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# International cluster collaboration: Preparatory Briefing on South Korea

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**Abstract:** The preparatory briefing on South Korea is the result of the collection of relevant cluster information in the country, including business and sector trends, cluster policies and programmes, as well as a cluster mapping. It concentrates on the so-called industrial complexes. This document is intended to provide a good overview of the country's opportunities for European cluster organisations and SMEs.

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# 1. South Korean Economy: focus on sectoral trends

## 1.1. Overview

South Korea has a **strong export-oriented economy**. Indeed, by 2010, South Korea had emerged as the world's 7th largest exporting country.<sup>1</sup>

**The EU and South Korea are important trading partners. South Korea is the EU's eight largest export destination**, with the EU being South Korea's fourth largest export destination after China, the US and Japan. The EU has a significant surplus in trade in services with South Korea and in 2013 EU exports of services to South Korea amounted to €10.6 billion, compared to imports of €5.6 billion<sup>2</sup>. In 2014, EU exports of goods to South Korea amounted to €43.2 billion, whereas imports from South Korea totaled €38.8 billion. South Korea accounts for 2.5% of EU exports and 2.3% for its share in EU imports, being ranked 8<sup>th</sup> overall as an EU trade partner.

**The EU-South Korea Free Trade Agreement has been in place since July 2011**, as one of the first of a new generation of FTAs lifting trade barriers<sup>3</sup> and representing the EU's first trade deal with an Asian country. The FTA eliminates duties on nearly all trade in goods as well as tariff barriers to trade, with specific focus on the automotive, pharmaceuticals, medical devices and electronic sectors, creating new opportunities for access to many markets. Imports to and from South Korea are closely monitored by the European Commission and a yearly monitoring report is produced and presented. The EU-South Korea FTA agreement has had a positive result, whereby the EU's previous trade deficit with South Korea has turned into a trade surplus of €7.4 billion.

**There are however a number of barriers in place between the EU and South Korea for certain sectors of trade**<sup>4</sup>. The longest standing barrier to trade is for bovine products, which was put into place on December 1<sup>st</sup> 1996. Other barriers to EU-South Korea trade include cosmetics (09 July 2008) and new technologies for cars (10 February 2014). The European Automobile Manufacturers Association for example underlines the difficulty for EU automobile companies to enter the Korean car market.<sup>5</sup>

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<sup>1</sup> For information about the economic development of Korea during the last decades, see:

<http://www.korea.net/AboutKorea/Economy/The-Miracle-on-The-Hangang>

<sup>2</sup> European Commission, European Union, Trade in goods with South Korea, April 2016:

[http://trade.ec.europa.eu/doclib/docs/2006/september/tradoc\\_113448.pdf](http://trade.ec.europa.eu/doclib/docs/2006/september/tradoc_113448.pdf)

<sup>3</sup> European Commission, South Korea Trade Policy, <http://ec.europa.eu/trade/policy/countries-and-regions/countries/south-korea/>

<sup>4</sup> European Commission, Market Access Database, Trade Barriers, South Korea,

[http://madb.europa.eu/madb/barriers\\_result.htm?sectors=none&countries=KR&measures=none](http://madb.europa.eu/madb/barriers_result.htm?sectors=none&countries=KR&measures=none)

<sup>5</sup> <http://www.acea.be/industry-topics/tag/category/south-korea>

## 1.2. Opportunities for Europe – investment, trade and Science, Technology & Innovation cooperation

**South Korea is considered to have a very stable macroeconomic environment** and one of the strongest according to the Global Competitiveness Index<sup>6</sup>, being ranked fifth in the world. The GDP Growth Rate in South Korea averaged 6.3% from 1980 to 2015, 3.3 % in 2014, 2.7% in 2015 and is projected to be 3.6 % in 2017<sup>7</sup>. In terms of **political stability**, South Korea has a balanced image: the World Bank rates South Korea's political stability from 1996 to 2014 with an average value of 0.35 points and 0.19 in 2014<sup>8</sup> (on a notation where the minimum of -2.5 means weak; maximum 2.5). In 2014 it was ranked as the 84<sup>th</sup> most politically stable country in the world.

According to the EU Gateway to Korea, “the **EU remains the largest foreign investor in Korea** (€6 billion, i.e. 1/3 of total FDI into Korea in 2014 and with an accumulated stock of €43 billion).” There is a “potential for European business in Korea based on a large, dynamic economy with average annual GDP growth of 5%, the presence of globally competitive firms with 17 Korean firms in fortune 500. This makes Korea a global test market with sophisticated consumers.”<sup>9</sup>

A number of pro-European **support organisations for entering the Korean market** exist. For example, EU Gateway organises and funds business missions in high technology sectors for European companies to develop their business with Korea. The Programme offers financial and logistical support, strategic preparation and a tailored search for business contacts.<sup>10</sup> The European Chamber of Commerce in Korea, established since 2012, supports business relations.<sup>11</sup> Most EU countries operate an agency that supports businesses going international (e.g. AWEX – Belgium, Business France, BPI – France, etc.).

Meanwhile the Korea Trade-Investment Promotion Agency (KOTRA) provides market information and investment support<sup>12</sup> and a dedicated business incubation centre and investment support facility for foreign investors has been founded through Invest Korea Plaza.<sup>13</sup>

**South Korea is considered as a rather innovative economy** according to the Global Competitiveness Report, being ranked 19<sup>th</sup> in the world. In 2011 it had the highest GERD in the world (4.04% of GDP) and averaged 2.85% of GDP from 1996 to 2011<sup>14</sup>. South Korea also has a high score for technological readiness. The Global Competitiveness Index gave the country's technological readiness a score of 5 points, where the maximum was 5.76, ranking it 27<sup>th</sup> in the world.

In terms of Science, Technology and Innovation (STI) cooperation, an **Agreement on the Scientific and Technological Cooperation between the EU and South Korea** has been in force since 2007. It builds

<sup>6</sup> World Economic Forum, The Global Competitiveness Report 2015, Republic of Korea, <http://reports.weforum.org/global-competitiveness-report-2015-2016/economies/#economy=KOR>

<sup>7</sup> OECD, Data, Domestic Product, Real GDP forecast, <https://data.oecd.org/gdp/real-gdp-forecast.htm#indicator-chart>

<sup>8</sup> The Global Economy, Political Stability in South Korea, based on world bank data:

[http://www.theglobaleconomy.com/South-Korea/wb\\_political\\_stability/](http://www.theglobaleconomy.com/South-Korea/wb_political_stability/)

<sup>9</sup> <https://www.eu-gateway.eu/content/korea>

<sup>10</sup> [http://eeas.europa.eu/delegations/south\\_korea/eu\\_rok/trade\\_relation/index\\_en.htm](http://eeas.europa.eu/delegations/south_korea/eu_rok/trade_relation/index_en.htm)

<sup>11</sup> <https://ecck.eu/about-ecck/vision-mission/>

<sup>12</sup> <http://english.kotra.or.kr/kh/index.html>

<sup>13</sup> <http://www.investkorea.org/en/ik/ikp.do>

<sup>14</sup> The Global Economy, [http://www.theglobaleconomy.com/South-Korea/Research\\_and\\_development/](http://www.theglobaleconomy.com/South-Korea/Research_and_development/)

on an Agreement for Cooperation between Euratom and South Korea in the field of fusion energy research that has been in force since 2006.<sup>15</sup> An EU-Korea Joint Science & Technology Cooperation Committee (JSTCC) is set up and has been taking place biennially since 2007 (the latest JSTCC having been held in Seoul in June 2015<sup>16</sup>). **Cooperation has been agreed on the following five research areas: ICT, Nanotechnology, Health/Bio, Energy and Satellite Navigation.** Indeed, during the JSTCC 2015, both sides underlined their agreement to “deepen, scale up and open cooperation in selected thematic areas of mutual benefit. These areas include a joint call on 5G-next generation communication networks, Internet of Things and cloud services, a twinning call on CO<sub>2</sub> capture technologies, and cooperation through multilateral initiatives on nano-safety and on infectious disease preparedness.” Other new common priority topics could include nanoelectronics, materials modelling, innovative medicine, medical devices, and satellite navigation.<sup>17</sup> Under the Horizon 2020 Work Programme for 2016/2017, there are two EU-Korea joint calls in ICT (5G, IoT, and Cloud Computing) and Energy (Carbon Capture).<sup>18</sup> **The Science & Technology Agreement was recently reviewed (2013)**, and puts cluster collaboration among its recommendations for further cooperation enhancement.<sup>19</sup>

### 1.3. Sectoral strengths

Traditionally, South Korea’s economic growth is based on a **strong manufacturing sector**. Services are historically less developed, but their growth has been emphasized during recent years.<sup>20</sup>

<sup>15</sup> [http://eeas.europa.eu/delegations/south\\_korea/eu\\_rok/science\\_technology/index\\_en.htm](http://eeas.europa.eu/delegations/south_korea/eu_rok/science_technology/index_en.htm)

<sup>16</sup> See the joint statement here: [https://ec.europa.eu/research/iscp/pdf/policy/eu-korea\\_jstcc\\_statement.pdf](https://ec.europa.eu/research/iscp/pdf/policy/eu-korea_jstcc_statement.pdf)

<sup>17</sup> <http://ec.europa.eu/research/iscp/index.cfm?pg=korea>; For example, both sides agreed to launch a joint call in the autumn of 2015 addressing the topics of 5G communication networks, Internet of Things and brokerage of mobile cloud services with an estimated budget of € 12 million (€6 million from each side). This is the implementation of a bilateral ICT cooperation as a follow-up of the joint declaration signed in June 2014. See more detailed information in the EU-Korea Joint Statement: [http://ec.europa.eu/research/iscp/pdf/policy/eu-korea\\_jstcc\\_statement.pdf#view=fit&pagemode=none](http://ec.europa.eu/research/iscp/pdf/policy/eu-korea_jstcc_statement.pdf#view=fit&pagemode=none). The Konnect project (FP7-funded) also provides a number of good information concerning EU-Korea STI collaboration: <http://www.haneurope.or.kr/member/en/index.do>

