial for laying a solid foundation for industrial development.

To help workers cope with advances in technology, governments should provide vocational and technical training or promote such training in the workplace. As an economy becomes more advanced, technological competence becomes a critical factor. To build up technical competence, governments should introduce policies that nurture high-caliber scientists and engineers that can work at the forefront of science and technology. In the case of Korea, education and industrialization supported each other in sustaining and accelerating development. Education enabled industrialization and in turn industrialization increased the demand for education and rewarded those who were better educated.

The Korean experience provides a useful guide to the countries of LAC regarding training and industrial cooperation, science and technology partnerships and policy learning. The latter should include both successes and failures in policy planning and implementation in conjunction with the practice of policy evaluation. Korea originally adopted a top-down approach to policy planning but they later embraced a bottom-up consensus building approach, which improved the implementation of science, technology and human resource development. Alongside success stories, there were also failures in policy planning and implementation. One example is the regional industry and cluster policy that led to the current regional development gap.

During the early catch up phase of industrialization, Korea implemented national policies that focused on nurturing investment in the capital region which was composed of Seoul, Incheon, and Gyeonggi province as well as key export locations. While these policies were successful at promoting

economic growth, they inadvertently created economic disparities between the capital region and the other regions. According to regional indicators this gap is widening, especially in terms of population growth and knowledge-intensive activities. Currently, Korea is more inclined to enhance policy effectiveness by using comprehensive policy evaluation methods. This example highlights the opportunities for LAC countries to learn from Korea's policy evolutions, which can help them avoid costly trial and error processes.

Science and technology cooperation could be identified to produce mutual benefits for all participants. To do so, governments may plan cooperative projects that combine complementary resources. Furthermore, it is important to reduce the gap between university education and the needs of industry, and/or the gap between high-caliber scientists and engineers (usually coming from higher education institutions) and technicians with practical knowledge. It is worth examining the distinctive role of Korea Polytechnic (KP), especially its value to SMEs that supply large enterprises. In addition to KP, the Human Resources Development Services of Korea (HRD Korea) have introduced many types of worker training programs that have kept pace with the changing needs of industries.

Lastly, there is ample room for business cooperation, mediated by the governments of Korea and countries in the region. As Korea makes the transition from a production-based economy to an innovative-based economy, leading industries are facing strong pressure to further climb up the technology ladder and build on their competitive advantage. Large enterprises are increasing their emphasis on global networks. In this context, training foreign workers in Korea and overseas is becoming an effective way of industrial cooperation between Korea and the LAC region.

Chapter four by Roberto Urmeneta discusses policies, institutions and instruments that support SME exports in LAC. Exporting SMEs are increasingly important in the region as they help to diversify countries' export baskets and generate high quality jobs. Exporting offers SMEs an opportunity to improve their productivity and generate added value. Competing on an international stage requires investments in marketing, improving product quality, conforming with quality standards, innovating, and learning to do business with foreign buyers. An externality of improving SMEs productivity is their contribution to reducing poverty and income inequality in the region, as they account for most firms and employ a significant share of the regions workforce.

However, in practice few SMEs in the region sell abroad due to barriers that impede their ability to innovate, invest in technology, and hire or train human resources. These include a lack of information on the preferences of foreign clients, types of certifications required in foreign markets, and the types of foreign buyers. Furthermore, SMEs struggle to access loans due to insufficient guarantees and the banks' difficulty in assessing the associated risks. These factors contribute to their low productivity level, limited degree of internationalization, and a high turnover rate. Every year about one third of all exporting SMEs either enter or exit the export sector. This is due in part to the fact that almost half of all exporting SMEs only export one product to one destination, which makes them especially vulnerable to changes in demand.

In this context, many countries in the region have implemented policies, institutions and instruments to support exporting SMEs. There are both public and private initiatives that help SMEs to export directly or indirectly. Direct policies include loans and non-reimbursable assistance to facilitate SME exports. Indirect policies aim to improve business linkages and generate a positive business environment for SMEs, such as simplifying registration procedures, creating special tax regimes or establishing special labor regulations. These policies are carried out by both public and private entities. Public institutions are mainly trade promotion organizations (TPOs) linked to ministries of agriculture, economy, production or trade. Private organizations include chambers of commerce, exporter associations, and non-governmental organizations (NGOs).

Public institutions promoting SME exports face important challenges in terms of organization, implementation, monitoring, evaluation and financing. For example, the budget of TPOs in LAC was only 0.1% of the region's total export value in 2015, which was significantly lower than that of, for example, France (0.2%) and Korea (0.5%). Small budgets explain in part why most TPOs in the region

only have a small network of sales offices abroad. These offices are important to inform home country's SMEs on consumer tastes, regulations, certifications and distribution networks in overseas markets.

In LAC, SMEs face challenges in gaining access to finance from private banks that provide relatively few loans to SMEs. Here public institutions play an important role in providing essential medium and long-term loans as well as offering other financial instruments to SMEs. Public financial institutions range from SME support agencies and guarantee societies to public banks and development banks. In 2015, there were 23 financial institutions in 14 countries offering 112 instruments. Exporting SMEs require specific instruments that go beyond traditional credit. Currently many of these specific instruments are not available. However, evidence suggests specialized financial support for exporting SMEs yields many benefits, including an increase in employment.

To improve the skill level of employees from exporting SMEs, several public institutions offer training grants and funds that support training initiatives. Many of these are carried out by TPOs in association with other funding institutions. The most successful training support programs are based on a full diagnosis of exporting SMEs, identifying their stage of development and associated challenges. A common challenge of these programs is the lack of adequate trainers who know the challenges that SMEs face and have both the experience and the appropriate methodology to adequately address them.

Public institutions also promote innovation and the adoption of new technologies. Some SMEs are unaware of the potential benefits of adopting new technologies, while others are aware but cannot innovate due to the high costs of new equipment and machinery. Furthermore, they are impeded by a lack of skilled labor. Most exporting SMEs have insufficient internal funds to finance such projects and limited access to credit from private and public banks. Several countries have created specialized institutions that promote science, technology and innovation programs. However, non-reimbursable and co-financed public and private support for (exporting) SME innovation remains recent and limited. Science, technology and innovation policies are often disconnected from other policies that promote structural transformation such as SME development and internationalization. Furthermore, international cooperation programs for these purposes seem to be in decline.

Finally, there are several public-private initiatives that support SMEs to export indirectly by selling products and services to domestic multinational companies with strong export links. Furthermore, indirect exports are easier to establish than direct exports, as no borders need to be crossed. However, most SMEs face major challenges in becoming suppliers of multinationals, mainly because of their low productivity levels, low quality products and services and a lack of compliance with global quality standards. A few countries have introduced policies that aim to increase the presence of SMEs within the supplier base of multinational companies. These policies focus on providing training and support to help SMEs meet stringent quality standards, initiatives that promote collaboration among SMEs to strengthen their capacities and overcome barriers such as access to capital goods and finance, and supplier development programs (SDPs) that support multinational companies in sourcing more products and services from SMEs.

Based on Korea's successful experience in developing policies and support structures to internationalize SMEs, the chapter presents some potential areas for cooperation with LAC, including:

- Improving information and statistics to enhance the formulation, monitoring and evaluation of policies, particularly regarding indirect SME exports.
- Upgrading ecosystems for policies and instruments for exporting SMEs, including better synergies between macro policies and specific programs for SMEs.
- Enhancing efforts to reduce trade costs in terms of customs procedures, access to trade finance, and technical, sanitary and phytosanitary standards.
- Strengthening export promotion agencies, with a specific focus on their international office networks in markets offering the greatest potential to expand exports.

The final chapter by Jai Sheen Mah analyzes the evolution of Korea's policies for SME development and internationalization since the 1960s, when it switched from import substitution to export promotion. Since then Korea has achieved rapid economic growth, becoming the world's eighth largest goods exporter in 2016. In the 1960s and 1970s, export promotion policies focused on large industrial companies known as chaebols. The government began to pay more attention to SMEs in the 1980s. The main emphasis has been on promoting their exports; however, some organizations support SMEs investing abroad.

Under Korean law, a firm is classified as an SME if it averages sales of between 80 and 150 billion won (roughly US$ 70 million to US$ 130 million) over a 3-year period and whose assets do not exceed 500 billion won (about US$ 440 million), depending on the industry. In 2015, Korean SMEs were responsible for exporting US$ 100 billion worth of goods, which translates to 18 percent of the country's total exports. However, if indirect exports were to be included (typically SMEs products are used as inputs by exporting firms) it is estimated that the SMEs' contribution to total exports would have reached around 30%. Exporting SMEs account for a very small share of all SMEs (2.6 percent in 2013) but represent a very high share of all exporting firms (93.5 percent in 2012). Electricity/electronics, machinery and the chemical industry combined accounted for more than two-thirds of SME exports in 2009.

Korean SMEs supplying components to large Korean companies (notably in the automobile industry) have often accompanied them when they have invested abroad, especially within Asia. From 1990 to 2000, the share of SMEs in Korea's outward foreign direct investment (OFDI) flows more than doubled from 19 percent to 42 percent, respectively. However, since then there has been a sharp decrease of SMEs in the OFDI flows, which in 2014 stood at only 9 percent. This is related to the decreasing share of manufacturing and the increasing share of large-scale mining and energy projects in Korea's OFDI.

Korea has a well-established legal and institutional framework for the promotion of SMEs, which is enshrined in its Constitution. The SMEs Promotion Act was legislated in 1994. Various ministries and agencies have provided support for SME internationalization, including the Ministry of Trade, Industry and Energy (MOTIE), Small and Medium Business Corporation (SBC), Small and Medium-Sized Business Administration (SMBA), Korea Trade-Investment Promotion Agency (KOTRA), and Korea International Trade Association (KITA). SMBA has been the central government authority in charge of planning and implementing the main export promotion programs. The budget allocated by SMBA to promote SME exports increased from US$51 million in 2011 to US$85 million in 2015.

The government helps transforming SMEs that were only selling to the domestic market to become exporters. In 2015, it selected 2,400 promising firms, mostly SMEs, to become exporters. First, these firms received several support measures including finding buyers, training on export practices, and on-line marketing methods. Second, the government strengthened international marketing efforts such as holding Expos abroad and sending trade delegations. Third, the government expanded the IP-Desk (established in 2006) to provide legal counsel to SMEs on disputes relating to intellectual property rights (IPRs). Fourth, KITA and KOTRA strengthened the provision of information to exporting SMEs. Concerning new export methods, the government supports SME participation in e-commerce. It also supports Korean firms entering procurement markets in major developed countries and international organizations. Although this support is not specific to SMEs, they are expected to be the main beneficiaries. Another type of support for SMEs is help in complying with rules of origin requirements for exports to countries with whom it has signed free trade agreements (FTAs).

Korea International Trade Association (KITA) provides export promotion programs targeting SMEs. KITA's Export Start-Up Program, which is supplied together with KOTRA and EXIM Bank, provides SMEs that are initiating exports with a package including the establishment of export infrastructure, international marketing and export finance. KITA lends to each SME whose export value per year is smaller than US$10 million at a fixed interest rate of 3.5%. KITA also provides

translation and interpretation services to exporting firms and maintains Trade Venture Plaza wherein 48 offices are provided to SMEs at low rent rates.

K-sure and EXIM Bank provide finance for SME internationalization. The Korea Federation of SMEs (KBiz) also supports SMEs' exports. First, it covers up to 50% of the costs that should be borne by SMEs when they face trade remedies or infringement of IPRs. Second, it offers free training programs on internationalization. Third, it supports SMEs' access to foreign networks.

In summary, it appears that the number and scope of programs implemented by the government of Korea to promote SME exports outnumber those in most other countries. Support measures include provision of information, support for SMEs' participation in foreign networks, capacity building (such as support for R&D activities and human resource development), export finance and export insurance services, among others. In 2013, the government changed the structure of export promotion to strengthen competition among trade-related agencies. That is, the same programs can be implemented by diverse agencies. Mah argues that it would be helpful for the Korean government to consider reorganizing the system of support for SME internationalization depending on the expertise of each agency.

I. Latin America within Korea's Trade and Integration Strategy

Won-Ho Kim[2]

South Korea (hereafter, Korea) is a small country of only 120,000 km2 in extension, out of which only 17.7% is arable land to feed a population of about 50 million. Hence, Korea needs to import about 80% of its food. It also imports 100% of its petroleum. Thus, Korea had to industrialize and produce manufactured goods to sell abroad and earn foreign exchange. Naturally, Korea's trade dependency rate is high, amounting to 90~110%. And trade policy has been essential for Korea's economic development.

Korea pursued the multilateral approach in international trade policy as its core strategy until the unprecedented financial crisis of 1997-1998. Korea joined the General Agreement on Tariff and Trade (GATT) in 1967, took tremendous advantage of the international trade boom while it pursued export-led industrialization, and achieved fast economic growth through the early 1990s. A Korean negotiator recalled that Korea repeatedly argued for strengthening the multilateral system against regionalism which diverted trade and investment on various occasions including the first ministerial meeting of the World Trade Organization (WTO) in 1996 (Yu 2005: 159). However, the expansion of regional trade arrangements (RTAs), as exceptions from GATT's most favored nation (MFN) rule, even after the establishment of the WTO, forced Korea to finally abandon its earlier strategy and join the regionalist trend because of the opportunity cost and discriminatory nature of RTAs against non-member countries.

Interestingly, Korea's first free trade agreement (FTA) partner was Chile, in South America, far away from East Asia. Soon after the Korea-Chile FTA went into effect as of April 1, 2004, Peru came up as the next FTA partner from Latin America, and then Colombia. Recently, Ecuador has launched negotiations with Korea though it preferred to name it a Strategic Economic Cooperation Agreement (SECA) rather than FTA, and earned Korea's consent. These four Andean countries' interest in advancing trade with Korea should be worth exploring though the scope of this paper focuses on explaining Korea's strategy. As of this writing, the Korea-Central America FTA is also

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under negotiation. In contrast, Korea's FTA negotiation with Mexico has stalemated since 2008, and Korea and the Southern Common Market (MERCOSUR) have never reached agreement on an FTA negotiation though a joint feasibility study was carried out.

This paper will attempt to explore the dynamics of the political economy of Korea-Latin America FTA negotiations. It will first review the policy setting affecting Korea's trade strategy. Then, Korea´s FTA strategy will be discussed, particularly focusing on Latin America. The following sections will explore the political economic dynamics of each of Korea´s FTA negotiation in Latin America, from Chile to MERCOSUR. Lastly, new challenges related to the Trans-Pacific Partnership (TPP) and Regional Comprehensive Economic Partnership (RCEP) will be discussed.

A. Trade policy environment

As mentioned above, Korea was arguably one of the biggest beneficiaries of the international trade boom during the 1960s and 1970s. GATT provided Korea access to a large open market. Its enabling clause to allow the Generalized System of Preferences (GSP) benefits to developing countries also offered Korea a preferential access to large industrialized markets including the United States.[3] That is why Korea was a staunch participant in the GATT process since it became a member. The Uruguay Round (UR) of multilateral negotiations under GATT that began in 1986, however, served as a warning to Korean policymakers. Freer trade could create a political burden in a growing democracy. Particularly, the farmers militantly protested Korea's market opening in the early 1990s.

In Latin America, structuralist strategies were dominant mostly during the period between the Great Depression and the debt crisis of the 1980s. As part of this strategy, most countries in the region attempted import substitution industrialization (ISI) and built high tariff barriers against free flow of foreign goods and services. Chile was one of the first in opening its market in the mid-1970s. Membership to the GATT came also late for most Latin American countries. However, such free-trade-unfriendly policies in Latin America changed fundamentally after the 1980s debt crisis. As part of market-oriented reforms, most Latin American countries undertook trade liberalization measures.

Mexico and Chile moved quickly, among others, beyond the region. Mexico negotiated free trade agreements with the US and Canada, and then moved on to the rest of the world including Asia. Chile followed suit. While Europe was indulged in its intraregional integration, East Asia rose as the new frontier for the Latin American strategists. Mexico and Chile joined the inter-governmental Asia Pacific Economic Cooperation (APEC) in 1993 and 1994 in order to be involved, as much as possible, in the integration process of Asia. Then, these pioneer countries searched for an FTA partner in East Asia, which served as a benchmark for Peru and Colombia in their moves toward Asia Pacific. Brazil and Argentina, however, took a different path forming the MERCOSUR customs union, which would result in more trade diversion than in an FTA with a tariff-averaging scheme (Jonanovic 2006: 169). Although MERCOSUR has an FTA in Asia, with India, it does not reap the benefits in trade and investments of an FTA. MERCOSUR's existing extra-regional RTAs are rather politically motivated (Kim 2009).

On the other hand, Korea did not show any interest to any formal or informal FTA proposals by any country in the mid-1990s due to domestic political issues. Any post-UR trade negotiations would bring about more social tension. The policymakers were not able to dictate as freely as before the democratization process starting in June 1987, and decision-making was even hampered after the disappearance of the so-called super-ministry of the Economic Planning Board (EPB) as of December 1994. Yet the official explanation to turn down any FTA proposals was that Korea did not want to distort its trade structure, which was already diversified.

[3] The US graduated Korea from its GSP list as of January 1, 1989 (Suns 1988).

Ironically, the Asian and Korean financial crisis of 1997-1998 served to change such mindset among Korean policymakers. While the Korean government secured the International Monetary Fund (IMF) rescue facility of US$21 billion[4] and a second line of defense or back-up facility by thirteen industrialized countries for US$23.35 billion including US$10 billion committed by Japan in December 1997, it had to commit itself to further opening its markets. Specifically, Korea would need to abolish the so-called Import Diversification Law, which Japan considered suing as an unfair trade practice, before the WTO (Lee 2006: 228). Now Korea's mandate was to match such trade liberalization measures with further penetration into overseas markets. In the midst of recovery from the financial crisis, the Korean government had to develop more aggressive trade promotion programs and institutional frameworks. One of such efforts was to work towards the signing of an FTA. The rationale was that Korea needed to get out of the dilemma of being discriminated in major markets while other countries were working to conclude FTAs giving mutual preferential access. Korea needed stable access to overseas markets. At the same time, an FTA would also serve to lock in the economic reforms and liberalization measures taken to recover from the recent financial crisis (Yu 2005: 163).

In an attempt to compensate for the late entry to the FTA strategy, Korea wanted to promote deep integration by negotiating as full a range of issues as possible, including, the so-called Singapore issues —investment, government procurement, trade facilitation, and competition policy— and intellectual property rights (IPRs) in the forthcoming FTAs.

B. Korea's FTA Strategy toward Latin America

The Korean government finally chose Chile, known as a Latin tiger, as the first FTA negotiation partner in November 1998. There were several economic and political reasons why Chile, a geographically distant country, was to be the first partner. While the government was to confront a possible domestic political opposition to further liberalization, it also needed to justify the paradigm shift. Firstly, Korea suffered from a trade deficit with Chile largely because of copper imports. An FTA would help correct the trade imbalance. As table 1 shows, Chile was the only country with a deficit among Korea's major Latin American trade partners in 1999. Secondly, it could be argued that Chile was a relatively small economy and any possible negative impact from an FTA with Chile would be marginal. Thirdly, Chile was one of the most experienced countries in FTA negotiations, and Korea would learn from Chile for its future negotiations. Fourthly, Chile was proactive in undertaking and FTA with Korea compared to other Latin American countries.

Using similar reasoning, Mexico was not chosen. Although Mexico was the most experienced economy in FTA negotiations it was a much larger trade partner than Chile. If Korea wanted to maximize the economic effect from any FTA in the region, it should have taken Mexico as the first partner. However, Mexico's economic size would have rather been a burden to the inexperienced Korean negotiators. That was why Korea did not consider Mexico or turned down any Mexican offer for an FTA by that time.

When the Korean government finally concluded the negotiation of its FTA with Chile, it really learned from it. Firstly, it still had to deal with the domestic front. The latter phase of the negotiation and the period between its conclusion and ratification by the Korean National Assembly were continuously marred by street demonstrations to oppose it. The Chilean fruit industry was particularly questioned and it was feared that it would penetrate and dominate the Korean consumer market, and ultimately jeopardize Korean fruit producers. Mass media PR efforts by the Korean government and specialized research agencies to convince the public of marginal impact in the agricultural sector but tangible benefits in the manufacturing sector through an FTA with Chile did not

[4] Besides the stand-by agreement with the IMF, the Korean government secured a US$10 billion World Bank facility and a US$4 billion Asian Development Bank facility in December 1997 (Lee 2006: 163).

dissipate the concern of the Korean agricultural sector. The final deal was a generous, supplementary legislation to compensate for possible economic damage to the fruit farmers. The Korean government established an Inter-ministerial Meeting for International Economic Policy (IMM) presided by the vice prime minister for economic affairs to handle issues of affected classes and industries. A fund of 119 trillion won (about US$110 billion as of 2004) would be mobilized for ten years during 2004 to 2013 to restructure the agricultural sector in the name of the Basic Plan for Agriculture and Rural Area. Furthermore, the so-called FTA implementation fund of 1.2 trillion won (about US$1.1 billion) would be spent to compensate for the negative impact on the agricultural sector from FTAs (Yu 2005: 181). There was an academic and practical debate on whether such an appeasing measure was necessary even after the episode. Such inclusive response by the government resulted from a serious asymmetry between FTA supporters and opponents. As Ahn (2005: 263-264) asserts, the winners such as the auto and electronics industries remained silent while the losers of the agricultural sector mobilized up to 22,000 demonstrators to the street during early 2000 to mid-2002. The expected gain in the Chilean consumer market for the Korean manufacturing sector would be minimal as compared with the life and death impact on the Korean fruit farmers.

Table 1
Korea's Trade with the Major Latin American Partners
(1998, US$ thousand, percentage)

	Exports	Change 1998/1997	Imports	Change 1998/1997	Balance
Region Total	8 866 685	2.3	2 196 652	-46.1	6 670 032
Panama	2 021 396	5.4	26 616	-94.0	1 994 780
Brazil	1 792 147	4.7	693 409	-44.0	1 098 738
Mexico	1 404 889	-4.5	190 711	-44.6	1 214 178
Argentina	584 349	-7.3	126 175	-50.1	458 174
Chile	566 958	-13.5	706 346	-39.2	-139 388
Colombia	271 908	-16.2	52 138	-32.1	219 770
Venezuela	270 963	22.2	25 160	-57.1	245 803
Guatemala	266 696	39.4	66 363	447.2	200 333
Peru	260 274	10.2	61 925	-40.5	198 349

Source: KITA.net.

Secondly, the Korean government considered the implications of the legal process of an FTA negotiation. To avoid any possible controversy over discretion in decision-making, it followed a legally prearranged process. In June 2004, by Presidential decree, the Procedure to Conclude FTAs was undertaken to enhance transparency of the relevant decision-making process. According to the decree, IMM was to be the ultimate decision-making body, and the FTA Policy Committee presided by the Minister of Trade would examine policy alternatives. This Committee would be supported by an FTA Advisory Meeting composed of experts and business representatives. Any final decision-making should be made after a public hearing (Yu 2005: 169).

Thirdly but not least, the Korean government earned some confidence in trade negotiation and began to draw a bolder plan for future FTAs under an "FTA Roadmap" in 2003. The Trade Negotiation Unit in the Foreign Ministry recruited more experienced personnel and allocated more manpower to pursue the so-called simultaneous multiple negotiations to minimize the opportunity cost, re-balance the positive and negative impacts on different sectors, and maximize the gains from simultaneous negotiations. To select partners, it considered economic feasibility, implications for ultimate negotiations with largest or industrialized economies, and political and diplomatic concerns. The short-term partners would be Japan, Singapore, the Association of Southeastern Asian Nations (ASEAN), Mexico and the European Free Trade Association (EFTA); medium to long term partners

included US, European Union (EU), China, China-Japan-Korea, East Asia; and other aspirants included Canada and India. (Yu 2005: 165-166).

This strategy was also applied in South America. When Chile was chosen as the first FTA partner, Peru officially and unofficially showed strong interest in negotiating an FTA with Korea. The sixth largest economy in Latin America, however, did not attract immediate attention as Korea's next FTA partner. The larger the partner economy was, higher priority would be given as long as the domestic front was manageable. When Japan signed its first Economic Partnership Agreement (EPA) with Mexico on September 17, 2004 soon after the Korea-Chile FTA (KCFTA) went into effect, Korea anxiously wanted to negotiate an FTA with Mexico. But Mexico had already shifted to the FTA moratorium mode by then. Korea needed to bring a third partner to ultimately negotiate with Mexico. The MERCOSUR customs union was invited to the table. The then four-country trade bloc was divided in its extra-regional strategy, in particular, Brazil's industrial sectors were resistant to any free trade with the strong manufacturing economy in East Asia. When Korea found Mexico and Brazil not so enthusiastic to negotiate an FTA, Korea began to respond to those countries still excited in the region, such as Peru and Colombia.

When Korea concluded FTAs with large economies such as EU, US and China, a significant policy shift was made by the new Park Keun Hye government (2013-2018). Upon inauguration, the new government switched the trade negotiation function from the Ministry of Foreign Affairs to the Ministry of Trade, Industry and Energy (MOTIE). For the first couple of years the old trade team co-worked with the new one to transfer experiences, and in early 2015, a 'new FTA Strategy' focused on Mega-FTAs such as the Regional Comprehensive Economic Partnership (RCEP) and the Trans-Pacific Partnership (TPP), upgrading existing FTAs and new FTAs with emerging economies was announced. New partners would be selected by "their economic performances, trade policy, position in international division of labor, and international political factors." In this category, Central America and Ecuador were included (MOTIE 2015).

The next sections attempt to categorize what Korea has negotiated and will negotiate with Latin American partners. The first section explores the background of the negotiations, the major contents of the treaty, the political dynamics of the process for the FTAs between Korea and Chile, Peru and Colombia, respectively. The economic effects of the KCFTA and the Korea-Peru FTA (KPFTA) will also be presented. The following section will briefly touch upon the more recent negotiations of Korea with Central America and Ecuador. The last section will review the aborted Korea-Mexico FTA and the Korea-MERCOSUR initiatives.

C. FTAs in force

1. Chile

Korea was the first Asian economy to negotiate an FTA with Chile. Furthermore, the KCFTA was the first trans-Pacific FTA, and inspired other countries in Asia and Latin America to engage in inter-regional trade arrangements. Latin America's share in Korea's exports tended to be highest among the Asia Pacific countries, and Asia's share in Chile's exports was also the highest in Latin America. Both countries were aggressive in exploring each other's market. Chile's trade structure was biased toward Asia as its exports of copper to Japan, Korea, and China accounted for more than thirty percent of its total exports by late 1990s, increasing to over forty percent today.

The two parties concluded the two-year negotiation in October 2002. Korea and Chile agreed to open their markets for 87.2% and 41.8% of items respectively upon entry into force, and eliminate all tariffs within 10 years for 96% of items in trade. However, the Korean negotiators became gradually cautious of resistance by the agricultural sector, and decided to limit or exclude several items from the market access. There was apparent fear among the Korean fruit producers about the price competitiveness of Chilean fruit. Chilean grapes were already popular among Korean consumers because of its cheaper

price. Chilean grapes were applied seasonal tariffs so as to reduce the impact on local grapes in Korea. Rice, apples and pears were excluded. Chile responded by excluding Korean-made refrigerators and washing machines, which accounted for 5~6% of Korean exports to Chile. KCFTA stipulates a relatively restrictive rule of origin (RoO) of regional value content (RVC) with a bilateral accumulation clause that would prevent geographical trade deflection, generate trade diversion and induce foreign direct investments following the NAFTA model (Cho et al. 2005: 141-148; Jovanovic 2006: 173). Although the first FTA for Korea, KCFTA intended to be comprehensive by including not only goods but also service, investment, government procurement, and intellectual propert rights (IPRs). Chile was not a member of WTO Agreement on Government Procurement (GPA).

During the negotiation, a number of seminars were held in Korea to discuss whether it would seriously affect the Korean agricultural sector. Many news articles were dedicated to this debate. Several investigative delegations of different organizations visited Chile to look into the fruit industry there. The two governments signed the text of the treaty in February 2003. The Korean government finally sent it to the National Assembly for parliamentary ratification. It was ratified by the Chilean Lower House and Senate on August 26, 2003 and January 22, 2004 respectively. However, the Korean assemblymen, not only those with constituencies coming from rural areas but also those of the ruling progressive party, were hesitant to proceed to approve it for fear of any political backfire in the forth-coming general elections in April 2004. Even the Chilean ambassador in Korea visited the National Assembly to explain Chile's views about the treaty and the controversy in Korea. The bill finally was passed on February 16, 2004.

Around April 1, 2005, exactly one year after the treaty went into effect, many waited for its real economic effect. The short-term outcome was very positive for both sides. Korea's exports to Chile increased in 2004 by 36.9% over the previous year, and its imports from Chile by 82.8%. Korean share of the Chilean import market increased from 2.8% in 2002 to 3.12% in 2004 (Lee & Cheong 2005: 196). Korea's trade deficit with Chile increased. Particularly because of the increase in the price of copper. In the long-term, however, the import volume has not changed much as Table 2 shows, which means that Chilean side's trade surplus may be more vulnerable to commodity price fluctuation.

The largest increases in market share were those of Korean cars in Chile, and Chilean wine in Korea. As tariffs for Korean passenger cars were eliminated when the KCFTA entered into force, their market share in Chile rose from 16.1% in 2003 to 28.9% in 2014. It contrasted with Japanese cars' share, which decreased from 29.5% to 14.8% during the same period. The Chilean wine gained ground in the Korean market quickly after KCFTA from the fifth place in 2003 with 6.5% market share, after France, US, Italy and Australia. The figure rose to 13.8% in 2004 to take the third place, and to 20.8% in 2014 to occupy the second place after the French with 30.5% (Lee 2015).

Table 2
Trend of Korea's Trade with Chile 2003~2015
(millions of US$, %, metric tons)

	Exports				Imports				Balance
	Amount	Change	Volume	Change	Amount	Change	Volume	Change	
2015	1 742	-16.4	1 701 931	5.7	4 412	-8.3	2 924 746	26.4	-2 670
2014	2 083	-15.2	1 610 166	-22.5	4 810	3.3	2 313 842	15.4	-2 727
2013	2 458	-0.5	2 076 917	-15.1	4 658	-0.4	2 005 381	6.5	-2 199
2012	2 469	3.7	2 444 905	6.8	4 676	-3.7	1 883 388	10.6	-2 207
2011	2 381	-19.2	2 288 781	-26.9	4 858	15.1	1 703 411	-12.7	-2 477
2010	2 947	32.2	3 130 010	52.9	4 221	36.0	1 952 019	-9.2	-1 274
2009	2 229	-26.5	2 047 041	-21.1	3 103	-24.8	2 149 776	14.4	-874

Table 2 (conclusion)

	Exports				Imports				Balance
	Amount	Change	Volume	Change	Amount	Change	Volume	Change	
2008	3 032	-2.7	2 595 164	-24.1	4 127	-1.3	1 879 500	-10.3	-1 096
2007	3 115	98.9	3 417 730	143.1	4 184	9.7	2 096 058	-14.0	-1 069
2006	1 566	36.1	1 405 675	66.7	3 813	67.3	2 436 492	-7.1	-2 247
2005	1 151	62.5	843 261	45.0	2 279	17.9	2 623 452	10.7	-1 128
2004	708	36.9	581 397	-4.7	1 934	82.8	2 370 312	29.2	-1 225
2003	517	13.9	609 865	36.8	1 058	40.3	1 834 477	-16.2	-540 536 387

Source: KITA.net.

2. Peru

Peru aimed to compete with Chile for access to the Asian markets. Its industrial structure was quite similar to Chile's, which included mining, fishery and agriculture as major sectors. Its export share in Asia was the second highest in Latin America. After Chile joined APEC in 1994, Peru followed suit in 1997. When Chile negotiated an FTA with Korea, Peru wished to do so too. However, Peru's first Asian FTA partner was Singapore, signing the treaty in May 2008 and activating it in August 2009. Then China was next: signing in April 2009 and activating it in March 2010. While Peru became one of the fastest growing economies in the world by that time, China's FTA with Peru would threaten Korea's potential interests in Peru. Competition among East Asian economies was already underway in South America. China signed an FTA with Chile in November 2005 and reinforced it in October 2006. Then Japan followed suit in 2007. The so-called China-Japan-Korea (CJK) competition intensified with FTAs. Korea proceeded to negotiate its second FTA in the region, with Peru.

The KPFTA became the "gold standard" among Asia-Latin America FTAs in terms of coverage and liberal RoO. KPFTA is considered an upgrade in investment and trade facilitation as compared to KCFTA though both are advanced in services liberalization, competition, government procurement, and IPRs. It is also the most comprehensive FTA with respect to IPR among the first 18 Asia-Latin America FTAs in expanding copyright protection to 70 years after the death of the creator (ADB-IDB-ADBI 2012: 50, 55-65). The RoO of KPFTA was designed to reduce administrative cost and follow the trend of importation and global sourcing of materials. For the determination of RoO, KPFTA allowed both methods of change in the tariff classification heading and the value-added method. KPFTA also includes a clause to deal with products undergoing outward processing (OP) in the Kaesong Industrial Complex (KIC).[5] KPFTA aims to eliminate tariffs over 10 years on all products with the exception of 107 agricultural and marine products including rice, beef, hot pepper, garlic, onion, ginseng, and walleye Pollack. From 2015, all Korean exports of automobiles with engine displacement of 1500-3,000 cubic centimeters (cc) would be tariff-free while those of over 3000cc immediately. Those of less than 1500cc, from 2020.

The Korean domestic frontier for KPFTA was not as harsh as KCFTA. It was signed in November 2010, and entered into force in August 1, 2011. KPFTA became Korea's seventh FTA after those with Chile, Singapore, EFTA, ASEAN, India and EU.

KPFTA is also considered as beneficial to both parties as table 3 shows. Owing to the fast tariff reduction schedule mentioned above, Korean cars' market share in Peru also jumped from 25.0% in 2010 to 29.4% in 2014 while the Japanese shrank from 43.3% to 14.1% during the same period. The Peruvian cuttlefish and squid also dominate the Korean import market taking 75.4% of the

[5] OP refers to temporary exportation of goods for further manufacturing. The KIC is an outward processing zone (OPZ) in North Korea in which South Korean companies have set up manufacturing plants and employ North Korean labor (Lee 2013).

market share in 2014 from 0% in 2010. Its tariff was 20% before KPFTA, but is gradually being reduced to 0% by 2020 (Lee 2015).

Table 3
Trend of Korea's Trade with Peru 2010~2015
(millions of US$, %, metric tons)

	Exports				Imports				Balance
	Amount	Change	Volume	Change	Amount	Change	Volume	Change	
2015	1 218	-12.5	1 113 903	-5.4	1 146	-20.0	925 727	3.7	72
2014	1 392	-3.4	1 177 728	-34.8	1 433	-27.7	892 767	-37.0	-41
2013	1 440	-2.2	1 807 410	65.4	1 983	21.0	1 417 379	97.6	-543
2012	1 473	7.7	1 093 059	45.7	1 639	-15.9	717 461	-48.4	-167
2011	1 368	44.8	750 142	-13.8	1 950	87.7	1 391 441	111.6	-583
2010	944	47.2	870 018	79.8	1 039	13.0	657 484	-30.9	-94

Source: KITA.net.

3. Colombia

Peru's FTAs with Asian economies in turn inspired the neighboring Colombia. To take advantage of its dual oceanic access to the Atlantic and the Pacific, Colombia aspired to diversify its trade structure by penetrating further in Asian markets. Colombia wanted to join APEC, and waited for the lift of its membership moratorium in 2007 in vain. Colombia joined Chile, Peru, Mexico and several other countries to form the Latin American Arc of Pacific Countries in 2006, and then the Pacific Alliance in 2011 to promote relations with Asia-Pacific economies. In this context, Colombia proposed an FTA negotiation with Korea as its first FTA partner in Asia. As Colombia was expected to be the next Peru with dynamic economic growth thanks to political and social stabilization, Colombia competed with Argentina and Venezuela for the third place in Latin America in terms of GDP after Brazil and Mexico. Korean businesses were much interested.

The bilateral negotiation started in December 2009, and the treaty was signed in February 2013. Colombian coffee and cut flowers are expected to dominate Korean import market soon after its entry into force. Based on the Harmonized System for Korea (HSK) product lines, 96.1% of Korea's imports from Colombia and 96.7% of Colombia's import from Korea will become duty free within 10 years of implementation. Very sensitive products, 151 in total, including beef, milk/cream, potatoes, garlic, onions, oranges, apples, Asian pears, ginseng were excluded from the concession. Notably, rice and rice related products were excluded from the agreement.