<sup>18</sup> [http://eeas.europa.eu/delegations/south\\_korea/eu\\_rok/science\\_technology/index\\_en.htm](http://eeas.europa.eu/delegations/south_korea/eu_rok/science_technology/index_en.htm)

<sup>19</sup> Prof. Bernard BOBE and Dr Patrick CREHAN, for European Commission Directorate-General for Research and Innovation International Cooperation, A Review of the S&T Agreement between the European Union & the Republic of Korea, 2013, p10; [http://ec.europa.eu/research/iscp/pdf/policy/korea\\_review.pdf](http://ec.europa.eu/research/iscp/pdf/policy/korea_review.pdf)

<sup>20</sup> “In recent years, the government has taken the first steps to developing a stronger service sector, but more concerted actions and more popular support are needed. Other economies around the world—both mature and developing—face or faced this same challenge as manufacturing jobs are erased by automation, new technologies, and more efficient use of labor. In South Korea, however, both the problem and the opportunities are particularly acute. Its economy is more reliant on manufacturing than any other country in the Organisation for Economic Co-operation and Development (OECD), partially because the government’s sustained focus on manufacturing siphoned capital, talent, and other resources away from the domestic-service industries. As a result, the service sector today has ample room to grow. [...] Services account for 58 percent of the economy in South Korea.” Richard Dobbs, Roland Villinger, Beyond manufacturing, in: South Korea: Finding its place on the world stage, 04/2010

The following figure provides an overview on Korea's strategic technologies for 2013-2017:

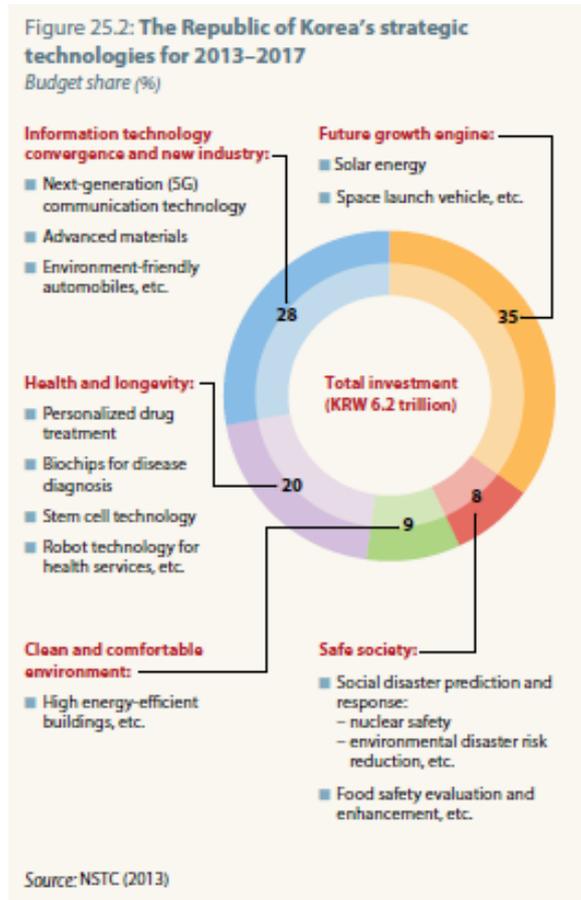


FIGURE 1 - KOREA'S STRATEGIC TECHNOLOGIES FOR 2013-2017<sup>21</sup>

**Important players in the Korean economy that contribute to the country's sectoral strengths:**

- Industrial complexes: Industrial complexes are industrial agglomerations of one or several economic sectors on a specific territory – one could translate them into “industrial parks/science parks”. An industrial complex corresponds to physical infrastructure; it is the result of a centralised policy building infrastructure throughout the country on the basis of historical industrial strengths. Industrial complexes can be found all over the Korean territory.
- Mini Clusters: So called Mini Clusters are what in Europe generally would be called “clusters”. They are generally part of industrial complexes – as being grouped in physical infrastructure – and have a governance structure, as well as triple helix members. Mini clusters in Korea, as well as the industrial complexes, are managed by a cluster promotion agency with a centralised structure, Korea Industrial Complex Corp. (KICOX; see more details in the following chapters).
- Chaebols: Chaebols are usually family-owned corporate groups, typically global multinationals controlled by a chairman that oversees all operations. Chaebols – often translated as “business conglomerates” - are major economic actors and contribute highly to the Korean GDP, but play also an important role in politics and the Korean society in general. The four major chaebols are Hyundai Motor Company, SK Group, Samsung and LG.<sup>22</sup>

<sup>21</sup> UNESCO Science Report: towards 2030 – Republic of Korea, 11/2015, p. 665

<sup>22</sup> For more information on Chaebols see <https://www.cnet.com/news/the-chaebols-the-rise-of-south-koreas-mighty-conglomerates/>

The most important sectors for **exports from the EU to South Korea** are machinery and appliances (31.5%), transport equipment (18.2%) and chemical products (12.1%), with a similar range of products imported from South Korea to the EU; machinery and appliances (35.5%), transport equipment (25.4%) and plastics (8.7%).<sup>23</sup>

**A variety of sectors in Korea are well developed / present a market potential. Clusters can be found in all these economic sectors**, with an emphasis on high-tech applied to a variety of applications (digital sector/ video/ IT, electronics, medical sector /health/ biotech, materials, machinery/ automotive/ transport...), the heavy and chemical industry having still a strong presence, too (see more details about the cluster community in chapter 3).

The following are sector examples (non-exhaustive list) with importance in Korea and potential for EU companies:<sup>24</sup>

**Food/beverages** have a certain potential, Korea importing more than 70% of its needs for food products. The agro-alimentary deficit was close to €16 billion in 2013. For example, Korea is among the primary consumer of alcoholic beverages world-wide. Specialty food products are also well perceived (European brand products).<sup>25</sup> Also, according to EU Gateway to Korea, Korea is the second largest market in Asia for processed organic Food & Beverage and shows a significant growth potential: 19% growth is expected for processed organic food until 2020. The majority (60% - 70%) of organic food in Korea is imported, including 85% of the ingredients used in organic food processing and a high market potential for EU companies exists.<sup>26</sup> Relevant cluster in Korea: FOODPOLIS, national food cluster located in Iksan city along the west coast of South Korea. It has been established by the Korean Ministry of Agriculture, Food and Rural Affairs (MAFRA) and is focused on global agri-food exports and research and development (for more information on the cluster see: <http://eng.foodpolis.kr/> ).<sup>27</sup>

Similar to the popularity of brands in food/beverages products, design and quality **clothes** are sought for, the sales of ready-made clothes having reached €20.3 billion in 2013. Sports and outdoor clothing has a very high growth rate and further potential. Korea is world-leading in the consumption of **cosmetics** products per inhabitant (market of €6.6 billion in 2013), being the third Asian market after Japan and China and the first with regards to cosmetics for men (sales estimates: €674 Million in 2013), and organic-based cosmetics seem to be a priority.<sup>28</sup> Relevant clusters in Korea: Textopia Textile Information Center, Seoul Fashion Center, Dongdaemun Fashion Cluster, Textile in Daegu City, cosmetics in Osong Bio-technopolis.<sup>29</sup>

<sup>23</sup> <http://ec.europa.eu/trade/policy/countries-and-regions/countries/south-korea/>

<sup>24</sup> See also interesting information from Business France, <http://export.businessfrance.fr/coree-du-sud/librairie-specialisee.html>

<sup>25</sup> BPI France; <https://www.awex.be/fr-BE/Infos%20march%C3%A9s%20et%20secteurs/Infosmarch%C3%A9s/Cor%C3%A9e%20du%20Sud/Pages/Secteursporteurs.aspx>

<sup>26</sup> <https://www.eu-gateway.eu/node/3>

<sup>27</sup> For more information on the food industry in Korea see: FI Korea, The Food Industry of Korea, 2012

<sup>28</sup> BPI France; <https://www.awex.be/fr-BE/Infos%20march%C3%A9s%20et%20secteurs/Infosmarch%C3%A9s/Cor%C3%A9e%20du%20Sud/Pages/Secteursporteurs.aspx>

<sup>29</sup> For more information see: <http://www.textopia.or.kr/new/english/index.html>; <https://www.sba.seoul.kr/eng/jsp/business/fashion.jsp>; Hyungjoo Kim et al, Science & Technology Policy Institute Korea, From Crisis to Opportunities? Korea's Fashion Industries in Changing Global Production Networks and Upgrading towards the Dongdaemun Fashion Cluster; <https://www.kedc>

Also, the **medical sector** is of interest, as it seems as if “Korea has positioned (itself) as the hub of global **clinical studies** in Asia because it has the necessary infrastructure in its rich labor force in areas such as basic science, life science, and clinical research, which are needed as foundations to developing new drugs.”<sup>30</sup> **Clinical devices** are a strong import sector – it represents a €2 billion market (2013) and imports account for 41.5% in the sector.<sup>31</sup> Relevant cluster in Korea: Osong Bio-technopolis and the Daegu-Gyeongbuk High-tech Medical Cluster.<sup>32</sup>

Since the 1960s, the **chemical industry** in Korea has importantly contributed to the country’s economic growth. Nowadays, Korea’s chemical industry is in the process of transforming from a large-scale commodity industry to one that produces innovative, high-value-added products.<sup>33</sup> The manufacturing sector reaching maturity, Korea’s major chemical companies are strongly exploiting the electronic materials business as a new growth market. The **materials industry** as the basis of the manufacturing businesses appears to be on the rise with good potential e.g. for information and electronic materials (it accounts for example for 10.4% of LG Chems total sales, Korea’s largest chemical company).<sup>34</sup> Relevant cluster in Korea: parts and materials in the Seoul zone, Gyeonggi Zone and Busan Zone, new materials in the Gangwon Zone, fine chemistry in the Ulsan Zone, petrochemicals in the Gwangju and South Jeolla Zone.<sup>35</sup>

**Machinery** and in particular the **automotive** sector are well developed in Korea, even though the economic crisis has caused some downturn of sales on the domestic and international market.<sup>36</sup> A number of organisations strongly support the sector, e.g. the Korea Association of Machinery Industry (KOAMI, the leading industrial organisation for the machinery sector), the Korea Machine Tool Manufacturers' Association or the Korea Automobile Manufacturers Association.<sup>37</sup> Strong trade relations in the sector exists with the US.<sup>38</sup> Relevant cluster in Korea: the automotive cluster in the Daegu-Gyeongbuk-Gyeongnam region with 2,5 million production units per year and the “Ulsan Autovalley Project”, a regional cluster for automobile manufacturing and distributing enterprises in the Ulsan city area.<sup>39</sup>

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[phrp.org/pb/assets/raw/Health%20Advance/journals/phrp/OBTech.pdf](http://phrp.org/pb/assets/raw/Health%20Advance/journals/phrp/OBTech.pdf) and <http://eng.osong-bio.kr/home/contents/view.do?menuKey=437&contentsKey=198>

<sup>30</sup> <http://members.krpia.or.kr/company/ceo.asp>; For more information on the Biopharmaceutical industry in Korea see: [BIOPHARMACEUTICAL - Invest Korea](http://biopharmaceutical-investkorea.com)

<sup>31</sup> BPI France; <https://www.awex.be/fr-BE/Infos%20march%C3%A9s%20et%20secteurs/Infosmarch%C3%A9s/Cor%C3%A9e%20du%20Sud/Pages/Secteursporteurs.aspx>

<sup>32</sup> For more information see: <http://www.kcdc-phrp.org/pb/assets/raw/Health%20Advance/journals/phrp/OBTech.pdf> and <http://eng.osong-bio.kr/home/contents/view.do?menuKey=437&contentsKey=198>; [http://www.dgfez.go.kr/eng/page.php?mnu\\_uid=365&](http://www.dgfez.go.kr/eng/page.php?mnu_uid=365&)

<sup>33</sup> Il Moon et al., The Chemical Industry of South Korea: Progress and Challenges in American Institute of Chemical Engineers (AIChE), 12/2011.

<sup>34</sup> <http://www.businesskorea.co.kr/english/news/industry/1381-korea%E2%80%99s-chemical-industry-expanding-electronic-materials-businesses>

<sup>35</sup> Individual cluster websites are available on the e-cluster portal, however in Korean only, e.g. <https://www.e-cluster.net/metro/main/index.jsp>

<sup>36</sup> Korea Automobile Manufacturers Association, Korean Automobile Industry, Annual Report 2014, 2014

<sup>37</sup> <https://www.koami.or.kr/>, <http://www.komma.org/komma/eng/Introduction.do> and [http://kama.or.kr/eng/AK/K\\_eng\\_ak1.jsp](http://kama.or.kr/eng/AK/K_eng_ak1.jsp)

<sup>38</sup> See interesting elements on US investments and trade relations with Korea in the machinery sector on [http://www.trade.gov/mas/ian/build/groups/public/@tg\\_ian/documents/webcontent/tg\\_ian\\_002600.pdf](http://www.trade.gov/mas/ian/build/groups/public/@tg_ian/documents/webcontent/tg_ian_002600.pdf)

<sup>39</sup> [http://www.dgfez.go.kr/eng/page.php?mnu\\_uid=361&](http://www.dgfez.go.kr/eng/page.php?mnu_uid=361&) and [http://static.sdu.dk/mediafiles//Files/Om\\_SDU/Institutter/Graenseforskning/konference/Ingo/KimAbstract.pdf](http://static.sdu.dk/mediafiles//Files/Om_SDU/Institutter/Graenseforskning/konference/Ingo/KimAbstract.pdf)

Of course, Korea has a well-developed **Information and Communication technologies (ICT) sector**: mobile phone market penetration reaches 110% of the population, over two thirds of the population uses smart phones, 4G is well spread – the necessary infrastructure is present. The software and IT services market is estimated at USD25.6 billion (2013) with an annual growth rate of 8%. The Korean “in house” service is here particularly strong, visible through well-known brands such as Samsung, LG, etc. (The so-called Chaebols, business conglomerates or multinational companies have in particular in the IT sector strongly supported the economic development in Korea.) With regards to video gaming, Korea is well-known as a producer and consumer market – it generates on its own 6.3% of the world sales revenues in the sector, accounting for USD10.7 billion (growth rate between 2012 and 2013: +5.6%). The “**creative economy**” concept is put forward in Korea since the Park Geun-hye Administration (2013) in the context of Korea’s transition to an advanced innovation-driven economy. It is defined by Park, “as the idea of creating new engines of growth and employment through the convergence of science and technology with industry, the fusion of culture and industry, and the blossoming of creativity in the very borders that were once permeated by barriers.” With the aim of creating new growth and employment opportunities, the focus on new forms of convergence of information and communications technologies (ICT) with traditional industries, as well as culture and content is put forward. This new policy’s scope is to strengthen the relations between the public and the private sector and as such to enhance the impact of Korea’s substantial R&D investments, as well as to improve the regulatory environment for innovative entrepreneurs. SMEs are specifically encouraged to seize the opportunities of the digital economy.<sup>40</sup> Relevant clusters in Korea: Gangnam Seoul mobile cluster, Gumi National Industrial Complex.<sup>41</sup>

South Korea’s comparative advantage lies in technology and design, not in resource-intensive heavy-manufacturing industries, which will inevitably lose market share to competitors in China. New growth areas exist such as alternative energy, green technologies, and biotechnology.

## 1.4. Zoom: “Green technologies”

Korea aims to be one of the top 7 renewable energy powerhouses by 2020 and among the top 5 by 2050, with public investments in this sector set to reach €3.75 billion in 2017.<sup>42</sup> Statistics Korea has undertaken an analysis of Korea’s development towards the objective of becoming a “green nation” on the basis of a number of elaborated OECD indicators and concludes that “Korea is changing its direction towards a greener economy”.<sup>43</sup>

<sup>40</sup> Sean Connel, Korea Economic Institute of America, Building a Creative Economy in South Korea: Analyzing the Plans and Possibilities for New Economic Growth, 12/2013 and OECD, KOREA - Policy Priorities for a Dynamic, Inclusive and Creative Economy, 10/2015. More information can also be found in UNESCO Science Report: towards 2030 – Republic of Korea, 11/2015.

<sup>41</sup> For more information see: [http://www.pmcomplex.go.kr/Front\\_Eng/02\\_Gumi/01\\_Introduction.asp](http://www.pmcomplex.go.kr/Front_Eng/02_Gumi/01_Introduction.asp) and [Gumi High-tech Valley National Industrial Complex - Invest Korea](#)

<sup>42</sup> <https://www.eu-gateway.eu/business-missions/missions-calendar/green-energy-technologies-korea>

<sup>43</sup> See details on the OECD indicators and analysis results in Statistics Korea, Korea’s Green Growth based on OECD Green Growth Indicators, 03/2012

## Green technologies in Korea's policy strategy

South Korea is one of the first countries to enshrine green growth in its national development strategy.<sup>44</sup> In 2008, the country dedicated 80 percent of its fiscal stimulus plan to green growth projects, particularly infrastructure and transportation<sup>45</sup>. Indeed, the Korean Government has launched its strategic plan "Low Carbon, Green Growth" in 2008.

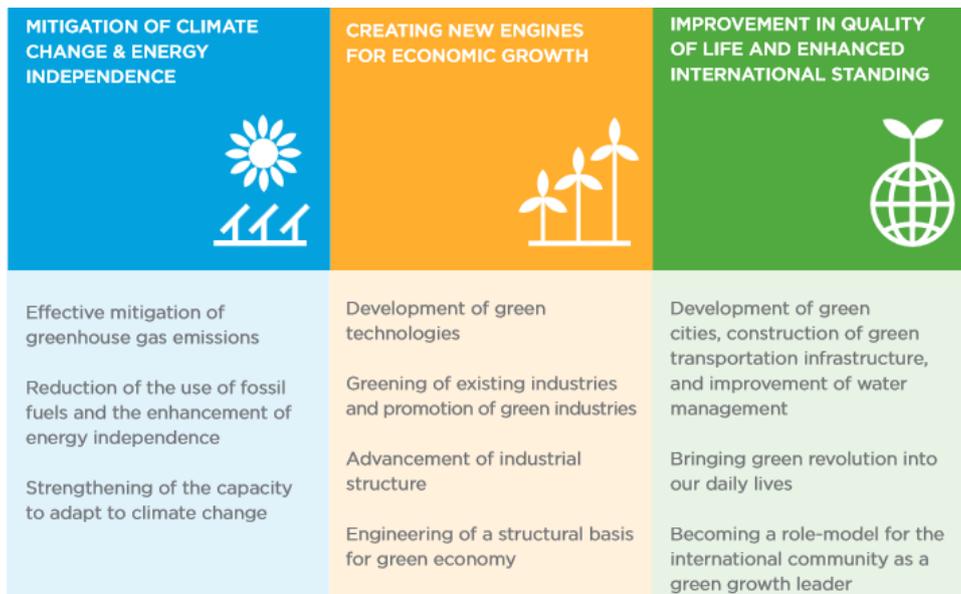


FIGURE 2 - THREE OBJECTIVES AND TEN DIRECTIONS OF THE STRATEGIC PLAN "GREEN GROWTH"<sup>46</sup>

It then announced in 2009 a « Green New Deal », programme of USD38.5 billion investment between 2009 and 2012 into "green" technologies: transports, water management, waste, air and forests, as well as sustainable construction... It included also the objective of reducing by 2020 the country's CO<sub>2</sub> emissions by 35% and thus favoured the introduction of new technologies that could support the energy efficiency efforts in industry, buildings and transports.<sup>47</sup>

The "Green New Deal" was aimed at being "more than just an environmental policy but a new paradigm of progress and - changing people's behavior and way of thinking".<sup>48</sup>

<sup>44</sup> More information in: Whang Jooho, KOREA'S GREEN ENERGY POLICIES AND PROSPECTS, in: KOREA'S ECONOMY, Volume 27, 2011, p.49ff. Besides, even before, Korea had started its orientation towards new technologies with environmental aspects – as writes Prof. Dr.-Ing. Kim, Gi Eun in Technology Innovation & Green Policy in Korea, 2010: "During and after the Korean economic crisis in 1998 the so called 5 T's (information technology, biotechnology, nanotechnology, environmental technology and culture technology) had been strategically planned as growth engines for the further development in the 21st century.