In contrast to the FTA with Chile, the Korea-Colombia FTA met resistance in Colombia, not in Korea. The Colombian automotive sector was particularly critical of the treaty, citing concerns about increased competition by Korean imported cars. After the pact was signed in February 2013, the Korean National Assembly approved it on April 29, 2014. The Colombian Senate approved it on November 13, 2013, and the Lower House enacted Law 1747 to approve it on December 16, 2014. After a protracted review by the Colombian constitutional court, the FTA entered into force in July 2016.

D. Recent FTA negotiations

1. Central America

Central America has been important for Korean small and medium-sized enterprises (SMEs). The Korean textile and garment industries actively invested in the region since the mid-1980s serving as a platform to re-export to the United States by taking advantage of their trade preference status. The Korean government supported Korean business interests through "summit diplomacy." The first Korea-Central America summit was held in Guatemala in September 1996, the second was the Korea-SICA summit in Costa Rica in September 2005, and the third was held in Panama in June 2010. Since 1997, Korean and Central American high-ranking government officials have held regular Korea-Central America (later, Korea-SICA) Dialogue and Cooperation meetings. While Korea's counterparts in Central America expanded from five to eight, the idea of a Korea-Central American FTA was raised intermittently, with different numbers of members, from two or three up to five or six. Yet, the Korean government did not give Central American countries priority basically because of its small market size. Korea had to deal with other imminent issues first.

After completing FTA negotiations with larger economies as described above, the Korean government´s new trade negotiation office announced its plan to negotiate a plurilateral FTA with a group of six Central American countries: Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama. In taking this decision, Korea considered its direct investments in the region, amounting to US$ 3,860 million as of 2014. Negotiations were launched in September 2015, and the agreement was signed between Korea and five Central American countries in February 2018.[6] The coverage of the agreement is comprehensive, including issues such as investment and trade in services.

Central America expects to increase its exports to Korea, which only accounts for 1.6% of the region's total exports to the world by exporting beef, seafood and agricultural goods including cut flowers, pineapple, sugar, coffee, banana, etc., Costa Rican IT products and services including IT-enabled business services and Salvadoran aircraft services. With many Korean SMEs present there, the region hopes to induce more Korean investments by promoting its geographic advantage, investment incentives, favorable business climate, competitive operating costs, and advanced infrastructure (Delgado 2015).

2. Ecuador

Ecuador is another case of competition among Andean economies. Ecuador tends to compare the composition of its trade with Korea, with that of Chile, Peru, and Colombia because Ecuador produces similar goods. The Ecuadorian government believes that about ten of its products have been "severely affected with direct negative employment consequences because of Korea's FTA with Ecuador's neighboring countries" and it suffers from a trade deficit with Korea unlike before (Pazos 2015; Korea Times 5/17/2015). Ecuador did not want to lose opportunities in Asia, either. If signed, this would be Ecuador's first free trade pact with an Asian country. The two trade ministers met in Seoul in August 2015 to declare their intention to negotiate free trade. However, there were differences regarding the terminology. Ecuador preferred to call it a Strategic Economic Cooperation Agreement (KESECA) rather than FTA or Trade Agreement (TA), apparently to evade any domestic controversy as the Rafael Correa government was promoting a nationalistic development strategy. It was reported that both ministers "agreed the proposed deal should be a comprehensive, high-level deal and that the talks should be concluded at an early date" (YNA 8/25/2015). The two parties met in Quito for the first round of negotiation on January 26-28, 2016 to discuss the fourteen subjects including market access and rules of origin. The negotiations are still ongoing as of early 2018.

[6] Korea and Guatemala agreed to continue negotiating towards the latter's accession to the FTA.

In 2014, Korea's exports to Ecuador amounted to US$812 million, down 11.8% from the previous year, while its imports from Ecuador spiked more than fivefold to $342 million from $48 million. Korea expects to expand cooperation and diversify oil import sources through an FTA with the third oil rich country in South America (MOTIE 2015). Besides the bilateral trade needs, Korea chose Ecuador as a strategic choice while MERCOSUR did not respond positively to a Korean request for an FTA as described below. As a political ally to MERCOSUR member countries including Venezuela and Brazil, Ecuador may have better access to MERCOSUR through its FTA with the economic bloc. The Korean trade ministry expected that the proposed FTA with Ecuador would provide a gateway for Korean firms to MERCOSUR. In this sense, what KESECA stipulates on RoO will matter to the Korean interests.

On the other hand, Ecuador emphasized the difference between FTA and SECA. Ecuador explained that SECA is a comprehensive and balanced agreement and promotes differentiated treatment consistent with the parties' different levels of economic development. It would "promote economic and social development, create new opportunities for trade and investment, competitiveness and innovation, which will contribute in the reduction of trade and productive asymmetries of both countries" (Pazos 2015). The Korean negotiators were not used to such terminology. A possible discrepancy of philosophy over free trade could be critical to the ultimate conclusion of the negotiation, and to the prospects of KESECA.

E. The deadlocked FTAs

1. Mexico

As table 4 shows, Brazil and Mexico are Korea's top export destinations in the region, and has a large surplus with these countries. In this sense, the original objective for having an FTA has not been achieved in Latin America yet.

Ironically, as described above, the timing of the proposal of an FTA to each other was mismatched. When Korea proposed a joint study of an FTA in November 2003, Mexico announced an FTA moratorium to suspend any new FTA negotiation due to the so-called FTA fatigue (Yu 2005: 177). In the meantime, Korean businesses suffered discrimination as Mexico increased tariffs on products made in non-FTA partners, and favored firms from FTA signatories in government project biddings as Mexico was not a GPA member (Yu 2005: 162). Furthermore, Korean businesses invested in the maquiladora in-bond industries that benefited from tariff exemption for re-exporting to the US market. As the maquiladora program faded out, however, the production cost rose and outsourcing parts locally became difficult, thus losing competitiveness.

The joint study was finally undertaken in May 2004 through August 2005. FTA was understood as an unpromising project on the Mexican side. Answering to President Rho Moo-hyun's request, President Vicente Fox agreed in September 2005 in Mexico City to negotiate a limited Strategic Economic Complementation Agreement (KMSECA) so as to bypass the objections of the key Mexican manufacturing sectors. The following year, however, two rounds of negotiations for KMSECA ended in failure. President Rho later sent his special advisor for FTA affairs Han Duck-soo as special envoy to attend President Felipe Calderon's inauguration ceremony on December 1, 2006. Han proposed and Calderon accepted a new full FTA negotiation. The following two years replicated what occurred with KMSECA, faced with resistance from Mexico's steel, automotive, textile and electronics sectors though Mexico could benefit from preferential access to the Korean markets for beef, pork, coffee, asparagus, tomato, strawberry, mango, pepper, water melon, orange, garlic, beer, tequila, etc. (Kim 2010). President Lee Myung-bak's suggestion in Mexico City in June 2010 for a resumption of FTA talks was turned down by President Calderon (Expansión 2010).

As of this writing, the atmosphere of the bilateral relations between Korea and Mexico is quite favorable for a new FTA talk. The reformist Enrique Pena Nieto government of the Institutionalized

Revolutionary Party (PRI) takes a different approach from the two predecessors from the pro-business National Action Party (PAN). The two countries formed MIKTA, an association of five middle powers, along with Indonesia, Turkey and Australia in September 2013 to promote their global interests. One of the Mexican government's efforts to smoothen Mexican industrial objection to Korean automobile industry's investment in Mexico was successful as Kia Motors invested in an auto production factory in Pesqueria, Nuevo Leon since August 2014 (*El Universal* 2014). Korean officials continued to show interest in FTA with Mexico, and Mexico, especially from the agricultural sector, expressed the same interest (*24 Horas* 2014; *Mundo Ejecutivo* 2015). During President Park's state visit to Mexico in early April 2016, the two leaders agreed to a working-level consultative meeting in the fourth quarter of 2016 to study the resumption of the FTA negotiation (*Hankyung Daily* 4/11/2016).

Table 4
Korea's trade partners in Latin America
(2015, US$ thousand, %)

	Exports	Change (2015/2014)	Imports	Change (2015/2014)	Balance
Region Total	30 675 421	-14.5	16 016 443	-12.5	14 658 978
Mexico	10 892 170	0.4	3 471 728	6.2	7 420 442
Brazil	5 494 977	-38.4	4 059 499	-17.3	1 435 478
Panama	2 230 263	-19.3	390 765	-21.1	1 839 498
Bermuda	2 032 385	-0.3	1	-89.3	2 032 384
Chile	1 742 442	-16.4	4 412 084	-8.3	-2 669 642
Peru	1 217 956	-12.5	1 146 280	-20.0	71 676
Colombia	1 129 047	-25.2	321 698	-47.1	807 349
Argentina	1 046 847	38.9	698 981	39.4	347 866
Bahamas	778 639	-6.7	10 820	-32.8	767 819
Ecuador	641 255	-21.0	261 554	-23.6	379 701
Cayman Islands (UK)	539 753	-7.3	75	391.4	539 678
Venezuela	449 345	90.5	20 768	39.0	428 577
Guatamala	398 447	24.7	161 935	-49.5	236 512
Puerto Rico	285 081	5.2	185 974	-27.6	99 107
Dominican Republic	265 125	20.0	78 654	-38.8	186 470
Costa Rica	245 342	1.2	149 821	-48.5	95 521
Paraguay	224 720	0.2	19 655	-72.9	205 065
Uruguay	192 795	-24.5	83 627	15.2	109 168
Nicaragua	148 665	-18.4	12 604	-41.9	136 061
El Salvador	129 016	-7.5	14 179	-75.5	114 837
Honduras	117 094	1.9	55 085	7.9	62 010
Trinidad & Tobago	105 623	-5.3	116 533	-33.6	-10 910
Bolivia	90 339	-30.3	247 281	-17.4	-156 942
Cuba	51 535	-7.7	5 671	-53.4	45 865

Source: KITA.net.

F. Mercosur

MERCOSUR, a regional trade arrangement between Brazil, Argentina, Paraguay, and Uruguay since 1991, made meaningful progress characterized by increased intraregional trade and greater inflows of foreign direct investments. The Brazilian economy's rise has drawn the world's attention to MERCOSUR as an important market and as a prospective trade partner. MERCOSUR concluded FTAs with neighboring countries including Chile and Bolivia, and preferential trade agreements (PTAs) with India and the South African Customs Union (SACU). Although at a stalemate, MERCOSUR's negotiation of FTAs with US and EU has the potential of affecting global trade relations. Under this context of new opportunities and threats, Korea's government decided to pursue an FTA with MERCOSUR. Korea as a trading economy needed to secure the market of MERCOSUR, whose importance in Korea's trade structure had drastically risen since the 1990s. Korea's market interest in South America was boosted by the trade liberalization, stable economic growth, and expanded purchasing power of consumers in Brazil and Argentina (Kim 2003). On the occasion of President Roh Moo-hyun's official visits to South American countries in November 2004, the leaders of Korea, Brazil, and Argentina finally reached an agreement in principle on the desirability of enhanced trade arrangements among them. Korea as a dynamic economy was to be an attractive platform in Asia to the South American countries. Subsequently, Korea and MERCOSUR launched a joint feasibility study on a trade agreement, which was officially completed in November 2007.

A computable general equilibrium (CGE) model analysis suggested that Korea's agricultural sector would be negatively affected, while MERCOSUR's automobile and auto parts industry would be seriously damaged. This outcome apparently led the two parties to stall on the FTA negotiation, especially on the part of MERCOSUR.[7] In particular, Brazil did not want to refer to this initiative as an FTA, but rather call it just a trade agreement. Thus the study was named the joint study on the feasibility of a Korea-MERCOSUR Trade Agreement, and was completed in October 2007. No further measures have been taken by any party since the MOU for the "Establishment of a Joint Consultative Group to Promote Trade and Investments between the Republic of Korea and MERCOSUR" was signed in July, 2009.

Especially since 2016, MERCOSUR has gradually changed its critical stance toward FTAs. As of early 2018 it is actively engaged in concluding its protracted negotiations with the EU, and it has signaled its interest in soon launching new negotiations with partners such as Canada and Korea.

G. TPP v. RCEP

In Korea's FTA negotiation history, Japan and Mexico stand out as aborted projects. The Korea-Japan EPA negotiation stopped in November 2004 after six rounds of talks, and the Korea-Mexico FTA negotiation has stalemated since 2008. Interestingly, the two countries are the only members of TPP with whom Korea does not have an FTA. That is why Korea may be interested in joining the so-called Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). This agreement, signed in Santiago (Chile) in March 2018, was negotiated by the eleven remaining members of the TPP after the United States withdrew from it in January 2017. The CPTPP has only minor differences with the TPP, mostly in intellectual property and investment where some TPP provisions were suspended.

For Korea, CPTPP can not only be an option to integrate with Mexico and Japan, but also to improve existing FTAs with other CPTPP members. Although the Korean negotiators may prefer a bilateral FTA negotiation with Mexico rather than individual negotiations with all the eleven members of CPTPP, joining this pact itself would have an important meaning. If Korea does not join CPTPP, it may incur an opportunity cost from being excluded from CPTPP GVCs, from trade diversion by

[7] Further discussion on this subject, see Kim (2009).

CPTPP members, etc. The risks of joining CPTPP would be the same as those from a Korea-Japan FTA, which would affect vulnerable sectors such as machinery, parts and components, innovative industries, etc. Also, Korea may need to negotiate the excluded items in the existing FTAs if the respective partners wish to update them by taking advantage of the new negotiation. However, the benefits from accumulation of RoO with FTA partners through the CPTPP should outweigh the possible negative impacts.

On the other hand, the negotiations of RCEP are expected to conclude soon. However, RCEP's speeding up will not necessarily mean the opening of the 16 Asian member economies to the level of TPP. As India, Japan and China compete with one another in RCEP, and the smaller economies of CLMV (Cambodia, Laos, Myanmar, and Vietnam) demand exceptions from trade liberalization measures, there is a high probability that RCEP would end up being just a symbolic document without much substance. Korea's best strategy would be to join both mega-FTAs while promoting market liberalization in either CPTPP or RCEP.

H. Conclusion

Korea was a latecomer to FTA negotiations, but since the financial crisis of 1997-1998 it caught up fast to become one of the most active FTA negotiators in the world. Interestingly, this change of course began with a Latin American trade partner. It was not by accident, however, that Chile was chosen as the first FTA partner, and that both led trans-Pacific FTAs. The two countries had a highly diversified trade structure and promoted active market penetration into each other's region. Korea's subsequent FTA negotiations in Latin America created competition among Andean countries and among East Asian economies. Chile, Peru, Colombia and Ecuador have come up with rivalry, competition, and benchmarking with each other for access to Asia in general, and Korea in particular. Korea became the first Asian FTA partner for Chile, Colombia, Ecuador, and Central America as a group. Korea, Japan, and China competed in Latin America in general, particularly in Chile and Peru. China and Japan followed Korea in concluding FTAs with Chile, and Korea and Japan followed China for FTAs with Peru. Japan and China followed Korea for consideration of an FTA with Colombia. Korea followed Japan to negotiate an FTA with Mexico.

While Korea wanted to promote comprehensive or deep FTAs, the first ten years of FTA negotiation for Korea were the most difficult period in terms of domestic management. The Korea-Chile FTA brought many lessons for the Korean government to become more strategic for the following negotiations with Peru and Colombia. KCFTA at eleven years and KPFTA at four years are generally considered equally beneficial for the parties concerned. Such outcome stimulated more trade partners to join Korea's FTA network. With the completion of major FTAs, the Korean government shifted its focus in 2015 toward emerging economies to include Central America and Ecuador. As of early 2018, while no clear signal has been shed for the resumption of the deadlocked Korea-Mexico FTA negotiations, prospects seem much better for the launch of negotiations between Korea and MERCOSUR. At the same time, Korea's next challenge will come from the mega-FTAs such as CPTPP and RCEP. In particular, joining the CPTPP would bring about an indirect FTA with Mexico.

Bibliography

24 Horas (2014), "Corea del Sur quiere un TLC con México," 16 de abril, http://www.24-horas.mx/corea-del-sur-quiere-un-tlc-con-mexico/(Accessed, February 10, 2016).

ADB-IDB-ADBI (2012), Shaping the Future of the Asia-Latin America and the Caribbean Relationship. Asian Development Bank, Inter-American Development Bank, and Asian Development Bank Institute.

Ahn, Sei-young (2005), "Evaluation of Domestic Condition for Korean FTA Policy and Other Country Cases," in J. Rho and I. Cheong, eds. FTA Strategy in the Global Era (Seoul: Haenam), pp. 255-297. (in Korean)

Cho, J., H. Bang, and I. Cheong (2005), "FTA Rules of Origin," in J. Rho and I. Cheong, eds. FTA Strategy in the Global Era (Seoul: Haenam), pp. 129-154. (in Korean)

Delgado, Joel (2015), "Korea-Central America FTA: Opportunities and Challenges," Presented to the 19th Korea-Latin America Business Forum, Seoul, November 26.

El Universal (2014), "México y Corea del Sur: El camino hacia un TLC," 3 de octubre, http://archivo.eluniversal.com.mx/finanzas-cartera/2014/impreso/mexico-y-corea-del-sur-el-camino-hacia-un-tlc-113813.html (Accessed, February 10, 2016).

Expansion (2010), "México no busca TLC con Corea del Sur," 1 de julio, http://www.cnnexpansion.com/print/economia/2010/07/01/tlc-corea-del-sur-mexico-cnnexpansion (Accessed, February 10, 2016).

Jovanovic, Miroslav N. (2006), The Economics of International Integration. Cheltenham: Edward Edgar.

Kim, Won-Ho (2003), "Relações Econômicas Contemporâneas entre a Coréia, o Brasil e Países do Cone Sul,"in Ásia, América Latina, Brasil: A Construção de parcerias, edited by Lytton L. Guimarães (Brasília: NÉASIA, Universidade de Brasília), pp. 137-166.

Kim, Won-Ho (2009), "Prospects of Korea-MERCOSUR FTA Negotiations Implications from MERCOSUR's Structure and Past Negotiations," Taiwanese Journal of WTO Studies No. 13, pp. 29-53.

Kim, Won-Ho (2010), "Toward the Resumption and Completion of the Stalemated Negotiations on a Korea-Mexico FTA," in K. Kwon, W. Kim et al., Korea-Latin America Economic Cooperation: Current Status and Future Prospects, Research Backgrounder 10-27. Korea Institute for International Economic Policy, pp. 113-183. (in Korean)

Korea Times, 5/17/2015, "Ecuador calls for ethical buying," http://www.koreatimes.co.kr/www/news/nation/2015/09/176_179064.html (Accessed: January 27, 2016).

Hankyung Daily, 4/6/2016, "Korea-Mexico FTA Resumes?" http://hei.hankyung.com/hub01/201604060874I (Accessed: April 11, 2016)

Lee, Hae Yeon (2015), "Past and Future of Korean FTAs with Latin America and the Caribbean," Presented to the 19th Korea-Latin America Business Forum, Seoul, November 26.

Lee, Kyu-Sung (2006), The Debt Crisis of Korea: Occurrence, Recovery and After. Seoul: Park Young Sa. (in Korean)

Lee, Pierce (2013), "Rules of Origin and the Kaesong Industrial Complex: South Korea's Uphill Battle Against the Principle of Territoriality" North Carolina Journal of International Law 39: 1 (Fall). https://www.law.unc.edu/journals/ncilj/issues/volume39/issue-1-fall-2013/rules-of-origin-and-the-kaesong-industrial-complex-south-koreas-uphill-battle-against-the-principle-of-territoriality/ (Accessed, January 30, 2016).

Lee, T. and I. Cheong (2005), "Korea-Chile FTA and Korea-Singapore FTA: Contents and Evaluation," in J. Rho and I. Cheong, eds. FTA Strategy in the Global Era (Seoul: Haenam), pp. 185-215. (in Korean)

MOTIE (Ministry of Trade, Industry and Energy) (2015), "The Second Round of FTAs Focused on Emerging Economies," Press Release. April 29. http://www.motie.go.kr/motie/ne/presse/press2/bbs/bbsView.do?bbs_seq_n=157194&bbs_cd_n=81 (Accessed, February 10, 2016, in Korean)

Mundo Ejecutivo (2015), "México busca TLC con Corea del Sur," 25 de junio, http://mundoejecutivo express.mx/negocios/2015/06/25/mexico-busca-tlc-corea-sur(Accessed, February 10, 2016).

Pazos, Marcelo (2015), "Korea-Ecuador FTA: Opportunities and Challenges," Presented to the 19th Korea-Latin America Business Forum, Seoul, November 26.

Portafolio (2015), "El TLC con Corea, en vilo en la Corte Constitucional," 7 de septiembre de 2015, http://www.portafolio.co/economia/el-tlc-corea-vilo-la-corte-constitucional (Accessed, February 10, 2016).

SUNS (1989), "Singapore, Korea and Hong Kong Protest GSP Exclusion," Feb. 4. http://www.sunsonline.org/trade/areas/agricult/02040088.htm (Accessed, February 10, 2016).

Yonhap News Agency (YNA) 8/25/2015, "S. Korea, Ecuador declare launch of FTA talks"http://english. yonhapnews.co.kr/business/2015/08/25/7/0502000000AEN20150825003951320F.html (Accessed: January 27, 2016).

Yu, Myung Hee (2005), "Current Status of Korea's FTAs and Policy Direction," in J. Rho and I. Cheong, eds. FTA Strategy in the Global Era (Seoul: Haenam), pp. 157-184. (in Korean)

II. Innovation and skills policies in Latin America and the Caribbean

Andrew Berry

Innovation is increasingly recognised as the key driver of productivity and economic growth. It is central to the sustainability, productivity and competitiveness of an economy as recognised by the new United Nations Sustainable Development Goals (SDGs) adopted in September 2015. Fundamental to the promotion of innovation is the level of investment in research and development (R&D), which fuels technology adoption and furthers skills acquisition. Innovation is changing economies by creating a new demand for technology, advancing skills and knowledge, which in turn raises employment remuneration and improves quality of life (IDB, 2011; OECD, 2010; UNDP, 2015).

Innovation also encourages the creation of new economic sectors and leads to the generation of new firms. Innovation advancements increase knowledge-based production, leading to higher levels of specialization and productivity growth. Moreover, increased innovation is fundamental to raising living standards and stimulating economic growth. At the macro level, long-term growth is determined by the interaction between R&D spending, innovation, productivity and per capita income. Therefore, a high capacity to innovate is a prerequisite for developing countries wishing to catch up and increase living standards (Crespi et el, 2014).

Governments have a key role in raising innovation levels. Public policies and initiatives that adapt to new innovation processes and changes in the global economy can stimulate national innovation efforts. This is done through continuous reform of institutional frameworks and regulations that promote innovation (OECD, 2007). These include the business environment, skills development and international trade, with investment being a common denominator across all three. Investment is an important ingredient in the promotion of innovation, where public funding in both basic and scientific research and education can help develop skills and technological advancements (OECD, 2007). Public investment in assisting start-ups and SMEs generates important linkages and knowledge dissemination. International investment in the form of FDI allows the transfer of advanced knowledge and skills to be adopted from outside sources and fed into the national system (OECD, 2007).

Government interventions are required to support and finance public innovation and research that enables the private sector to innovate. Government instruments include supporting public-private

partnerships, tax credits, offering financial support, reducing business start-up procedures, and supporting the development of clusters and start-up incubators (OECD, 2007).

In recent years countries within Latin America and the Caribbean have adopted more sophisticated innovation models that recognise the key role of science and technology (S&T) and are based on the promotion of public-private partnerships. Furthermore, innovation policies in the region have been influenced by the increasing importance of information and communication technologies (ICTs), which play a central role. As part of the new innovation model most countries have created or improved governance structures to better integrate institutions and facilitate knowledge flows to disseminate innovation between the public and private system (OECD, 2013). This report analyses the innovation policies and initiatives of Latin American and Caribbean countries in order to identify strengths and challenges based on a National Innovation System (NIS) approach.

A. Conceptual framework

The term 'innovation' has evolved in recent times due to the growing acknowledgement that innovation is no longer a linear process that solely originates from science. The linear approach assumed that science was the primary source of innovation. Therefore, it was perceived that increased investment and inputs into science would generate further innovations and technology flows. However, now there is greater acknowledgement that innovation stems from knowledge generation and its diffusion through a complex web of actors and interconnected linkages. Innovation prospers from high levels of collaboration and interaction, and while R&D is fundamental, it is now recognized that innovation seldom occurs in isolation. Moreover, it is not limited to the creation of new products but can occur at any stage and in many forms, such as incremental improvements to processes and the adoption or adaptation of new technology (OECD, 2010; OECD, 1997).

It is within this context that we adopt a more contemporary definition of innovation provided by the Oslo Manual (third edition), where innovation "... is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations" (OECD, 2005). Innovation as defined here provides a broad approach that does not solely point to R&D as the driver of innovation, but acknowledges the influence of a multitude of factors.

Innovation as defined can be thought of as a system of knowledge flows that occur between actors. The nexus between knowledge and innovation is highlighted by a firm's continuous preoccupation to aquire knowledge and transform it into new products or a competitive advantage. Firms are at the center of the innovation system and use channels to external sources from which to extract knowledge. External sources can include universities, other firms, research institutes or international networks. For firms to innovate they need to participate in an innovation system that allows them to develop close linkages with cooperating firms, customers and suppliers as well as institutions and competing firms (OECD, 1997).

The development of the 'national innovation system' (NIS) framework gives rise to the notion that innovation occurs through intrinsic interactions between public policy institutions, businesses, universities and research centers (Padilla, 2013). The NIS places great emphasis on high governmental capacity at all levels to implement policies that support frontier sectors in generating scientific and technological capabilities as well as improving business competition (OECD, 2013). NIS is the main approach for the design and implementation of innovation policies. The premise is that well developed public policies and regulation combined with coordination and trust can foster innovation development (IDB, 2010a).

Although there is no universal definition for an NIS, in the context of this paper it is defined as a "… set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and

implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artifacts which define new technologies" (Metcalfe, 1995).

Knowledge flows determine the level of innovation, therefore measuring codified knowledge such as patents and publications offers an insight into national level knowledge flows. Reviewing national knowledge flows helps to assess fluidity and identify bottlenecks that can feed into policy decisions. Assessing the interconnectedness of science and technology development between government, businesses and academia provides a view of knowledge distribution within a national innovation system (OECD, 1997).

Each country has variations regarding their institutions, policies, economy, social conditions and history, which makes every NIS unique to the requirements of the country. Although the NIS framework is conceptually vague, it allows for analysis of developing countries' innovations systems by identifying the key institutions and actors within the system.

1. Innovation and skills strategies

Investment in innovation is critical for creating new knowledge and ensuring its successful dissemination. Fundamental to the promotion of innovation is the level of R&D investment, which fuels technology adoption and furthers skills acquisition. Moreover, a strong NIS requires a critical mass of highly educated and skilled human capital, especially in the areas of science, technology and innovation (STI). It is for this reason that countries around the world are increasingly positioning education and training at the core of their innovation strategies. It is the pursuit of innovative activities that is the key driver for developing countries to catch up.

Innovation policies are often developed to try and rectify market failures; however, other factors can impede innovation development. There is a strong correlation between political stability, level of corruption, absence of violence, government effectiveness and innovation. Political stability in the region is very heterogeneous with Argentina, Chile, Costa Rica, Cuba, the Dominican Republic and Uruguay all having positive indicators. However, Argentina, Cuba and the Dominican Republic have negative values in government effectiveness meaning they are less effective at implementing policies. Due to internal conflicts Colombia, Mexico and Panama are not considered to have political stability although they have effective governments. The remaining countries have negative values in both government effectiveness and political stability (UNESCO, 2015). Other relevant factors include a country's geography, natural resources, the efficiency of the domestic banking system and regional geopolitics. However, it is not the object of this chapter to discuss these issues further.

Over the past decade, Latin America and the Caribbean has made modest progress in improving its innovation and skills capacities. Several countries have created and improved institutions, methodologies and instruments to step up innovation efforts. Moreover, they increased their penetration rates of information and communication technologies, and improved their coverage of tertiary education. However, as developing countries in Asia and other parts of the world are pursuing more aggressive innovation and skills policies, the region risks falling behind. This section reviews the progress made and key challenges that Latin American countries face and what policies are being implemented to overcome these challenges.

B. National Innovation System governance structures

The design of NIS in the region takes different forms. Argentina, Brazil, Costa Rica, the Dominican Republic, Ecuador and Uruguay all have dedicated science, technology and innovation ministries that oversee the management of their NIS. In 2016, several governments are creating or considering creating such ministries, including Bolivia (Plurinational State of), Chile, Colombia and Peru. Moreover, Chile, Colombia, Mexico and Peru have national councils for science, technology and

innovation (STI). In Chile, the National Innovation Council for Competitiveness (CNIC) provides guidance to the Office of the President of the Republic who leads the NIS. The Mexican National Council on Science and Technology (CONACYT) is an advisory body to the Mexican government that oversees the implementation of the NIS and promotes technical modernization and STI research throughout the country. In Colombia, Colciencias (the Administrative Department of Science, Technology and Innovation) is responsible for the design, coordination, promotion and implementation of STI policies (UNESCO, 2010; UNESCO, 2015; OECD, 2011; OECD, 2012; OECD, 2013; http://www.colciencias.gov.co). Table 5 below shows the main institutions governing NIS of selected Latin American countries.

Table 5
Selected Latin American countries: Institutions governing National Innovation Systems, 2015

Argentina	Ministry of Science, Technology and Productive Innovations (MINCYT)	Science & Technology Burea (GACTEC)	Inter-institutional Council on Science and Technology	Federal Council on Science and Technology
Brazil	Ministry of Science and Technology (MCT)	National Council of State Secretaries for Science, Technology and Innovation Affairs	National Council of State offices for Science, Technology and Innovation	National Council on Science and Technology (CCT)
Bolivia	Vice-Ministry of Science & Technology (VCyT)	Ministry of Education	Inter-Ministerial Committee for Science, Technology and Innovation	
Chile	Inter-Ministerial Committee for Innovation	Presidency of the Republic	National Innovation Council for Competitiveness (CNIC)	
Colombia	Department of Science, Technology and Innovation. (Colciencias)	Ministry of Commerce, Industry and Tourism of Colombia		
Costa Rica	Ministry of Science, Technology and Telecommunications (MICITT)	National Scientific and Technological Research Council (CONICIT)		
Dominican Republic	Ministry of Higher Education, Science and Technology (MESCyT)			
Ecuador	Ministry of Higher Education, Science, Technology and innovation (SENESCYT)	The Ministry Coordinator of Knowledge and Human Talent (MCCTH)		
Mexico	General Council for Scientific Research and Technological Development	National Science and Technology Council (CONACYT)	Scientific and Technological Consultative Forum (FCCyT)	
Peru	National Science, Technology and Technological Innovation Council (CONCYTEC)	Office of the President of the Council of Ministers (PCM)		
Uruguay	Ministerial Cabinet for Innovation (GMI)	Innovation, Science and Technology for Development Office (DICYT)		

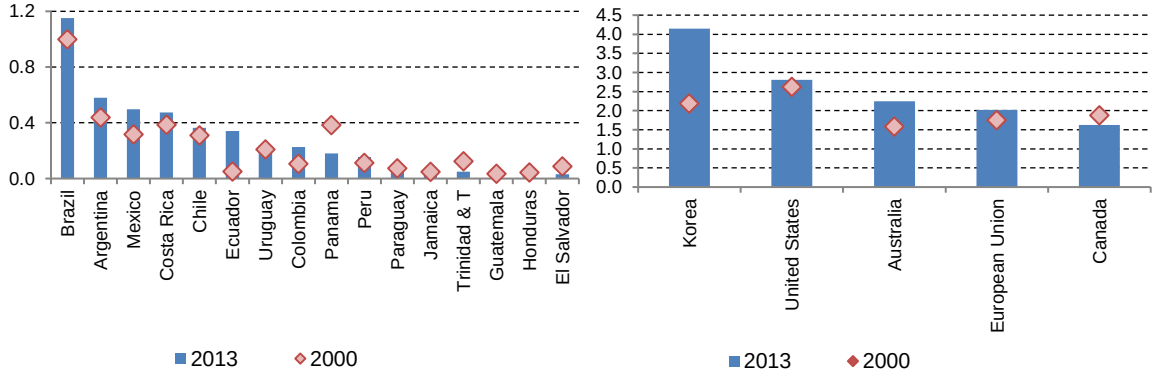
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Lemarchard, G.A. (2010), "National Science, Technology & Innovation systems in Latin America and the Caribbean", Science Policy Studies and Documents in LAC, No. 1, UNESCO, Montevideo.
Note: This table has been updated according to information drawn from government websites.

In many countries in the region, NIS suffer from incohesive management and insufficient coordination. Few countries have adopted policy evaluation mechanisms that ensure policies are implemented as designed. Moreover, lack of capacity to evaluate and monitor implemented programs fails to provide essential feedback to policy designers and limits action for improvements. Policy design and coordination issues can lead to project duplication between ministerial departments. Few countries have developed institutions to monitor private sector developments with the ability to forecast future skills requirements, which is essential for coordination between the public and private sector (Fundación Telefónica, 2011; OECD, 2012; Padilla, 2013).

C. Funding mechanisms

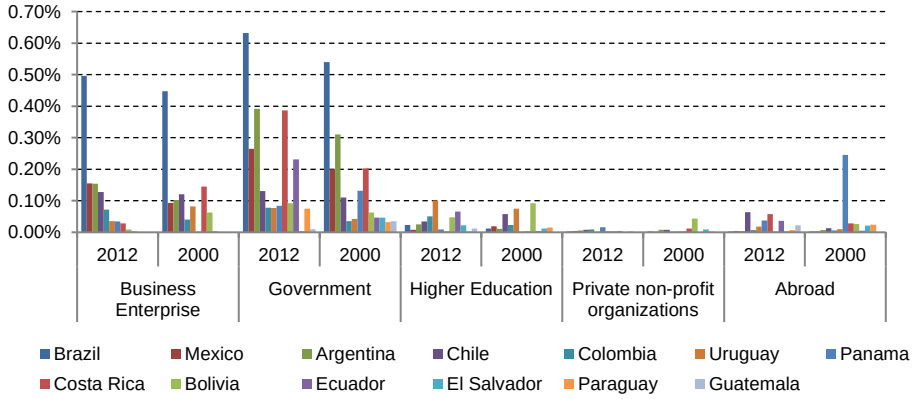
Investment in R&D in the region continues to be low compared to developed countries. Brazil was the only country in the region with a level of spending above 1% in 2013 (see figure 1). In addition to Brazil, only Argentina, Mexico and Costa Rica had expenditure levels above 0.4% of GDP. However, in all countries, the expenditure increased as a share of GDP between 2000 and 2013, with the exception of Panama, Trinidad and Tobago and El Salvador. One additional drawback is that most of this spending comes from the public sector, which focuses primarily on basic instead of applied research. In contrast to developed countries, R&D investment by the private sector accounts for only one-third or less in the majority of countries in the region (see figures 2 and 3).

Figure 1
Selected countries and groups: R&D expenditure, 2000 and 2013
(Percentages of GDP)



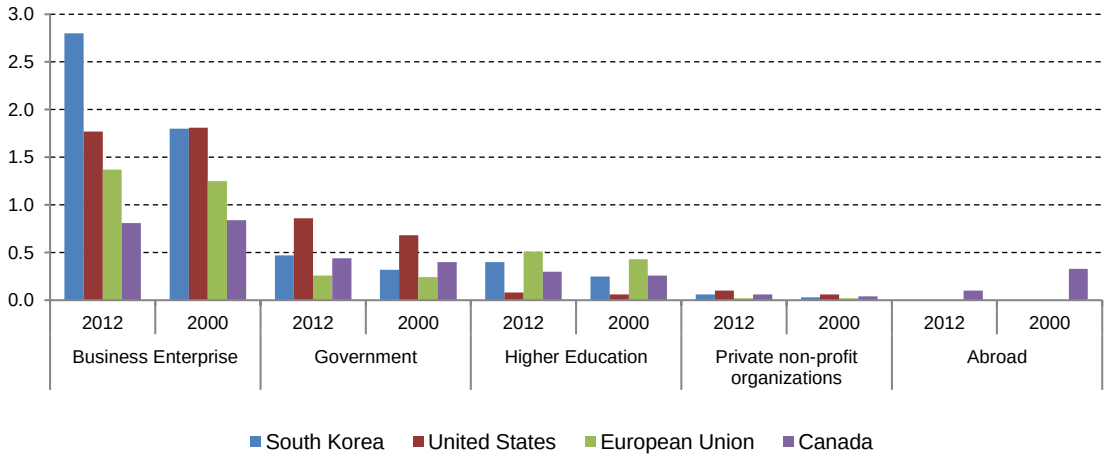
Source: Economic Commission for Latin America and the Caribbean (ECLAC), based on World Bank World Development Indicators.