<sup>45</sup> <http://www.korea.net/NewsFocus/Sci-Tech/view?articleId=104426>

<sup>46</sup> Sang Dae Choi, The Green Growth Movement in The Republic of Korea: Option or necessity?,

[http://www.greengrowthknowledge.org/sites/default/files/kggp\\_knowledge%20note%20series\\_01.pdf](http://www.greengrowthknowledge.org/sites/default/files/kggp_knowledge%20note%20series_01.pdf)

<sup>47</sup> BPI France; <https://www.awex.be/fr-BE/Infos%20march%C3%A9s%20et%20secteurs/Infosmarch%C3%A9s/Cor%C3%A9e%20du%20Sud/Pages/Secteursporteurs.aspx>

<sup>48</sup> Pan Sang HAN - Minister Counsellor, Korean Delegation to the OECD, Sustainable and Green Tourism - Korea's Green New Deal and 4 Rivers Restoration Project, 06/2010



## Green New Deal

### Background & Key projects

- Green New Deal announced in Jan. 2009 - 9 key projects and supporting projects
- focused on job creation as well as building the foundation for low carbon economy transition

Project Name	Budget (billion KRW)			Job Creation (# of jobs)		
	2009	~ 2012	total	2009	~ 2012	Total
total sum	4,363	45,687	50,049 (\$41billion)	93,360	863,060	956,420
<b>• 4 Major River Restoration</b>	488	13,990 (\$11billion)	14,478 (\$12billion)	7,000	192,960	199,960
• Green Transportation	1,835	7,819	9,654	25,042	113,025	138,067
• Integrated Territory Management	25	347	372	816	2,304	3,120
• Water Resource Catchment	185	758	942	3,063	13,069	16,132
• Green Car & Clean Energy	321	1,732	2,053	1,643	12,705	14,348
• Waste Resource Reuse	51	879	930	2,377	13,819	16,196
• Forestry	313	2,104	2,417	22,498	148,204	170,702
• Green Home, Green School	-	8,050	8,050	-	133,630	133,630
• Ecological River	5	479	484	393	10,396	10,789
Support Projects	1,140	9,530	10,670	30,528	262,038	141,639

FIGURE 3 - THE KOREAN "GREEN NEW DEAL"<sup>49</sup>

Korea established the Presidential Committee on Green Growth (PcGG) for the implementation of its "green" policy as the highest inter-ministerial institution, with broad engagement from the private sector. This Committee was co-chaired by the Prime Minister and a representative of the private sector, and consisted of relevant government ministers and representatives from private stakeholders.<sup>50</sup>

In addition, the Korean administration released its Development Strategy for New and Renewable Energy Industry in October 2010, planning to invest USD36.4 billion in new and renewable energy areas between 2011 and 2015 in order to build the country into the fifth-biggest renewable energy producer in the world.

According to Korea.net, "the current government also aims to increase South Korea's dependence on renewable energy for all energy needs from 2.4 percent last year to over 11 percent by 2030. The Renewable Portfolio Standard, mandatory usage of renewable energy for public buildings, the One Million Green Homes Project, and green car development are some of the government's plans that are under way to realize this scheme."<sup>51</sup>

<sup>49</sup> Pan Sang HAN - Minister Counsellor, Korean Delegation to the OECD, Sustainable and Green Tourism - Korea's Green New Deal and 4 Rivers Restoration Project, 06/2010

<sup>50</sup> Sang Dae Choi, The Green Growth Movement in The Republic of Korea: Option or necessity?,

[http://www.greengrowthknowledge.org/sites/default/files/kggp\\_knowledge%20note%20series\\_01.pdf](http://www.greengrowthknowledge.org/sites/default/files/kggp_knowledge%20note%20series_01.pdf)

<sup>51</sup> <http://www.korea.net/NewsFocus/Su-Teen/view?articleId=104726>

## Green tech industry strengths and strategic initiatives

South Korea is also leading the global industry in green technology development. The top 30 private enterprises invested KRW 22.4 trillion (circa USD 26.2 billion) in green technologies between 2011 and 2013.<sup>52</sup>

For example, the Korean companies LG and Samsung cover 40% of the global market for lithium secondary batteries that are used to power smart phones and electric cars and eco-friendly green car development is equally performant. The country's high competence in the secondary battery market equally influences the eco-friendly green car development. "In 2010, [Hyundai Motor Company](#) developed the nation's first full-speed battery electric vehicle, the BlueOn. The South Korean government has promised to support the private sector in developing the parts and materials needed for electric vehicles manufacturing, and it is already providing a subsidy of USD 18,000 for each first-time buyer."<sup>53</sup>

Korean actors, as strongly supported through its dedicated policy, are clearly aiming to be leader in green technology. The city of Songdo, for example, is about to become a smart city, comprehensively intertwining physical and technological infrastructure. Reduction of land use for new construction, pollution and wasted energy, as well as waste water management and green transport are among the priorities.<sup>54</sup>

Recently the European Commission has launched a "Gateway Europe | Korea" portal with focus on being a "green gateway"; its mission is to promote technologies, products and services that offer solutions with regards to sectors related to the environment, water, renewable energies, energy efficiency and construction materials. The EU Gateway | Business Avenues took-off on the 4-8 July 2016, targeting Green Energy Technologies in Korea for its inaugural business mission.<sup>55</sup>

Green Technologies are strongly supported by the Korean government, e.g. a policy research centre / government-funded think-tank specialising in green climate technology has been established in 2013, the Green Technology Center (GTC).<sup>56</sup> GTC serves as Korea's gateway for global green technology cooperation, as it connects developed and developing countries for growth and diffusion of green technology and strategies.<sup>57</sup> The [Global Green Growth Institute](#) is an outgrowth of President Lee Myung-bak's (2008-2013) commitment to next generation energy sources and technologies and Korea's Presidential Committee on Green Growth focuses on climate change issues.<sup>58</sup>

Korea has also invested to spreading green tech solutions in other regions/countries: it has quadrupled its foreign assistance budget since 2000, to US\$800 million in 2009, and it has pledged to boost financing of green energy, conservation and development projects to 30 percent of the total aid budget by 2020. E.g., in the framework of the East Asia Climate Partnership support has been provided to Sri

<sup>52</sup> UNESCO Science Report: towards 2030 – Republic of Korea, 11/2015, p. 663

<sup>53</sup> <http://www.korea.net/NewsFocus/Sci-Tech/view?articleId=104426>

<sup>54</sup> <http://www.worldbank.org/en/news/feature/2012/05/09/Korea-s-Global-Commitment-to-Green-Growth>

<sup>55</sup> <https://www.eu-gateway.eu/business-missions/missions-calendar/green-energy-technologies-korea> and [http://eeas.europa.eu/delegations/south\\_korea/press\\_corner/all\\_news/news/2016/20160712\\_en.htm](http://eeas.europa.eu/delegations/south_korea/press_corner/all_news/news/2016/20160712_en.htm)

<sup>56</sup> The Green Technology Center (GTC) defines itself as "a green climate technology policy research center that contributes to the realization of the creative economy through climate change technology policy and through research on international cooperation, also contributing to Korea's national development by strengthening global leadership." See: <http://www.gtck.re.kr/frt/en/main.do>

<sup>57</sup> <http://www.greengrowthknowledge.org/organization/green-technology-center-korea-gtc-k>

<sup>58</sup> <http://www.worldbank.org/en/news/feature/2012/05/09/Korea-s-Global-Commitment-to-Green-Growth>

Lanka and the Korea International Cooperation Agency has intervened in Azerbaijan on water resources management.<sup>59</sup>

A number of clusters around “green technologies” have been created<sup>60</sup> – the following are examples: Renewable energy/wind power cluster in Jeonbuk Province, Daegu water cluster, Chungcheong solar energy cluster/ Chungnam Techno Park, the “Asia Solar Valley” and a cluster for next-generation electric cell industry at the Ochang Scientific Industrial Complex.<sup>61</sup>

## Summary of the analysis of various sectors with regards for their potential for cluster cooperation

A number of sectors have high potential for cooperation between European and Korean companies, both for trade and investments. EU Gateway Korea summarises it well: “The five targeted sectors are: Green Energy Technologies, Healthcare & Medical Technologies, Environment & Water Technologies, Construction & Building Technologies, and organic Food & Beverage.”<sup>62</sup>

## 2. Cluster community in South Korea

South Korea today counts a large number of “industrial complexes” clusters and subsequent **Mini Clusters**, each composed of a variety of large companies, SMEs, research institutes, universities, etc. Clusters are supported through an industrial-complexes based cluster programme (2005-2016) – indeed, in Korea a majority of clusters are based on the “industrial complexes” which shows that they have predominantly grown out of industrial agglomerations, mainly due to the historic fact that Asia used to be “the factory of the world”. They are nowadays operated in an “integrated information network to nurture local industry and promote an academia-industry-research network”.<sup>63</sup> This means, “industrial complexes” provide the physical infrastructure as some sort of industrial parks (as result of centralized policy building infrastructure throughout the country), whereas the Mini Clusters regroup the different triple helix actors. The cluster management is provided on a centralised level by the cluster promotion agency **Korea Industrial Complex Corp. (KICOX)**, and the Mini Clusters do not have dedicated cluster manager. The figure below shows the concept of clusters in Korea :

<sup>59</sup> <http://www.worldbank.org/en/news/feature/2012/05/09/Korea-s-Global-Commitment-to-Green-Growth>

<sup>60</sup> An interesting analysis on the potential of green clusters in Korea – though dating from 2010 – stipulated that “The Daegu, Gyeongsang and Chungcheong (including Jeollabuk-do) regions are promising in the field of solar cells and the southeastern region has potential in wind power. The Gyeongsang region (Daegu, Gyeongbuk and the southeastern regions) has the highest potential in hydrogen/fuel cells, and the Chungcheong and Gyeongsang regions (Daegu, Gyeongbuk and the southeastern regions) are both promising regions in bioenergy. In the LED sector, the Honam region is promising, whereas the southwestern region holds potential in green cars.” More can be found here: Green cluster to vitalize regional economy, The Korea Herald, 09/2010, <http://www.koreaherald.com/view.php?ud=20100930000451>

<sup>61</sup> More information here: [http://www.investkorea.org/jeollabuk-do\\_en/industry/industry03.do](http://www.investkorea.org/jeollabuk-do_en/industry/industry03.do); <http://www.businesskorea.co.kr/english/features/special-reports/4089-daegu-metropolitan-city-setting-global-hub-water-industry>; [http://www.ctp.or.kr/global\\_site/english/eng\\_main.asp](http://www.ctp.or.kr/global_site/english/eng_main.asp); [http://www.investkorea.org/chungcheongbuk-do\\_en/industry/new\\_industry04.do](http://www.investkorea.org/chungcheongbuk-do_en/industry/new_industry04.do)

<sup>62</sup> <https://www.eu-gateway.eu/news/eus-innovative-companies-promising-industries-come-korea>

<sup>63</sup> [http://www.kicox.or.kr/home/eng/Industrial/Industrial\\_complex.jsp](http://www.kicox.or.kr/home/eng/Industrial/Industrial_complex.jsp)

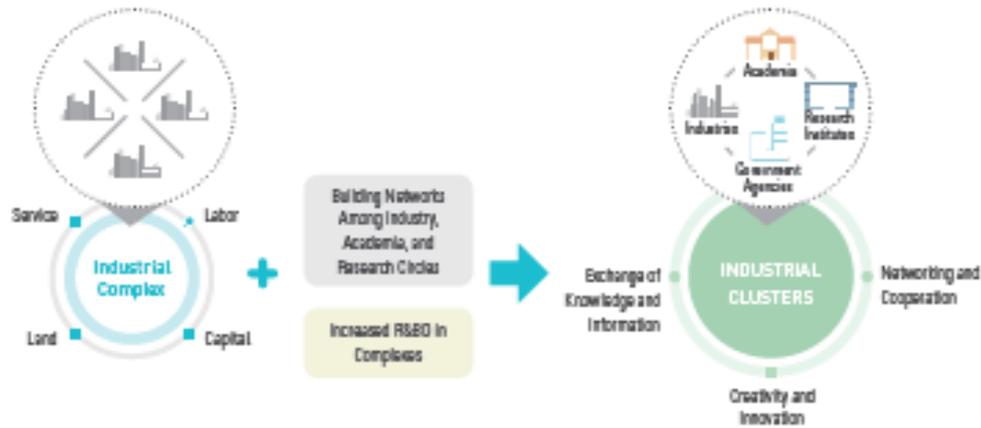


FIGURE 4 - THE CONCEPT OF CLUSTER<sup>64</sup>

Korea currently counts 45 industrial complexes nationwide, covering a large variety of industrial sectors and being spread over all Korean regions. They regroup some 78 Mini clusters; e.g. the G-Park industrial complex (science park) counts 5 mini clusters (Health ICT, ICT Infrastructure..). The figure below presents the 45 industrial complexes and how they are classed in separate groups by KICOX:

23 national industrial complexes	(Seoul Digital, Bupyeong, Juam), Nam-dong, Bukpyeong, Paju Publication, Paju Tanhyeon, Sihwa, Asan, Seokmun, Gumi, Osong Gwahak, Changwon, Ulsan, Onsan, Anjeong, Myeongji Noksan, Yeosu, Gunsan, Gunjang, Iksan, Gwangju High-tech, Daebul, Gwangyang Yeongwan
10 general industrial complexes	Bukpyeong, Janghowon, Daegu Dalseong II, Sacheon, Busan Gwahak, Sinho, Jeonggwan, Sinpyeong Janglim, Giryong I, Gimhae
9 foreign investment zones	Gumi, Cheonan, Inju, Ochang, Osong, Sacheon, Pyeongdong, Daebul, Dalseong
3 rural industrial complexes	Donghwa, Samgye, Jeonggwan

FIGURE 5 – LIST OF INDUSTRIAL COMPLEXES NATIONWIDE<sup>65</sup>

<sup>64</sup> Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p.3

<sup>65</sup> [http://www.e-cluster.net/en/kicox/kicox\\_area/kicox\\_area\\_custom.jsp](http://www.e-cluster.net/en/kicox/kicox_area/kicox_area_custom.jsp), up to date web-portal according to KICOX.

## 2.1. Cluster mapping



FIGURE 6 - REGIONAL SPREADING OF KOREAN INDUSTRIAL CLUSTERS<sup>66</sup>

The industrial complexes are mainly sectoral and geographical production agglomerations that were supported by the government through its industrial cluster policies (see chapter 4) in order to network, implement projects, develop the innovation ecosystem and establish a governance and management system.

Korea Industrial Complex Corp. ([KICOX](http://www.kicox.com)) is in charge of the industrial complexes management and operation.

<sup>66</sup> Ministry of Trade, Industry & Energy et al., The Industrial Cluster Program of Korea, March 2016, p.9

The web portal for industrial clusters ([www.e-cluster.net](http://www.e-cluster.net))<sup>67</sup> set up by KICOX provides a basic map of regional industrial clusters. When clicking on the map on the website, further information on the main regional hubs and different complexes is provided with up to date information. An example for the North-Western region (appearing when clicking on “IT Parts & material”) is provided below.

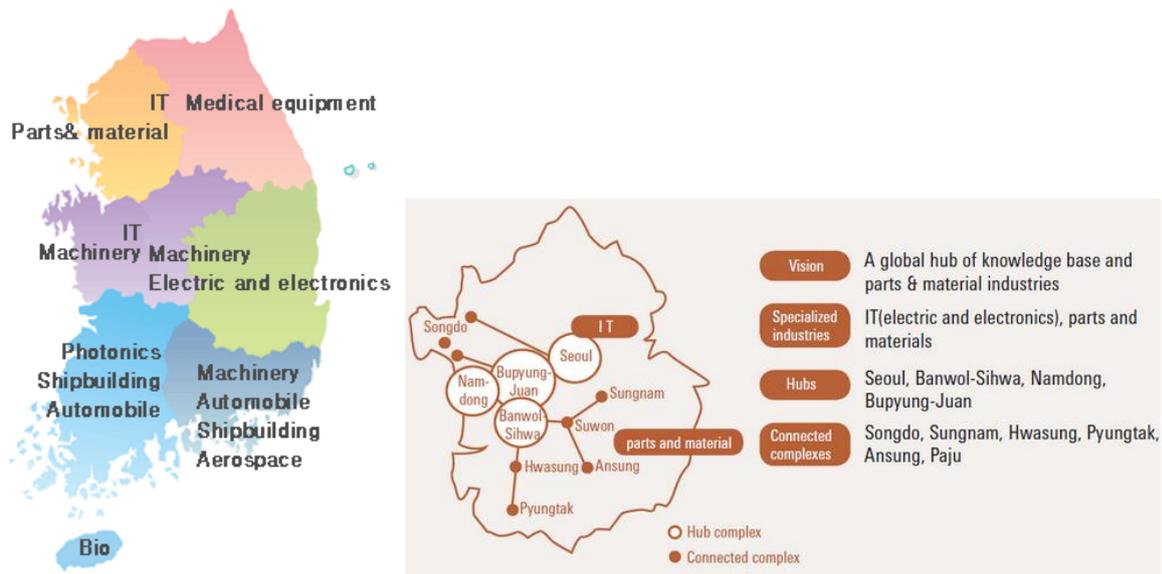


FIGURE 7 - MAP OF REGIONAL CLUSTERS ON THE KOREAN WEB PORTAL E-CLUSTER.NET<sup>68</sup>

The list of the currently 78 Mini Clusters can be found in Annex 6.4. In addition, for each Mini Cluster that is part of an industrial complex, a specific website exists, however in Korean available only. They can be accessed when scrolling over the map provided and are listed in a separate box for each geographic area (see example below for Seoul):

<sup>67</sup> The Korean Industrial Complex Corp. (KICOX) E-cluster portal, <http://www.e-cluster.net/en/index.jsp>

<sup>68</sup> KICOX E-Cluster portal, <http://www.e-cluster.net/en/index.jsp>

## Cluster Program

- Overview
- Support
- Process
- Success Story
- Mini Cluster Map

### Status of Industrial Clusters



HOME Cluster Program > Mini Cluster Map

### Mini Cluster Map

For a full list of Mini Cluster rooted in each area, move a mouse on each round button.