Figure 2
Selected Latin American countries: R&D expenditure by source as a percentage of GDP, 2000 (or nearest available year) and 2012 (or latest year available)



Source: Author, based on data from Red de Indicadores de Ciencia y Tecnología Iberoamericana e Interamericana (RICYT) [online] http://www.ricyt.org/indicadores.

Figure 3
Selected countries and groups: R&D expenditure by source as a percentage of GDP, 2000 (or nearest year available) and 2012 (or latest year available)



Source: Author, based on Eurostat data.

Some governments have explored new sources of income to promote innovation in addition to general tax revenues. For example Chile, Colombia and Peru have sought to generate funds through royalties from natural resource extraction (UNESCO, 2015). Argentina, Brazil, Mexico and Uruguay have remodelled their funding policies based on the sectoral model, which allows rents to be gained from specific sectors (UNESCO, 2015). The sectoral model seeks to generate bigger impacts in shorter timeframes, and requires greater dialogue with public and private stakeholders to identify priority areas and develop tailor-made solutions. Sectoral policies provide support for sectors that have high export potential, are susceptible to external competition or show signs of strong growth (Szirmai et al., 2013).

While few countries in Latin America provide fiscal incentives for private sector R&D (Brazil, Chile, Colombia and Uruguay), most have innovation funds that distribute resources to private funds for innovation projects on a competitive basis (Navarro et al., 2016). For example, in Argentina

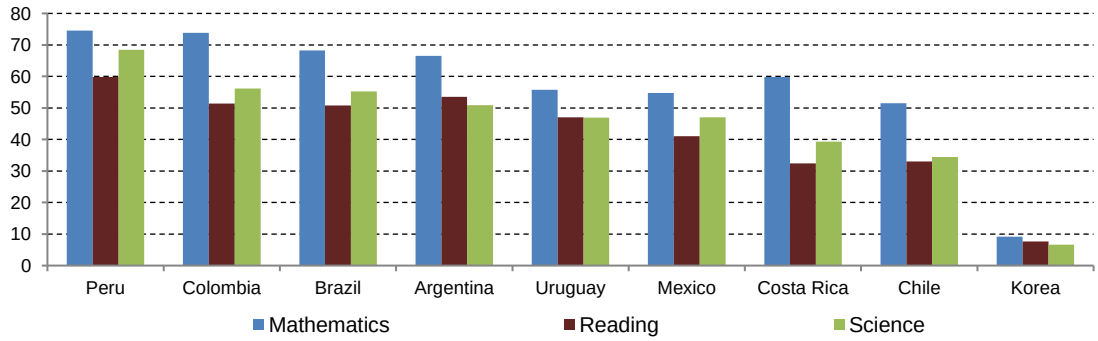
FONTAR (Fondo Technológico Argentino) has been supporting firm innovation through non-reimbursable funding, reimbursable funding, credits for innovation, tax credits and matching grants (Crespi et al, 2014). In Colombia, COLCIENCIAS provides funding for firm innovation. The fiscal return of these funds is mostly positive, because the expanded tax revenues by innovative firms are higher than the cost of the funds promoting innovation.

D. Skills development

During 2000 to 2012 there was a very positive increase in education as a percentage of GDP in most CELAC countries. Nevertheless, the region continues to face challenges in producing high quality skilled workers. The shortfall of skilled workers in Latin America means that 36% of firms in the formal sector find it difficult to find workers, compared to the global average of 21%. The root cause of the problem is the insufficient provision of quality education (ECLAC, 2015a).

The lower quality of education is illustrated by the OECD's 2012 Program for International Student Assessment (PISA) data for selected Latin American countries and the Republic of Korea. Figure 4 shows the share of low performers based on exams taken by 15 years old in the areas of mathematics, reading and science. Over 50% of students in participating Latin American countries had low scores in mathematics and over 40% in science (except Chile and Costa Rica). In contrast, the share of low performers in Korea was below 10% in all three categories, with science showing the lowest rate at 6.6%.

Figure 4
Selected Latin American countries and Republic of Korea: Low performers in mathematics, reading and science, 2012
(Percentage of total 15-year old students)

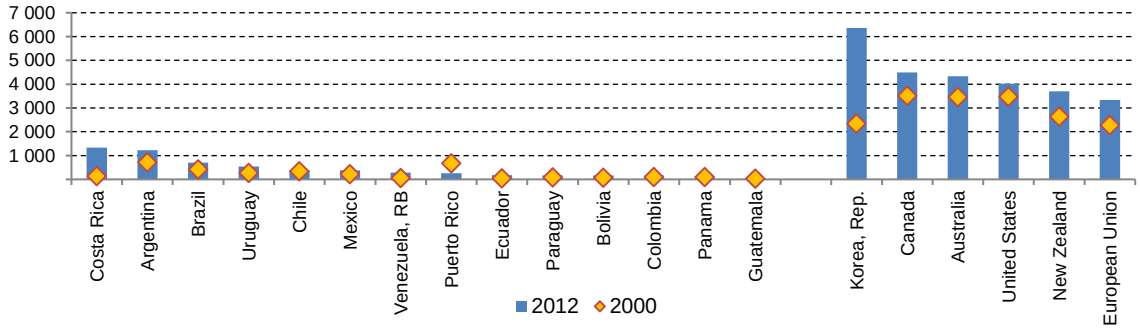


Source: Economic Commission for Latin America and the Caribbean (ECLAC) based on the OECD PISA 2012 Database.

In addition to low levels of primary and secondary school education, the region generates relatively few researchers. Moreover, the most popular fields of graduate studies are social sciences followed by medicine instead of science and technology studies, in contrast to Korea and developed countries (see Figure 5).

A strong innovation system requires a critical mass of graduates in the field of engineering and technology. Graduates in such fields are needed to innovate, be creative and conduct cutting edge research. They also act as a link between the public and private sectors as well as having the potential to adapt new innovations to national requirements (IDB, 2010a). The total number of engineering and technology university graduates in Latin America and the Caribbean in 2012 amounted to 314,480. The majority had graduated at degree level (320,065), with few masters' graduates (13,500) and even fewer PhD graduates (2,477). Social sciences are the most popular field of study for Degree and Master courses while Humanities is the most popular for PhD programs (see table 6).

Figure 5
Selected CELAC and advanced countries: Researchers in R&D, 2000 and 2012
(Per million people)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), based on World Bank, World Development Indicators database.

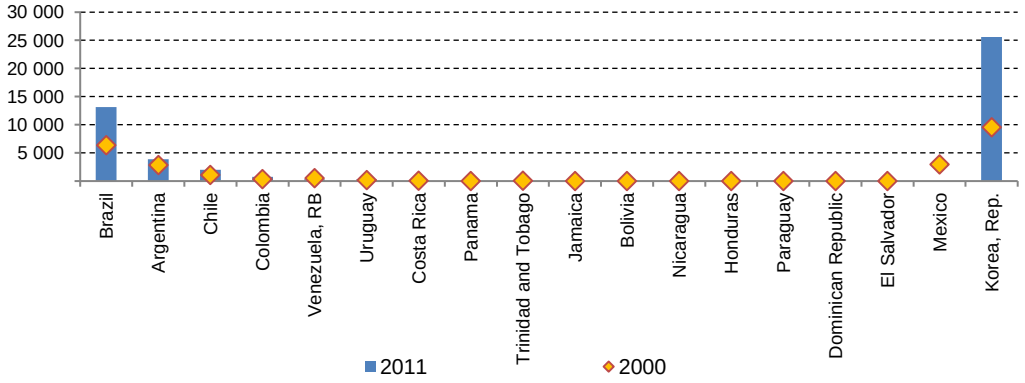
Table 6
Latin America and the Caribbean: Total number of university graduates at each level and by field of study (2012)

	Degree graduates	Masters graduates	PhD graduates
Social Sciences	1 185 645	63 992	3 980
Medical Sciences	320 065	12 792	3 036
Engineering and Technology	298 503	13 500	2 477
Humanities	135 957	32 142	6 749
Natural and Exact Sciences	118 984	8 448	3 362
Agricultural Sciences	52 399	6 917	2 319
Total	**2 111 553**	**137 791**	**21 923**

Source: Author, based on data from Red de Indicadores de Ciencia y Tecnología Iberoamericana e Interamericana (RICYT) [online] http://www.ricyt.org/indicadores.

The low number of publications being produced in the region in the field of science and technology can be explained by the lack of researchers in this area. Moreover, the number fell between 2000 and 2011, with the exception of Brazil (see figure 6).

Figure 6
Selected CELAC and Korea: Number of Scientific and Technical journal articles, 2000 and 2011



Source: Economic Commission for Latin America and the Caribbean (ECLAC) based on World Bank, World Development Indicators.
Note: No data available for 2011 for Mexico.

The poor education performance in science, technology and innovation in the region are caused by a combination of factors. The primary causes include a mismatch between supply and demand, public research doesn't meet the needs of the private sector and there is a lack of applied research. Regional companies also exacerbate the situation by adopting existing technology rather than recognizing the importance of conducting their own research and development. Therefore, research centers and universities produce graduates with skills and ideas that do not benefit the private sector, leading to brain drain within the region (Navarro et al., 2016).

Several governments in the region have increased efforts to prevent the brain drain affect and seek to attract innovators and highly skilled human capital from key innovative industries. In addition to traditional policy instruments, such as strengthening technical secondary education and scholarships, other instruments are being introduced such as encouraging and accommodating returning doctorates from abroad and adopting brain circulation initiatives that attract scientific diaspora. Well-funded initiatives to attract scientific diaspora have been developed in Argentina, Brazil, Colombia, Ecuador, Mexico and Uruguay (Navarro et al., 2016).

In Argentina, the Raices Program (Red de Argentinos Investigadores y Cientificos en el Exterior) was created in the mid-2000s to incentivise Argentinian scientists that had emigrated abroad to return. The programme offers financial incentives such as a 'return allowance' and a return flight. The program successfully repatriated 820 scientists back to Argentina between 2003 and 2013 (Arvanitis and Gaillard, 2014; Fernandez Roich, 2013).

Brazil launched a project called 'Science without borders' which seeks to attract science and technology researchers and scientific leaders from abroad and increase mobility of undergraduate and graduate researchers. The programme was launched in 2011 and is primarily funded by the Brazilian Government. Scientists moving to Brazil can expect, the same salary as in their home country, financing projects to be performed locally and extended stays in Brazil. The programme offers 101,000 scholarships to study at the world's best universities for high achieving Brazilian students (Arvanitis and Gaillard, 2014; Horta, 2013).

Another initiative currently being implemented in Brazil is called FINEP. Its mission is "to promote Brazil's economic and social development through public funding for science, technology and innovation at companies, universities, technological institutes and other public or private institutions". FINEP offers both reimbursable and non-reimbursable grants for research institutes and firms. The grants support basic and applied research, product innovation and development and services and processes.[8]

Chile created 'Start-up Chile' with the aim of attracting worldwide entrepreneurs to start businesses in Chile and enable knowledge dissemination to local entrepreneurs. Other efforts include subsidizing the recruitment of scientists and engineers with advanced degrees as a way to insert researchers into industry (Navarro et al., 2016). In 2003, Mexico created the Networks of Talents for Innovation, which develops networks in large North American cities to attract Mexican diaspora to business opportunities in innovation in Mexico (Horta, 2013).

ICT in the area of education is key in promoting innovation and technical ability in school children. Therefore many countries including Brazil, Chile, Mexico, Guatemala, Costa Rica and Colombia are working to provide training programmes for educators and other personnel within the education system. The Enlaces programme in Chile is responsible for training 110,000 teachers (over 80% of public school teachers) in ICT skills (ECLAC, 2008).

In Uruguay ICT was adopted into education in 2007 through a programme called *Conectividad Educativa de Informática Básica para el Aprendizaje en Línea* (CEIBAL). The aim was

[8] http://finep.gov.br/our-programs

to provide access to information and modern learning tools by providing one laptop per child. The program began by providing laptops to teachers and primary school children before expanding to secondary school children. The project incorporated training for primary teachers and evaluation mechanisms to gauge the impact of learning through the use of technology. Over 750,000 students and teachers are in possession of their own laptops. The project has now been expanded to include 'Ceibal en Ingles', which aims to improve English learning in schools. The project is partnered with the British Council, and allows English lessons to be conducted in classrooms via videoconference. In 2015, 76,000 students benefited from weekly English lessons[9] (LATU, 2007).

The majority of countries in the region have incorporated the need to improve science, technology and innovation into their national education strategies. Argentina's national education strategic plan 2012 - 2016 aims to promote technical education that enables youth to find work and meet the demands of businesses in technical innovation. The plan includes improving the quality and relevance of professional education that bridges the gap between secondary and higher technical education as well as vocational training (Consejo Federal de Educación Argentina, 2012). In 2012, with the aim to produce one engineer per 4,000 inhabitants by 2016, the Worldwide Forum on Engineering Education in Buenos Aires was launched followed by the Strategic Plan for Engineering. Furthermore, 2,000 additional engineering scholarships were added to the existing 12,000 scholarships (Fernandez Roich, 2013).

The Bolivian strategy (2004 – 2015) includes a Programme for Strengthening Technical and Technological Training (FFTT). FFTT is a pilot project aimed at implementing new types of training in technical and technological areas for primary and secondary students in order to strengthen individuals' capacity (Republica de Bolivia Ministerio de Educacion, 2003). Costa Rica, as part of its National Development plan 2015 – 2018, aims to increase the education budget to the equivalent of 8% of GDP. The government also plans to develop skills in the use of ICT to innovate in the teaching and learning process (Gobierno de Costa Rica, 2014).

The National Development plan 2013–2018 in Mexico prioritises education as one of the five national goals. The plan acknowledges the importance of quality education for development. One of the six objectives is to promote science and technology education as an essential element for the transformation of Mexico into a knowledge society (Gobierno de Mexico, 2013). The Dominican Republic developed a 10-year plan that will run from 2008 – 2018. The plan covers 5 specific areas including education quality, curriculum, planning, modernization, teacher services and students. The objectives include increasing the level of mathematics and consolidating all dimensions of science and ICT at all levels of the education process (Republic Dominicana Secretaría de Estado de Educación, 2007).

In 2004, Brazil implemented the 'ProUni' project designed to allow high performing students from underprivileged backgrounds to access private universities through government subsidies. Since 2004, the program has assisted over 120,000 students a year to gain higher education (Horta, 2013). Another initiative is called "bringing higher education to the countryside" (interiorização da educação superior). This initiative provides higher education through distance learning and helps raise the education level of teachers around the country. Due to advances in ICT, distance learning and online courses help promote science, technology, engineering and mathematics in education in the country. In order to promote the importance of engineering a 'Problem Based Learning' (PBL) methodology approach has been adopted in engineering and computer science. PBL stimulates critical thinking in students and encourages interaction and teamwork (Horta, 2013).

Chile has developed a number of programmes to further the development of its human resources. In 2009, the Associative Research Programme (PIA acronym in Spanish) was formed to strengthen its scientific base so that research findings can benefit other sectors of the country. Through

[9] http://www.unesco.org/new/en/education/resources/online-materials/single-view/news/technology_serving_social_justice_ and_ education _in_ uruguay/#.VyINvKMrKRt

both national and international associations the programme aims to consolidate centres of science and technology. In 2010, the programme was responsible for the start-up and continual funding of 20 Research Rings in Antarctic Sciences and Science and Technology. The Regional Programme was developed to promote and strengthen regional science, technology and innovation capacity. The project creates and manages regional centres which coordinate STI activities based on thematic areas determined by regional authorities (CONICYT, 2011).

In 1988, the Chilean government developed the Programme of Formation of Advanced Human Capital, designed to increase the number of highly skilled and knowledgeable researchers and professionals. Through the provision of scholarships the programme promotes further education in masters and PHD courses both within Chile and abroad. The country also supports a programme for the attraction and insertion of advanced human capital into academia and productive sectors. In addition, they also attract foreign scientists and support companies to develop their own R&D. The aim is to strengthen accredited academic institutions and research centres in their scientific and technological capacity and explore areas for international collaboration. The EXPLORA programme was created in 1995 with the aim of disseminating science and technology into Chile's society, especially children and young people. The project operates in all of Chile's 15 regions and promotes the social value and dissemination of science and technology (CONICYT, 2011).

As part of Mexico's Special Programme for Science, Technology and Innovation (2014–2018), funding was increased by 20% in 2014 for science and technology. Government initiatives include increasing the number of research positions and international scholarships to create linkages with the international scientific community. Mexico is also strengthening intellectual property regulation and its Knowledge Transfer Offices in order to promote and commercialise public research (OECD, 2015a).

In Uruguay researchers are encouraged to find part-time or full time employment as a way to improve skills and create a bridge between the public and private sectors. Moreover, professors can either reduce their workloads or take time off from university duties while remaining as members of the faculty in order to work in the business sector (Thorn and Soo, 2006).

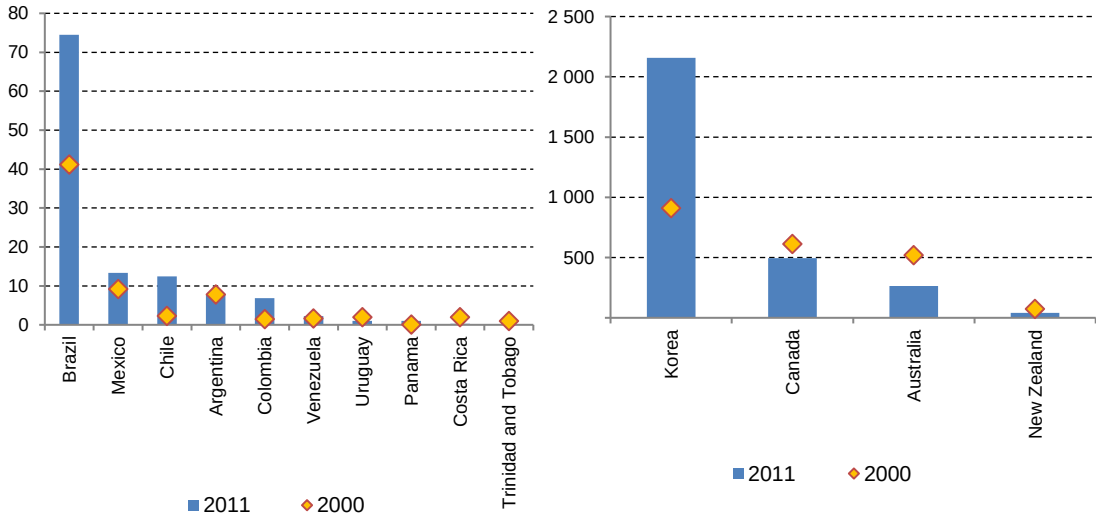
Research centres in the region are also being developed or revamped with increased funding to better provide human capital for the needs of industry. Two examples include Argentina (Instituto Nacional de Tecnología Agropecuaria, INTA) and Colombia (Centro Educativo Nacional de Inglés y Sistemas, CENIS) (Navarro et al., 2016).

E. Patents, entrepreneurship, start-ups and funding

The number of triadic patents registered by the region between 2000 and 2011 suggests that regional entrepreneurship is low and that firms aren't competing at an innovative level. With 75 patents in 2011, Brazil outperformed Mexico by almost 7 times (see figure 7). However, data from Brazil in 2013 shows that non-resident applications were by far the largest contributer at almost three times the amount of residential applications. The number of 'green' patents filed in Brazil by transnational firms such as Whirlpool, Fiat and Dow amounted to 20% in 2014 (ECLAC, 2015b).

Since 2012, several CELAC countries (especially Chile, Colombia, Mexico, Panama, Peru and Uruguay) have targeted policies to assist entrepreneurs and start-ups (see table 7). Chile introduced 'Start-Up Chile' in 2010, Colombia launched INNpulsa in 2012, Mexico created INADEM and Peru launched 'Start-up Peru'. These countries are now advancing beyond the experimental stage and evolving their instruments to adapt to the needs of global entrepreneurial ecosystems. Some countries are not only implementing traditional financial support instruments such as seed, angel and venture capital but are seeking or implementing crowdfunding mechanisms (OECD, 2015b).

Figure 7
Selected CELAC and advanced countries: Triadic patents, 2000 and 2011
(Number)



Source: Economic Commission for Latin America and the Caribbean (ECLAC) based on data from the Organization for Economic Cooperation and Development (OECD), OECD.Stat.
Note: No data available for 2011 for Bolivia, Costa Rica, Guatemala, Peru and Paraguay.

Table 7
Selected countries in Latin America: Targeted policy tools to promote start ups, 2015

Category	Tool	Argentina	Brazil	Chile	Colombia	Mexico	Peru
Financing	Seed Capital	In development	Implemented	Implemented	Implemented	Implemented	Implemented
Crowd-funding			recently created	recently created	Needs to be created or reformed	recently created	
Angel Investors		Implemented	In development	recently created	Implemented		
Venture Capital		Implemented	Implemented	Implemented	In development	Implemented	
Business services and entrepre-neurial training	Incubators	Implemented	Implemented	Implemented	In development	Implemented	recently created
	Accelerators	In development	Implemented	Implemented		In development	Implemented
	Technology transfer and university spin-offs	In development	Implemented	In development		Implemented	
	Business training	Implemented	Implemented	Implemented	In development	In development	In development
Regulatory framework	Ease of creating or closing down business			In development	In development	In development	In development
	Taxation and special legislation		In development	In development		Recently created	

Source: Aurthor based on OECD (2013), Start-up Latin America: Promoting innovation in the region, Paris.
Note: Some parts of this table have been updated with information from government websites.

In addition, some countries in the region are building traditional support systems using mentoring networks and replacing traditional incubators with new agile ones. Such incubators are less

expensive and offer co-working spaces that reduce administrative costs. Moreover, new entrepreneur networking facilities are being developed to assist the creation of new businesses and support entrepreneurs to develop their business.

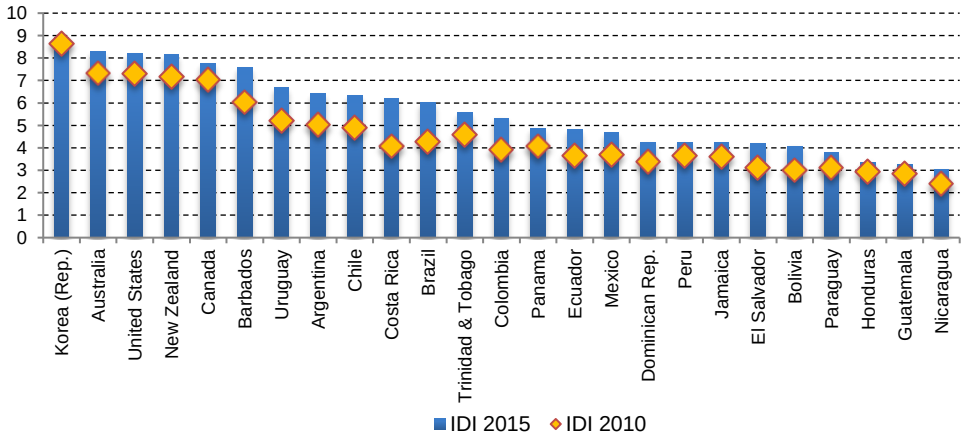
F. Digital economy

The explosive growth of ICT over the last decade has created a digital economy made up of ICT services, hardware and software, broadband networks and end users. The digital economy provides a platform for the creation, production and consumption of new goods and services, as well as allowing new ways to add value to existing goods and services. ICT networks also facilitate the diffusion of knowledge and connectivity between governments, firms and societies.

Over the past decade, the countries of the region made great progress in the use and integration of digital technologies, but continue to face important challenges. In the last decade the number of Internet users more than doubled, reaching 54% of the population in 2015 (ECLAC, 2016), while there are 700 million mobile phone connections. Several countries in the region are among the most intensive users in the world of social networks. Nevertheless, the region faces restrictions in infrastructure supply, regulation and service affordability. Moreover, it faces challenges to update existing infrastructure to greater fiber-optic capacity. In this context, mobile broadband provides high potential for economic development by allowing greater Internet dissemination. Mobile broadband provides wider coverage with greater affordability (ECLAC, 2013; ECLAC 2015c; Navarro et al., 2016).

The region has progressed at varying levels in terms of digital advancements. The least advanced countries failed to close the Internet penetration gap with more advanced countries in the region between 2006 and 2014 (ECLAC, 2015c). A well-respected indicator of a country's ICT infrastructure level is the ICT Development Index (IDI) produced by the International Telecommunications Union (ITU). The IDI provides an overall ranking of a country's performance against a set of three key indicators: access to ICT, level of use and level of skills. Over the last five years many countries have improved their performance in ICT (see figure 8). However, ICT levels in the region vary widely, with some countries closing the gap with leading economies while others continue to lag behind. For example, while Costa Rica climbed 23 places between 2010 and 2015, Peru dropped 13 places. Korea, on the other hand, was ranked number 1 in the world in both 2010 and 2015 (ITU, 2015).

Figure 8
ICT development index scores, 2010 and 2015



Source: Author, based on Global ICT development data.

Various countries in the region have been developing national plans to improve their digital infrastructure since the early 2000s, encouraged by the World Summits on Information Society and the Millennium and Sustainable Development Goals. Moreover, some countries in the region are now on their third or fourth generation digital strategy, such as Chile, Colombia, Mexico and Uruguay. These agendas aim to improve the role of technology to drive economic growth, sustainable development and social inclusion. Moreover, governments have created financial support instruments such as grants and loans for ICT development, including strengthening broadband infrastructure and promoting greater access to telecommunication services. Another key element of the digital economy is the protection of users through privacy and personal data protection instruments. In 2014, 67% of Latin American countries had laws in place, whereas the percentage was much lower in the Caribbean (39%) and Central America (38%) (ECLAC2015c).

G. Regional cooperation

Regional cooperation is important in fostering knowledge and innovation in a highly competitive world (De la Mothe and Paquet, 2012). Regions provide the environment and infrastructure that drives innovation and enables knowledge generation and dissemination. The regional integration of innovation policy instruments has the potential to dramatically increase opportunities to overcome restraints such as market size and scope (Navarro et al., 2016). Furthermore, international cooperation is being promoted by the 2030 Agenda for Sustainable Development in the area of science, technology and innovation. Initiatives of the Agenda aim to promote science-policy interactions, STI facilitation and innovation capacity building. Specifically, Goal 17.6, which calls for enhanced regional and international cooperation (both South-South and North-South), aims at enhancing knowledge sharing through global technology facilitation mechanisms (Giovannini, Enrico et al., 2015).

There are several regional cooperation initiatives in the areas of STI and ICT. Some of the most important are listed below.

The South American Council of Science, Technology and Innovation (COSUCTI) was created in 2012 by the 12 member countries of the Union of South American Nations (UNASUR). Its objective is to promote regional cooperation on STI. At its third meeting, held in Ecuador in July 2014, ministers set a priority for COSUCTI to conduct joint research projects. Among the areas prioritized were new technologies, bio-knowledge and renewable energy. Moreover, it has been tasked with developing mechanisms that strengthen intellectual property rights and technology transfer. Joint research projects should focus on common problems in UNASUR member countries. COSUCTI suggested that Yachay City of Knowledge in Ecuador become a regional laboratory for the generation of knowledge, new technologies and innovation.

The Regional Fund for Agriculture Research (FONTAGRO) acts as a unique mechanism for cooperation between Latin American and Caribbean countries and Spain. It is a consortium of 15 member countries that finance innovation and research in agriculture. Projects are defined by the board of directors who are representatives from each member country. FONTAGRO promotes innovation in food security, family farming and competitiveness. The organisation is sponsored by the Inter-American Development Bank (IDB) and the Inter-American Institute for Cooperation on Agriculture (IICA).

FONTAGRO funds are responsible for generating 35 new technologies and knowledge sources, 15 new technologies in Latin America and 4 new technologies at the global level. According to their data, 69% of their projects have been adopted by end users and 77% incorporated into national research and innovation systems. The projects include a wide range of innovations focused on adding value to products, improving production and processing systems and helping small farmers to gain access to markets. An example of one of their projects is the adoption of technology in Argentina and the Dominican Republic in the area of beekeeping. The project used technical advances to produce

honey without antibiotics, which reduced behive mortality rates and allowed producers to certify that their honey was organic in international markets. (IICA and IDB, 2014; FONTAGRO; 2015).

The Regional Broadband Observatory (Observatorio Regional de Banda Ancha, ORBA) supports regional dialogue and provides information that assists countries to develop and monitor public policies for universal broadband. It is composed of 11 countries (Argentina, Brazil, Plurinational State of Bolivia, Chile, Colombia, Costa Rica, Ecuador, Mexico, Paraguay, Peru and Uruguay). Its activities include: developing indicators about broadband services including diffusion (fixed and mobile), affordability and quality (upload/ download speeds and latency). They also collect, systematize and disseminate policy information and prepare reports in relevant areas.[10]

The Ibero-American and Inter-American Network on Science and Technology Indicators (RICYT) is an organization that conducts analysis on science and technology in Ibero America (plus Portugal and Spain). They promote the development of measurement instruments to further international cooperation and assist in decision making processes. Specific activities include designing indicators to measure Ibero-American countries' STI performance. They also organise international workshops and publish their analysis of STI in the region. The latest project to be conducted by RICYT is 'Technical assistance to improve the production of research and development (R&D) indicators at the government sector in six countries of Latin America and the Caribbean'. The project seeks to improve the provision of information about R&D resources and activities. RICYT will work with each of the six countries' National Agencies of Science and Technology as part of the project.[11]

The Ibero-American Observatory of Science, Technology and Society (OCTS), established in 2008 by the Organisation of American States (OAS), is dedicated to researching and disseminating evidence about the challenges, capabilities and opportunities for science and technology within Latin American countries. Moreover, it conducts analysis on current skills for conducting scientific research, innovation and technological development. The observatory works closely with RICYT.[12]

The eLAC action plan was adopted in 2005 to improve the region's ICT performance, in accordance with the Millennium Development Goals and the World Summit on Information Society (WSIS). ECLAC is eLAC's acting technical secretariat, providing a platform for information exchanges between stakeholders, monitoring progress and publishing reports. The latest action plan (eLAC2015), adopted in Lima, Peru in 2010, provides a roadmap from 2010 to 2015. The plan was established through open consultation between stakeholders from the public, academic and private sectors on eight key strategic areas including: access, e- government, the environment, social security, productive development and innovation, enabling environment, education, and institutional structure for State policy. There are three mechanisms of coordination and cooperation, including a ministerial conference, presiding officers and national focal points. eLAC2015 has ensured political commitment to furthering ICT development in the region so as to ensure universal broadband access as well as improvements in health care services, education, e-government, security and SMEs access to ICT (ECLAC, 2013).[13]

The Latin American and Caribbean Collaborative ICT Research Federation (LACCIR) was created in 2007 by the Inter-American Development Bank and Microsoft Research with the aim of creating a virtual collaborative environment for universities in the region. Research conducted through LACCIR is concentrated on regional problems including education, healthcare, e-government, micro-economies, and environment and climate change.[14]

10 http://www.cepal.org/es/observatorio-regional-de-banda-ancha.
11 http://www.ricyt.org/.
12 http://observatoriocts.org/index.php?option=com_content&view=category&layout=blog&id=3&Itemid=2.
13 www.cepal.org/elac2015/default.asp?idioma=IN.
14 http://www.laccir.org/laccir/portals/0/laccir_brochure/index.html.

The Latin American Cooperation of Advanced Networks (redCLARA), established in 2003, is a non-profit international law organisation. Its goal is to develop a strong ICT infrastructure among regional countries to facilitate joint projects and communication among researchers. Since 2008, over 729 universities across the continent have been linked into to the network with speeds up to 622Mpbs. RedCLARA has helped to provide essential infrastructure that had previously been inaccessible due to high cost (ECLAC, 2008).

Created in 1970, Convenio Andrés Bello for education, science, technology and culture is an organization with international and intergovernmental legal status. It works to increase the development of education, science, technology and culture within its twelve member countries.[15]

The Commission for the Scientific and Technological Development in Central America and Panama (CTCAP) was established in 1975. It encourages linkages between member countries' national science and technology bodies to generate scientific policies and develop an STI strategic regional plan. The Secretariat of Central American Integration (SICA) defines CTCAP rules of operation and constitution. The CTCAP 2007 plan aims to strengthen regional capacity in knowledge management and innovation, establish regional research centres of excellence networks and modernize STI funding so that the coverage level of resources and access to new sources of cooperation can be increased (ENLACE, 2013).

H. International cooperation

Korea is one of the leading players engaging with Latin American and Caribbean countries to improve their innovation and skills development. Korea has transformed itself from a poor, war torn country and an aid recipient to a model for developing countries and an aid donor. It is within this context that the Korean Ministry of Strategy and Finance (MOSF) developed the Knowledge Sharing Program (KSP). Since 2004, the program aims to reduce the knowledge divide by sharing Korea's knowledge and development know-how with partner countries. The program recognizes the importance of knowledge sharing as an effective development tool due to Korea's own experience of learning from advanced countries. KSP programs comprise of high level policy consultations customized to the needs of partner countries. KSP's also include training opportunities, in-depth analysis and modules of action according to Korea's own experiences.[16] Table 8 shows all the KSP projects that Korea has undertaken with regional countries.

Each KSP follows the same program cycle, starting with Demand Identification (Demand survey and a high-level demand identification), Policy Research (Pilot study visit, local reporting workshop & additional visits, interim reporting & policy practitioners' workshop), Policy Consultation (Final reporting workshop & senior policy dialogue, dissemination) and finally Monitoring & Evaluation (Monitoring, evaluation), see figure 9 (KIM, 2012).

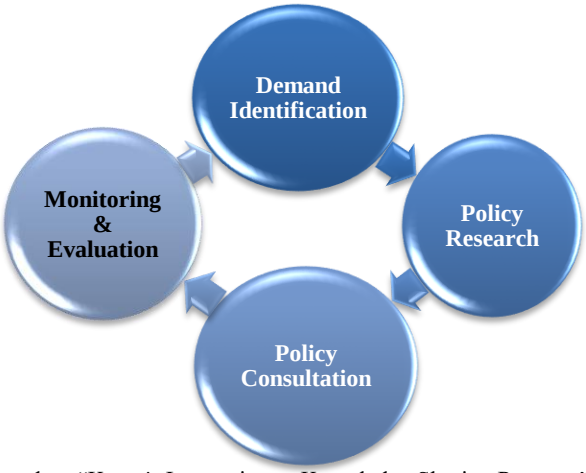
[15] http://convenioandresbello.org/inicio/que-es-el-cab/.
[16] http://www.ksp.go.kr/ksp/ksp.jsp.

Table 8
Republic of Korea's knowledge sharing projects within Latin America and the Caribbean

Partner country	Participation Year	Project Name
Belize	2014	Formulation of a National STI Strategy and Action Plan and Establishment of a Belize-Korea Science, Technology and Innovation (STI) Institute
Brazil	2013	Promoting Agricultural Innovation for Nurturing Smallholder Farmers in Brazil
	2012	Establishment of Science and Technology Parks in Colombia 2. Promotion of Local Economic Development
Colombia	2014	Attraction of Investments for Industries and IT-based Productivity Enhancement for SMEs
	2015	Upgrading the International Competitiveness of Colombian Enterprises: Focusing on R&D and Export Capacities
	2013	KSP for the Design and establishment of a National Multi-Sectorial Competitiveness Strategy.
Costa Rica	2014	Strengthening institutions and support mechanisms to foster innovation in Costa Rica
	2015	Development of Human Resources in Science and Technology
Ecuador	2012	Ecuador's Production Matrix Transformation (Yachay - City of Knowledge)
El Salvador	2014	Policy Consultation on National R&D Policy and Ecosystem for Three Strategic Industries: Plastic, Chemical & Pharmaceutical and Textile Industry
	2015	Implementation Plan for Innovation Ecosystem and National Competitiveness Program for SMEs
Guatemala	2014	Policy advice to enhance the capacity of the public sector and the economy in Guatemala
	2015	2015/16 Knowledge Sharing Program with Guatemala
Honduras	2011	Honduras National ICT Master Plan
	2012	Feasibility Study/Research for the Implementation of the Honduras National ICT Master Plan
	2013	Strategies on strengthening the national competitiveness of Honduras: Focus on strengthening competitiveness of SMEs development and e-government
Mexico	2012	Promotion of Mechanical Parts Industry, and Technical Manpower Development and Promotion of Industry-Academy Cooperation in Hidalgo of Mexico
	2013	Policy Consultation to Strengthen Economic Capabilities of Four Mexican States
	2014	Enhancing Innovation Capacities for Sustainable Development of the Mexican Economy
	2015	Enhancing Innovation Capacities for Sustainable Development of the Mexican Economy
Nicaragua	2015	2015/16 Knowledge Sharing Program with Nicaragua
Peru	2010	Linking with the New Era of Development: CEPLAN of Peru and the Integrated Information System
	2013	Policy Recommendations for Capacity Building of Peru's Knowledge Economy

Source: Economic Commission for Latin America and the Caribbean (ECLAC), based on website of the KSP program.