Seoul
<b>Digital Contents</b> <a href="http://mini.e-cluster.net/DC">http://mini.e-cluster.net/DC</a>
<b>Information and Communication</b> <a href="http://mini.e-cluster.net/ICT">http://mini.e-cluster.net/ICT</a>
<b>Green IT</b> <a href="http://mini.e-cluster.net/GT">http://mini.e-cluster.net/GT</a>
<b>IMT</b> <a href="http://mini.e-cluster.net/IMT">http://mini.e-cluster.net/IMT</a>

FIGURE 8 - MINI CLUSTER MAP<sup>69</sup>

### Additional information on the Korean cluster mapping:

The Koranet project has analysed a number of Korean clusters and provides an overview of their historic development and focus.<sup>70</sup> Some clusters have also themselves developed promotional presentations that show their development and modus operandi.<sup>71</sup>

On the previous European Cluster Collaboration Platform, only KICOX was profiled.

Additional detailed cluster profiles can be found on international web pages, e.g. the profiles of the Cluster Ansan and the Daedeok Innopolis Science Park are available on the International Kooperation portal of the German Ministry for Education and Research – though only in German.<sup>72</sup>

Several sophisticated mappings and listings of South Korean industrial clusters had been elaborated in different publications related to the Governmental Industrial cluster policy, such as *The industrial Complex Cluster programme of Korea*, Ministry of Knowledge Economy et al, November 2010, p.147-149 or *The industrial Complex Cluster program of Korea – Summary, Second edition*, Ministry of Knowledge Economy et al, November 2011 (mapping p.9, 26-27), but the information is no longer up

<sup>69</sup> [http://www.e-cluster.net/en/clusters/cluster\\_map/cluster\\_map.jsp](http://www.e-cluster.net/en/clusters/cluster_map/cluster_map.jsp)

<sup>70</sup> Koranet, Overview on Existing Publications on S&T and Cluster/Networks Statistics (Part 2, Cluster), p.11ff

<sup>71</sup> See the example of Gumi: [http://www.koranet.eu/media/12\\_Gumi\\_KICOX\\_Jeoung.pdf](http://www.koranet.eu/media/12_Gumi_KICOX_Jeoung.pdf)

<sup>72</sup> See: <http://www.kooperation-international.de/innovationsportal/clusterportal/ansan.html> and <http://www.kooperation-international.de/innovationsportal/clusterportal/daedeok-innopolis-science-park.html>

to date. Another web portal of KICOX provides a description of industrial complexes as well, but the e-cluster portal has now replaced that website.<sup>73</sup>

## 3. Cluster policies and programmes in South Korea

### 3.1. Historic evolution of the Korean cluster policy

In 2003, the Korean government started to emphasize the cluster paradigm as part of both science and technology policy and industrial policy. As a result, many ministries started their own cluster policies. There were several representative policies such as Daedeok Innopolis, Technoparks, Mini-clusters in Industrial Complexes and S&T complexes of regional governments.<sup>74</sup>

A number of **policies dedicated to strengthening (industrial) clusters** have been implemented in South Korea. Some government-led projects promoting building infrastructure, developing technologies, and enhancing networking nationwide such as “Promoting Regional Strategical Industries” focused on regional R&D capabilities and was implemented in two phases from 2002 to 2008 in several regions, as well as “nurturing Hub Universities for Industrial Collaboration” implemented from 2004 to 2008 to promote regional collaboration between universities and industrial parks. Meanwhile, other projects were focused on building the core capabilities of particular regions such as “Nurturing Daeduk R&D Special District”, “Building Osong Bio-Health Science Park” and “High-Tech IT Complex” at Sangam, Seoul. However, other clusters led by global companies such as Semiconductor and Digital Valley in Suwon-Giheung and LCD Cluster in Paju were formed spontaneously and developed.<sup>75</sup>

As analyses Koranet “In Korea, there are several kinds of innovation cluster policies. Not only the former Ministry of Science and Technology (MOST) but also the former Ministry of Commerce, Industry and Energy (MOCIE) have implemented cluster policy with different objectives and targets. MOST focused more on science and research based clusters while MOCIE did on production-based industrial clusters and regional Technoparks. MOST changed the legal status of old Daedeok Science Town to Daedeok Innopolis in order to make it the world-class innovation cluster by making full use of the accumulated S&T capabilities of public research institutes and universities located near Daedeok. MOCIE, instead, has focused on existing industrial production complexes and tried to encourage university, research and industry networks in the name of the innovation cluster policy. It also has chosen and designated 17 regional Technoparks with the regional governments as of 2008. Other ministries – such as the former Ministry of Health and Welfare (MW, then Ministry for Health, Welfare and Family Affairs) - has also come up with an innovation cluster by targeting certain areas with

<sup>73</sup> Official presentations of the zones from the KICOX website:

[http://www.kicox.or.kr/home/eng/industrial/industrial\\_complex.jsp](http://www.kicox.or.kr/home/eng/industrial/industrial_complex.jsp) and subsequent pages

<sup>74</sup> Koranet, Overview on Existing Publications on S&T and Cluster/Networks Statistics (Part 2, Cluster), p.40

<sup>75</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p. 23ff

technology specialties. In addition, regional governments have also implemented their own innovation clusters, as Digital Media City (Seoul Metropolitan City), Gwanggyo Technovalley and Pangyo Technovalley (Gyeonggi Provincial Government).<sup>76</sup>

### 3.2. Zoom: The development of industrial clusters – the Industrial Complex Cluster Programme

From the early 2000s, Korean policies concentrated on innovation-led growth through the promotion of industrial clusters – combining production and R&D capacities in one location (for information on previous policies and development see Annex 6.1).<sup>77</sup>

Industrial cluster policies in its beginning were based on **three main principles**: specialized development by region – inter-connected development of the regions – improvement of spatial quality and life quality. A number of cluster projects emerged in the following on the basis of the cluster programme launched (see Annex 6.2), among which “Turning industrial complexes to innovation clusters” and “Industrial Complex Cluster Programme”.<sup>78</sup>

**The Industrial Complex Cluster Programme (ICCP) was launched in 2005**, as a main cluster programme, with the aim of converting Korean industrial complexes from geographic agglomerations with sector-focus into some sort of science / techno parks.<sup>79</sup> This was seen as crucial for economic development, from agglomerations of production units to places of innovation and development of new knowledge to gain competitiveness in a global knowledge economy. Under this policy, industrial clusters are defined as a: “geographically proximate group of interconnected companies, universities, institutes and associated governmental institutions in a particular field, the intention of which is to create new knowledge and technology by promoting cooperation among them”<sup>80</sup>. Indeed, the policy focus was shifted from quantitative to qualitative economic growth. The today **purpose of the programme is “to build self-sustainable clusters based on the network of industry, academic, research, and government fields”**. It aims at the “execution of R&D programmes to bolster the innovative capabilities of SMEs as well as networking activities to promote exchange and cooperation among industry, academic, research, and government fields as well as building up of industrial clusters.”<sup>81</sup>.

**The ICCP is supervised by the Ministry of Trade, Industry and Energy (MOTIE)** (formerly “Ministry of Knowledge Economy” from 2008 to 2013), which oversees the whole programme, from planning policies to modifying laws and systems. It has **spent KRW 630 billion (= about €502 million) between**

<sup>76</sup> Koranet, Overview on Existing Publications on S&T and Cluster/Networks Statistics (Part 2, Cluster), p.3; information on the evolution of the cluster policy in Korea can be found on p. 9ff.

<sup>77</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p. 20ff

<sup>78</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p. 26

<sup>79</sup> See also Koranet, Overview on Existing Publications on S&T and Cluster/Networks Statistics (Part 2, Cluster), p.22ff for more information

<sup>80</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010.

<sup>81</sup> Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p.6f

**2005-2015 on the programme.**<sup>82</sup> The Ministry outsourced the tasks of controlling, planning, evaluating, and managing the whole programme to the **Korea Industrial Complex Corp. (KICOX)**<sup>83</sup> that was assigned as a Cluster promotion agency in 2004.<sup>84</sup>

Within the ICCP, having during the first years concentrated on building sectoral innovation systems and regional development, the government started to promote a **pan regional cluster programme** in 2010 and then to expand it into all **industrial complexes and clusters nationwide** (2015). The programme's initial targets (7, then 12 pilot complexes) have since expanded nationwide and the connection between the different types of complexes (state general cutting-edge metropolitan, agricultural and knowledge-based) is being strengthened.<sup>85</sup> Information and a figure in Annex 6.3 provide a good overview of the progress.

The management of the clusters has evolved as a result of the programme's different phases, from "Cluster agencies" established for each complex, with the responsibility of making extended plans for their clusters as well as discovering, implementing, and evaluating specific projects, to a restructuring with **11 regional headquarters** to operate the tasks previously performed by cluster agencies.

They consist each of a number of **Mini Clusters** which they operate (with companies in the complexes, universities and research institutes), supporting organisation alliances (with local governments, innovation parks) and a pool of experts in the field.<sup>86</sup> The current state of Mini Clusters can be found in Annex 6.4 - it has increased from 49 in the first year of the programme to 78 in 2016 (an example: the Changwon cluster with main focus on machinery has composed and operated Mini Clusters that specialise in machine tools, moulds, transportation equipment, mechatronics and metal materials).

The tables in Annex 6.5 summarise the evolution of the cluster policy and thus the programme since 2005 and provide further information on the different support systems and support programmes. As part of the support programmes, a number of Corporate Growth Support Centers provide consulting services in industrial clusters on issues such as technologies, business activities and finances.<sup>87</sup>

The Industrial Complex Cluster Programme (ICCP) was started in 2005 and is aimed at being completed in 2016. Its development can be divided into **three phases** – the Formation Stage (2005-2008), the

<sup>82</sup> Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p.6; see also an overview of budget spent between 2005-2009 in Koranet, Overview on Existing Publications on S&T and Cluster/Networks Statistics (Part 2, Cluster), p.26

<sup>83</sup> Korea Industrial Complex Corporation, <http://www.kicox.or.kr/home/eng/index.jsp>

<sup>84</sup> KICOX presents itself as follows: "KICOX - Korea Industrial Complex Corp. is a sole, public and national level industrial complexes' management and supervising agency established in 1997 after integrating 5 regional complex management corporations operating independently. KICOX is headquartered in Daegu City and configured as 6 regional headquarters and 18 branch offices nationwide. KICOX has been operating an industrial complex-based cluster programme targeting all industrial complexes nationwide since 2005. The project to strengthen competitiveness of industrial complexes has established and operated 65 "mini-clusters (the industry-academia-research labs alliance composed according to industry/technical field)" that find and provide support for solutions to problems coming from overall corporate activities covering technology development, marketing, and management all the time."

<sup>85</sup> Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p. 6ff

<sup>86</sup> See more information on the role of Mini Clusters in Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p.12

<sup>87</sup> For more information, see Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p.16f

Growth Stage (2009-2012) and the Independence Stage (2013-2016); an overview can be found in Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p.7.

The particularity of the programme consists in the fact that it promotes projects that are established in a **bottom-up approach**, responding to difficulties discovered by resident companies in industrial complexes through the activity of the small-sized industry-university-institute alliances – the Mini Clusters, constantly supported through the programme management.<sup>88</sup>

The ICCP is promoted through a **dedicated web-portal**, the e-cluster (<http://www.e-cluster.net/en/index.jsp>). More details on the programme can easily be found in Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010. No official publication with information on the programme is available on the web-portal after 2011, though, but a recent publication from March 2016 can be obtained from KICOX upon request. The web portal is maintained operational.

#### What is the status and the future of the ICCP?

Since its launch in 2005, the programme has undergone three phases: (1) creating a Korean cluster model (first phase 2005-2008), (2) sharing the benefits of the programme with other parts of the nation (second phase 2009-2012) and fostering global innovation clusters (third phase 2013-2016).

KICOX states that the ICCP was “ranked no.1 R&D project in 2015 and 2016 from the Korea government of R&D evaluation”.<sup>89</sup>

In January 2016, the KICOX president declared that “KICOX should carry forward the project of innovation support centres, which are scheduled to be set up in four regions – Bupyeong, Changwon, Yeosu and Daebul – as planned, so that it can advance businesses in the outdated complexes and become a facility to support the growth of its businesses.”<sup>90</sup>

### 3.3. Cluster internationalisation policy support programmes

As part of the Global Cluster Exchange and Cooperation Programme (that is part of the ICCP), “support is provided for exchange and cooperation among industrial clusters at home and abroad.”<sup>91</sup> Nevertheless, no clear internationalization strategy through the programme could be detected.

Indeed, KICOX indicates that it “does not follow specific cluster internationalisation activities, but that they have contracted MoU with China, Germany and the U.S. respectively.” The organisation also notifies that it does “not have any specific collaboration plan for Korea - EU until now”.<sup>92</sup> It has however

<sup>88</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p. 58

<sup>89</sup> Exchange with Ms Sohee Jeong, manager of the cluster team at KICOX; a detailed overview of achievements can be found in Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p.18ff

<sup>90</sup> Business Korea, Driving Creative Economy - KICOX Pledges to Make Korean Industry Base of Creative Economy, 6 January 2016, <http://businesskorea.co.kr/english/news/industry/13473-driving-creative-economy-kicox-pledges-make-korean-industry-base-creative>

<sup>91</sup> Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p.6

<sup>92</sup> Exchange with Ms Sohee Jeong, manager of the cluster team at KICOX

signed a cooperation agreement with TCI in June 2014 and since closely collaborated, e.g. for the organization of the TCI 2015 Global Conference.<sup>93</sup>

Indeed, cluster internationalization does not seem to be part of the strategic policy focus of the ICCP. It rather targets Korean clusters being internationally visible and comparable. According to the cluster management analysis of 2010, “in 2016, when the third phase concludes, it is predicted that Korean clusters will get abreast of and compete with world prestigious clusters like Silicon Valley in the U.S. [...]”<sup>94</sup>

**Box 25.1: The Republic of Korea's Silicon Valley**

<p>Moving away from its earlier focus on catch-up technology, the Republic of Korea has invested in a dedicated world-class science and business cluster in and around the city of Daejeon, less than an hour's journey from Seoul in a high-speed train. The International Science Business Belt dates from 2011. It is the country's biggest research complex, home to 18 universities, several science parks and dozens of research centres, both private and public.</p>	<p>2021. It will form part of the multi-functional research facility now called RAON. Here, researchers will be able to carry out groundbreaking research in basic science and look forward to discovering rare isotopes. RAON will be hosted by the Institute for Basic Science, which is itself under construction. It should open its doors in 2016. The institute plans to attract world-renowned scientists and to cultivate an environment that maximizes the researcher's autonomy; it intends to make its mark among the top 10 world-class research institutes in basic science with a measurable impact on society by 2030.</p>	<p>In order to foster synergies and convergence between basic science and business, high-tech companies and leading enterprises are being invited to group themselves around hubs such as the Korea Basic Science Institute.</p>
<p>The jewel in the crown will be a heavy ion accelerator, due for completion by</p>		<p>The ultimate aim is to build a global city combining science, education, culture and art, where creativity, research and innovation can flourish, as they do in Silicon Valley in the USA or in the cities of Boston (USA), Cambridge (UK) or Munich (Germany).</p>
		<p>Source: NTSC (2013), <a href="http://www.isbb.or.kr/index_en.jsp">www.isbb.or.kr/index_en.jsp</a>, <a href="http://ibs.re.kr">http://ibs.re.kr</a></p>

**FIGURE 9 - KOREA'S AMBITION OF INTERNATIONAL CLUSTER STANDARDS<sup>95</sup>**

For example, the Research & Business Develop (R&BD) promotion programmes that are part of the Industrial Complex Cluster Programme aim at promoting the business and research activities of companies by providing support for pilot production, industrial property rights application, market expansion and international certificates.

Even without clear policy support for internationalization, the industrial complex clusters of Korea have however started collaborative activities with clusters all over the world. A map summarising such activities can be found in Ministry of Knowledge Economy et al, The industrial Complex Cluster program of Korea – Summary, Second edition, p.22f and the current “global cluster network” is mapped in Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p.30f

<sup>93</sup> Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p.34; more information of such existing collaboration will be specified in the ECCP “Discussion paper” on Korea.

<sup>94</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p. 146

<sup>95</sup> UNESCO Science Report: towards 2030 – Republic of Korea, 11/2015, p. 673

## 4. Conclusion

South Korea has a stable economic environment and wide-spread sectoral development, some fields having interesting growth rates. Several sectors present potential for EU clusters and companies to engage collaboration / seek for market opportunities.

Korea has made cluster development a clear policy strategy for several years (and preparatory policies for decades) and supports cluster development in dedicated programmes. Clusters are developed throughout all Korean regions, building on and contributing to regional sectoral strengths.

A clear cluster dynamic and high priority of its support through the government make favorable framework conditions for engaging in cluster collaboration with Korea. There is however no clear policy support for internationalization of Korean clusters.

*[report v1.2 by EF, inno TSD, November 2016]*

## 5. Annexes

### 5.1. Korean policy that led to the development of cluster industrial programmes

Over the past 50 years and following the Korean War (1950-1953), Korea has implemented **industrial location policies** (e.g. the steel industrial complex in Pohang, the machinery complex in Changwon or the petrochemistry complex in Ulsan) in order to rebuild the country and then boost the national economic growth and industrialization. Development policies thus concentrated on investment into strategic locations and specific areas, namely locations with good logistics potential (large cities, harbours).<sup>96</sup>

#### Changes in Industrial Location Policies

Category	1960s	1970s	1980s	1990s	2000s	2010s
Development stage	Industry formation	Development of the heavy and chemical industries	Industrial structure adjustment	Take off	Growth and expansion	Development and expansion of new industries
Industry focused	The light industry	The heavy and chemical industries	The technology intensive industry	The information technology industry	The knowledge industry	The convergence industry
Location policy	<ul style="list-style-type: none"> <li>Industrial land development planned and attempted</li> <li>The land selected for export-oriented light industry</li> </ul>	<ul style="list-style-type: none"> <li>A large-scale industrial complex for the heavy and chemical industries established</li> <li>Restrains on metropolitan area development</li> </ul>	<ul style="list-style-type: none"> <li>Industrial complexes improved</li> <li>Balanced regional development implemented</li> <li>Development of agricultural and industrial complexes</li> </ul>	<ul style="list-style-type: none"> <li>Location diversified</li> <li>Regulation eased</li> <li>The name-change of industrial complexes</li> <li>The development process simplified</li> </ul>	<ul style="list-style-type: none"> <li>Specialized clusters</li> <li>Support for the knowledge economy and cluster development</li> <li>Cluster programs implemented</li> </ul>	<ul style="list-style-type: none"> <li>Multi-purpose complexes built</li> <li>Cutting-edge urban complexes expanded</li> <li>The old industrial complexes revitalized</li> <li>Specialized Complexes built</li> </ul>
Characteristics	<ul style="list-style-type: none"> <li>The Ulsan Industrial Center established</li> <li>Korean Export Industrial Complex (Guro)</li> </ul>	<ul style="list-style-type: none"> <li>A large-scale industrial complexes built in Gyeongsang Province (Changwon, Gumi, Ulsan)</li> <li>Free export zone development</li> </ul>	<ul style="list-style-type: none"> <li>A large-scale industrial complexes built in the Southwest</li> <li>Agricultural and industrial complexes developed</li> <li>Apartment-type plants built</li> </ul>	<ul style="list-style-type: none"> <li>The name-change of industrial complexes</li> <li>The development process simplified</li> <li>Individual locations expanded</li> <li>Technoparks established</li> </ul>	<ul style="list-style-type: none"> <li>Cutting-edge urban industrial complexes</li> <li>Cultural industrial complexes</li> <li>Foreign investment regions</li> <li>Advancement of industrial complex structures</li> </ul>	<ul style="list-style-type: none"> <li>Multi-purpose districts</li> <li>Industrial-academia-convergence districts</li> <li>Renewal of old industrial complexes</li> <li>Specialized industrial complexes</li> </ul>