Figure 9
KSP program cycle



Source: Prepared by author based on "Korea's Innovation to Knowledge Sharing Program", KIM, Jang Saeng. (2012).

KSP projects cover a wide spectrum of areas, including transport, public health, trade, agriculture, industrial organisation, corporate finance and governance, and development planning and policy, to name a few. KSP's have been successful in assisting partner countries to achieve their aims and objectives. For example, in 2012, the Brazilian Agricultural Research Corporation (EMBRAPA) applied for a KSP called 'Promoting Agricultural Innovation for Nurturing Smallholder Farmers in Brazil'. The Korean researchers who visited Brazil focused on building cooperatives and strengthening legal frameworks, enhancing post-harvest management technology and providing policy recommendations that would help increase the trade of animal and agricultural products between their countries. Another example is the KSP initiated by Colombia in 2014 to upgrade its international competitiveness with a special focus on R&D and export capacities. Korean researchers established mechanisms to facilitate university and industry collaboration in R&D, developed best practices to promote agro-industrial exports and supported Banco de Desarrollo Empresarial (BANCOLDEX) activities to improve the international competitiveness of Colombian enterprises.[17]

In addition to KSP, Korea has also been offering Development Experience Exchange Partnerships (DEEP) since 2012. These were created to provide policy advice and institutional building to effectively address the demands of developing countries. In Latin America, DEEP projects have focused on health and education to support the social inclusion of underprivileged peoples. In El Salvador, Guatemala and Honduras projects are in place to increase police capacity to enhance and ensure public security. In Peru, a DEEP project was responsible for constructing a maternal health center in Pachacutec, Callao. The center has been acknowledged by the Peruvian government as a model for medical services for underprivileged people.[18]

In 2010, a Joint Initiative for Research and Innovation (JIRI) was adopted between the European Union (EU) and the Community of Latin American and Caribbean States (CELAC). STI activities are jointly developed, with a special focus on research and innovation and the digital economy. Research areas of common interest for both regions include renewable energies, climate services, bio-economy, marine research, ICT and health. Cooperation is based on regional projects that will boost scientific research and technological development. Priority areas are co-led by a country from each region as seen in table 9.

The principal project that provides a platform for these working groups is called the ALCUE NET project. According to ALCUE NET's impact page, a project in Colombia is working to change the political mindset in the area of bio-economy and assist the country to develop its own bio-economy model.[19] The health WG is supported by the EU-LAC Health project whose goal is to define a detailed roadmap to support cooperative health research for policy makers and stakeholders. The aim is to provide new insights on improving coordination and funding for health research between the two regions.

EU-CELAC cooperation also targets higher education. The Erasmus+ programme's Key Action 2 (Cooperation for innovation and the exchange of good practices) conducts capacity building projects for higher education. The projects focus on modernizing education and training in order to enable youth to achieve stable employment. Since 2007, projects have been designed to fund and promote the mobility of staff, students and researchers through university partnerships, benefiting 780 students within 60 partnerships involving 220 higher education institutions. Over 2,500 students from the region have been awarded scholarships from the Erasmus Mundus joint master and doctoral. In addition, ALFA III, has helped to better align higher education with the business sector and local government, increasing gender equality and improving the managerial skills of micro, small and medium-sized entrepreneurs (European Commission, 2015).

[17] http://www.ksp.go.kr/projects/policylist.jsp.
[18] http://www.koica.go.kr/english/schemes/projects_dEEP/index.html.
[19] http://alcuenet.eu/impact.php?id=45.

Table 9
JIRI: Priority areas and co-leading countries

Priority area of working group (WG)	Countries co-leading the working group	
Bioeconomy	Argentina	France
ICT	Chile	Finland
Biodiversity and Climate Change	Colombia	France
Renewable energies	Mexico	Spain
Health	Brazil	Spain
Good practices, finance & Researchers' Careers	Mexico	Portugal
	Chile	Finland

Source: Prepared by author based on the EU CELAC SOM on S&T Concept Note, http://alcuenet.eu/policy.php.

I. Conclusions and recommendations

1. Conclusions

This chapter has shown that the region's National Innovation Systems (NIS) are heterogeneous, with some countries closing the gap with leading economies while others lag behind. The contributing factors as outlined in this report include low levels of investment in R&D, lack of coordination between the private sector and public institutions, and low numbers of researchers and graduates in technology and science.

Brazil was the only country in the region to dedicate more than 1% of its GDP to R&D in 2013.

Moreover, most R&D investment in the region is funded by the public sector, whereas in countries like Korea the business sector is the largest contributor. This is due in part to the private sector in the region lacking strong financial incentives to invest in R&D. Moreover, only a small share of public R&D focuses on applied research carried out in collaboration with the private sector and oriented towards business applications.

Innovation in the region is hampered by the lack of skilled workers. The quality of education in the region continues to lag behind advanced countries. Moreover, progress in tertiary science and technology education is slow: in 2012, the total number of engineering and technology PhD students in the region amounted to only 2,477 out of a total of 21,923 PhD graduates.[20] The advancement towards knowledge based economies is being impeded by a persisting mismatch between human capital development and the demands of businesses.

Although several countries in the region are currently seeking to improve their NIS structures, many are insufficiently coordinated, resulting in an overlap of responsibilities and an inefficient use of funds. A key issue is the lack of government feedback mechanisms that monitor the implementation of policies and their success rate. In addition, there is insufficient research on future demands of the private sector to ensure that education systems adapt to meet these requirements. Thus Latin American countries need to further strengthen their NIS so that they facilitate the development, implementation and monitoring of STI policies.

To address these challenges, it is suggested that CELAC develop cooperation with Korea to raise the level of innovation and skills development across the region. The following section provides a number of recommendations on how CELAC and Korea can work together to develop win-win benefits in these two areas.

[20] http://www.ricyt.org/indicadores.

2. Recommendations

At the Academic Seminar 'Exploring strategies for economic cooperation between the Republic of Korea and Latin America and the Caribbean', held at ECLAC's headquarters on April 11th 2016, both CELAC and Korea stated their objectives for closer cooperation. Korea defined three objectives: increase bilateral trade in sectors with high value added, create a common market with free movement of goods, people and capital, and share the Korean development experience with the region. The plan also includes three key pillars: economic cooperation in industries with high value added, building physical and institutional infrastructure, and a cooperative partnership for development.

CELAC stated that closer cooperation should benefit islands and landlocked countries in particular. In addition, cooperation should prioritise areas that contribute to the achievement of the Sustainable Development Goals. From the CELAC perspective, the key to economic cooperation with Korea is to raise the value added of products and services exported by the region and to advance regional integration into global value chains. Also to promote productive development in the agriculture and mining chains, electronics industry and tourism, among others. Korea could also assist in the sustainable development of SMEs.

The following recommendations seek to unite the objectives of CELAC and Korea in developing greater economic cooperation.

Cooperation with existing regional organizations

RICYT

Joint cooperation between Korea and RICYT could:

- Expand the capacity of RICYT to conduct research on NIS design, share NIS best practices, conduct STI analysis and diagnosis as well as provide STI indicators.

ECLAC

Joint cooperation between Korea and ECLAC could:

- Promote the importance of STI and labor skills policies that increase competitiveness, sustainability and development.
- Increase the dialogue on NIS development with the region's different economic integration mechanisms such as the Andean Community (CAN), Caribbean Community (CARICOM) the Southern Common Market (MERCOSUR), Central American Cooperation System (SICA) and Pacific Alliance, among others.

COSUCTI and CTCAP

Joint cooperation between Korea, COSUCTI and CTCAP could:

- Encourage local innovation centers in South and Central America to promote high tech projects that focus on nanotechnology, megatronics and electronics. The centres could also include training on patents and other intellectual property rights.

LACCIR

Joint cooperation between Korea and LACCIR could:

- Strengthen LACCIR's collaboration with Korean universities, including through scholarships and internships.
- A list of R&D projects being undertaken by academic institutions in the region could be incorporated into LACCIR's virtual environment. This could encourage collaboration with SMEs working in similar areas and prevent a duplication of resources.

- Encourage regional universities to conduct free courses on basic STI to entice a greater number of high tech students.[21]

FONTAGRO

Regional cooperation with Korea could:

- Strengthen the impact of FONTAGRO and promote the development of similar consortiums in key industries such as mining, electronics and tourism, etc.

Recommendations based on the combined aims of CELAC and Korea

- Support the creation of innovation clusters, techno parks and innopolis.
- Help countries in the region to create new financing mechanisms for the internationalization of SMEs (working capital, certification and trade promotion)
- Help co-finance and provide technical assistance to entrepreneurs in the following industries: agriculture, mining, electronics, automobile, tourism and machinery production.
- Develop Knowledge Management Systems.
- Help reduce STI gaps between CELAC countries and advanced countries by developing partnerships in key export sectors such as bio-drugs, radioisotopes, satellites, vaccines, nio-kerosene, nano-material and advanced manufacturing.
- Offer internships at Korean institutes for LAC engineering and high-tech graduates

[21] The University of Chile has been offering such courses.

Bibliograhpy

ALCUE NET (2015). EU CELAC SOM on S&T Concept Note. Latin America, Caribbean and European Union Network on Research and Innovation (ALCUE) http://alcuenet.eu/policy.php

Arvanitis, R. and J. Gaillard (2014), *Research Collaboration between Europe and Latin America: Mapping and Understanding partnership*, Archives contemporaines.

CONICYT (2011), "Science, Technology and Innovation for the Development of Chile."

Consejo Federal de Educación Argentina (2012), "Plan Nacional de Educación Obligatoria y Formación Docente – Resolución CFE Nº 188/12 – 5 de diciembre de 2012."

Cornell University, INSEAD and WIPO (2015), "The Global Innovation Index 2015: Effective Innovation Policies for Development," Fontainebleau, Ithaca, and Geneva.

Crespi, G., E. Tacsir and F. Vargas (2014), *Innovation dynamics and productivity: Evidence for Latin America*, United Nations University, Maastricht.

ECLAC (2008), Bridging the digital divide: Towards the eLAC2010 goals in education, Santiago, Chile.

_____ (2013), The digital economy for structural change and equality, Santiago, Chile.

_____ (2015a), Education, structural change and inclusive growth in Latin America, Santiago, Chile.

_____ (2015b), *Foreign Direct Investment in Latin America and the Caribbean*, Santiago, Chile.

_____ (2015c), "The new digital revolution: From the consumer Internet to the industrial Internet."

_____ (2016), Estado de la banda ancha en América Latina y el Caribe 2016. Santiago, October.

ENLACE (2013), "Landscape of Research Technology and Development in Central America: Setting up the bi-regional dialogue" Enhancing Scientific Cooperation between the European Union and Central America.

European Commission (2015), "Higher education cooperation between the European Union, Latin America and the Caribbean - Academic cooperation and mobility: bringing the two regions closer."

EU-LAC Health (2016), "EU-LAC Health Conference to launch EU-CELAC Joint Initiative on Health Research and Innovation."

Fernandez Roich, Cynthia (2013), "Study of Science, Technology, Engineering and Mathematics (STEM) and STEM-related issues in Argentina."

FONTAGRO (2015), "Innovation in family farming."

Fundación Telefónica (2011), *InnovaLatino: Fostering Innovation in Latin America*, Ariel and Fundación Telefónica, Madrid, Spain.

Giovannini, Enrico et al. (2015), "The Role of Science, Technology and Innovation Policies to Foster the Implementation of the Sustainable Development Goals (SDGs): Report of the Expert Group 'Follow-up to Rio+20, notably the SDGs,'" Brussels, European Commission.

Gobierno de Costa Rica (2014), "Plan Nacional de Desarrollo 2015 - 2018."

Gobierno de Mexico (2013), "secretaria de educacion publica."

Horta, Hugo (2013), "Education in Brazil: Access, quality and STEM," Technical University of Lisbon.

IDB (2010a), "Science, Technology, and Innovation in Latin America and the Caribbean: A Statistical Compendium of Indicators," Inter-American Development Bank.
_____ (2010b), "The Imperative of Innovation: Creating prosperity in Latin America and the Caribbean."
_____ (2011), "The Imperative of Innovation: Creating prosperity in Latin America and the Caribbean." 2nd Edition.
ITU (2015), "Measuring the Information Society Report 2015," Geneva, Switzerland, International Telecommunication Union.
KIM, Jang Saeng. (2012), "Korea's Innovation to Knowledge Sharing Program", KSP Center for International Development.
LATU (2007), "Proyecto Ceibal."
Metcalfe, S. (1995), "The Economic Foundations of Technology Policy: Equilibrium and Evolutionary Perspectives", in P. Stoneman (ed.), Handbook of the Economics of Innovation and Technological Change, Blackwell Publishers, Oxford UK)/Cambridge (US).
Navarro, J.C., J.M. Benavente, and G. Crespi, (2016), "*The New Imperative of Innovation: Policy perspectives for Latin America and the Caribbean"*, Inter-American Development Bank, Washington DC.
Organization for Economic co-operation and Development (OECD) (1997), "National Innovation Systems."
_____ (2005), *OSLO Manual: Guidelines for collecting and interpreting innovation data*, 3rd Edition."
_____ (2007), "Innovation and Growth: Rationale for an Innovation Strategy."
_____ (2010), "Ministerial report on the OECD Innovatin Stategy: Innovation to strengthen growth and address global and social challeneges 'Key Findings.'
_____ (2011), *OECD Reviews of Innovation Policy: Peru*, OECD, Paris.
_____ (2012), *Latin American Economic Outlook 2012 Transforming the State for Development: Transforming the State for Development*, Latin American Economic Outlook, OECD, Paris.
_____ (2013), *Start-up Latin America: Promoting innovation in the region*, Development Centre Studies, OECD, Paris.
_____ (2015a), "Mexico: Policy priorities to upgrade the skills and knowledge of Mexicans for greater productivity and innovation."
_____ (2015b), *Estudios del Centro de Desarrollo Startup Amèrica Latina Construyendo un futuro innovador*, Development Centre Studies, OECD, Paris.
Padilla Pérez, R. (2013), *Sistemas de innovación en Centroamérica Fortalecimiento a través de la integración regional*, ECLAC, Santiago, Chile.
Republica de Bolivia Ministerio de Educacion (2003), "Estrategia de la Educacion Boliviana 2004 - 2015."
Republic Dominicana Secretaría de Estado de Educación (2007), "Plan Decenal de Educación 2008-2018."
Szirmai, A., W. Naudé and L. Alcorta (2013), *Pathways to Industrialization in the Twenty-First Century: New Challenges and Emerging Paradigms*, WIDER Studies in Development Economics, Oxford University Press, Oxford, England.
Thorn, Kristian and Maarja Soo (2006), "Latin American Universities and the Third Mission: Trends Challenges and Policy Options."
UNDP (2015), "Human Development Report 2015: Work for Human Development," United Nations Development Program.
UNESCO (2010), *National Science, Technology and Innovation Systems in Latin America and the Caribbean*, UNESCO, Montevideo, Uruguay
_____ (2015), *The UNESCO Science Report: Towards 2030*, UNESCO Paris.

III. The Korean innovation experience

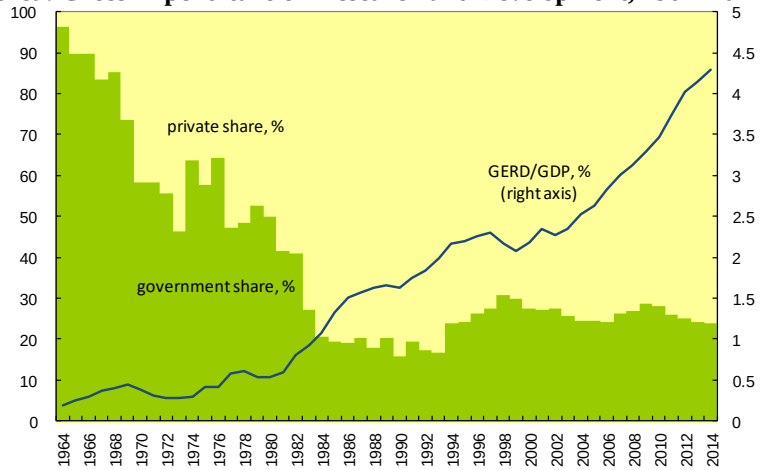
Suh Joonghae

A. Driving economic development through science and technology

1. Overview

The Korean government has long recognised that strong science, technology and innovation (STI) policies are imperative for successful industrialisation. Hence, over the last five decades the country has implemented policies that have advanced domestic STI development. As a result, the number of researchers increased dramatically from 1,900 in 1963 to 437,447 in 2014, an average increase of 8,550 researchers per year. Over the same period, Korea's gross expenditure on research and development (GERD) rapidly increased by 4%, principally due to the active expansion of private sector investment. The private sector has been outpacing the government's share of national R&D expenditure since 1984 and as a result the government's share has decreased in recent years to only about one-fourth of GERD (Figure 10).

Figure 10
Korea: Gross Expenditure on Research and Development, 1964–2014



Source: Korea Industrial Technology Association, Main Indicators of Industrial Technology, various years.

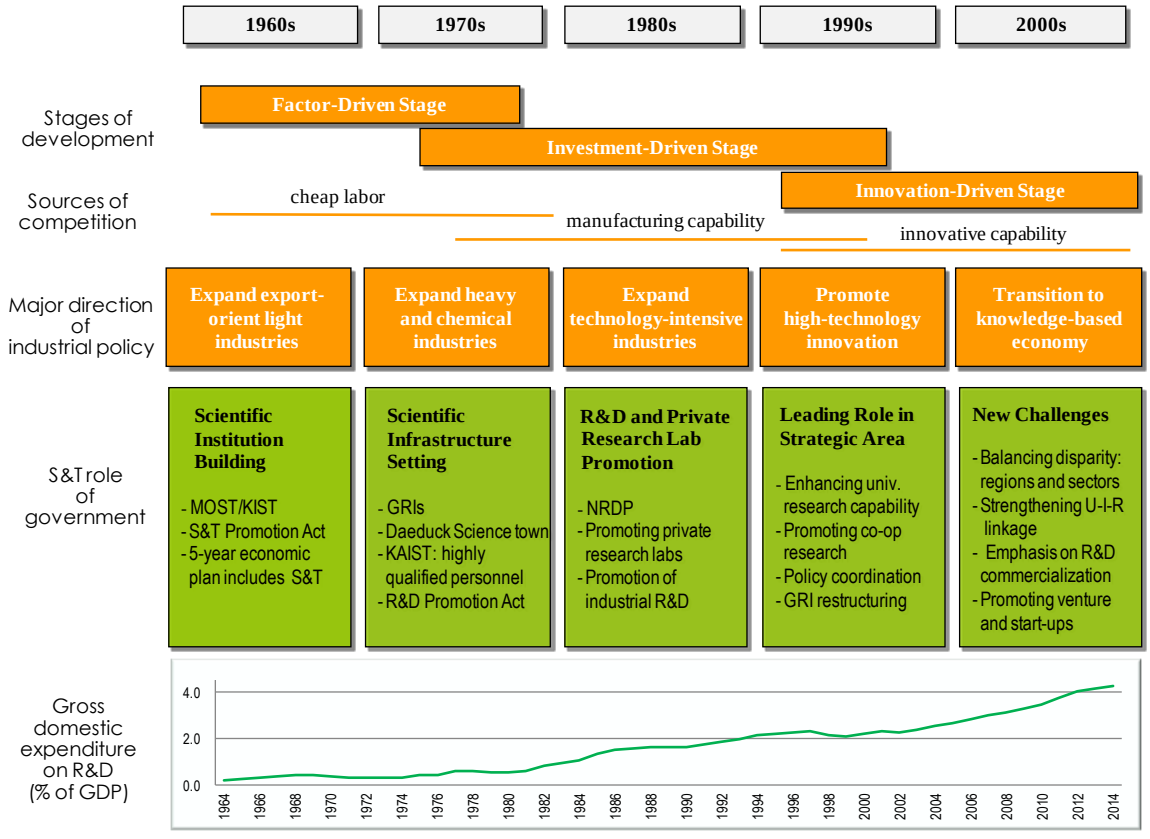
2. Innovation in Korea

The Korean government has advanced its STI capabilities in step with Korea's phases of industrial development (Figure 11). As part of the technological assimilation strategy in the 1960s, the Korean government introduced large-scale long-term foreign loans and allocated them to selected industries. The investment enabled firms to finance massive imports of capital goods and to build turn-key plants.

In the 1970s, as the economy was transitioning towards heavy industries, the government created government research institutes (GRI's) designed to compensate for domestic technological weaknesses in chemicals and heavy machinery. GRI's such as the Korea Institute of Machinery and Metals (KIMM), and the Electronics and Telecommunications Research Institute (ETRI), worked with private industries to enhance technological capabilities and further industrial development.

From the 1980s up until the financial crisis in 1997, the Korean government strived to stimulate R&D activity. They implemented several important initiatives to advance domestic R&D, including creating the National R&D Programs (NRDP) in 1982 and the Highly Advanced National R&D in 1992. Moreover, the government began to enhance university research capability and promote cooperative research between GRIs and industry. These efforts had a positive impact on businesses that during the period increased their R&D activity as a way to compete in foreign markets and sustain their growth at home. After the financial crisis, the government changed policy direction and began reinforcing long-term sustainable economic development. STI policies were re-oriented towards alleviating regional disparities in R&D and innovation as "Balanced National Development" became the national vision.

Figure 11
Changes in Government Science, Technology and Innovation Policy



Source: Updated from Suh and Chen (2006), originally Mitchell (1997).

3. The role of government policy in stimulating R&D business

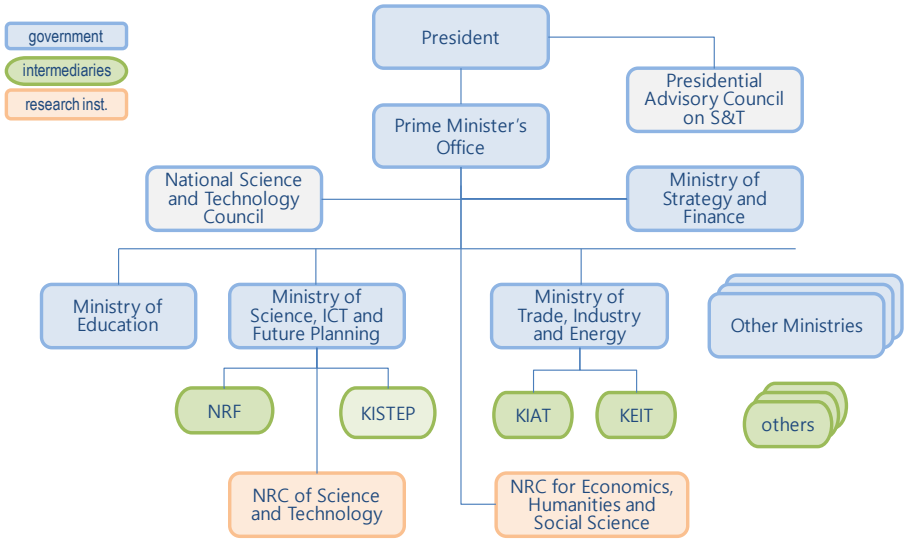
The significant rise in private sector investment in R&D can be attributed to the policy initiatives implemented by the Korean government. The most important of which was investing in the country's education system. Rapid R&D investment could not have occurred without a highly-educated labour force that was able to meet the increasing demands of both the private and public sectors. Typically, it is the lack of human resources that constrains R&D advancement in both developing and developed countries, rather than a shortage of finances.

Other initiatives include the outward-looking or export driven development strategy that forced domestic businesses to compete in the world stage. This exposed domestic businesses to intense global competition, requiring them to invest heavily in R&D as a way to compete and remain competitive. Moreover, the government's industrial policy favoured large firms that gave birth to a unique business organisation called the 'Chaebol'. Chaebols are typically large multinational companies that enjoy greater financial affluence owing to the scale and scope of their business operations. Their affluence allows them to engage in expensive and precarious R&D projects that are not feasible for small- and medium-sized firms. Therefore, it is of no surprise that in 2014, 57.1% of the total R&D investment in Korea was attributed to the top twenty firms (KITA, 2015).[22]

4. Korea's National Innovation System

Korea's National Innovation System (NIS) is a three-layered structure that includes the government, intermediary organizations, and government-funded research institutes. At the top of the structure is the President and the Presidential Advisory Council on S&T (PACST). Intermediary organisations provide an essential link between the government and research institutes (Figure 12).

Figure 12
The Current Structure of STI Policy in Korea



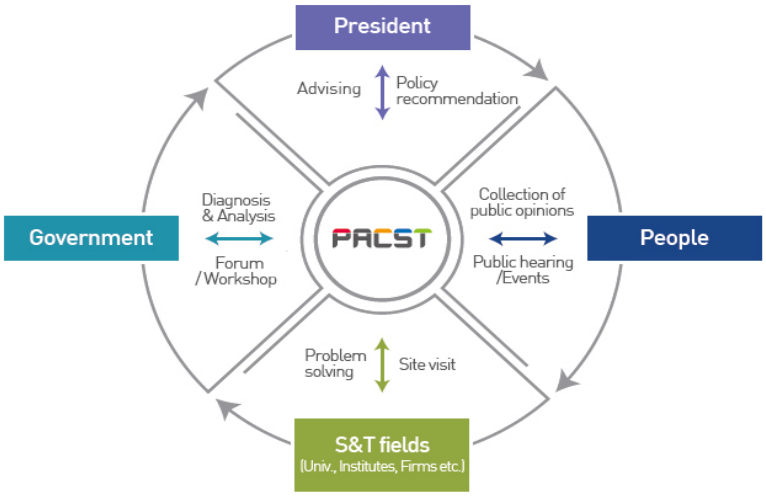
Source: Author's compilation.

[22] The top twenty companies took 57.5 percent of total industrial R&D investment in 1995. For two decades, the concentration rate remains almost the same.

Presidential Advisory Council on S&T (PACST)

PACST is responsible for forming national science and technology mid- and long-term policies. The council advises the President in accordance with Article 127 of the Constitution and the Presidential Advisory Council on Science and Technology Act.[23] PACST is a science and technology think tank composed of globally competitive scientists and engineers who are specialists in their field. These members are responsible for providing S&T recommendations to the council regarding their own specialities, which include institutional reform, R&D personnel and technology innovation. PACST offers an all-inclusive approach to overcoming key domestic S&T challenges by encouraging communication between the government, S&T professionals and the general public (Figure 13).[24]

Figure 13
OACST: Channels of communication



Source: Taken from PACST website, Role & Function: http://english.pacst.go.kr/intro/en_estaBgRoles.do.

The Framework Act (and its predecessor the Special Act) proclaimed that the S&T Basic Plan be the backbone of Korea's S&T policy-making, and authorized the NSTC to be the governing body. As is shown in Table 10, the composition and the secretariat of NSTC has changed several times.

The primary functions of the NSTC include:

- Establishing and coordinating major policies and planning the promotion of S&T
- Establishing a basic plan and a local master plan for S&T promotion
- Suggesting a budget for S&T and R&D investment
- Managing, coordinating and distributing a national research development business budget
- Establishing a mid and long term national research development business plan
- Investigating, analysing and evaluating the national research development business
- Developing and promoting a government funded research institution plan for S&T

[23] The article 127 of the Constitution states: "(1) The State shall strive to develop the national economy by developing science and technology, information and human resources and encouraging innovation. (3) The President may establish advisory organizations necessary to achieve the purpose referred to in paragraph (1)."

[24] PACST homepage, accessed at May 11, 2016.

- Establishing and coordinating a national growth engine policy
- Coordinating STI policy to drive the next generation growth engine and to develop a talented labour force
- Development of a support system for promoting local technology innovation policy
- Financial support for technology innovation
- Policy support related to national standards and intellectual property rights[25]

Table 10
Changes in National Science and Technology Council

	1999-2003	2004-2007	2008-2010	Current
Composition	Chair: President Members: 14 government & 3 civilians	Chair: President Members: 13 government & 8 civilians	Chair: President Vice Chair: Minister of Education, S&T Members: 10 government & 13 civilians	Co-chair: Prime Minister and private sector Members: 13 government delegates and 10 private delegates
Secretariat	Minister of S&T	Vice Minister of S&T	Senior Secretary to President for Education, Science and Culture	Minister of Science, ICT & FP
Main Activities	S&T Basic Plan, Coordination of ministerial R&D, Evaluation of R&D performance	Inter-ministerial R&D budget allocation, Evaluation of R&D performance	Priority-setting for R&D budget allocation	Priority setting and coordination, Evaluation of R&D performance

Source: Author, compiled from NSTC homepage.

Intermediary Organizations

With the exception of the Korea Institute of Science and Technology Evaluation and Planning (KISTEP), all intermediary organizations act as mediators for government R&D spending. KISTEP is a policy-support organization that supports the formation and coordination of major S&T policies as well as planning and evaluating national R&D programs. A key function of KISTEP is supporting the allocation and modification of the national research and development projects budget. In addition, KISTEP is tasked with assessing and evaluating technology and forecasting future S&T. KISTEP is governed by the Ministry of Science, ICT and Future Planning (MSIP).

The National Research Foundation (NRF) of Korea was established in 2009 after the following three organizations merged together: the Korea Science and Engineering Foundation (established in 1977), the Korea Research Foundation (established in 1981), and the Korea Foundation for International Cooperation of Science and Technology (established in 2004). The merger was aimed at streamlining national research and making academic R&D activities more efficient and fair. The NRF plays a mediating role in implementing MSIP and Ministry of Education R&D programs related to academia.

[25] http://www.nstc.go.kr/eng/major.jsp.

Government-funded Research Institutes

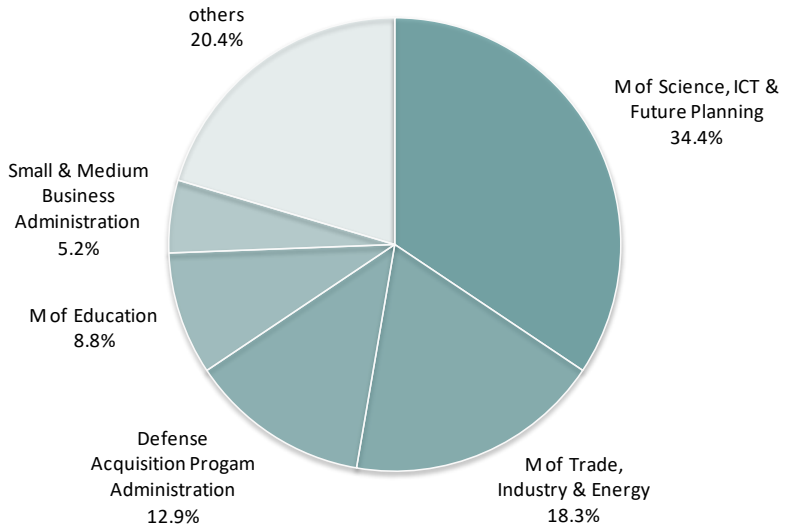
Government-Funded Research Institutes (GRIs) are organized under two research councils: The National Research Council of Science and Technology and the National Research Council for Economics, Humanities and Social Science.

The National Research Council of Science and Technology is composed of 25 government-funded research institutes in the field of science and technology. The oldest research institute is the Korea Atomic Energy Institute which was established in 1959. KIST was established in 1966 for the purpose of supporting industrialization through research and development in industrial technologies. Currently, KIST conducts generic, basic, and long-term R&D that is not viable for businesses to pursue. National Research Council for Economics, Humanities and Social Science is composed of 26 government-funded research institutes. KDI was established in 1971 for the purpose of assisting development planning and now covers broad areas of economic policies. Other institutes are doing rather more specialized research.

Government allocation of R&D funding

The government layer is made up of various ministries and administrations that run R&D programs. They all receive a percentage of the governments' R&D budget, which in 2015 amounted to KRW 18,890 billion (US$ 16.6 billion).[26] The Ministry of Science, ICT and Future Planning (MSIP) received KRW 5,667 billion (34.4%), which was slightly more than the combined amounts received by the Ministry of Trade, Industry and Energy (18.3%) and the Defense Acquisition Program Administration (12.9%) (Figure 14). In addition, the Ministry of Education and the Small and Medium Business Administration jointly received a similar amount as that of the Defence Acquisition Program Administration. These "Big Five" departments received almost 80% of the total budget, while all other ministries and administrations shared the rest.

Figure 14
Allocation of Government R&D Budget, 2015



Source: Korea Institute for S&T Evaluation and Planning (KISTEP).

[26] Based on average exchange rate for 2015.

B. Support policies for Industrial Technology Development

1. An overview of Korea's policy schemes

Korea's S&T policy strategy has successfully led the country to rapid economic growth using very limited internal resources. However, there have been some negative effects such as a reduction in the amount of basic research being conducted, which has weakened university research. In addition, the emphasis on predicating industrial technology has raised the problem of duplication within government programs, making them inefficient. The economic bias of S&T policy and the predilection for industrial technology are beginning to abate but the legacy still dominates policy debates in Korea.

Korea's S&T policy practices both past and present do not conform to typical policy frameworks such as the perspectives of market demand and supply (Kim, 2003), the framework of production, diffusion and use of scientific and technological knowledge (Lundvall and Borras, 2005), theoretical framework of technology policy (Steinmueller, 2010), or the functional framework of innovation policy (Edler and Georghiou (2007). However, policies can be grouped based on their common features and their impacts on industry. The classification is not clear-cut and some overlap with other groups, such as the policy for human resource development, which can be viewed as both a supply side measure and an actor capacity building tool. Table 11 below attempts to classify the policies into categories.

Table 11
Policies for Industrial Technology Development

Policies	Schemes	Primary goals	Tools/examples
Supply-side	HRD	Meet the skill demand	Training and lifelong learning Korea Polytechnic
	NRDP	Develop core industrial technologies	Ministries' R&D programs 1982: NRDP, 1992: HAN 1998: KOSBIR
	Tax incentives	To stimulate business R&D activities	Tax deduction, Tax exemption
	Financial support	To alleviate financial burden, to enhance financial access	Policy loans Technology credit guarantee
	Venture business promotion	To promote venture business	KOSDAQ (1996), venture business accreditation (1999)
Actor capability	GRIs	To build up national research centers	1966: KIST 1973: KAIST
	Universities	Help basic research Produce high-caliber manpower	KAIST, GIST, DGIST, UNIST
	Business Enterprises	To support business R&D	Private R&D Centers, Army service exemption for R&D personnel (1982),
	UIR linkage	Make synergic effects	See section 3.4
Complementary	Regional industrial, innovation promotion policies (+location)	Mitigate the unbalance, promote regional growth	See section 4
Demand-side	Export promotion	To exploit scale economies, to stimulate technological efforts	Lowering tariff & non-tariff barriers Export insurance
	Competition policy	Framework condition of innovation: intensify competition pressure	Fair trade IPR
	Procurement	To give growth opportunity, to set technical standard	Confinement of firms affiliated with the Conglomerates

Table 11 (conclusion)

Policies	Schemes	Primary goals	Tools/examples
Other	Technology foresight	To build common vision and to guide policy intelligence	The first in 1994, the fourth in 2012
	Standardization & accreditation	To increase the product quality	KS, KT, venture business accreditation
	Awards	To enhance public awareness of STI and science culture,	Science Day & the Order of Scientific Achievement, Chang Yŏngsil Award,
	Science Culture	To expand science base	National Science Museum, KOFAC
Information infrastructure		To build information infrastructure to expedite the transition to a knowledge economy	See section II.6

Source: Author's compilation.

Supply-side policies

This policy covers National R&D Programmes (NRDPs), tax incentives, financial support and venture business support policies. Most NRDPs aim to develop advanced industrial technologies with business enterprises and large companies who provide matching funds so as to secure their commitment and reduce the use of tax-payer's money. The Korean Small Business Innovation Research Program (KOSBIR) is an offspring of the NRDP, customized for the needs of SMEs. Based on the US SBIR, KOSBIR was introduced in 1998. KOSBIR encourages government ministries and public enterprises to apportion a small part of their R&D budget to SMEs. Currently twelve ministries and six public enterprises are engaged with KOSBIR.

Tax incentives and financial support measures had been implemented long before the launch of NRDP in 1982. Tax exemption and deduction are the most direct and important tools for the government to stimulate business enterprise R&D activities. Venture business support policies were formulated around the mid-1990s, but they were explicitly and extensively used after the financial crisis in 1997 as a means to realize the country's vision of a knowledge-based economy (Suh and Chen, 2007).

Actor capability policies

Actor capability policies aim to strengthen the R&D capacities of GRIs, universities and business enterprises. The government offers grants and project based funding to these three actors so that they can provide R&D activities. GRIs receive grant-funding that represents roughly one-third of their budget and enables them to cover basic salaries and conduct autonomous research. Project-based funding originates from commissioned NRDP research projects, which offers additional incentives based on researcher's performance and the construction and maintenance of R&D facilities.

The three actors take on different roles within the NIS. GRIs conduct mission-oriented national technology programs, universities are responsible for developing high-caliber manpower, and business enterprises focus on the development of market-oriented technology. The government strives to maximise the overall societal effects of R&D investment by strengthening the innovative capacities of actors while maintaining the balance among them. However, as scientific research, technology development and market creation become more integrated so the line that defines them becomes blurred. There are other institutions that play a supportive role in assisting the aforementioned actors, including intermediary institutions, financial intermediaries, local research centers, and junior colleges.

Universities contributed little during the early stages of the country's industrialisation. University courses at that time were predominantly geared towards education, with little emphasis on fostering research. However, as the research capacity of universities increased dramatically over the subsequent years, the government embraced them as a key actor within their NIS. Government

support for university research is also composed of grant and project-based funding, although salaries are typically not covered. Universities receive less support than GRIs but they have greater autonomy in terms of their individual research. In order to maximise the potential of universities and take advantage of their abundant human resources the government decided to re-structure them into research centres.

Complementary policies

When individual actors pursue their own innovation goals the results tend to be of a lower standard than what can be achieved by a well-orchestrated system. Similarly, the nationwide approach frequently fails to utilize the potential of all regions, which ultimately undermines the national growth potential. University-Industry Relations (UIR) and regional industrial/innovation promotion are complementary policies that have been developed to overcome regional disparities. Regional disparity was considered an unavoidable consequence of economic development, particularly during the period of rapid growth, but has since has become an important issue to address. Complementary policies aim to overcome disparities by increasing coordination and linkages between actors within the NIS. Although budgets for complementary policies remain small in comparison to mainstream policies they are receiving greater attention and funding than before.

Demand-side policies

Demand-side policies are designed to stimulate domestic technological development. These policies can be broken down into the following three categories:

- Export promotion has been very effective at accelerating the technical capabilities of domestic firms by forcing them to compete in highly competitive markets. Furthermore, this policy has allowed exporting firms to develop economies of scale and maximise capacity utilisation through continued technological advancements (Kim, 2003).
- Competition policies have also advanced the technological capabilities of domestic firms. In 1980, the Fair-Trade Act was introduced with the aim of restricting the growth of Chaebols and prohibit improper market practices. Moreover, the government brought down tariff and non-tariff barriers as a way to liberalise the market. This meant that domestic firms had to expeditiously innovate in order to compete with multinational firms. In 1986, the government introduced Intellectual property rights (IPRs) protection to prevent the reverse engineering of foreign products, which further spurred domestic R&D efforts (ibid, 2003).
- Government procurement policies provide growth opportunities for SMEs and encourage them to intensify their technological efforts by setting technical standards. Software procurement is one such example, software including system-integration services is mostly confined to SMEs and is not affiliated with Chaebol's. This offers SMEs a growth opportunity to meet the technical standards act and upgrade their technological capabilities. In 2015, 72% of Korea's public procurement market worth an estimated KRW 119 trillion (8% of nominal GDP) was procured by SMEs.

Other Policies

Technology foresights are an important tool for developing a common vision and guiding S&T policy. The aim is to strengthen the country's comparative advantage in science and engineering so that it can compete with leading technological countries while meeting domestic demand. So far there have been four such foresight activities since 1994 and currently the country is preparing for their fifth (Shin et al., 1999).

Standardization and accreditation have been continuously used in Korea. The Korea Standard (KS) and Korea Technology (KT) are well-known examples of standardization efforts. Accreditation

of venture business, although it was criticized as being wrongly used, had been instrumental in triggering venture business in Korea, since it fills the information gap in the technology market.

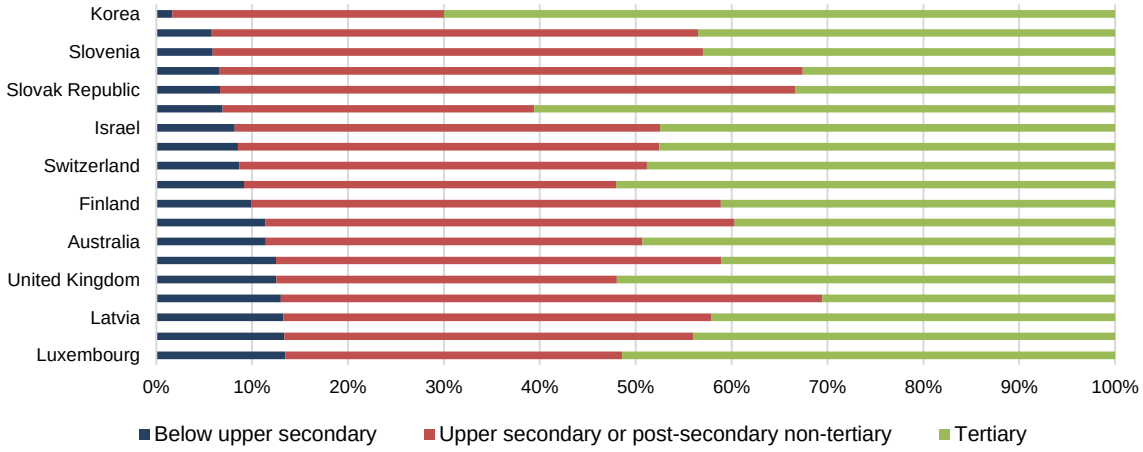
Since 1973, there has been an annual 'Science Day' celebration held on the 21st of April which is the day that the Ministry of Science and Technology was established in 1967. The annual celebration honours the winners of the Science and Technology Orders and Medals.[27] IR52 Chang Yŏngsil is Korea's highest industrial award and is named after Chang Yŏngsil who was a famous 15th century Korean inventor. IR 52 refers to Industrial Research and 52 weeks in a year. The award was established in 1991 by the Ministry of Science and Technology in partnership with the Korea Industrial Technology Association and Maeil Business newspaper. The IR52 Chang Yŏngsil award aims to promote innovation within both the public and private sectors as well as facilitating the commercialization of research results.

C. Meeting skills requirement

1. Investment in education

Korea has one of the most successful education systems among OECD members. In 2016, it was recorded that 70% of young adults had attained a tertiary education with only 1.7% having attained an education below upper secondary (Figure 15).

Figure 15
Education level attained by 25 years olds
(Percentage)

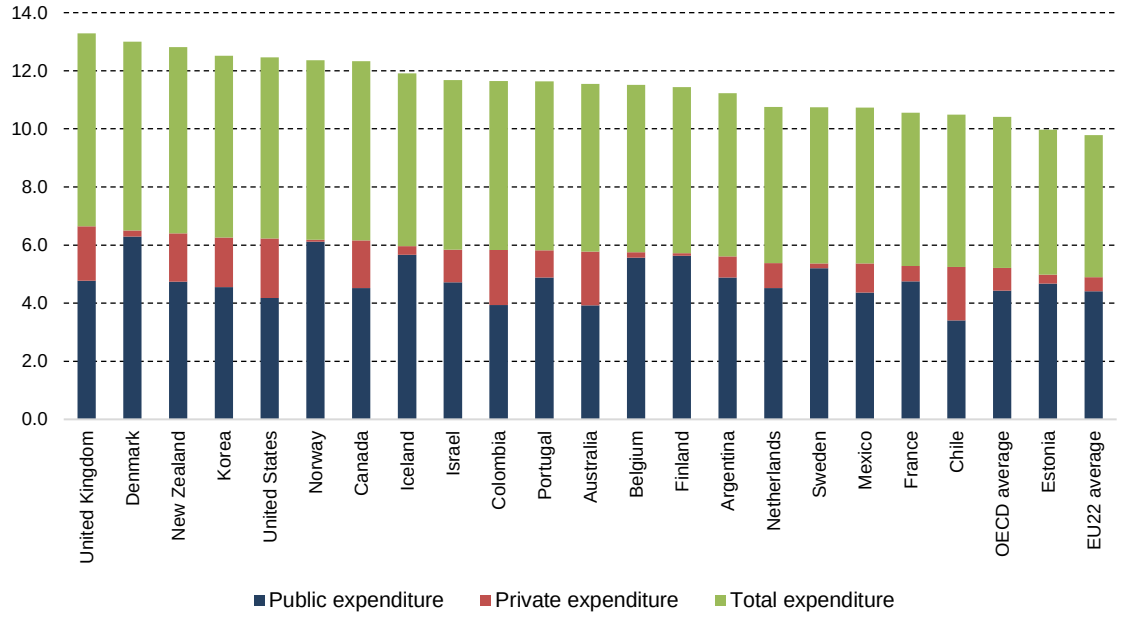


Source: Author.

In 2014, Korea was one of the top seven OECD countries to have invested more than 6% of GDP on education (Figure 16). The largest contribution came from the public sector although Korea's private sector contributed 1.7% of GDP. However, public investment represents 87.5% of non-tertiary education whereas in tertiary education the private sector invests 52% (Figures 17 & 18). The leveraging of private investment in higher education and dedicating public resources to non-tertiary education allowed Korea to provide basic education for all Koreans.

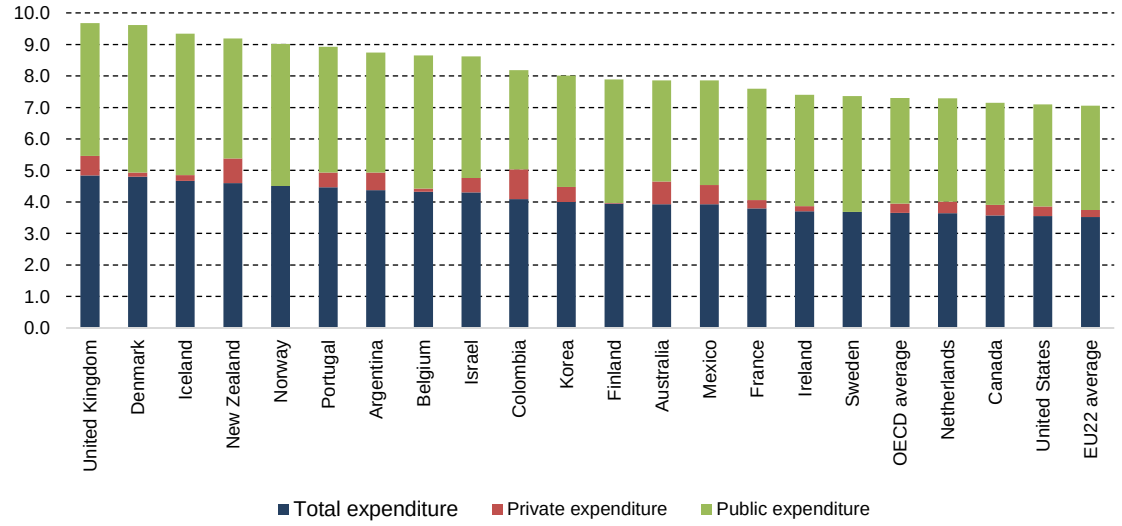
[27] http://english.moe.go.kr/boardCnts/view.do?boardID=265&boardSeq=1800&lev=0&searchType=S&statusYN=C&page=19&s=english&m=0301&opType=.

Figure 16
Expenditure on educational institutions as a percentage of GDP (2014)



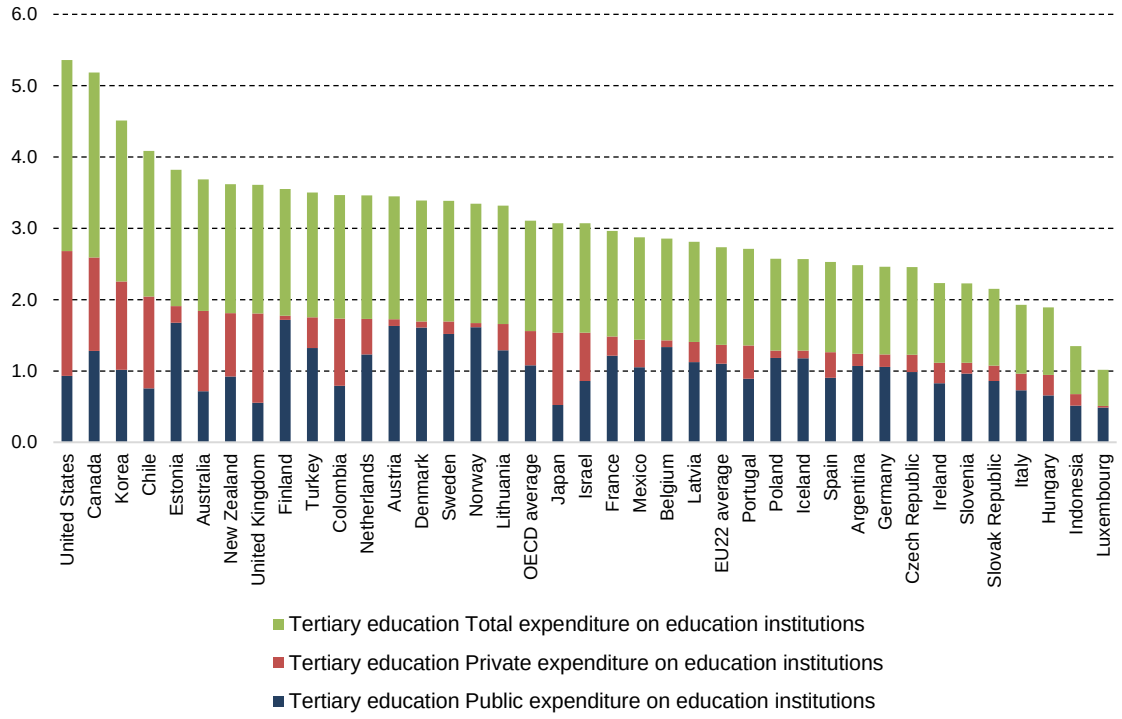
Source: Authors based on 'Education at a Glance 2017', OECD Indicators.

Figure 17
Non-Tertiary education: Public and private expenditure on educational institutions as a percentage of GDP (2014)



Source: Authors based on 'Education at a Glance 2017', OECD Indicators.

Figure 18
Tertiary education: Public and private expenditure on educational institutions as a percentage of GDP (2014)



Source: Authors based on 'Education at a Glance 2017', OECD Indicators.

D. Challenges facing the Korean education system

The education model that has been implemented in the past now faces new challenges as Korea strives to become a knowledge economy. In order to nurture knowledge and creativity, which are the key ingredients of a knowledge economy, Korea needs to develop a more flexible education system. The government needs to adopt a new approach that is based on autonomy and accountability of individual institutions. For example, diversity in the high school education system is needed to meet the expectations of socio-economic changes.

Universities need to play a key role in addressing the mismatch between formal education and the labour market. This is a daunting task for Korean universities that have traditionally focused on training scholars and social elites. Universities have remained quite passive in the practical application of knowledge and have failed to respond effectively to the needs of industry.

An opinion survey of executives conducted by IMD in 2014 concluded that Korea's university education ranked 53rd out of a total of 60 countries in terms of benefitting the economy. Here three-party collaboration among the government, universities and industry is needed. The government should increase investment in higher education as a way to incentivise universities to proactively respond to ongoing socio-economic changes. Moreover, universities need to provide innovative education programs that can meet future economic demands.

Furthermore, the government in conjunction with industry needs to make a concerted effort to establish an efficient job training system. It is important that linkages between higher education institutions and other adult training/educational facilities (adult education, job training, and employer-based training) are strengthened to ensure that skilled labour keeps pace with fast moving technology. This issue is further discussed in the following section.

E. Vocational Training

The human resource development (HRD) environment in Korea has influenced the government's policy focus (see table 12). During the early years of industrialisation the government concentrated on supporting vocational training as the formal education system was not able to supply the required volume of graduates.

Table 12
Shifts in the HRD Paradigm in Korea

	1960–70s	1980s	1990s	2000s onwards
Context	-National economic development plans -Rapid economic growth	-Continuous high growth	-Globalization -Economic crisis: reform and restructuring	-Transition to a knowledge-based society
Main emphasis	Vocational and technical education	Outreach programs	Strategic HRD	Individuals' right to lifelong learning
Priority of government policies	Investment in vocational high schools and colleges	Investment for the disadvantaged	High performers & experts	Investment in learning for all
Major policy tasks	Financial support for vocational and technical education	-Training for the unemployed -Training support for small and medium firms	-Cost saving policies (e-learning) -Encouragement for private sector investment	-Creation of ubiquitous learning environments -Learning accounts -Learning partnerships

Source: Adapted from Suh and Chen (2007) Chapter 6.

Both vocational training and lifelong learning are now widely perceived by employers and employees to be one of the key factors for long-term corporate success and individual growth. Individuals invest financial and other resources in their lifelong learning as a strategic imperative to survive and enhance employability in an era of continual downsizing. Business enterprises now find themselves competing to attract, develop, and retain employees in order to build knowledge-based organizations. Many firms participate in the lifelong learning movement in Korea as it cultivates skills and raises the intellectual abilities of the labour pool, which are essential requisites for a knowledge society. The Korean government has made great efforts to transform Korea into a knowledge-based nation by developing regional learning societies in cooperation with local governments. In short, Korean firms and the government are exerting their energies to transform the Korean society into a knowledge-based one.

Korea still has a long way to go despite government efforts to promote skill formation through on-the-job training. According to the Survey of Adult Skills done by OECD (2015), Korea shows relatively moderate position among the OECD countries in the participation in employer-sponsored education. Distinguished from four groups of occupation, 57% of Korea's skilled occupation attends education program sponsored by employer, whereas only 17% of elementary occupations benefit such opportunities. Similarly to other OECD countries, "participation in employer-sponsored formal and/or non-formal education is more likely for adults in occupations that require more skills." (OECD, 2015, p389)

As of 2010, Korea's public training system includes 110 projects undertaken by 16 ministries and agencies (Kang, 2011). These projects can be categorised according to education, employment and unemployment. As is shown in table 13, more than half of the government's budget for vocation training is spent training employed workers.

Table 13
Schemes for Vocational Training

Training for unemployed		Training for employed	Training for unemployed	
Formal education	Preparation for entrance into labor market	Period of employment	Period of non-employment	
	Unemployed youth	Employed	Unemployed Econ. inactive labor	Retirement
Out-of-school adolescent		- SME - Irregular - Self-employed	- Women - Mid- & old-aged - Handicapped	

Source: Kang, Soon-Hee (2011).

1. The Case of Korea Polytechnic

The Korea Polytechnic was established in 1977 and in 1998 the institution became the Skill College in which accreditation was awarded in accordance with the Higher Education Law. The College was renamed Korea Polytechnic in 2006 and was reorganized in 2010 under the Workers Vocational Skills Development Act. Currently the polytechnic is affiliated with HRD Korea and has 35 campuses, all of which are in close proximity to industrial workplaces.

Although the Korea Polytechnic originated as a subsidiary institution, it currently takes a unique position among a myriad of vocational training institutions. The polytechnic is unique because it provides flexible courses and practical learning tailored to mid-skilled workers. At the Korea Polytechnic over 90 percent of teaching staff have technical certificates, which are not required at junior colleges. Furthermore, junior colleges focus more on theory than practical training, which is contrary to the Korea Polytechnic that ensures graduates are able to apply their new skills immediately in the work place. The Korea Polytechnic departments are organised according to industrial needs such as, automation of industrial equipment, semiconductor system, automobile, and management of bio-product quality. They are not organised by academic classification.

2. University-Industry-Research Institute Cooperation

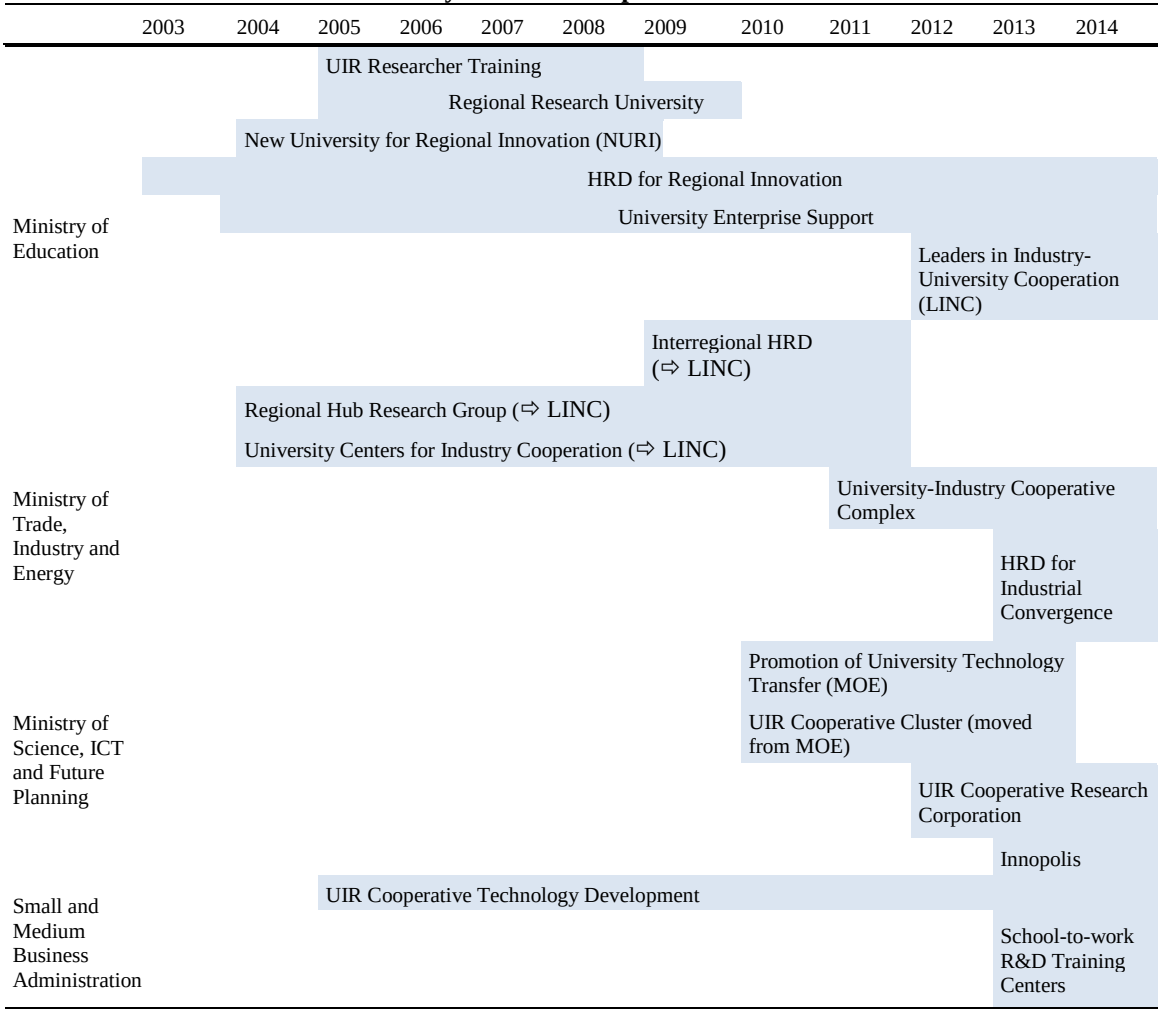
University-Industry-Research (UIR) cooperation has become an important policy area since the early 2000s. In 2003, the Industrial Education Promotion Act of 1997 was superseded by the Industrial Education Enhancement and Industry-Academia-Research Cooperation Promotion Act. This new act places greater emphasis on UIR cooperation, which aims to increase the nation's economic development through the diffusion and commercialization of knowledge and technologies developed by universities and research institutes. The law becomes the basis for establishing universities' technology licensing offices. In 2004, the government enacted the Special Act on Balanced National Development, which seeks to correct a developmental imbalance between the country's regions and create a balanced society.[28] Since the enactment, government ministries have revised their technology-related laws to include clauses on UIR cooperation and launch new programs to further such cooperation.

Policy schemes summarized in table 14 show a wide array of government programs that promote UIR cooperation. However, in terms of budget size, two programs stand out —the New

[28] http://balance.pa.go.kr/eng/html/act.htm.

University for Regional Innovation (NURI) managed by the Ministry of Education and UIR Cooperative Technology Development (UIR CTD) managed by the Small and Medium Business Administration.

Table 14
Policy Schemes that promote UIR



Source: KDI (2015).

The NURI program was the embodiment of the vision of "Balanced National Development" in education/research policies. The NURI program was designed to promote regional development by alleviating the concentration of economic and human resources in the capital region. This was achieved by strengthening the research capabilities of regional universities. The program ran for five years (2004 to 2008) and received favourable recognition as being a successful program.

UIR cooperation has been historically aimed at meeting the needs of SMEs. In 1993, 10 consortia made up of regional SMEs and engineering colleges received 50% of their research expenses from the Ministry of Commerce and Industry (Maeil Business Newspaper, June 2, 1993). However, research produced by these consortia's made little impact as many SMEs at that time were concerned with financial and marketing issues. As technological issues became a major concern for SMEs, UIR cooperation attracted more attention from the government and the business community. Since the early 2000s, UIR CTD has grown substantially in terms of budget size and project scope, and now it is a flagship program of the SMBA.

F. Regional Industry and Cluster Policy

1. Overview of Policy Schemes

National policies implemented during the early catch up phase of the countries industrialisation focused on nurturing investment in the Capital region (Composed of Seoul, Incheon, and Gyonggi province) as well as key export locations (OECD, 2012). However, although these policies were successful at growing the economy they inadvertently created economic disparities between the capital region and the other regions. According to regional indicators this gap is widening, especially in terms of population growth and knowledge-intensive activities.

In 2014, almost half of the population, 49.6%, lived in the central region, an increase of 4.3% since 1995. Furthermore, R&D expenditure in the central region increased by 15.2% during the same period. The increased concentration of people and R&D resources in the Capital region is a natural phenomenon, where knowledge-intensive activities tend to flow towards cities and their surrounding areas. It is therefore no surprise that Seoul and the surrounding region of Gyenggi are responsible for generating roughly 50% of the total national Gross Domestic Product (GDP) (OECD, 2012).

The growing disparity between regions can be attributed to the lack of opportunities for entrepreneurial development and access to quality education outside of the Capital region. Since the mid-1990s, the Korean government in an effort to rectify this imbalance has attempted to disperse business services, economic activities and high-quality education away from the Capital region. By the end of the 1990s, regional industrial upgrading was promoted by regional development policies, typically Technoparks were the principal policy for boosting regional industrial development. However, this resulted in regional competitiveness rather than the desired balanced growth. It was during the Roh Administration that the government introduced 'balanced development' as a national priority. In 2003, a special act on Balanced National Development was approved by the National Assembly providing a legal framework for regional development. The act aimed to reduce disparities between regions and decentralise existing policy approaches from the Capital region (OECD, 2012). The current regional policies to promote industries can be grouped into five key areas that include regional strategic industries, industrial location, start-ups and business incubation, university-industry linkages and regional innovation system (table 15).

Regional Strategic Industries: The main objective of promoting regional strategic industries is to upgrade industrial structures and jumpstart new emerging industries. There are currently 17 Technoparks in operation one in each province or metropolitan city and two in Gyeonggi province.

Industrial Location: This program is very closely related to manufacturing industries and will be expanded on further in the next section.

Start-ups and Business Incubation: In 1996, SMBA was assigned the responsibility of creating a fertile environment that would allow the sustained growth of SMEs. Business incubation has been among the key policy measures of SMBA. Recently, MSIP followed suit by implementing new policies for supporting start-ups and young entrepreneurs.

University-Industry Linkages: MOE, MOTIE, MSIP and SMBA are implementing various programs to strengthen UIR linkages. Currently the majority of Korea's universities that receive research grants or participate in national R&D programs run TLO's, since TLO is a requirement for applying for government programs.

Table 15
Current Policies for Promoting Regional Industries

	Regional Strategic Industries	Industrial Location	Start-ups and Business Incubation (BI)	University-Industry Linkages	Regional Innovation System
Main objective	Upgrade industrial structure, jumpstart new industries	Improve infrastructure, upgrade & renovate industrial complexes	Nurture start-ups and young entrepreneurs	Make synergic effects, universities to meet the needs of industry	To alleviate disparity, support regional innovation actors
Ministry in charge	MOTIE	MOTIE	SMBA, MSIP	MOE, MOTIE, MSIP, SMBA	MSIP, SMBA
Main organizations	Technoparks	Korea Industrial Complex Corp.	Regional BI Centers, Creative Economy Innovation Centers	University Technology Licensing Offices (TLOs)	Regional Innovation Centers, Innopolises

Source: Author's adaption of KDI (2015).

Regional Innovation System: Ministry of Science and Technology, the predecessor of MSIP, implemented the first Comprehensive Plan for Promoting Regional Science and Technology in 2000. Since then the Regional S&T has been an important part of S&T policy in general. SMBA has followed suit by emphasising the importance of strengthening SMEs' innovation capability.

2. Upgrading Industrial Complex

The first industrial complex was established in Guro (a suburb of Seoul) in 1965, by 2013 there were 1,033 industrial complexes in Korea. In total, these complexes occupy an area of 1,368 km2, hosts 80,547 companies and are responsible for employing around 2 million workers. The industrial complexes are more concentrated in and around the Capital region (Seoul, Incheon metropolitan city and Kyonggi province). In 2004, 41% of the country's companies resided in the Capital region employing 33% of the labour force. However, the percentage of companies operating in the capital region stands at 58% and employ 39% of workers (KICOX 2015).

Industrial complexes amass individual firms and related supporting institutions into one place with the aim of creating a cluster effect. However, most of Korea's industrial complexes do not act as a mechanism for inter-firm networks and learning. Although there are various supporting institutions that aim to help resident firms, the frequency of use and the degree of satisfaction with the services offered are less than expected. In addition, only a small portion of resident firms are doing collaborative R&D with other firms or innovators, such as universities and government research institutes.[29]

The research capabilities of each region differ depending on the types of industries that are operating in the complexes. The Capital Region takes the lion's share of Korea's R&D resources followed by Daejeon, where Daeduck Science Town is located. That is why the Korean government started to develop innovation clusters and effective regional innovation systems across the country. In 2004, the government initiated the Regional Balanced Growth Plan, which combined regional public and private research activities together with the aim of developing regional sustainable economic development. Despite some success stories, there have been many challenges in trying to achieve the

[29] Kim and Suh (2003) is a detailed analysis of Korea's major industrial clusters: Daeduck valley in Deajeon city, Gumi electronics cluster, a biotechnology cluster in Gyeonggi province, Daegu textile industry, and Changwon machinery industry. All these regional clusters are assessed on the grounds of whether they are acting as innovation clusters. As of 2003, most of Korea's industrial clusters received negative assessments. KDI (2015) contains up-to-date analysis of Korea's 10 regional industries and asses them better than in Kim and Suh (2003), but are still lower than expected.

goal of establishing self-sustained regional innovation systems. The most important of those challenges has been strengthening the research and innovation capabilities of local and regional universities.

3. A chronology of Industrial Location Policies

At the beginning of industrialization in the 1960s, export-oriented industrial complexes were constructed for light industries. As a part of the economic development plan, the "Comprehensive Plan for National Land Development" was unveiled in 1963. The Government's drive to construct heavy and chemical industries (HCI) in the 1970s set forth a tremendous need to develop industrial complexes, and big scale land development. The Industrial Location Act was enacted in 1973, as a means to expedite land development and construction of industrial complexes across the country's regions. In parallel to these events, massive urbanization was taking place.

The HCI drive was a fast-track to industrialization, but it caused enormous distortions in many economic sectors. Industrial location policies in the 1980s adopted a rational approach to mitigate regional imbalances, particularly the increasingly widening gap between the capital region and the rest. Development of agro-industrial parks were encouraged as a means to give more job opportunities to rural areas.

Entering the 1990s, industrial location policy faced a new challenge, it needed to upgrade industrial complexes in line with industry requirements, specifically Information and Communications Technology (ICT). The concept of high-tech parks was introduced, and a shift began from manufacturing bases to knowledge centers. The concept of high-tech parks was reinforced in the 2000s, when regional industries began to diverge. Cities became knowledge-intensive hubs, and manufacturing bases began to relocate to provinces or even overseas. The concept of clusters was introduced as a basic framework for industrial location policy. Table 16 highlights the changes in industrial location policies from the 1960s to the 2000s.

Table 16
Korea's Industrial Location Policies

	1960s	1970s	1980s	1990s	2000s
Stages of industrial development	Start of industrialization	Construction of capital-intensive industries	Industrial rationalization	Re-orientation of development strategy	Transition to knowledge-based economy
Key focus of the policy	Construction of export-oriented "light industry" Industrial Complex (IC)	-Construction of large scale HCI ICs - Expansion of capital region	- Alleviation of regional imbalance - Development of rural industrial parks	- Strengthening of R&D & logistics, paving the way for ICT infrastructure - Concept of "high-tech" parks	- Introduction of cluster concept - Emphasis on environmental sustainability
Institutional Base	Comprehensive Plan for National Land Development	Promoting the Industrial Location Act	Adjustment Plan for Capital Region	Law of Industrial Location (LIL)	Revision of LIL
Main Examples	Ulsan IC, Korea Exporting IC (Guro IC)	Regional ICs, *Masan* Export Zone	Agro-industrial parks	High-tech parks	Urban Knowledge Centers

Source: Author's compilation from KICOX (2015).

G. Policy Implications

1. Lessons learned from the Korean Experience

Although Korea's experience can offer guidance to other countries, their exact methods are unlikely to be replicated due to the countries unique characteristics and experiences. For example, the Confucian tradition places a high value on education, achievement and loyalty to the nation and the political leadership. Other factors such as ethnic homogeneity and the ongoing security threat are also important to take into account. There are also features that are typical of the Asian development model, such as strong state involvement in the orientation and management of the economy, very high savings and investment rates, and a hierarchical industrial organization that better serves mass production. However, there are a number of key features that can be taken from the Korean experience that can help countries gradually transform themselves into a knowledge economy, including approaches to follow and pitfalls to avoid.

The Korean experience offers some lessons for policy makers responsible for trade, technology and education development in developing countries. By adopting an outward-looking development strategy the Korean government drove business enterprises out into the international market. Domestic businesses were then put under mounting pressure to innovate and thus responded by investing heavily in R&D. These efforts were boosted by strong incentives and government R&D programs that started in the early 1980s. The incentives helped enterprises create their own innovative capabilities, which resulted in a significant output of patents a decade later. By developing technological competence domestic businesses have been able to survive international competition and establish world prominence in high-tech industries. A protectionist policy may be effective in creating the initial market opportunities for domestic industries but if the policy is prolonged, industries will develop immunity against market pressure for innovation. It may be for this reason that export-oriented firms and export economies achieve technological learning more rapidly than import-substituting firms and economies (Kim 1997).

There is no doubt that education builds a nation's ability to absorb new information and technology. Education gives rise to individual's initial tacit knowledge, which is an essential building block for technological learning. Therefore, the government should assume full responsibility for taking the necessary measures to promote human resource development. For example, investing in education in the way Korea did in the 1960s and 1970s is essential for laying a solid foundation for industrial development.

To help workers cope with advances in technology, governments should provide vocational and technical training or promote such training in the workplace. As an economy becomes more advanced, technological competence becomes a critical factor. To build up technical competence, governments should introduce policies that nurture high-caliber scientists and engineers that are capable of working at the forefront of science and technology. In the case of Korea, education and industrialization supported each other in sustaining and accelerating mutual development. Education enabled industrialisation and in turn industrialization rewarded those who had invested in their education, which then increased the demand for education.

Korean innovation system today has two faces: a highly advanced modern sector (predominantly based on high-tech manufacturing and ICT industries) and a low-productivity service sector (made up of mostly non-tradable sectors). Enhancing productivity of the latter is the most important and urgent challenge for Korea. Although, Korea will tackle the challenge in the same manner as it has faced challenges in the past, through public-private partnerships, though keeping in mind the danger of cronyism. In particular, Korea's approaches to education and technology illustrate both the pragmatism and the discipline that would inspire developing countries in their efforts to build a knowledge economy.

3. Recommendations for Cooperation

The following are a number of recommendations from the Korean experience that could benefit the Latin American and Caribbean (LAC) region.

Policy learning: As discussed earlier, Korea has implemented many kinds of mid- and long-term plans for science, technology and human resource development. Over this time, the nature of policy planning has changed from a top-down approach to a bottom-up consensus building approach. It is important to note that alongside success stories, there are many failures in policy planning and implementation. Currently, Korea is more inclined to enhance policy effectiveness by using comprehensive policy evaluation methods (policy evaluation is also one of the key functions of the government's think-tanks including KDI and KISTEP.) Therefore, policy learning should include both successes and failures in policy planning and implementation, together with the practice of policy evaluation (KSP is a good channel for this).

Guro Industrial Park and Wonju Medical Equipment Cluster (WMEC) are two success stories of industrial location and cluster policy. WMEC is a particularly good example, since it started almost from scratch in a region where both industrial and R&D activities were poor. Though still a long way to go for a sustained innovation cluster, WMEC shows how to build a new high-tech cluster in partnership with the government, regional universities and business enterprises. Wonju Medical Industry Techno Valley[30] is a non-profit government funded foundation that acts as a link between the government and the medical industry. The foundation seeks to improve the international competitiveness of the Korean medical industry by providing courses and marketing.

Cooperation in science and technology: Areas of S&T cooperation should be identified that offer a mutual benefit for all participants. Governments should plan cooperative projects that combine complementary resources between Korea and LAC.

Cooperation in training: This chapter has highlighted the distinctive role that the Korea Polytechnic (KP) has played in filling the gap between university education and the needs of industry. KP can also be seen as filling the gap between high-caliber scientists and engineers, usually produced by higher education institutions, and technicians with practical knowledge. The latter is especially valuable for SMEs that play a supplier role for large enterprises. In addition to KP, Korea has introduced many types of worker training programs including the HRD Service of Korea.[31] Though not all the training programs have been effective they have benefitted the industry's changing needs.

Industrial cooperation: Korea's leading industries are facing strong pressure to further climb up the technology-ladder by building on their competitive advantage and moving from production-based to innovation-based. Large enterprises are increasing their emphasis on global networks. In this context, there is ample room for business cooperation, mediated by governments. Training foreign workers in Korea and overseas is becoming an effective way of industrial cooperation between Korea and LAC. The majority of Korea's cooperative relationships are currently with other Asian countries, due in part to close geographical proximity. Korea's experiences in industrialization will be a valuable asset to LAC countries. Overseas training will be a viable agenda between Korea and LAC (KOICA would be able to assist with this).

30 www.wmit.or.kr.
31 www.hrdkorea.or.kr.

Bibliograhpy

Edler, Jakob and Luke Georghiou (2007) "Public procurement and innovation – Resurrecting the demand side," *Research Policy*, Vol 36, pp 949-963.

KDI (2015), Evaluation of Regional Industry Policy.

Kang, Soon-Hee (2011), "Korea's public training system: Current status, outcomes and tasks," Paper presented at the 9th East Asian Labor Forum, October 28. (In Korean)

Kim, Dong-Ju and Joonghae Suh, eds. (2003), *Innovative Clusters and Regional Economic Development: International Perspectives*, Korea Research Institute for Human Settlements and Korea Development Institute.

Kim, Linsu (2003), "The dynamics of technology development: Lessons from the Korean experience," in Sanjaya Lall and Shujiro Urata, eds., *Competitiveness, FDI and Technological Activity in East Asia*, Cheltenham, UK: Edward Elgar.

_____ (1997) *Imitation to Innovation: The Dynamics of Korea's Technological Learning*, Harvard Business School Press.

Korea Industrial Complex Corporation (KICOX) (2015), *Industrial Complex Clusters in Korea: Achievements and Challenges*, Daegu, Korea: Korea Industrial Complex Corporation.

Korea Industrial Technology Association (2015), *Major Indicators of Industrial Technology*, Seoul: KITA.

Lundvall, Bengt-Ake and Susana Borras (2005), "Science, technology and innovation policy," in Jan Fagerberg, David Mowery and Richard Nelson, eds., *The Oxford Handbook of Innovation*, OUP, Chapter 25.

Mitchell, Graham R. (1997), *Korea's Strategy for Leadership in Research and Development*, Washington DC: US Department of Commerce, Office of Technology Policy.

OECD (2015), *OECD Science, Technology and Industry Scoreboard 2015: Innovation for Growth and Society*, Paris: OECD.

OECD (2015a), *Education at a Glance*, Paris: OECD.

Shin, T., Hong, S.K. and Grupp, H., (1999), Technology foresight activities in Korea and in countries closing the technology gap. *Technological Forecasting and Social Change*, *60*(1), pp.71-84.

Steinmueller, Edward (2010), "Economics of technology policy," in Bronwyn Hall and Nathan Rosenberg, eds., *Handbook of the Economics of Innovation*, Elsevier, Volume 2, Chapter 28.

Suh, Joonghae and Derek Chen, eds. (2007), *Korea as a Knowledge Economy: Evolutionary Process and Lessons Learned*, Washington DC: World Bank.

IV. Policies, institutions and instruments supporting the internationalisation of SMEs in Latin America

Roberto Urmeneta

A. SME participation in exportas

An important dimension of firm growth dynamics is their ability to improve performance through exports, or rather learn to export. By engaging in export activities, companies improve their productivity as they are obliged to invest in marketing, improve product quality, comply with quality standards, innovate, and learn to do business with foreign buyers. In fact, firms entering export markets can expect their future earnings to rise through increased demand and reduced production costs. Furthermore, contact with foreign markets also allows firms to access new technologies and business models. Moreover, exporting helps them to diversify risks by reducing their exposure to economic cycles in domestic markets. An externality of improving productivity in particular of small and medium sized enterprises (SMEs) is their contribution to reducing poverty and income inequality in the region, as these account more most firms in the region and a significant share of employment.

However, SMEs face several challenges when seeking to export. These include a lack of information on the needs of foreign clients, types of certifications required in foreign markets, and the availability of distribution channels. Furthermore, SMEs struggle to access loans due to the banks' difficulty in assessing risks associated with lending to them. These challenges combined with low productivity levels explain why there is little internationalisation and a high rate of turnover of Latin American SMEs. Every year about one third of all exporting SMEs either enter or exit the export sector. This is due in part to the fact that almost half of all exporting SMEs only export one product to one destination, which makes them vulnerable to changes in demand.

Exporting firms in the region represent less than 1% of the total number of formal firms in Latin America, whereas, for example, in the European Union this share is over 5%. To put this into perspective, the total number of exporting firms in Latin America is equivalent to those found in countries with populations that are only a fraction of the region like France, Korea and Spain. Moreover, exporting firms are highly concentrated in the region with the top 1% of firms accounting

for 63% of the total value of exports compared to only 47% in the European Union in 2014 (Urmeneta, 2016).

Moreover, SMEs exports only account for a small share of the total value of the regions exports, whereas the share of SME exports is much higher in the European Union (almost one third) and Korea (one fifth). From 2008 to 2015, SME exporters in the region saw their share of the total value of exports drop from 6.5% to 6.0% even though the number of SME exporters remained high (Table 17).[32] The decline during this period can be attributed in part to the drop-in demand from neighbouring countries in Latin America, which adversely affected exporting SMEs in particular (Urmeneta, 2016).

Table 17
Latin America: Total exporting firms and exporting SMEs, 2008-2015
(Number, index and percentage)

	2008	2009	2010	2011	2012	2013	2014	2015
All 15 countries (1)								
Total number of exporting firms **(**thousands**)**	119.3	115.3	115.4	117.1	115.9	115.4	114.8	114.0
Total index 2002 = 100	116	112	112	114	113	112	112	111
Percentile concentration 99			66.7	67.7	66.8	67.0	64.8	64.2
Total number of exporting SMEs (thousands) **(2)**	107.4	103.2	102.8	104.3	103.2	102.7	102.2	101.4
SMEs index 2002=100	118.2	113.3	113.0	114.1	112.7	111.9	111.3	109.6
Share of SMEs in total exporting firms (%)	90.0	89.5	89.1	89.1	89.0	89.0	89.0	89.0
Share of SMEs in value of exports (%)	6.5	6.8	6.6	6.1	6.3	6.2	6.1	6.0

Source: Prepared by the author using data from customs, revenue and tax services and labour institutions in each country.
Note: Figures for 2015 are estimates based on total exporting firms in Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Peru and Uruguay. (1) Customs data from Argentina, Bolivia (P.S), Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Paraguay, Peru and Uruguay. (2) Exporting SMEs are defined by firms whose exports are less than 1000 * GDP per capita * share of exports in GDP, see Urmeneta (2016).

The low share of SMEs in the total value of exports combined with the fact that they only employ around 25% of the export sector's workforce is due in part to low labor productivity (Table 18). The productivity of SME workers in the region is only 13% of the level of large firms, compared to 30% in Korea and 68% in the European Union. This is explained in part by the lower levels of education of the workforce in SMEs compared to those working in large companies. On average over half of all SME workers in Latin America did not finish secondary education and only 17% obtained a tertiary education degree. In consequence, wages of SME workers in the region are only one third of their peers working in large companies. These differences are smaller in Korea and the European Union.

[32] The share of SMEs in total exports would be higher if indirect sales abroad through intermediaries were included, which are particularly important in the agriculture sector, although no data is available on this.

Table 18
Latin America, European Union and Korea: Level of productivity, education and wages of workers in SMEs and large firms
(Percentages)

Productivity of companies (Percentage of large companies)				Education level of workers (Percentage of workers with Tertiary)			Workers' wages (Percentage of wages of workers in large companies)		
Size of company	Latin America (2011-2015 6 countries)	European Union (2015)	Korea (2015)	Latin America (16 countries 2014)	European Union (2011)	Korea (2012)	Latin America (2013, 15 countries)	European Union (2015)	Korea (2010)
SME	12.8	68.2	29.6	17.0	35.0	35.0	34.7	74.0	43.8
Large	100.0	100.0	100.0	44.9	35.0	n.a.	100.0	100.0	00.0

Source: Prepared by the author based on data from ECLAC, ILO (2015), EU, OECD, Economic Census and Federation of SMEs of Korea and national surveys of employment and wages.

B. SME intenationalisation policies and promotion agencies

Governments in Latin America have undertaken many direct or indirect policies to support SME exporters. These policies include public and private initiatives that help SMEs to export or sell to other exporting firms as an effort to facilitate their integration into larger producer networks or value chains. Direct policies include loans and non-reimbursable assistance to facilitate SME exporters. Indirect policies aim to improve business linkages and general business environment for SMEs, such as simplifying registration procedures, creating special tax regimes or establishing special labour regulations. In sum, six types of policy initiatives can be distinguished to support the internationalisation of SMEs in the region (see Table 19). Some countries in the region have implemented all six of these policies in a coordinated way. However, in many countries, institutions typically focus on their own goals without coordinating and implementing policies with other institutions.

Table 19
Latin America: Policies and programs to promote exporting SMEs

Policy Focus	Goals	Actions and programs	Institutions
Production processes	To enhance companies' exporting potential	Support the upgrading of SMEs through loans and training programs	Ministry of Finance, development banks, private banks
Networks and trade contacts abroad	To provide SMEs with information on and access to distribution networks abroad	Deliver information on the country´s market, quality standards, distribution networks, clients, trade fairs, etc.	Ministry of foreign affairs, commercial attachés – foreign offices of trade promotion agencies, market intelligence
Indirect exports	To develop SMEs' potential to become suppliers of export companies	Help SMEs to identify stable buyers in terms of large exporting firms. Supplier development programs	Ministry of Economy and Development
"Non-discriminatory" support	To support most innovative export development projects	Assist through objective selection processes to those who request it. Open competition to exporter support funds.	Trade promotion agencies
Technology adoption	To support projects that facilitate the adoption of new technologies that allow companies to better compete abroad.	Adopt technically innovative projects or projects in leading sectors. Programs to support the acquisition of patents in innovative products.	Ministry or agencies of science and technology, patent offices
Local identity	To differentiate products on the basis of local characteristics oriented to specific market niches	Support through programs that reinforce local identity and geographical origin.	Local offices of trade promotion agencies, municipalities and others

Source: Prepared by the author based on an analysis of objectives of SME internationalization policies in the region and speeches given by authorities in charge of institutions implementing these policies.

Both public and private institutions promote the internationalisation of SMEs. Public institutions are mainly trade promotion organizations linked to Ministries of Agriculture, Economy, Production or Trade (ECLAC, 2014). Private organizations include chambers of commerce, exporter associations, international cooperation agencies and non-governmental organizations (NGOs). Many of these institutions only have small budgets and display low levels of coordination with other organizations promoting similar goals. Also, many programs promoting exporting SMEs typically only seek to promote business development without addressing underlying barriers that inhibit exporting SMEs. Many exporting SMEs are deterred from entering such programs due to complex procedures and frequent changes in eligibility criteria.

The strengthening of multilateral trade rules resulting from the Uruguay Round in 1994 and the creation of the World Trade Organization (WTO) one year later gave a boost to trade promotion agencies (TPAs). In the second half of the 1990s and 2000s, many of these institutions were created, restructured and/or reinforced to boost export promotion activities. Moreover, export support instruments were restructured to ensure they would not be considered as export subsidies according to WTO rules. In Central America and the Caribbean, several TPAs are also responsible for the attraction of foreign direct investment (FDI) and the promotion of tourism. Several are private entities which receive support from the public sector. In the Caribbean, for example, the Caribbean Agency for Export Development of the 15 CARIFORUM member states also has a mandate to promote FDI and coordinate actions with national promotion agencies. In recent years, several TPAs have increased reciprocal contacts and adopted similar instruments such as export coaching, export directories, export tests, market intelligence and participation in international fairs.

In 2015-2016, several countries in the region restructured their TPAs. In 2015, ProColombia was reorganized, while in Cuba the center for the Promotion of Foreign Trade and Foreign Investment (CEPEC) was transformed into Pro Cuba. In the same year, Pro El Salvador (PROESA) gained independence from the Ministry of Economy and became an institution of public law that reports directly to the Presidency of the Republic. In Argentina, an investment and export promotion agency was created under the Ministry of Production in 2016, which incorporated the current Export-Ar Foundation

Growing support for exporting SMEs has not led to a substantial increase in funding their promotion. TPAs have the potential to boost international trade, but receive limited resources in relation to their countries' exports. Some institutions, which are also in charge of FDI attraction and tourism promotion, receive a somewhat higher budget proportionally, such as Jamaica (see Table 20).

Table 20
Selected countries: Trade promotion agencies, 2015

Country	Agency	Employees	Number of offices abroad		National Offices	Budget/ Exports
	(Year created)	(Number)	2010	2015	(number)	(%)
Argentina	EXPORTAR (1993)	104	0	0	3	0.001
Bolivia	PROBOLIVIA (2008)	49	0	0	1	0.092
Brazil	APEX (2003)	290	6	9	1	0.066
Chile	PROCHILE (1974)	410	54	53	16	0.039
Colombia	PROCOLOMBIA 2015	472	15	26	8	0.120
Costa Rica	PROCOMER (1996)	24	10	10	13	0.128
Ecuador	PROECUADOR (2010)	264	27	31	6	0.083
El Salvador	PROESA (2015)	77	2	7	1	0.166
Guatemala	DACE (2000)	41	0	2	1	0.072
Honduras	FIDE (1984)	S/I	0	1	1	0.010
Jamaica	JAMPRO (1990)	78	2	2	2	0.381
Mexico	PROMÉXICO (2007)	381	28	48	29	0.035
Nicaragua	CEI (2002)	49	1	1	3	0.050
Panama	PROINVEX (1998)	38	0	0	1	0.016

Table 20 (conclusion)

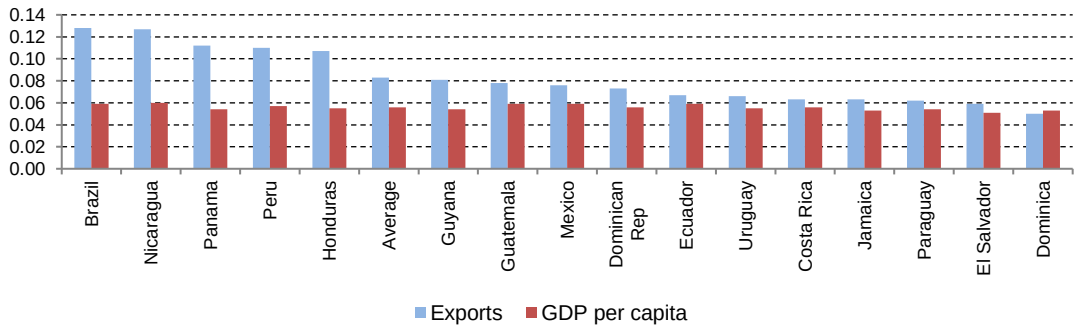
Country	Agency	Employees	Number of offices abroad		National Offices	Budget/ Exports
	(Year created)	(Number)	2010	2015	(number)	(%)
Paraguay	REDIEX (2004)	40	1	4	1	0.046
Peru	PROMPERÚ (2007)	380	19	36	7	0.197
Dominican Rep	CEI-RD (2003)	136	0	1	1	0.054
Uruguay	Uruguay XXI (1996)	40	0	0	1	0.022
Korea	KOTRA (1962)	685		125	8	0.490

Source: Prepared by the author based on reports, web pages and budgets from each institution.

In 2015, Latin America and the Caribbean only invested 0.08% of the total value of exports in TPAs, which is significantly less than Asian and developed economies.[33] Moreover, several countries including Brazil, Chile, Colombia, Costa Rica, Honduras and Panama have seen their real budgets decrease in the 2010 to 2015 period. This reduction can be attributed in part to the fall in commodity prices that led to a decline in total exports (15% in 2015) and the devaluation of currencies. The latter strongly affects promotion agencies as their budgets are set in local currencies and much of their expenses are in US dollars. Notwithstanding the above trends, the number of staff working in TPAs has tended to increase during this period, but they are still a long way from catching up with developed countries.[34]

The International Trade Center (ITC) (2016), a joint cooperation agency of UNCTAD and WTO, concludes that export promotion has a positive impact on export earnings and an even greater impact on GDP per capita. On the basis of data for 77 countries from 2005 to 2013, it shows that for every dollar spent on TPAs, exports would increase on average by 0.074% and GDP per capita on average by 0.065%. This means that a 1% rise in the TPA budget increases exports on average by 87 dollars and GDP per capita on average by 384 dollars. In the context of the region, if the TPAs budget increased by only 1% in Brazil, Honduras, Nicaragua, Panama, and Peru, their exports would be higher than both the average of the world and the region. Moreover, the impact on GDP would be even greater (see figure 19).

Figure 19
Selected countries: Impact of a 1% budget increase of trade promotion agencies, 2005-2013
(Percentage increases in exports and GDP per capita)



Source: Prepared by the author based on data from ITC (2016). Investing in Trade Promotion Generates Revenue. A study of Trade Promotion Organizations International Trade Center, Geneva, Switzerland.

[33] For example, France's TPA budget equalled 0.18% of the country's exports, while Korea's TPA budget was 0.49% of Korea's exports in 2015.

[34] For example, the French TPA had 1,500 employees and its peer in Korea had 685 persons in 2015.

C. Tools to facilitate access to information: foreign commercial offices

Exporting firms require essential information before they can export, for example, business opportunities and distribution networks in potential export markets. However, information asymmetries generate adverse selection problems that occur when foreign consumers cannot identify the quality of products offered by foreign suppliers. In a similar vein, exporters lack information about potential destination markets, such as consumers tastes, import requirements and regulations and distribution networks.

Many TPAs have a network of sales offices in their major foreign markets to reduce information asymmetries by collecting essential information on consumer tastes, regulations, certifications and distribution networks. Opening offices in foreign countries greatly benefits exporters and facilitates their access to new markets. These offices provide specialised marketing services relevant to the export sector that include organizing export and buyer missions, participating in international trade fairs and assisting individual businesses. If the export potential of markets is small, one single office may cover multiple countries. In contrast, if a national market is large, for example China and the United States, it may be justified to establish multiple offices. Often these offices are coordinated by a central body tied to the embassy and managed by a director with diplomatic accreditation. Econometric evidence suggests that the return on each invested dollar in these offices is 34.5 dollars (Volpe, 2010).

The majority of TPAs in Latin America and the Caribbean only have a small network of sales offices abroad. The countries that have developed extensive networks of foreign sales offices include Chile (53 offices abroad), Mexico (48), Peru (36) and Ecuador (31) (Table 21). ProMéxico, for example, has 48 offices in 31 countries, 12 of them in the United States. Procomer of Costa Rica has established a network of 14 foreign offices. Argentina and Uruguay are in an intermediate position as they carry out their export promotion through commercial attachés based at their embassies. However, there are countries that do not seem to have external networks such as Bolivia, Cuba, Haiti and Panama.

D. Financial support for exporting SMEs

In contrast to OECD countries where SMEs receive 25% of all loans issued, SMEs in Latin America and the Caribbean only receive 13% despite efforts by banks in the region to improve lending.[35] SMEs are limited as they can only marginally influence credit markets in part due to their small participation. In addition, SMEs are sceptical of private banks and second-tier approaches that often replicate off-program operations that segment credit markets (Ferraro & Stumpo, 2010).

Accessing credit can be costly for SMEs in the region due to expensive bank guarantees and high interest rates. These are often double those charged to large companies and are among the highest in the world (ECLAC-OECD, 2012). Insufficient access to credit is a key obstacle for SMEs seeking to export. However, if SMEs manage to generate internal cash flows or access bank credit they are far more likely to venture into new international markets. Therefore, financial institutions need to broaden their support for SMEs by developing alternative sources of finance such as supplier credit, value chain financing and special titles in stock markets (IDB, 2013).

SMEs' exports are constrained by a lack of financial support and high fixed costs required to enter foreign markets. These fixed costs are associated with having to comply with import quality standards, labelling standards and certification standards, which often require hiring expensive specialised consultancy services.

[35] Several countries in the region have made efforts to increase the SMEs' share in total loans issued. For example, in Mexico the share of total loans issued rose from 5% in 2009 to 6.5%, while the share in total loans issued to companies rose from 16% to 22% over the same period (Bank of Mexico, 2015).

In this context, countries in the region have developed two financial support systems for exporting SMEs:

- Creation of specific institutions like development banks specialised in supporting exporting SMEs (such as Mexico and Venezuela).
- Creation of dedicated departments that support exporting SMEs based within larger institutions in the public sector (such as Chile).

Public financial institutions have played an important role in providing credit to SMEs in several countries. In these countries where private banks provide few loans, the public sector offers medium and long-term credit. These institutions participate significantly in the banking system, with an average participation rate of close to 23%. In 2015, there were 23 financial institutions in 14 countries offering 112 instruments.[36]

Public financial institutions are diverse, ranging from SME support agencies, guarantee societies, public banks and development banks. The latter support not only SMEs but also large firms. Their support is a key instrument in promoting specific sectors or projects with positive externalities, such as highly innovative companies (ECLAC-OECD, 2012). In 2011, foreign trade loans represented only 5% of the total Development Banks' portfolio. Development banks promote trade mostly through traditional instruments such as credit for pre-and post-export financing, without major ventures in the provision of more specialized financing instruments. However, only 18% of these instruments are directed at SMEs. Most credit is concentrated on foreign trade in general, although some are focused on intraregional trade (Pérez-Caldentey et al., 2014).

Exporting SMEs require specific instruments that go beyond traditional credit. Currently these specific instruments are not used to their full potential. Evidence suggests specific financial support for exporting SMEs yields many benefits, including an increase in employment. For example, in Brazil, the IDB concluded that SMEs that receive credit increase their employment by 11% on average (2.6 jobs per establishment). Therefore, there is a potential to create almost 462,000 additional jobs in the Brazilian manufacturing sector by supporting SME exporters (IDB, 2013). These programs should directly finance (first tier) SMEs. The instruments need to be flexible during the period granted for foreign trade financing.

E. Programs and instruments to improve exporting SMEs skills and innovation

The ability of SMEs to hire well equipped workers depends crucially on the quality of a country's education and training system, which is responsible for preparing (young) people with the necessary skills and knowledge. Unfortunately, due to the low quality of the regions education systems there is a lack of skilled workers. Unskilled workers lower productivity, increase business mismanagement and failure. This situation can be mitigated in part by specific programs that foster entrepreneurial skills. Some policymakers in the region seek to strengthen cooperation with the business community to develop entrepreneurial teaching materials, provide training and train teachers to improve the performance of exporting SMEs.

Unlike large companies, SMEs lack both the human and financial resources to invest in training their own workforce and attracting the most talented candidates. However, several public initiatives assist SMEs in improving the skill level of their employees through training grants and

[36] For example, in Brazil, there are 4 organizations offering 26 instruments in total (Banco de Amazonia with 6, Banco del Nordeste with 3, BNDES with 3 and Bank of Brazil with 14).

funds that support training initiatives. These networks can be horizontal —in which SMEs jointly contract training services— or vertical — in which links between buyers and suppliers are exploited.

Frequent training for exporting SMEs is carried out by TPAs in association with other funding institutions. In Central America and the Caribbean, some of these funding institutions are usually international organizations.[37] Training programs teach managers of SMEs how to export using coaching methods. They offer both one-year programs that lead to a formal diploma and shorter courses that focus on overcoming specific obstacles.

The most successful training support programs are based on a full diagnosis of exporting SMEs, identifying their stage of development and associated challenges. They typically combine practical training sessions that provide hands-on training for entrepreneurs with individual coaching by mentors. The latter are usually successful exporting SME managers with over 5 years of experience. In addition, these training programs require a co-payment by the exporting SME, which provides an extra incentive to succeed. The selection process is relatively simple and training is delivered using face-to-face, remote or on-site methods. In addition, these programs provide follow-ups and incentives for participation and performance enhancement. Successful training experiences for exporting SMEs can be found in almost all countries in the region. A common challenge of these programs is the lack of adequate trainers who know the challenges that SMEs face and have both the experience and the appropriate methodology to adequately address them.

In recent years, several TPAs have been providing free training programs specifically for exporting SMEs that have reached a certain level of maturity. In Brazil and Mexico these training programs are provided by other government institutions. The countries with the most successful programs are Chile, Costa Rica, Dominican Republic, Mexico, and Uruguay. Nonetheless, few exporting SMEs in the region benefit from these training programs due to their small size.

The internationalization of SMEs is also hindered by their lack of innovation, which limits their competitiveness. Some SMEs are unaware of the potential benefits of adopting new technologies, while others are aware but cannot innovate due to the high costs of new equipment and machinery. Furthermore, they are impeded by a lack of skilled labour. Most exporting SMEs have insufficient internal funds to finance such projects and accessing credit from private and public banks is limited.

Several countries have created specialized institutions that promote science, technology and innovation programs. However, non-reimbursable and co-financed public and private support for (exporting) SME innovation remains recent and limited.[38] Often the goals of more general programs focus on supporting SME innovation and modernization (Dini, 2014). These programs share several characteristics, such as a lack of continuity precipitated by their dependency on temporary sources of (foreign) funding, small budgets, and weak coordination with other actors and programs of national innovation systems. The latter prioritize basic science policies instead of the applied types of innovation and adoption of new technologies. Moreover, science, technology and innovation policies are often disconnected from other policies that promote structural transformation such as SME development and internationalization. Furthermore, international cooperation programs for these purposes seem to be in decline.

[37] The European Union and some of its member countries provide funding for training activities in Bolivia (Plurinational state of), Colombia, Honduras and Nicaragua. The United States and the Interamerican Development Bank provide similar support to El Salvador, Jamaica, and Paraguay.

[38] Examples are Argentina (the Ministry of Science, Technology and Productive Innovation (MINCyT)), Chile (the National Commission of Science and Technology (CONICYT, especially FONTEC) and Chilean Economic Development Agency, CORFO), Mexico (National Council of Science and Technology (CONACYT)), Colombia (the Administrative Department of Science and Technology (COLCIENCIAS)) and Uruguay (the National Agency of Research and Innovation (ANNI)). Some countries have specialized agencies to promote SME innovation: Argentina (the Secretariat of Small Business and Regional Development), Chile (the Technical Cooperation Service), Colombia (the Micro, Small and Medium Enterprise Directorate), Mexico (the National Institute of the Entrepreneur) and Uruguay (the National Directorate of Handicrafts, Small and Medium businesses) (Berry, 2016).

F. Increasing SME participation in global value chains through supplier development programs

Despite many recent studies on global value chains (GVCs), little continues to be understood about the participation of SMEs in these chains in Latin America. Some preliminary evidence suggests that SME participation is low partly because of the small number of exporting firms and associated products.[39] The region's participation in GVCs is typically based on the supply of commodities by large firms that generate few backward linkages. This is even true for countries such as Costa Rica and Mexico, which have been relatively successful in entering sophisticated manufacturing-oriented GVCs through foreign affiliates of multinational companies in priority sectors (electronics, medical supplies, motor vehicles and business services). However, so far, these multinationals have generated few backward linkages to local supplier's due to their heavy reliance on imports of intermediate goods.

Instead of exporting directly, SMEs can also participate in GVCs by selling products and services to multinational companies within the same country. These indirect exports are less difficult than direct exports, as no borders need to be crossed, the business and legal environment is the same, as well as the language. As many multinational firms are present in Latin America and the Caribbean, this is an important opportunity to step up the integration of SMEs within GVCs. The potential benefits are huge for SMEs that sell to global companies in terms of access to information, knowledge, management skills and technology. This in turn allows SMEs to improve the quality of their products, increase efficiency, produce larger volumes, cut operating costs, and step up innovation and specialisation. However, most SMEs face major challenges in becoming suppliers of multinationals, mainly because of their low productivity levels, low quality products and a lack of compliance to global quality standards (IDB, 2014).

Several policy interventions have the potential to increase the presence of SMEs within the supplier base of multinational companies, such as:

- Centers that provide training and support to help SMEs meet stringent quality standards;
- Initiatives that promote collaboration among SMEs to strengthen their capacities and overcome barriers such as access to capital goods and finance;
- Initiatives that support multinational companies in sourcing more products and services from SMEs.

The latter policy interventions are often referred to as Supplier Development Programs (SDPs). These have been implemented in several countries in the region with relative success. SDPs are public private programs aimed at increasing the number of SME suppliers to multinational companies. The organization of SDPs depends on the type of value chain and the types of SME suppliers and buying companies within it. These programs help lead firms by assisting their SME suppliers to improve their production and delivery capabilities. Assistance can take the form of direct investments, credit provision, information exchanges, quality certifications, and training. As a result of this support, many SME suppliers manage to innovate and improve their products and services, while migrating to higher value added and quality segments within GVCs.

Three types of agents participate in most SDPs:

- Anchor companies, which are large firms that have the potential to mobilise SMEs and other firms around their production chain due to their push and pull capacity and multiplier effects.

[39] Some recent studies on this topic are Rosales, Inoue and Mulder (2015), ECLAC (2014), OECD and World Bank Group (2015), SELA (2013), Stezano (2013) and UNCTAD (2013).

- SME suppliers provide goods or services to large companies. These are the main beneficiaries of these programs.
- Intermediaries: These are non-profit organizations, government agencies or companies specialized in the execution, monitoring and evaluation of business development and assistance projects.

One example of a SDP can be found in the Chilean agricultural and forestry sector. Here the state economic development agency (CORFO) provides funds to help SMEs increase their share within the supplier base of large companies. A groups of SMEs, in combination with one or more large companies, submit proposals to public tenders of CORFO funding. If they are successful, the SMEs will receive technical assistance aimed at improving the quality of their sales to the large companies. These CORFO funds provide training programs for SME suppliers, carried out by an intermediary agency, or direct technical assistance. Table 21 presents examples of public and/or private SDPs in the region.

Table 21
Selected countries: Examples of public and/or private supplier development programs, 2015

Country	Name of program	Responsible institution	Start year
Argentina	Arcor, Biogénesis Bagó, IMPSA y Tenaris	Arcor, Biogénesis Bagó, IMPSA y Tenaris	No information
Brazil	Hyundai Motors Brazil	Hyundai	Since 2012
Chile	Supplier Development Program	CORFO, Ministry of Economy	Since 1999
Colombia	Supplier Development Program	UNDP	2014
Costa Rica	Supplier Development Program	Ministry of Commerce	Since 2003
El Salvador	Supplier Development Program	Ministry of Economy	2014
Guatemala	Suppliers to Korean textile companies	Hansae and INT Trading	2014
Mexico	Supplier Development Program	Undersecretary of Economy UNDP	2015
	Innovative Productive Development Program	Secretariat of Economy, Sub-Secretariat of Industry and Commerce / IDB	2013-2018
Peru	Supplier Development Program of Innovation	Production Ministry, National Innovation program for competitiveness and productivity (PNCIP)	2013
	Sustainable Productive Chains in Protected Areas	MEDA (Affiliate Canadian Institution)/IDB)	2007
Korea	Sector specific programs in for example electronics and pharmaceuticals	Ministry of Commerce, Industry and Energy, KOTRA	Since 1967

Source: Prepared by the author based on information of Supplier Development Programs (SDPs) and Rosales, Inoue and Mulder (eds., 2015). *Rising concentration in Asia-Latin American value Chains. Can small firms turn the tide?*, ECLAC, Santiago.
Note: The SDPs in Chile, Colombia, El Salvador, Mexico and Peru do not require anchor companies to export. In Colombia, El Salvador and Mexico the UNDP-led programs mainly aim to incorporate small businesses into production networks to improve their very low productivity.

There are also other public private initiatives to promote the productivity and production linkages of SMEs. For example, in Mexico, an Innovative Productive Development Program is being implemented with support from the IDB, which seeks to improve the linkages and productivity of SMEs. In Peru, a program on Sustainable Productive Chains in Protected Natural Areas is carried out, which is also largely financed by the IDB's Multilateral Investment Facility. Some large companies also train their own SME suppliers and help them improve their products and services without participating in a wider SDP. For example, large automotive multinationals in Brazil and large mining companies in Chile have implemented such programs.

However, initiatives to strengthen local SME suppliers within the region widely differ from those implemented in Korea. The latter are implemented by the public sector and Chaebols, such as Samsung in electronics and similar conglomerates in the pharmaceuticals sector. In addition, technical support centers have been created to strengthen the SME contribution in key export sectors (see the chapter by Mah in this same volume).

G. International cooperation as a tool to internationalise SMEs

Multiple international cooperation programs have promoted the development and internationalization of SMEs in Latin America and the Caribbean. The total value of this support in the region is difficult to estimate, in part because of differences between pledged and executed budgets. Some partial information for the region points to small amounts of support in a context where these firms dominate the region's economies.[40] Most multilateral cooperation is non-reimbursable, whereas development banks combine reimbursable and non-reimbursable instruments. At present, such cooperation faces several challenges, including potential cuts and coordination issues with existing government programs.

Within the region, the Inter-American Development Bank has a long tradition of supporting SMEs as part of its efforts to promote private sector development in the region. The IDB Group, which includes the Bank, the Inter-American Investment Corporation (IIC) and the Multilateral Investment Fund (MIF), spent more than USD 12 billion over the last decade to support the development of SMEs. In 2014, its portfolio included 154 operations worth USD 5.7 billion, which was 9% of the total IDB budget and 34% of their total funds for private sector development. The IDB initiatives focus on expanding access to finance, improving the business climate, increasing formalization, and improving SME development programs and policies as well as emphasizing coordination between the public and private sectors.

The Bank offers credit to second-tier financial institutions (such as national development banks) that channel resources to qualified financial intermediaries, who in turn make loans to SMEs. The IIC provides loans and capital investments to SMEs from countries with less access to international capital markets. The MIF is a pioneer in the use of capital investments as a tool for the development of small businesses. The IDB support goes beyond offering financial resources. Through the Micro, Small and Medium Enterprise Division of its Sustainable Development Department, the IDB also supports legal and regulatory reforms, provides technical assistance and disseminates best practices to help create the right conditions for private enterprises to flourish.

The IDB has also sponsored the Ibero-American Network of Export Promotion Agencies since 2007. This network was created in Madrid in 1999 with the aim of strengthening relations between member organisations. It is made up of almost 30 organizations from countries in the region, Portugal and Spain. The conference discusses technical subjects of common interest and promotes the exchange of good practices for successful trade promotion. The network has a biannual rotating presidency that oversees the organization of the network's plenary sessions, which are held once a year. In between there are four annual discussion seminars with the participation of representatives from some 20 organizations articulated around thematic axes. The Uruguay XXI agency was chosen (in November 2015) to be president of the Ibero Network for 2016 and 2017.

One of the largest external cooperation partners in the area of SME development and internationalization is the European Union through its AL-INVEST program. It started in 1994 with

[40] According to the Consultancy Group on Assistance to the Poorest (CGAP), state-owned banks in the region earmarked USD 25 billion for SME financing in 2011. Official Development Assistance (ODA) for SMEs in the region amounted to USD 18 billion from 2006 to 2012 (ILO, 2015). In some countries, international cooperation funds were almost half of the budgets of export promotion agencies.

the aim to attract European investment to Latin America. Over time its goals changed to promote the internationalization and improvement of productivity in micro-small and medium-sized companies in the region. This program initiated its fifth version in 2016, in collaboration with 11 international organizations coordinated by the Santa Cruz Chamber of Commerce Industry Services and Tourism of Santa Cruz Bolivia (CAINCO), following a tender process. It is carried out in collaboration with different types of organizations, including Chambers of Commerce, Trade Associations and Export Promotion Agencies.

Some UN agencies have also developed specific programs to increase cooperation with and within the region. The most prominent is the International Trade Center (ITC) of the WTO and UNCTAD. It carries out a series of technical assistance activities, focusing on trade promotion, trade policy and trade regulation. A key program called "aid-for-trade" seeks collaboration with developing countries (in particular the least developed countries) with the aim of supporting them to improve their supply capacity and trade related infrastructure so that they can increase the benefits of international trade.

H. Conclusions and proposals for international cooperation

In Latin America and the Caribbean, SMEs face far greater obstacles in their internationalization process than their peers in developed regions. They are prone to weaknesses in areas such as productivity, product quality, certifications, access to credit, and economies of scale. As the productivity differential between SMEs and large firms is far larger in Latin America than in developed regions, their degree of internationalization is much lower in the former compared to the latter. Notwithstanding this reality, there are opportunities to increase the number of exporting SMEs in the region along with their contribution to exports, structural transformation, inclusive growth and development, and employment. For this to happen, (potential) SME exporters need to enhance their productivity, and export diversification in terms of new products and new destinations both within and outside the region.

Although the need for stronger policies for SME development and internationalization is publicly recognized, in practice few resources have been allocated to pursue this goal. For example, in Brazil and Mexico SME support is only 0.085% and 0.015% of their GDP, respectively, whereas in Spain and Korea this percentage is 0.41% and 0.27%, respectively, in 2015. Although most countries in the region have institutions and programs to support (exporting) SMEs, these typically lack resources and are often unstable. There is also a need to connect and generate synergies between macro policies and programs provided by export promotion agencies. Moreover, promotion programs need to enhance SMEs indirect exports by increasing the number of SME suppliers to large export companies. A specific challenge that hinders the definition of effective policies for exporting SMEs is the lack of adequate information and statistics. Therefore, there is a need to improve the knowledge of direct and indirect exporters in the region.[41]

To increase the productivity of SMEs requires policies that promote the dissemination of general purpose technologies such as information and communication technologies, productive development policies, macroeconomic stability, deep international trade agreements and specific tools to promote SMEs and their exports. These policy complementarities are beyond the scope of this chapter, which focuses specifically on policies directly linked to the internationalization of SMEs.

More bilateral trade and cooperation between the region and Korea have resulted in several technical cooperation initiatives. Some of these have focused on the internationalisation of SMEs in the region, which Korea has a lot of valuable knowledge and expertise.[42] Cooperation projects that

[41] For more information on how to estimate sales, exports and employment of exporting SMEs, see Urmeneta (2016).

[42] There are currently Knowledge Sharing Programs (KSPs) that share Korean development experiences with countries of the region, including export promotion and development of exporting SMEs. See Mah (2016)

promote the internationalization of SMEs should focus on increasing FDI and linkages to SMEs, ease customs procedures, facilitate access to trade finance, and improve technical standards, sanitary and phytosanitary standards. All these could help reduce trade costs. Further cooperation should be aligned to the United Nations' objectives for sustainable development, specifically objectives 8 and 9. Specific policies to achieve the UN 2030 objectives focus on the mobilisation of resources and an in-depth study of micro, small and medium-sized enterprises. In addition, cooperation should also be aligned with an agreement adopted by the Third International Conference on Financing for Development in Addis Ababa in 2015.

Korea has a long track record of supporting SME exporters, which is embedded in a wide range of productive development policies. For this purpose, Korea has developed a solid institutional framework with functional support policies and programs, enabling Korean SMEs to raise their level of participation in exports to a high level.[43] Bilateral cooperation could complement existing initiatives to support SMEs and strengthen synergies between policies and programs. In particular, Korea may help streamline the complex institutional landscape in many countries in the region, improve mechanisms to facilitate SMEs' access to financing, training and innovation and share good practices of export promotion agencies.

Bilateral cooperation could be stepped up in a decentralized manner through intermediary organizations that currently implement projects and programs for exporting SMEs. New areas of cooperation may consider what existing instruments and programs are currently in place and consider what support is required to improve them. One example is to strengthen and improve export promotion agencies international office networks based on markets that offer the greatest potential to expand exports. Given budgetary constraints of the TPOs, one option is to design offices that can represent various countries of the region in different markets around the world. Table 22 presents this and other areas of cooperation.

Table 22
Areas of cooperation to support the internationalization of SMEs in Latin America

Area of cooperation	Challenge	Name of activity or program	Examples
Studies and diagnoses	Scarce knowledge of exporting SMEs	Databases of exporting firms by country. Directory of regional exporting firms	Projects that compliment firm-level customs data. Projects that generate export directories by sub-regions
Institutional and other improvements	Institutional weaknesses and lack of coordination	Programs to strengthen institutions and improve coordination	Ensure continuity to internationally funded programs. Support development of export promotion programs
Financing / credit guarantees	Adverse selection / low SME credit	Support loans to SMEs. New modalities of financial support for exporting SMEs	Resources to create new methods of financial support (leasing, factoring and others). Resources to promote new SME Savings and Credit Cooperatives
Training	Improve labor qualifications and skills	Support education and training	Resources and staff to foster relations between SMEs and training institutes. Resources to strengthen export know how

[43] For example, the Korean Agency for the Promotion of Trade and Investment (KOTRA) was created in 1962 under the Ministry of Commerce, Industry and Energy. It has 685 employees, 123 offices abroad and its budget equals 0.5% of exports.

Table 22 (concluded)

Area of cooperation	Challenge	Name of activity or program	Examples
Access to external markets	Lack of information and contacts / reduce information asymmetries	Support information on setting up offices, training and participation in business fairs	Conduct studies on potential demand in Asia for food products produced by SMEs in the region. Support the creation of multi-country offices in Asian countries
Innovation	Reduce technology and knowledge gaps	Support for technology transfers, equipment, and the development of new technologies	Improve SMEs innovation capacities, assimilation of technology used by exporting SMEs.
Value chains, networks and productive conglomerates	Need to coordinate and generate productive networks / increase participation in GVC	Cluster programs, linkages, and vendor programs	Dissemination of the Korean experience in regard to their SME suppliers and green growth programs. Supplier Development Programs. Support for sustainable supplier programs in the food sector

Source: Prepared by author based on an analysis of policies and programs that support exporting SMEs in Latin America and the Caribbean.

Bibliography

Bank of Mexico (April 2015). "Reporte sobre las condiciones de competencia en el otorgamiento de crédito a las pequeñas y medianas empresas (pyme)", México DF.

Berry, A. (2017), "Innovation and skills policies in Latin America and the Caribbean", Economic Commision for Latin America and the Caribbean, Santiago, Chile, in this volume.

Dini, Marco and otros (Nov. 2014). Una promesa y un suspirar: políticas de innovación para pymes en América Latina. ECLAC-Cooperación Alemana, Santiago.

ECLAC (2014), *International trade and inclusive development: Building synergies*. Santiago.

ECLAC - OECD, (2012), *Perspectivas económicas de América Latina 2013: Políticas de pymes para el cambio estructural* (LC/G.2545), Santiago.

Ferraro, Carlos and Giovanni Stumpo (2010). Políticas de apoyo a las pyme en América latina. ECLAC-Coeperazione Italiana, Santiago.

IDB (2013). Modelos para PYME Apoyados por el BID: El Caso de Brasil. Oficina de Evaluación y Supervisión. Documento de Enfoque, Washington, DC.

ILO (2015), Pequeñas empresas grandes brechas: Empleo y condiciones de trabajo en las MYPE de América Latina y el Caribe. Panorama Temático, Lima.

International Trade Center (2016). Investing in Trade Promotion Generates Revenue. A study of Trade Promotion Organizations International Trade Center , Geneva.

International Trade Center (2015), Perspectivas de competitividad de las pymes. Conectar, competir y cambiar para un crecimiento inclusivo. International Trade Center, Geneva,

Mah, J.S. (2016), "Korean Policies for SMEs Development and Internationalization", ECLAC, Santiago, Chile, in this volume.

OECD and World Bank Group (2015). Inclusive Global Value Chains Policy options in trade and complementary areas for GVC Integration by small and medium enterprises and low –income developing countries, Washington, DC.

Pérez-Caldentey, E., C. Vera, A. Díaz and S.Vera (2014), *El financiamiento del comercio internacional y el rol de la banca de desarrollo en América Latina*, ECLAC, Serie Financiamiento para el Desarrollo N251. Santiago, Chile.

Rosales V., K. Osvaldo, K. Inoue and N. Mulder (2015), *Rising concentration in Asia - Latin American Value Chains. Can Small firms turn the tide?*, ECLAC, Santiago, Chile.

SELA (Oct. 2013). Cadenas de Valor, Pymes y Políticas Públicas. Experiencias Internacionales y Lecciones para América Latina y el Caribe. SELA, CELAC, ECLAC. Caracas SP-CELAC/RFANDPIALC/DT N° 3

Stezano. F. (2013) "Políticas para la inserción de las microempresas y las pequeñas y medianas empresas en cadenas globales de valor en América Latina". ECLAC, *Serie Estudios y Perspectivas* 146, México.

UNCTAD (2013), Public-private partnerships to promote small and medium-sized enterprise participation in global value chain (TD/B/C.II/EM.3/2), Geneva.
Urmeneta, R. (2016), “Dinámica de las empresas exportadoras en América Latina: El aporte de las Pymes”, ECLAC, Santiago.
Urmeneta, R. (2013), ASEAN: Interrelaciones y potencialidades con América Latina y el Caribe. ALADI-CAF-ECLAC, Santiago.
Volpe, Christian (2010), Las Organizaciones de Promoción de Exportaciones: Un Retrato Institucional. BID, Santiago.

V. Korean Policies for SMEs Development and Internationalization

Jai S. Mah

The Republic of Korea (henceforth Korea) recorded very rapid economic growth since the early 1960s. GDP per capita increased from less than US$100 in 1960 to US$28,000 in 2014. Realizing the benefits of an outward-orientation, the Korean government actively pursued the internationalization of the economy. Thus the trade dependence ratio rose from 20% in 1963 to 68% in 1980 and to over 100% in 2014.[44] In the 1960s and 1970s, export promotion policies focused on large companies known as chaebols.[45] Technology-intensive industries began to lead Korea's exports in the late 1980s.

In the 1980s the Korean government began to pay more attention to the development and internationalization of small and medium sized enterprises (SMEs). The main emphasis has been on promoting SME exports. However, a few organizations provide support for SMEs investing abroad. Korea's outward foreign direct investment (OFDI) has increased significantly in the past few decades, and SME participation in global value chains (GVC) has increased as well. The Korean government has tried to strengthen the measures supporting SME internationalization.

This chapter analyzes the development and internationalization of SMEs in Korea in a historical perspective, focusing on the evolution of relevant government policies. Drawing on Korea's experience, some conclusions and recommendations are offered for Latin American and Caribbean countries.

A. Overview of economic development in Korea since the 1960s

The Korean government switched its economic development strategy from import substitution to export promotion in the early 1960s. Korea has achieved rapid economic growth since then (see table

[44] Source: Bank of Korea.
[45] Chaebols can be defined as large family-owned conglomerates covering diverse business areas in Korea (Chang, 2003).

23). The government aggressively pursued an export promotion policy, especially during the 1960s and 1970s. An economic crisis occurred in 1998, in the context of the Asian financial crisis. Although the economy quickly recovered, economic growth slowed down since the mid-2000s. Average real GDP growth reached 6.6% between 1962 and 2014, and 8.2% between 1962 and 1996, the period before the economic crisis. In 2014, goods exports reached US$613 billion, and the exports of goods and services to GDP ratio reached 51.4 per cent.

Table 23
Republic of Korea: GDP and export growth and exports/GDP ratio, 1962-2014

Period	Average real GDP growth rate in percentages	Good exports in billions of dolars	Export of goods and services/GDP in percentages
1962-1971	8.9	4	10.7
1972-1981	7.1	99	29.7
1982-1991	9.1	448	33.4
1992-2001	5.6	1 244	34.7
2002-2011	3.6	3 448	38.7
2012-2014	2.8	1 834	53.9

Source: International Monetary Fund (IMF), International Financial Statistics Yearbook, various issues; Bank of Korea, http://www.bok.or.kr.

Along with the rapid expansion of GDP and exports, Korea's industrial structure changed dramatically. The share of the primary sector in GDP fell from almost half in the mid 1950s to just 2% now, whereas the share of the tertiary sector (services) and especially the secondary sector (industry) increased substantially (see table 24).

Table 24
Republic of Korea: industrial structure, 1953-2014
Percentages of GDP)

Industry	Year			
	1953	1970	1990	2014
Primary	47.3	29.2	8.9	2.3
Secondary	12.7	26.1	41.5	43.6
Tertiary	40.0	44.7	49.6	54.1

Source: Song (2010); the data for 2014: Bank of Korea, http://www.bok.or.kr.

The switch in Korea's policy from import substitution to export promotion also brought important changes in the structure of exports. While in 1964 primary goods accounted for two-fifths of total exports, by the end of the 1970s their share had become negligible. Initially only selected companies were allowed to borrow from abroad, with payment being guaranteed by the government. Those firms became the large conglomerates called chaebols. To promote the heavy- and chemical-industry (HCI), the government decided to support several selected industries. It provided various tax incentives and export finance to export-related enterprises.

In the early 1980s the government tried to pursue market-oriented reforms and the direction of industrial policy changed. It began to emphasize research and development (R&D), reflecting policymakers' recognition that it was necessary for the economy to overcome the stage of imitating techniques developed by advanced economies. Since 1983, the focus of industrial policy shifted away from sector-oriented support (such as the HCI Drive) toward function-oriented support for R&D. The Information Technology (IT) industry began to lead Korean exports. In 1998 the Asian crisis hit the country and GDP fell 5 percent. To overcome the crisis, the government undertook reforms including

to FDI inflows. The Korean economy resumed growth quickly, although at lower levels than before the crisis (Mah, 2007; Koh, 2010). Since 1998, the government has emphasized the goal of transforming Korea in a knowledge-based society with a creative, innovation-driven economy.

B. The internalization of Korean SMEs

1. The development of the SME sector

The Korean government pursued its HCI Promotion Plan since the 1970s. Due to the economies of scale in that sector, economic growth was led by chaebols during the 1970s and 1980s (Mah, 2007). SMEs began to play a more important role since the 1980s (Kim and Nugent, 1994). Thus the ratio of SME employees to those in all industries increased from 75% in 1995 to 88% in 2005, having stabilized at around that level since then.[46] Moreover, the share of SMEs in value added in the manufacturing sector increased from 35% in 1980 to 50% in 2013 (see table 25). Although chaebols have been generally known as the drivers of Korea's economic growth, several of them became bankrupt during the crisis of the late 1990s.

Table 25
Republic of Korea: average value-added per employee in the manufacturing sector
(US$ thousands)

1980	12.5	6.9	1.81
1980	12.5	6.9	1.81
2000	140.1	49.6	2.82
2013	336.3	99.6	3.37

Source: Korea Federation of SMEs (2015).

Table 26 shows lending interest rates in Korea by firm size. Rates have decreased since 2001 for both large firms and SMEs. However, the rates charged on loans to SMEs continue to be higher than for large firms.

Table 26
Republic of Korea: lending interest rate
(Percentages)

Year	SMEs	Large firms
2001	6.74	6.42
2005	5.92	5.24
2010	5.68	5.25
2014	4.60	4.10

Source: Korea Federation of SMEs (2015).

In the late 1990s and early 2000s, the government introduced various programs supporting SMEs' R&D activities, leading to the so-called 'venture boom' in early 2000s. Since the subsequent administration also emphasized innovation, the share of SMEs in R&D expenditure increased from 11% in 1995 to 26% in 2011 (Kang and Mah, 2015).

[46] Source: Small and Medium Business Corporation (SBC), http://www.sbc.or.kr.

2. SME export performance

According to the OECD (2009), networks, supply chain links, social ties, immigrant links, improved global trade infrastructure, and sector and region-of-origin factors seem to stimulate SME internationalization. In addition, productive capacity and financing opportunities appear to be important factors which motivate SMEs to pursue internationalization in Korea.

A survey from 2011 shows that, compared with SMEs not exporting their products, exporting SMEs have been operating 1.5 years longer (12 years on average) and have more employees (30 full-time employees on average). The share of exports in total sales for exporting SMEs was 37% in 2010 (Pyo et al., 2011).

SME exports increased from US$76.8 billion in 2009 to US$100.4 billion in 2015 (see table 27). The ratio of SMEs' exports to total exports also increased in the late 1990s and early 2000s, peaking in 2003 and decreasing since then. Currently it stands at about 18%. The falling share of SMEs in total exports may be explained by rapidly increasing export values of IT products and automobiles, which are mostly produced by large firms such as Samsung Electronics and Hyundai Automotives.

Table 27
Republic of Korea: SME exports
(US$ billions and percentages)

Year	SMEs exports	SMEs exports/total exports (percentage)l
2009	76.8	21.1
2010	98.6	21.1
2012	102.9	18.8
2013	95.8	17.2
2014	110.3	18.0
2015	100.4	18.3

Source: SMBA, http://www.smba.go.kr; data for 2014 and 2015: Bank of Korea and unpublished, preliminary data (obtained from interview with a government official at SMBA, March 7, 2016).

The data reported in Table 28 show direct export values. However, the contribution of SMEs would increase significantly if indirect exports are included. Indirect exports comprise SMEs' products exported by trade agencies and the products sold by SMEs to exporting firms which use them as inputs (i.e. intermediate goods). According to KITA (2013), the share of SMEs' indirect exports through large firms reached 12% of Korea's total exports in 2012. Therefore, SMEs' contribution to total exports -including direct and indirect exports- is estimated to reach about 30% in 2015. Lee (2010) shows that in the automotive and shipbuilding industries, about 30% and 62% of the final goods' export values, respectively, can be explained by SMEs' indirect exports.

The number of exporting SMEs increased from 77,355 in 2009 (2.5 percent of all SMEs) to 87,865 in 2013 (2.6 percent of all SMEs).[47] Average export values per SME decreased from US$1.22 million in 2011 to US$1.10 million in 2013 (Lee and Kim, 2015). In 2012, SMEs accounted for 93.5 percent of all exporting firms.[48] Electricity/electronics, machinery and the chemical industry combined accounted for more than two-thirds of SME exports in 2009 (Lee, 2010).

[47] Data provided by Ms. Jee-Eun Lee, senior officer at SMBA, on May 24, 2016.
[48] Source: KITA, http://www.kita.org and data provided by SMBA.

3. SME participation in global value chains

With globalization, the role of global value chains (GVC) has continued to increase in the world economy. One of the clearest examples is the automobile industry. Automobiles are produced using thousands of parts. Some of them are imported and assembled in the importing country, the so-called knock down (KD) method. The remaining parts can be sourced from the host country, and local SMEs may supply such parts.

Hyundai Motor Company is the leading automobile producer in Korea, the world's fifth largest producer of automobiles. Since it first established a subsidiary in Turkey in 1997, it has set up factories in several countries including China, India, the United States and Brazil. Production by foreign subsidiaries represented 57 percent of Hyundai's production of automobiles in 2012.

Within Korea, 8,500 producers provide car parts to Hyundai. For overseas production, the local content ratio reached 90 percent in China and even higher in India. Hyundai's production capacity in China increased to 1 million cars per year in 2012. Some 121 Korean firms supplying components to Hyundai accompanied it to invest in China and 58 local producers also supply their components to it. Hyundai's subsidiary in India also increased its production capacity to 640,000 cars in 2012. Same as in China, some Korean firms supplying components to Hyundai also invested in India and 65 local producers also provided components to it (Lee and Koh, 2013).

4. Outward FDI in general[49] and by SMEs

Korea's outward FDI (OFDI) has increased substantially since 1990 (see table 28). Despite stagnating for a few years in the late 1990s, it recovered quickly after 2000. Korea's OFDI flows have exceeded US$20 billion each year since 2007, with Asia being the largest recipient. China (excluding Hong Kong) is Korea's second largest investment destination following the United States as of 2014.

Table 28
Republic of Korea: Outward foreign direct investment flows, 1990-2014
(US$ billions)

Year	World	Asia
1990	1 068	365
2000	5 286	1 710
2010	14 642	10 179
2014	26 769	8 926
1990-2017	278 740	118 265

Source: Korea Export Import (EXIM) Bank database.

Manufacturing has been the leading sector in Korea's OFDI. However, its share in total OFDI flows, which exceeded 50 percent between 1994 and 2006, has dropped since then, reaching 27 percent in 2014 (see table 29). The decreasing share of manufacturing is associated with the expansion of the mining and quarrying sector since 2006, due to the increase in large-scale resource development projects, mostly concerning crude oil and natural gas. Those projects were further promoted by the increased investment from state-owned enterprises in the energy sector (EXIM Bank, 2010; Oh and Mah, 2015).

[49] This part is mainly drawn from Oh and Mah (2015), unless specified otherwise.

Table 29
Republic of Korea: Outward foreign direct investment flows by sector, 1990-2014
(US$ millions and percentages)

Year	Mining and quarrying	Manufacturing	Financial and insurance	Real Estate	Total
1990	151 (14.2)	466 (43.7)	104 (9.8)	15 (1.5)	1 068
2000	139 (2.6)	1 617 (30.6)	66 (1.3)	432 (8.2)	5 286
2010	7 574 (30.7)	7 153 (29.0)	2 832 (11.5)	1 555 (6.3)	24 642
2014	5 344 (20.0)	7 244 (27.1)	3 921 (14.8)	3 953 (14.8)	26 769
1990-2014	52 323 (18.8)	98 492 (35.3)	22 438 (8.1)	22 438 (8.1)	278 740

Note: The share of each sector in total OFDI is presented in parentheses.
Source: EXIM bank database, rearranged by Oh and Mah (2015).

Although the share of SMEs in total OFDI increased from 19 percent in 1990 to 42 percent in 2000, it decreased sharply since then (see table 30). Specifically, SMEs have played a significant role in Korea's OFDI in Vietnam (source: EXIM Bank data base). By contrast, only a minimal share of Korean OFDI in Latin America corresponds to SMEs (see table 31).

Table 30
Republic of Korea: outward foreign direct investment flows by firm size
(US$ millions and percentages)

Year	SMEs (A)	Large firms (B)	All firms (C)	A/C (%)
1990	199	859	1 069	18.6
1995	780	2 393	3 228	24.2
2000	2 214	2 892	5 287	41.9
2005	1 955	4 508	7 283	26.8
2010	2 593	21 367	24 643	10.5
2014	2 304	22 505	26 769	8.6

Source: EXIM Bank data base.
Note: C – A – B: individuals and non-profit organizations.

Table 31
Republic of Korea: outward foreign direct investment flows in selected Latin American countries by firm size, 2013 and 2014
(US$ millions)

Country	2013			2014		
	SMEs	Large firms	All firms	SMEs	Large firms	Alll firms
Mexico	4	687	691	20	737	758
Brazil	32	500	532	15	436	451
Peru	1	265	267	0	403	403
Panama*	2	6	223	4	9	269
Chile	0	34	34	0	41	41

Source: EXIM Bank data base.
* Non-profit organizations accounted for most of Korea's investment in Panama in 2013 and 2014.

5. Barriers to SME internationalization

According to OECD (2009), based on a survey conducted in 10 OECD members (including Korea) and several non-OECD large economies, there are several important barriers to SME internationalization: first, shortage of capital to finance exports; second, identifying foreign business opportunities; third, limited information to analyze markets; fourth, inability to contact potential overseas customers; and, fifth, lack of managerial skills and knowledge. SMEs in general responded that the shortage of capital to finance exports is the most important barrier. However, Korean SMEs chose the lack of managerial skills and knowledge as the most serious barrier. This may reflect an adequate provision of trade finance to SMEs in Korea.

Lee (2010) shows that the three most needed government support measures for SMEs' export promotion in Korea are financial support (39 percent), information on foreign markets (33 percent), and marketing support (23 percent). Pyo et al. (2011) show that the main obstacles to SMEs' exports in Korea, particularly in the early export stage, comprise: difficulty of establishing/finding distribution channels in foreign markets; lack of specialists in international marketing; and lack of financial resources necessary for maintaining exports. According to Lee (2010), only 18 percent of the responding SMEs had experience utilizing the programs supporting SME internationalization.

C. Korea's government policies supporting SME's exports

1. SME promotional in general

(a) Policies supporting SME development

The Korean legal system officially stipulates protection and promotion of SMEs. Article 123 of the Constitution stipulates that: "The state should protect and promote SMEs." Until 2014 the Framework Act on SMEs defined them as firms satisfying all of the following conditions: total assets not exceeding 500 billion won (US$ 414 million as of January 2017), 3-year average sales below 80 or 100 billion won (depending on the industry in the case of the manufacturing sector); less than 300 employees in the manufacturing sector and less than 100 or 200 for the other sectors. In January 2015, the criteria for SMEs were changed to firms whose 3-year average sales were smaller than 80 to 150 billion won in the manufacturing sector and their total assets did not exceed 500 billion won.

During the 1970s, despite the law supporting SMEs, the support they received was negligible compared to that given to large firms (Park et al., 2013). In the 1980s, the government considered that the promotion of SMEs would be beneficial to economic development, as SMEs could respond relatively quickly to changing market conditions and be more innovative than large firms (Lee and Noh, 1996).

The SMEs Promotion Act was legislated in 1994. It specifies the improvement of the structure of SMEs including strengthening their management base, the establishment of the Small and Medium Business Corporation (SBC) and the SME Establishment and Promotion Fund. In 1996, the Small and Medium-Sized Business Administration (SMBA) was established as the government authority devoted to planning and implementing programs for the development of SMEs. Currently, SBC under the SMBA implements SME promotion measures.

(b) Policies to promote SME exports

Various ministries and agencies have provided support for SME internationalization. For instance, the Ministry of Trade, Industry and Energy (MOTIE), SBC, SMBA, Korea Trade-Investment Promotion Agency (KOTRA), and Korea International Trade Association (KITA) are all involved in SME export promotion. SMBA under the MOTIE has been the central government authority in charge

of planning and implementing the main export promotion programs. The Evaluation Committee within SMBA evaluates SME internationalization policies together with all other policy measures covered by SMBA. The Committee includes external experts such as professors and research fellows.[50] The budget allocated by SMBA to promote SMEs' exports increased from US$51 million in 2011 to US$85 million in 2015. Provincial governments also implement various schemes to promote SME exports (Lee and Kim, 2015).

Due to the existence of many export promotion agencies, SMEs struggled to recognize the functions of each agency. In 2008 the government reorganized the agencies in charge of promoting SME exports to reduce the waste of financial and human resources and to avoid confusion. SME export promotion began to be covered by KOTRA and SBC. These agencies began to cover the foreign and domestic tasks relating to export promotion, respectively. In 2013, the current administration set "internationalization of SMEs" as a goal and changed again the structure of export promotion to strengthen competition among agencies. That is, the same programs can be implemented by diverse agencies (Jeon, 2013).

The government set the direction of trade promotion in 2015 in 3 ways (MOTIE, 2015b). Two are directly related to SMEs. One is the strategic use of free trade agreements (FTAs). For that purpose, the government promotes SMEs' utilization of FTAs. The other way is strengthening SMEs' export capabilities. Specifically, the government pursues transforming SMEs which previously sold in the domestic market only into exporting firms and activating new export methods such as e-commerce.

In 2015 the government selected 2,400 promising firms, mostly SMEs, which had the potential to become exporters. Several support measures were provided to them. First, support on finding buyers, matching buyers with the concerned firms, training on export practices, and on-line marketing methods. Second, the government strengthened international marketing efforts such as holding EXPOs abroad and sending trade delegations. Third, the government expanded the IP-Desk (established in 2006) to provide legal counsel to SMEs on disputes relating to IPRs. Fourth, KITA and KOTRA strengthened the provision of information to exporting SMEs (MOTIE, 2015b).

Concerning new export methods, the government supports SME participation in e-commerce. It also supports Korean firms entering the procurement markets in the major developed countries and international organizations. Although this support is not specific to SMEs, they are expected to be the main beneficiaries. In addition, the government intends to expand market opportunities in emerging countries (MOTIE, 2015b).

The Korean government pursues several other measures to strengthen SMEs' export capabilities. First, it intends to strengthen financial support for SMEs' exports. Second, it promotes simultaneous penetration of foreign markets by both large companies and SMEs. Third, it supports SMEs' access to networks and overseas partners. Fourth, it allocated US$7.8 million in 2015 to implement the Export Incubator Program, which maintains 276 offices in 12 countries. To lessen the burden on SMEs of penetrating into foreign markets, this program prepares office spaces in the country concerned, covers part of the rent and provides specialists' consulting services to exporting firms (MOTIE, 2015b; SBC, http://www.sbc.or.kr).

Although many organizations are involved in promoting SME exports, KOTRA leads on international marketing. Out of 122 export promotion programs implemented by the government as of mid-2015, KOTRA was in charge of 50 (Lee and Kim, 2015). It maintains 124 offices in 84 countries. Table 32 illustrates some of the major KOTRA programs to promote SME exports. All are being actively implemented.[51]

[50] Interview with Mee-Young Ahn, senior officer at the Foreign Markets Division in SMBA, May 24, 2016.
[51] Interview with Dr. Yoon Jung Choi, Research Fellow at KOTRA, February 23, 2016.

Table 32
Main KOTRA Programs Promoting SME Exports in 2015

Program	Content
(a) Transforming firms targeting domestic market into exporting firms	Provide consulting services to 1,400 firms for 1 year
(b) Tailor-made consulting by experts in the importing country	
(c) Export incubator program	
(d) World champ program	Supporting 130 SMEs to become the Hidden Champions by collaboration between the firms and KOTRA in establishing the roadmap of penetrating into the market
(e) Supporting SMEs accompanying large firms in entering foreign markets	
(f) Supporting firms participation in foreign trade expos	US$28.7 million is allocated to 3,100 firms; SMEs are *de facto* beneficiaries
(g) Supporting trade fairs in Korea	Supporting part of the foreign buyers' air fares and accommodation costs when they attend trade fairs held in Korea; the annual average number of support: 21 cases during 2011-2014
(h) Analysis of foreign markets	Provision of information by collection and analysis of foreign market conditions
(i) Supporting procurement of foreign governments and international organizations	Provision of information on bidding and on preparing the necessary documentation
(j) Training and education	Train the foreign market experts and maintain the training programs by industries

Source: MOTIE (2015).

Korea International Trade Association (KITA) provides export promotion programs targeting SMEs. KITA's Export Start-Up Program, which is supplied together with KOTRA and EXIM Bank, provides SMEs starting exports with a package including establishment of export infrastructure, international marketing and export finance. KITA lends to each SME whose export value per year was smaller than US$10 million at a fixed interest rate of 3.5%. KITA also provides translation and interpretation services to exporting firms and maintains Trade Venture Plaza wherein 48 offices are provided to SMEs at low rent rates (MOTIE, 2015b).

K-sure and EXIM Bank provide finance for SME internationalization (see the next section). The Korea Federation of SMEs (KBiz) also supports SMEs' exports. First, it covers up to 50% of the costs that should be borne by SMEs when they face trade remedies or infringement of IPRs. Second, it offers free training programs on internationalization. Third, it supports SMEs' access to foreign networks (MOTIE, 2015b; KBiz, http://www.kbiz.or.kr).

Summing up, the number and scope of programs implemented by Korea to promote SMEs' exports outnumbers those in most, if not all, other countries. Unlike Korea, most developed countries focus their support specifically on providing information on market access and consulting services such as economic and legal issues (Lee, 2010).

2. Finance for SME internationalization

Export credit guarantees and other types of trade financing are utilized as public policy measures to overcome the lack of available capital for exporting SMEs (OECD, 2009). The EXIM Bank, K-sure, provincial governments and public agencies such as SBC provide schemes to finance SME exports. In recent years EXIM Bank and K-sure raised the share of SMEs as beneficiaries of their operations.

EXIM Bank, established in 1976, provides export finance and guarantees to exporting firms. In 2014 it provided US$75.7 billion in loans and guarantees to firms representing 13 percent of

Korea's total exports. About a third of its credits were allocated to SMEs in 2014. One interesting scheme targeting SMEs is the Korean Hidden Champion Initiative, launched in 2009. Candidates can be certified as Korean Hidden Champions if they export more than US$100 million per year and develop a product ranking within the top three in terms of global market share, or if their annual exports exceed US$300 million and their product ranks within the top five globally. In 2014, the program selected 33 SMEs as Hidden Champion candidates and provided them US$9 billion in financing (EXIM Bank, 2015a). The beneficiaries of the program are charged lower lending interest rates than the generally applied rates (MOTIE, 2015b).

The Korea Credit Guarantee Fund (KCGF), established by the government in 1976, guarantees repayment of SME's export-related borrowing from commercial banks. The amount of guarantees newly provided to exporting firms by the KCGF reached US$10 billion in 2013 (KCGF, 2014).

Export insurance was introduced into Korea in 1969 to protect firms from unexpected losses resulting from exporting. In 1992 the government established the Korea Export Insurance Corporation (KEIC), currently called the Korea Trade Insurance Corporation (K-sure), as an organization fully devoted to export insurance (K-sure, 2015). Korea has become one of the heaviest users of export insurance. Its utilization rate, defined as the insured amount divided by total export value, increased sharply since the early 2000s. In 2013 and 2014 it was about 30 percent (see table 33).

Table 33
Republic of Korea: export insurance utilization
(US$ millions and percentages)

Years	Premium revenue	Claims paid	Utilization ratio
2003-2004	212	690	21.7
2008-2009	594	714	30.3
2014	589	761	29.5

Sources: K-sure, Annual Report 2014, 2015 and http://www.ksure.or.kr.

In 2014, K-sure established a separate department dealing with SMEs and introduced the 'regional headquarters system' to assist them at their actual business sites. Regional headquarters were established in provinces outside Seoul, reducing transaction costs for exporting SMEs. The share of SMEs in the total amount of trade insurance provided by K-sure doubled from 10 percent in 2010 to 20 percent in 2014. The benefits granted by K-sure to SMEs include reduction of insurance fees and free provision of buyer information research services to start-up exporters, in addition to the regional headquarters system (K-sure, 2015). Several provincial governments also provide export insurance premium fees to each SME up to US$ 4.3 thousand (Lee and Kim, 2015; MOTIE, 2015b).

The Korean government does not provide tax incentives to exporting SMEs other than duty drawback, which is explained later.

3. Providing information on international trade and business opportunities

Various organizations provide information on international trade and business opportunities to promote Korea's exports. KOTRA analyzes foreign market conditions, maintains a trade-related statistics portal service (K-Stat) and provides information on tariff rates, regulations, non-tariff barriers and support measures in foreign markets. KITA provided integrated trade information covering 58 countries in 2015. Most of the beneficiaries are SMEs (MOTIE, 2015b).

(a) Supporting access to networks and overseas partners

In 2015, the government decided to expand the opportunities for SMEs to find overseas partners by holding expos abroad (123 times) and sending trade delegations (51 times) (MOTIE, 2015b). KOTRA and KITA mainly support SMEs' participation in foreign trade expos, trade fairs and export consortiums. The government also supports SMEs by designating private consulting and marketing firms abroad as a private network which provides SMEs with the services needed in penetrating foreign markets. It allocated US$ 4.8 million to this program in 2015 (MOTIE, 2015b).

(b) Supporting e-commerce

The government enacted the Law on Promotion of Electronic Commerce and completed construction its of e-commerce system in 2007. It requires electronic issuance of all documents needed for export and import. KTNET within KITA was designated as the main agency implementing e-commerce. E-commerce is utilized to the fullest extent in customs procedures. Korea has the most advanced level of e-commerce in the world. However, the rate of utilization of e-commerce by SMEs is lower than that by large firms (Lee and Kim, 2014). The SBC allocated US$14.9 million to support on-line exports in 2014. For instance, it supports registration of SME products at global on-line shopping malls such as Amazon (source: SBC, http://www.sbc.or.kr).

(c) Strategic use of FTAs

MOTIE and the Ministry of Agriculture are in charge of promoting utilization of FTA as well as supporting the development of new products satisfying their rules of origin (Lee and Kim, 2015). The government set the goal of raising the rate of SMEs' utilization of FTAs from 59 percent in 2014 to 65 percent in 2015. To achieve this, it: (i) supports part of the cost for SMEs of meeting FTA rules of origin; (ii) sends private consultants specializing in FTAs to companies; and (iii) provides free FTA training (prepared by the Customs Office) to SME staff. SMBA also provides consulting services to promote SMEs' use of FTAs. The budget allocated by the SMBA to this program amounted to US$2.2 million, supporting about 810 SMEs in 2015 (SMBA, http://www.smba.go.kr).

4. Improving SME workforce and its internationalization

SBC implements the "Support of SMEs' Human Resources" program. The amount allocated to it increased from US$13.7 million in 2010 to US$24.2 million in 2014. Training programs represented about 80% of the budget. SBC began to implement the training program since 1982. Since the early 2000s, it has operated 4 training institutes to train SME employees in production and management techniques. In 2014, it trained 48,228 trainees (source: SBC, http://www.sbc.or.kr).

KITA also provides trade practice training programs and a Cyber Trade Campus. KOTRA is in charge of training foreign market experts and maintaining the training programs by industries, where 90-100 percent of training costs are supported by KOTRA (MOTIE, 2015b).

5. Increasing SME internationalization through capacity building

(a) Strengthening capabilities

SBC financially supports improvement of productivity and enlarged value-added of SMEs under the "Development of SMEs" program, started in 2014. The beneficiaries are SMEs whose production activities are based on new growth engines, basic manufacturing sectors, firms with good technology level, and rapidly growing firms. The amount of lending was US$ 1.1 billion in 2014. The applied lending interest rate is policy loan basic interest rate + 0.5% points (source: SBC, http://www.sbc.or.kr).

Demand for highly skilled human resources is high in companies producing technology-intensive products. The government collaborates with the private sector to strengthen the SMEs' technological capabilities by providing human capital resources. For instance, at Gumi Industrial Cluster, resident enterprises, universities, and Korea Industrial Complex Corporation (KICOX) jointly set up the human resources plan customized for businesses and financed the program. KICOX identifies the human resources needs of firms in industrial complexes (KICOX, 2015).

(b) Promoting SMEs' R&D

The government's R&D-related measures for SMEs comprise various kinds of subsidies such as financial and tax incentives. From the development of new technology to its commercialization, R&D activities entail high costs and high risks. Since SMEs are generally unable to bear such costs and risks, it is reasonable for the government to support their R&D activities (Kang and Mah, 2015). Large firms in general depend on financing through issuing bonds and stocks, while SMEs mainly rely on borrowing from banks. However, SMEs tend to suffer from the lack of collateral (Hahn, 2015). With the foundation of the Korea Technology Credit Guarantee Fund (KOTEC) in 1989, a series of R&D subsidy programs began to be provided to SMEs. KOTEC examines the feasibility of firms' technology and guarantees bank lending to them (Hong et al., 2011). KOTEC, currently called KIBO, has evolved into a specialized institution promoting SMEs' R&D.

D. Policy instruments to promote SME participation in global value chains

1. Encouraging access to multinational supply chains

The government encourages SMEs' participation in GVCs. In 2014, the Korea EXIM Bank provided US$10.6 billion to Korean firms in the form of overseas investment financing. In the same year, it provided financing to SMEs for as much as US$1.4 billion through the Partnership in Overseas Business Program. This program supports SMEs participating in overseas ventures or projects as suppliers of large companies and government agencies (Korea EXIM Bank, 2015a).

2. Building competitive clusters

The government has maintained industrial complexes throughout Korea's process of industrialization and export-led growth. Industrial complexes accounted for 69 percent of manufacturing production and 79 percent of exports in 2013. There were 41 national industrial complexes by the end of 2014 (KICOX, 2015).

Guro Export Industrial Complex, established in 1964 and currently called Seoul Digital Industrial Complex, was the first designated industrial complex. Large HCI complexes were also developed in Changwon, Gumi, Ulsan and Yeosu during the 1970s. In the 1980s, industrial complexes were established in the Seoul Metropolitan area to accommodate SMEs. Various types of industrial complexes began to be established since the 1990s to promote high-tech industries (KICOX, 2015).

In 2005, realizing that the previous industrial complexes targeted just mass production relying on imitation of foreign technologies, the government initiated the Program of Industrial Complex Clusters. According to it, the traditional industrial complexes began to be transformed into spaces for exchange of knowledge and information and, thus, the government began to establish innovative clusters, wherein collaboration among academia, research and firms is pursued (KICOX 2015).

(a) SME coordination and collaboration

SME coordination and collaboration is pursued in some industrial clusters. For instance, the Banwol-Sihwa Industrial Cluster neighboring Seoul mainly focuses on the automobile parts industry. Its exports increased from US$8.1 billion in 2004 to US$14.3 billion in 2014. In 2014, it conducted over 400 networking activities. Businesses are actively sought through SME partnerships with large firms (KICOX, 2015).

(b) Sector-specific programs

There are several large scale, sector-specific clusters in Korea. The major ones are Gumi (electricity and electronics), Changwon (machinery) and Ulsan (automobiles) (KICOX, 2015). The Changwon cluster neighbors Masan Free Trade Zone (FTZ). Collaboration also occurs between FTZs and neighboring industrial clusters regarding specific industries. For instance, Daebul FTZ and neighboring Daebul Industrial Complex host many shipbuilding firms, mostly SMEs. Gunsan FTZ and Gunsan Industrial Complex host an automobile company, Korea GM, and some SMEs supplying automobile components (KDI, 2012).

3. Business linkage programs

The government promotes business linkages through a few programs. It supports SMEs' utilization of the large companies' foreign infrastructure. In addition, when a large company participates in a foreign trade EXPO together with SMEs, each company can be supported up to US$8.9 thousand to cover interpretation and rent costs (MOTIE, 2015b; SBC, http://www.sbc.or.kr).

EXIM Bank cooperates with large companies (and their local subsidiaries) to provide export credits and guarantees to SME partners supplying parts to them. In 2014, it provided export finance for as much as US$1.9 billion to SMEs under this program (EXIM Bank, 2015a).

Kwak, No and Zhang (2013) showed that, particularly in the electronics and automobile industries, SMEs accompany large Korean firms' investment in China, although Korean SMEs have little networks with Chinese local firms. KOTRA supports SMEs investing abroad to accompany large firms through market research, inter alia. According to KOTRA (2015), most large Korean firms invest in Vietnam together with SMEs.

4. Supplier development programs

In the mid-1990s, the labour productivity gap between SMEs and large firms widened due to the remarkable development of a few chaebols in technology-intensive industries. The government considered that this imbalance could hinder the economy's growth (Gregory et al., 2002). Moreover, the low export prices of Chinese and other Asian competitors threatened Korean SMEs. To raise their productivity, in the late 1990s the government decided to shift the direction of SME policy from 'protection and assistance' to 'autonomy and competition' (Kim et al., 2008).

Clusters are expected by the government to raise SME productivity through the utilization of knowledge and technology in academia-research-enterprises cooperation systems (KICOX, 2015). SMEs in a cluster can expect positive externalities such as the transfer of advanced technology from large firms and research institutes operating in the same cluster. Gumi Industrial Cluster is an example. As large firms and SMEs are vertically integrated in Gumi Industrial Cluster, SMEs lacking R&D competencies can raise their productivity level through collaboration with large firms (KICOX, 2015).

5. Promoting SME OFDI

Traditionally the government approved OFDI only in exceptional cases due to the continuing trade deficits. In 1987, the government relaxed restrictions on OFDI, which began to be open to all sectors

in 1996 (Mah and Noh, 2013). Although OFDI slowed down in the late 1990s, it recovered since then. The driving engine of OFDI after 2005 was the active promotion plan of the government, in which the limit on the amount of investment was relaxed (Oh and Mah, 2015).

Both KOTRA and EXIM Bank support Korean firms' OFDI regardless of their size. SMEs are the de facto main beneficiaries of the KOTRA programs because of their limited capacities (see table 34). EXIM Bank is mainly in charge of financial support for Korean SMEs' OFDI, lending them up to 90 percent of the necessary funds (MOTIE, 2015b).

Table 34
Main Measures of KOTRA Supporting SMEs' OFDI

Program	Content
Provision of investment information	collects OFDI information generated by various agencies in Korea, maintains OFDI information portal site (www.ois.go.kr) and provides one-stop service
Protecting Korean firms' IPRs	maintaining IP-Desk in 10 cities in 5 countries to protect the Korean firms' IPRs; financially supporting firms involved in IPR disputes
Training and education	Maintaining training programs to make investors familiar with the host countries
Supporting the investing firms	Maintaining 15 "Centers Supporting Korean Investing Firms"; provision of investment information, expert's consulting services; investment seminars
Supporting global M&A	"Global M&A Support Center" in KOTRA supports the SMEs' establishment of M&A strategies and provides M&A-related information
Global Corporate social responsibility (CSR) program	

Source: MOTIE (2015b).

There are more than a dozen organizations other than KOTRA and EXIM Bank supporting Korean SMEs' OFDI. For instance, KBiz maintains the Private Ambassadors Abroad System. It appoints Private Ambassadors abroad who are the CEOs of SMEs that have had business success in those countries. They are expected to provide free counseling to SMEs that want to invest in the concerned countries.

E. Other generic measures to stimulate SME internationalization

1. Free trade agreements

Korea signed its first FTA with Chile in 2004. Since then, it has signed FTAs with several of its most important trade partners. The number of FTAs effective as of February 2016 reached 14 (MOTIE, http://www.fta.go.kr).[52] The main remaining problem is their relatively low utilization ratio, due to the complicated rules of origin. SME utilization ratio is particularly low.

2. Trade facilitation

The Korean government has one of the most efficient customs systems, in terms of the short time needed to finish customs procedures (Jeong, 2014). For instance, the median lead time to import, i.e. the mean time from port of discharge to arrival at the consignee, is just one day, shorter than in most

[52] The Korea-Colombia FTA, signed in February 2013, entered into force in July 2016.

other countries (World Bank, http://data.worldbank.org). There is a single window for export and import procedures.

4. Tax incentives

Tax incentives are provided to R&D/human resources development activities by SMEs. With only a few exceptions, SMEs can benefit from tax exemption ranging from 10 to 30 percent of profit and on income tax. Incentives such as tax reduction are also provided to firms' R&D investment regardless of firm size (Jeon, 2015).

Tax benefits directly targeting exports are currently not available in Korea, since they are prohibited by the WTO Agreement on Subsidies and Countervailing Measures. However, duty drawback not exceeding the amount of duty actually levied on the imported product is allowed. The government began to implement the duty drawback scheme as an export promotion method in 1975 (Chang and Kim, 1997). The amount of duty drawback continued to increase to about US$4 billion in 2013. However, the drawback rate (the amount of duty drawback divided by the export value) decreased from 2.6 percent in 1990 to 0.6 percent in 2013.

5. Financial incentives

The government provides various kinds of policy loans (i.e., loans prepared by the government at lending interest rates lower than the commercial lending rates) targeting SME development (SBC, 2014). In 1996 it established the Korea Securities Dealers Automated Quotation market, which provides SMEs opportunities for equity financing. SBC implements the "Establishment of SMEs" program. Started in 1998, it targets employment generation by providing policy loans to SMEs which have good technologies and business potential. Policy loans provided under this program reached US$1.8 billion in 2014. The applied lending interest is a little lower than the policy loan basic interest rate.

The SBC program "Activation of venture firms" targets both firms trying to change their main areas of operation because of failure or restructuring and funds investing in SMEs. The former and the latter represent about 60% and 40% of the program's budget, respectively. The program's budget increased to US$322 million in 2015, over 30% compared with 2014.

The "SMEs' development of technologies" program, started in 2000, targets development of technology-based SMEs by promoting commercialization of their technologies. The program's budget increased from US$137 million in 2010 to US$332 million in 2014. This substantial increase shows the importance the government attaches to the development of advanced technologies.

6. Indirect support

The Korea Commission for Corporate Partnership (KCCP) designates the areas suitable for SMEs according to the concerned law. Large firms are prohibited from maintaining their businesses in such areas. These are determined considering the market size and competitiveness of SMEs in such areas, among other factors (KCCP, http://www.winwingrowth.or.kr).

7. Supporting corporate social responsibility (CSR)

Since 2011 the government supports Korean firms' CSR activities abroad. In 2015, the budget to support CSR activities abroad reached US$.9 million, and programs were implemented in 39 countries (MOTIE, 2015b). KOTRA also implements the Global CSR program, which supports Korean firms' donation of products or services to the host country (up to US$ 9 thousand for each event) or the operation of local technical schools (MOTIE, 2015b). SMEs are de facto the partners of this program.

F. Korea's international cooperation for SME internalization

1. Overview

Although Korea had been an aid recipient since independence, it began to provide official development assistance (ODA) in the late 1980s, reflecting its rapid economic growth. In 2009, it became a Member of the OECD Development Assistance Committee (DAC). The ministries and other agencies dealing with ODA are fragmented. The Ministry of Strategy and Finance (MOSF) and the Ministry of Foreign Affairs (MOFA) are mainly responsible for Korea's ODA. While the former is in charge of loans, the latter is primarily responsible for grants (EXIM Bank, EDCF Annual Report 2009). The Korea International Cooperation Agency (KOICA) is the executing agency of the MOFA, while the Economic Development Cooperation Fund (EDCF) within EXIM Bank is that of the MOSF. Various other ministries and municipal governments also design and implement their own grant programs (EXIM Bank, EDCF Annual Report 2010).

Korea's ODA has increased rapidly, from US$265 million in 2001 to almost US$1.8 billion in 2013. The ODA/gross national income (GNI) ratio also rose, from 0.06 percent in 2001 to 0.13 percent in 2013 (see table 35). However, it is still significantly lower than the average for all OECD DAC members (0.30 percent in 2014). Although the share of grants in total bilateral ODA rose from 60 percent in 2003 to 69 percent in 2008, it fell to 62 percent in 2013 (EXIM Bank, EDCF Annual Report 2015).

Table 35
Korea's ODA

	2001	2004	2007	2010	2013
Amount of ODA (US$ million)	265	423	696	1 174	1 755
ODA/GNI ratio (percent)	0.06	0.06	0.07	0.12	0.13

Source: EXIM Bank, EDCF Annual Report, various issues.

Asia accounted for 59 percent of Korea's bilateral ODA in 2013 (see table 36). Africa represented 21 percent, and Latin America and the Caribbean just 7 percent. Vietnam is Korea's most important recipient of bilateral ODA, receiving 18% of it in 2013 (EXIM Bank, EDCF Annual Report 2014). The main recipients of Korean bilateral ODA in Latin America and the Caribbean are, in descending order, Nicaragua, Ecuador, Honduras, Bolivia, Colombia and the Dominican Republic (see table 37).

Table 36
Republic of Korea: bilateral ODA by regions, 2013

Region	Amount (US$ million)	Share (percent)
Asia	772	58.9
Africa	272	20.7
CELAC	96	7.3
Others	170	13.1
Total	1 310	100.0

Source: EXIM Bank, EDCF Annual Report 2014, 2015.

Table 37
Korea's bilateral ODA to selected Latin American countries, cumulative amount at the end of 2014

Country	Cumulative amount (US$ million)	Share in total bilateral ODA (percentages)
Nicaragua	79.5	1.7
Ecuador	53.1	1.2
Honduras	30.3	0.7
Bolivia	29.4	0.6
Colombia	23.9	0.5
Dominican Republic	19.5	0.4

Source: EXIM Bank, EDCF Annual Report 2014, 2015.
Note: The amount is calculated based on the Korean won/US$ exchange rate as of the end of December 2014.

2. Knowledge sharing

The Korean government recognizes that knowledge sharing is an effective and innovative tool for economic development. Consequently, the MOSF launched the Knowledge Sharing Program (KSP) in 2004. It aims to share Korea's development experience, assisting its partner countries and working towards lessening the knowledge divide. The KSP has three pillars, with the Korea Development Institute (KDI) mainly leading bilateral KSP, EXIM Bank in charge of joint consulting with international organizations (multilateral KSP), and KDI School of Public Policy and Management in charge of modularization. During 2009-2015, the Korean government completed more than 150 KSP projects. They offer comprehensive policy consultations tailored to the needs of partner countries encompassing in-depth analysis, policy consultation, and training opportunities (source: http://www.ksp.go.kr).

Currently, KDI and EXIM Bank are the KSP's main implementing arms. KSP starts by identifying demands from Korea's development partners including specific governments and international organizations. The request form is completed by the development partner and sent to the Korean government. The implementing arms evaluate the requests, taking into account various aspects including the appropriateness of the project concerned and the development partner's volition of pursuing the project, and send the evaluation report to the MOSF. Then, finally the MOSF determines the concerned host government and the project.[53]

Up to August 2015, there have been 155 reports published in the KSP, including about 20 reports directly covering export promotion, FDI or SME development. Table 38 shows the selected list of KSP reports on such topics undertaken in Asia and Latin America.

[53] Interview with Jee Hyun Kim, a former principal researcher at the EXIM Bank, on March 14, 2016.

Table 38
KSPs on export promotion, FDI and SMEs conducted in Latin America

Country	Year	Contents
Dominican Republic	2009	Export development
Dominican Republic	2010-13	Establishment of an export credit agency
Brazil	2012	Building the basis for EPZs in the northeast region of Brazil
Ecuador	2012	Export promotion, industrialization and capacity building
Panama	2012	Promoting the agro-food exports
Peru	2012	Regional development plan for the southern economic corridor
Peru	2013	Competitiviness of SMEs in the southern economic corridor
Dominican Republic	2013	Export capacity building and export industry promotion
Honduras	2014	Strengthening the competitiveness of SMEs and e-government
Dominican Republic	2014	Export capacity building

Source: KSP, http://www.ksp.go.kr.

There have been several KSP projects on export promotion and a few on SME development in Latin America. The former comprised KSPs in Brazil, the Dominican Republic and Ecuador, while the latter took place in Peru. For instance, the KSP "Building the Basis for Implementing Export Processing Zones in the Northeast Region of Brazil" was completed in 2012 (KDI, 2012). It aimed to provide policy lessons from the successes and failures of EPZs in Korea for the implementation of EPZs in the northeast region of Brazil. It emphasized the importance of selecting the appropriate location such as the transportation condition, linkages to neighboring industrial estates, incentives to foreign investors, and industries consistent with the development level of the national economy.[54]

A series of KSP projects completed during 2006-2014 targeted export capacity building in the Dominican Republic, including export diversification and the development of a trade financing scheme. The KSP "Export Credit Capacity Building and Export Industry Promotion for the Dominican Republic", which was mainly prepared by the Korea EXIM Bank, was completed in 2013 (KDI, 2013a). It basically targeted promotion of capacity building in selected industries leading to export expansion and comprised: the establishment of an agro-food innovation center; the establishment of a national innovation university in light of the experience of Korea Advanced Institute of Science and Technology; and the promotion of the digital contents industry. The KSP "Export Capability Building of the Dominican Industry" was also completed in 2013 (KDI, 2013c). It provided concrete suggestions for the establishment of an export credit agency in charge of export finance and of the Trade Center in the Dominican Republic.[55]

The KSP "Enhancing the Competitiveness of SMEs in the Southern Economic Corridor in Peru" was completed in 2013 (KDI, 2013b). It focused on the role of SMEs in the alpaca, coffee, and automotive parts sectors. It also comprised research on agro-industry and information technology.[56]

[54] Mr. Helson Braga, President of the Brazilian Association of Export Processing Zones (ABRAZPE), attended the seminar "Exploring strategies for economic cooperation between the Republic of Korea and Latin America and the Caribbean" held in ECLAC headquarters in Santiago, Chile on April 11, 2016 (henceforth the Korea-CELAC-ECLAC seminar). There he expressed that some recommendations from the KSP report are being incorporated into the revision of EPZ law in Brazil.

[55] The representative from the Dominican Republic at the Korea-CELAC-ECLAC seminar confirmed that the KSP contributed to the recent creation of the country's export credit agency.

[56] Mr. Fausto Perez, the consultant in charge of KSP in Peru and who also attended the Korea-CELAC-ECLAC seminar, said that the KSP had little impact due to insufficient commitment to implement its recommendations and a lack of financing and enough marketable proposals, among other factors.

KOICA maintains a program similar to the KSP, the Development Experience Exchange Partnership (DEEP). It comprises policy consultation, feasibility study, and establishing master plans with respect to selected partners in light of Korea's development experience. Table 39 shows selected DEEP projects directly related to export and FDI promotion, capacity building with respect to special economic zones and industrial clusters, and SME development. In addition to the large-scale DEEP projects, KOICA maintains various short-term training programs to support capacity building of development partners dealing with topics including export promotion and promotion of FDI inflows. It also supports education of graduate students coming from development partner countries with the so-called KOICA Master Program.

Table 39
Selected DEEP projects undertaken by KOICA during 2011-2015

Country	Years	Contents
Colombi	2011-2014	Strengthening production capability of SMEs
Cambodia	2011-2013	Master plan on science and technology capabilities
Ethiopia	2011-2013	Establishing the economic development strategy
Honduras	2012-2014	Feasibility study on special development zones
Colombia	2013-2014	Plan on strengthening science and technology complex
Morocco	2013-2015	Strengthening the capabilities of international trade

Source: interview with Dr. Ji-Hyun Kim of KOICA, March 4, 2016.

G. Conclusions and recommendations for international collaboration

Before the entry into force of the WTO in 1995, the Korean government utilized various measures directly supporting exports. Since then, Korea has switched to a wide range of export promotion measures permitted by the WTO. Although the share of SMEs in total exports shrank, it appears to have increased recently due to the active promotion of their exports.

Korea's OFDI has significantly increased since the 1990s. The government supports SMEs' OFDI and encourages their participation in GVCs through a range of measures, although support for these goals is lower than for export promotion. This could be due to Korea's relatively recent history of OFDI compared with major developed countries.

Korea transformed itself from an aid recipient to a donor, reflecting its rapid economic growth. The amount of its ODA is still relatively small (0.13 percent of GNI). Given Korea's remarkable development experience, it is recommended for the Korean government to place more emphasis on sharing the knowledge acquired during that process with its development partners.

Korea's experience with the development and internationalization of SMEs provides many policy insights for the Korean government and for its collaboration with Latin American and Caribbean countries. It appears that Korea utilizes the largest number of measures to promote exports, particularly those by SMEs. The government maintains various export promotion measures including provision of information, supporting SMEs' participation in foreign networks, capacity building such as support of R&D activities and human resources, as well as export finance and export insurance services. In 2013, the government changed the structure of export promotion to strengthen competition among trade-related agencies. That is, the same programs are implemented by diverse agencies. It would be helpful for the Korean government to consider reorganizing the system of support for SME internationalization depending on the expertise of each agency.

Considering the main obstacles to SME exports, the Korean government needs to help SMEs to establish distribution channels abroad and to ensure more access to export finance and export insurance.

Agencies supporting SME internationalization should advertise more actively the availability of such programs. Although provincial governments have various schemes to promote SME exports, it would be better for them just to fund the programs and leave implementation to the specialized agencies under the central government. The government also needs to provide more support to SMEs' attending trade expos in the early export stage, as well as support them in obtaining certifications in foreign markets and providing information on those markets in the mature export stage (Pyo et al., 2011).

It is recommended for Korean universities to provide college programs training specialists with expertise in international trade and proficiency in major foreign languages. In addition, it is suggested to enhance the opportunities for SMEs to understand how to meet the rules of origin in FTAs and to access duty drawback schemes.

Korea's experience shows that the establishment and strengthening of export finance schemes are very important for the promotion of SME exports. Latin American governments could select particularly competitive SMEs with good potential and provide them export finance at lower interest rates than the generally applied rates, as in Korea's Hidden Champion Program. Also as in Korea, it may be helpful for Latin American countries to establish financial institutions or programs guaranteeing repayment of SMEs' export-related borrowing from commercial banks.

Korea is one of the heaviest users of export insurance. Drawing on its experience, Latin American countries that already have export insurance schemes may consider introducing a 'regional headquarters system' to assist SMEs at their actual business sites, the reduction of insurance fees and free provision of buyer information services to exporting SMEs, as is currently maintained by K-sure. It is also recommended to strengthen duty drawback schemes to promote exports. Korea could collaborate with the region's countries on the design and implementation of all these instruments.

Korea uses various kinds of indirect measures to promote SME exports. Some programs implemented by KOTRA in this regard include: i) provision of consulting services to SMEs trying to become exporters; ii) the Export Incubator Program, providing office facilities and consulting to newly exporting SMEs; iii) collaboration between SMEs and the trade promotion agency in producing export roadmaps; iv) supporting SMEs accompanying large firms in entering foreign markets; v) supporting SMEs' participation in foreign trade expos and trade fairs; vi) providing information on foreign markets, such as tariff rates, non-tariff barriers, and certificates; vii) supporting SMEs' participation in procurement of foreign governments and international organizations through provision of bidding information and assistance in preparing documentation; and viii) training foreign market experts by industries.

In addition to the support provided by KOTRA, other Korean organizations provide services to exporting SMEs. Those services include, inter alia: provision of translation and interpretation services to exporting SMEs; the Trade Plaza program, providing office spaces to SMEs at low rent rates; and the coverage of part of the costs borne by SMEs when facing trade remedies (such as antidumping duties) or infringement of IPRs. Latin American countries could consider implementing programs similar to those run by KOTRA or other Korean agencies, tailoring them to their own conditions.

To raise the productivity of SMEs, it is recommended that Latin American governments consider establishing or strengthening industrial clusters, as in Korea. For clusters to promote SME development and exports, it is recommended for cluster policy to consider key regional industries covered in specific industrial clusters rather than taking a uniform policy approach applied to all industrial clusters. KSP projects may be utilized for this purpose. Latin American countries may also benefit from the experience of the human resources plans customized for businesses' needs that have been established in some national industrial complexes in Korea, where resident enterprises and universities participate.

Reducing trade costs borne by SMEs may contribute to enhance their export performance. Therefore, Latin American governments should strengthen their trade facilitation efforts, including inter alia through promotion of e-commerce and e-customs. Same as in Korea, SME utilization of FTAs in Latin America is lower than for large firms, owing mainly to complicated rules of origin. Therefore, it is

recommended for Latin American governments to implement measures to increase SME utilization of FTAs. The region's countries could benefit from the Korean experience, for example in assisting SMEs to meet FTA rules of origin.

FDI and participation in GVCs is another aspect of SME internationalization. Targeting SMEs in particular, KOTRA and EXIM Bank of Korea provide information and lending to Korean firms investing abroad, respectively. Nevertheless, it is suggested for the Korean government to strengthen its support of SMEs' OFDI and participation in GVCs by introducing more concrete policy measures.

To promote SME participation in GVCs, it is necessary to support SMEs in understanding the production techniques and qualities of the products needed by large enterprises which export their products or invest in foreign countries. Furthermore, it is recommended for the government to study the GVC of each industry (Lee, 2010).

To promote local SMEs' integration into GVCs, it is suggested that Latin American countries establish industrial clusters or SEZs to host foreign-invested enterprises and attract local SMEs to those. Since most Korean SMEs are reluctant to invest in countries located far away from Korea, there is considerable potential for local SMEs to become suppliers of large Korean companies investing in Latin America and the Caribbean. Although Korean SMEs tend to accompany large firms' OFDI, they may feel little need to try to network with the local firms in the host country. From the viewpoint of CELAC governments, it is recommended to hold investment events inviting foreign investors, associations, and local SMEs to exchange their information and need.

Korea's experience with FTZs shows both successes and failures. In light of it, the Korean government could share knowledge with interested Latin American countries on issues such as selecting the appropriate location, linkages to neighboring industrial estates, tax and non-tax incentives to foreign investors, and industries appropriate for the development level of the host country.

Investment promotion agencies such as KOTRA have played an important role in supporting Korean SMEs' participation in GVCs. Such agencies should play a similarly important role in promoting Latin American SMEs' exports and participation in GVC. Since small countries may not have the capacity or resources to have their own trade and investment promotion agencies, it is recommended that countries coordinate their efforts and pool resources at the sub-regional level.[57]

In addition to the above suggestions, the following recommendations made by experts from CELAC countries on cooperation between Korea and CELAC should be considered carefully. First, Korea could assist CELAC countries with the methodologies to collect the statistical data and provide advice on how to boost SME participation in GVCs.[58] Second, Korea could: i) advise on indirect exports and selling services abroad; ii) provide business information on Asian markets where small CELAC countries cannot afford representative offices; iii) advice on setting up supplier development programs to promote sales of SMEs to multinational firms; and iv) develop a regional program with ECLAC on export innovation, supporting SMEs in acquiring certifications, adapting their products to international demand and optimizing distribution channels.[59] Third, Korea could provide advice to the region on supporting SME exports in niche markets through e-commerce.[60]

[57] I am indebted to Dr. Nanno Mulder for suggesting this idea.
[58] Source: presentation by Mr. Roberto Urmeneta, ECLAC consultant, attending Korea-CELAC-ECLAC seminar.
[59] Presentation by Mariana Ferreira from Uruguay XXI and Vladimir Hernandez from CEI-RD (Dominican Republic) at the Korea-CELAC-ECLAC seminar.
[60] Presentation by Andrea Ordonez from ProEcuador at the Korea-CELAC-ECLAC seminar.

Bibliography

Bank of Korea (BOK*), Economic Statistics Yearbook*, Seoul: BOK, various years.

Chang, Sea-jin (2003) *Financial Crisis and Transformation of Korean Business Groups: The Rise and Fall of Chaebols*, Cambridge University Press: Cambridge.

Chang, Keunho and Jinsoo Kim (1997), *Economic Effect of Duty Drawbacks and Policy Implications for Further Reform*, Korea Institute for Public Finance: Seoul (in Korean).

Choo, Seonghwan, *et al.* (2011), *Issues and Understanding the Korean Economy*, Mooyuk-gyungyoung-sa (in Korean).

Gregory, Gary et al. (2002), "Korean SMEs in the Wake of the Financial Crisis: Strategies, Constraints, and Performance in a Global Economy," University of Wollongong Economics Working Paper.

Hahn, Ki-Moon (2015) "A Study on Solution for Export SME's Export Financing", *Journal of Korea Research Society for Customs* (in Korean).

Hong, Soonyoung, et al. (2011) *Suggestions for the Role, Size, and Support System of the Political Finance for Growth Potential and Job Creation* (in Korean), KOSBI: Seoul.

International Monetary Fund (IMF), *International Financial Statistics Yearbook*, IMF: Washington D.C.: various issues.

Jeon, Eunkyung (2013) "Issues Regarding Export Promotion of SMEs", National Assembly Research Service, June (in Korean).

Jeon, Byung-Mok (2015) "Ways of Improvement of Enterprise Tax and System Supporting Investment", presented at the Public Hearing hosted by Korea Institute for Public Finance: Seoul, July 9.

Jeong, Jae-Wan (2014) "A Study on the Urgent Problems of the Customs Administration in accordance with the Agreement on Trade Facilitation", The Journal of Korea Research Society for Customs, (in Korean).

Kang, Hyein and Jai S. Mah (2015) "R&D Policy for Small and Medium-Sized Enterprises in Korea", *Science, Technology and Society*.

Kim, Sejong, Yoonbo Lee, Jongwook Lee, Byungsun Cho, Hoon Baek, and Heechul Jung (2008) *A Study on the Improvement of the Basic Law of Small and Medium Business in Environment Change* (in Korean), KOSBI: Seoul.

Kim, Linsu and Jeffrey B. Nugent (1994) "The Republic of Korea's Small and Medium-Size Enterprises and Their Support Systems," World Bank Policy Research Working Paper, No. 1404.

Koh, Youngsun (2010) "The Growth of Korean Economy and the Role of Government", in Sakong and Koh.

Korea Credit Guarantee Fund (2014), *Annual Report 2013*, http://www.kodit.co.kr, retrieved November 23.

Korea Development Institute (KDI) (2012) *Building the Basis for Implementing Export Processing Zones in the Northeast Region of Brazil*, KDI: Seoul.

_____ *Export Credit Capacity Building and Export Industry Promotion for the Dominican Republic* (2013a) KDI: Seoul, 2013.

_____ *Enhancing the Competitiveness of SMEs in the Southern Economic Corridor in Peru* (2013b) KDI: Seoul, 2013.

_____ *Export Capability Building of the Dominican Industry* (2013c) KDI: Seoul, 2013.
EXIM Bank, *Overseas Direct Investment Yearbook 2008-2010*, EXIM Bank: Seoul, 2009-2011 (in Korean).
_____ *Annual Report 2014* (2015a) Korea EXIM Bank: Seoul, 2015.
_____ *2015 Investment Climate Risk Assessment*. EXIM Bank: Seoul, 2015 (2015b) (in Korean)
_____ *EDCF Annual Report*, EXIM Bank: Seoul, various years.
Korea Export Insurance Corporation (KEIC), *Annual Report*, Seoul: KEIC, various years.
Korea Federation of SMEs, *2015 Factbook on SMEs*, Korea Federation of SMEs: Seoul (in Korean).
Korea Industrial Complex Corporation (KICOX) (2015) *Industrial Complex Clusters in Korea: Achievements and Challenges*, KICOX: Daegu.
Korea International Trade Association (KITA) (2013) "The Recent Trade Pattern of SMEs and the Ways of Export Promotion", working paper, KITA: Seoul, February (in Korean).
K-sure, *Annual Report*, K-sure: Seoul, various years.
Kwak, Jooyoung, Suyeon No, and Lian Zhang (2013) "Pre-clusterization and Competitiveness: An Exploratory Study of Korean Small and Middle-sized Enterprises in China", *Journal of the Korean Association of Trade and Industry Studies*: 107-144 (in Korean).
Lee, June-Ho (2010) Indirect Export of Korean SMEs: An Empirical Investigation, KOSBI: Seoul (in Korean).
Lee, Seong-Bong (2013a) "A Study on the New Framework of Export Promotion for Small and Medium Enterprises in Korea", *Ordo Economics Journal*, 2013 (in Korean).
Lee, Seong-Bong (2013b) "A Comparative Study between Korea and Japan on Comprehensive Government Initiatives to Support SMEs' Overseas Expansion", Ordo Economics Journal, 2013 (in Korean).
Lee, Sang-Jin and Houng-Cheol Kim (2014) "A Study on the Improvement Direction and Use Situation Analysis of e-Trade", *E-Trade Review* (in Korean).
_____ (2015) "A Study on the Efficiency Plan for Policy Support of Small and Medium-Sized Exporting Companies", *Journal of Korea Research Society for Customs* (in Korean).
Lee, Dongyup and Junghei Noh (1996) *A Study on the Credit System Based on Technology Appraisal*, Science and Technology Policy Institute (STEPI): Seoul (in Korean).
Mah, Jai S. (2007) "Industrial Policies and Economic Development of Korea", *Journal of Economic Issues*.
_____ (2013) and Sunyoung Noh, "A Comparative Analysis of the Patterns of Japanese and Korean Foreign Direct Investment in China", *Journal of World Investment and Trade*.
MOTIE (2015) *2015 Trade Promotion Plan*, MOTIE: Sejong.
_____ (2015) *Trade, Industry and Energy White Paper 2013-2014*, MOTIE: Sejong.
National Assembly Budget Office (NABO) (2012) *2013 Tax Expenditure Budget Analysis* (in Korean), NABO: Seoul.
OECD (2009) *Top Barriers and Drivers to SME Internationalisation*, OECD: Paris.
Oh, Ji Hyun and Jai S. Mah (2015) "The Patterns of Korea's Foreign Direct Investment in Vietnam", unpublished manuscript.
Pyo, Hanhyung, Dong-Yoon Oh, and Tae-Soo Park (2011) *A Study on the Export Determinants and Obstacles of Export SMEs by Stages of Growth*, KOSBI: Seoul (in Korean).
Small and Medium Business Corporation (SBC) (2014) 2014 SMEs Support System, SBC: Seoul (in Korean).
Song, Byung-rak (2010) *The Korean Economic Way*, Bakyoung-sa: Seoul, 5th ed.
Statistics Korea (2015) *Korea Statistical Yearbook 2014*.
UNCTAD (2006) *World Investment Report 2006*. United Nations: New York and Geneva.

PROJECT DOCUMENTS

Economic ties between the Republic of Korea and Latin America and the Caribbean have expanded rapidly since 2000. The region's interest in Korea also stems from that country's successful economic and social development experience. Based on reviews of the most important innovation and SME internationalization policies from both Korea and the region, this document aims to outline potential areas for future bilateral cooperation. Policymakers, private sector representatives and academics will appreciate the reviews as well as recommendations on how Korea and the region can step up their cooperation to improve and further develop these policies.

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