FIGURE 10 - INDUSTRIAL LOCATION POLICIES OVER THE TIME<sup>97</sup>

It dates back to these decades and the policy pursued that R&D and production sites were geographically separated (Daeduck was a concentration for R&D, Seoul for planning and management and other regions for production). As this division was a strong blocking point for further economic development, Korean policies changed in the early 2000s in order to stimulate innovation-led growth through the promotion of industrial clusters – combining production and R&D capacities in one location.<sup>98</sup>

<sup>96</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p.16f

<sup>97</sup> Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p.5. The evolution of the cluster policy in Korea is also well described in Sam Ock Park et Yangmi Koo, Innovation-driven cluster development strategies in Korea, <http://revel.unice.fr/eriep/?id=3514> and an overview of the Changes of Korean Industrial Location Policies over the decades can be found in Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p. 19

<sup>98</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p. 20ff

## 5.2. Overview of cluster programmes in Korea

Types		Status and Details
Government-Supported	The Industrial Complex Cluster program	<ul style="list-style-type: none"> <li>• Drawing up a comprehensive plan(June, 04) and implementing it in 12 industrial complexes               <ul style="list-style-type: none"> <li>* Changwon, Gumi, Ulsan, Gwangju, Banwol, Wonju, Gunsan, Namdong, Daebul, Noksan, Seongseo, Ochang</li> </ul> </li> <li>• Consolidating networking through 36 mini clusters               <ul style="list-style-type: none"> <li>- Support for troubleshooting in R&amp;D and marketing(\$53.2 million, 07 budget)</li> </ul> </li> </ul>
	Promoting Regional Strategic Industries	<ul style="list-style-type: none"> <li>• Supporting regional strategic industries: 4 regions(2nd phase) and 9 regions(1st phase)               <ul style="list-style-type: none"> <li>- Support for infrastructure building, technology development, and education in a package(\$368 million, 07 budget)</li> <li>* 4 areas of 2nd phase('04-08) and 9 areas of 1st phase('02-'07)</li> </ul> </li> <li>• Regional R&amp;D capability reinforcement through RIS and Regional Technology Innovation Project</li> </ul>
	Nurturing Daeduck R&D Special District	<ul style="list-style-type: none"> <li>• Drawing up a comprehensive nurturing plan(Apr. 04) and approving of special district laws in the National Assembly(Dec. 04)</li> <li>• Starting Special District Support Center(Sep. 05) and concentrating on creating special district business models               <ul style="list-style-type: none"> <li>- Constructing global venture eco-system including Institute company establishment support and high-tech company foundation(\$43.4 million, 07 budget)</li> </ul> </li> </ul>
	Nurturing Hub Universities for Industrial Collaboration	<ul style="list-style-type: none"> <li>• Promoting collaboration and inspiring the need for collaboration between universities and neighboring industrial parks by supporting 13 universities in various regions for educational system reform, technology development, and manpower training('04-'08)</li> </ul>
	Building Osong Bio-Health Science Park	<ul style="list-style-type: none"> <li>• Planning to move 5 government-run organizations including Korea Food and Drug Administration(KFDA)(until '10)</li> <li>• Carrying out development for the site and completing distribution of production facility sites(Oct. '07)(\$262.3 million, 07 budget)</li> </ul>
	Building Clusters for Regional Culture Industry	<ul style="list-style-type: none"> <li>• Building specialized culture industry clusters and culture industry promotion districts in various regions               <ul style="list-style-type: none"> <li>- Support for regional culture industrial clusters in 6 regions including Daegu (providing space and equipment, etc.) and planning to designate culture industry promotion districts(\$128.3 million 07 budget)</li> </ul> </li> </ul>
	High-Tech IT Complex	<ul style="list-style-type: none"> <li>• Creating a high-tech complex in DMC, Sangam to help Korea leap into East-Asian IT hub               <ul style="list-style-type: none"> <li>- Inducing domestic and foreign excellent IT companies and R&amp;D centers (\$127 million, 07 budget)</li> </ul> </li> </ul>
	Regionally Specialized IT Clusters	<ul style="list-style-type: none"> <li>• Running IT specialized institutes in 3 regions to strengthen regional IT R&amp;D capability and IT coordinative committee to help nurture specialized sector by region (Daegu, Kyongbuk, and Gangyang Regions)(\$3.9 million, 07 budget)</li> </ul>
Privately-Led	University-Centered Clusters	<ul style="list-style-type: none"> <li>• Nurturing POSTEC(Pohang) into a supply base of high-tech materials               <ul style="list-style-type: none"> <li>- Nurturing Hanyang University and Korea Polytechnic University(Banwol-Sihwa) into university-institute-industry linking clusters</li> </ul> </li> </ul>
	Company-Centered Clusters	<ul style="list-style-type: none"> <li>• Samsung Electronics(Suwonn, Giheung): semiconductor-digital valley (sales goal of 08: \$41.7 billion)</li> <li>• LG Philips(Paju): LCD cluster(sales goal of -10: \$17.4 billion)</li> </ul>

FIGURE 11 – OVERVIEW OF THE KOREAN CLUSTER PROGRAMMES<sup>99</sup>

<sup>99</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p.25

### 5.3. The Industrial Complex Cluster Programme (ICCP) early developments

The cluster programme started with seven pilot industrial complexes in 2005: Gumi (electronics), Changwon (machinery), Ulsan (automobiles), Banwol-Sihwa (parts and materials), Gwangju (photonics), Wonju (medical equipment) and Gunsan (machinery auto parts). In 2008 were then added five more complexes in order to expand it to a nationwide programme: Namdong (machine parts), Mungji Noksan (machinery), Seongseo (mechatronics), Daebul (shipbuilding) and Ochang (electronic information).<sup>100</sup>

The Korean government adopted 5 strategies to promote the programme in 2005. The programme's objective was to build sectoral innovation systems through networking and establishing systems through which companies, universities, institutes and local governments in the region would cooperate and pursue development in their region. The programme has been recognised for having “achieved a remarkable outcome of revitalising industry-university-institute networks and reinforcing the R&D capability of the complexes”<sup>101</sup>.



FIGURE 12 - MAP OF THE TARGETED COMPLEXES OF THE INDUSTRIAL COMPLEX CLUSTER PROGRAMME<sup>102</sup>

In 2009 the government adjusted the programme from focusing on the then current 12 industrial complexes to future pan regional economic zones. In its System Improvement Plan of 2010 the Ministry of Knowledge Economy announced the expansion to “hub-spoke type pan regional clusters with 193 industrial complexes”. It also announced strategies for building sustainable and self-sufficient clusters with 25 hubs and 168 spokes.<sup>103</sup>

<sup>100</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p. 33

<sup>101</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010

<sup>102</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p.34

<sup>103</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p. 33

[Building UP Pan Regional Clusters]

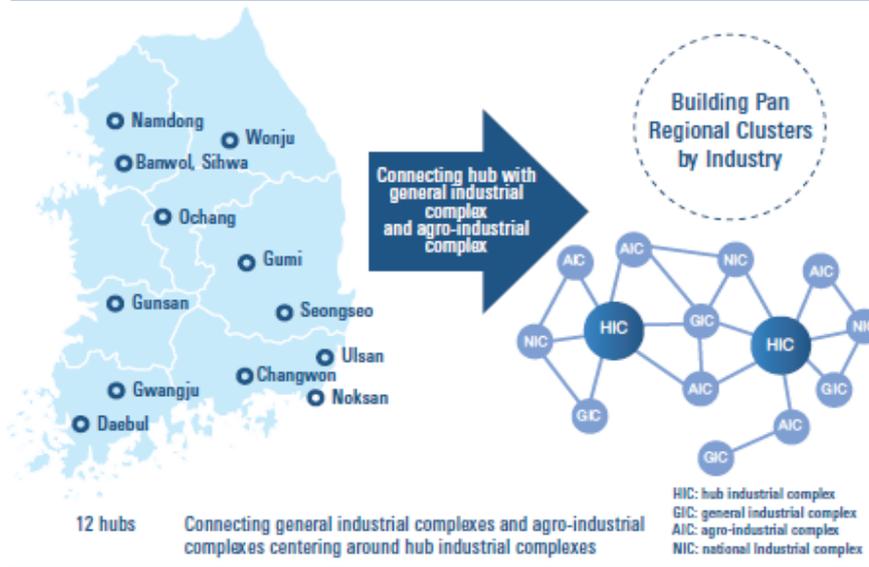


FIGURE 13 - PAN REGIONAL CLUSTERS<sup>104</sup>

The pan regional clusters were meant to disseminate what had been achieved through the existing cluster programme nationwide to other industrial complexes; the **5+2 pan regions** designated were Seoul Metropolitan region, the Chungcheong, Honam, Daekyung and Dongnam regions, plus the Gangwon and Jeju regions; they all have specialised industries.<sup>105</sup>

The following figure provides an overview of the progress throughout the years:

<sup>104</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p. 35

<sup>105</sup> Ministry of Knowledge Economy et al, The Industrial Complex Cluster Program of Korea, November 2010, p. 35ff

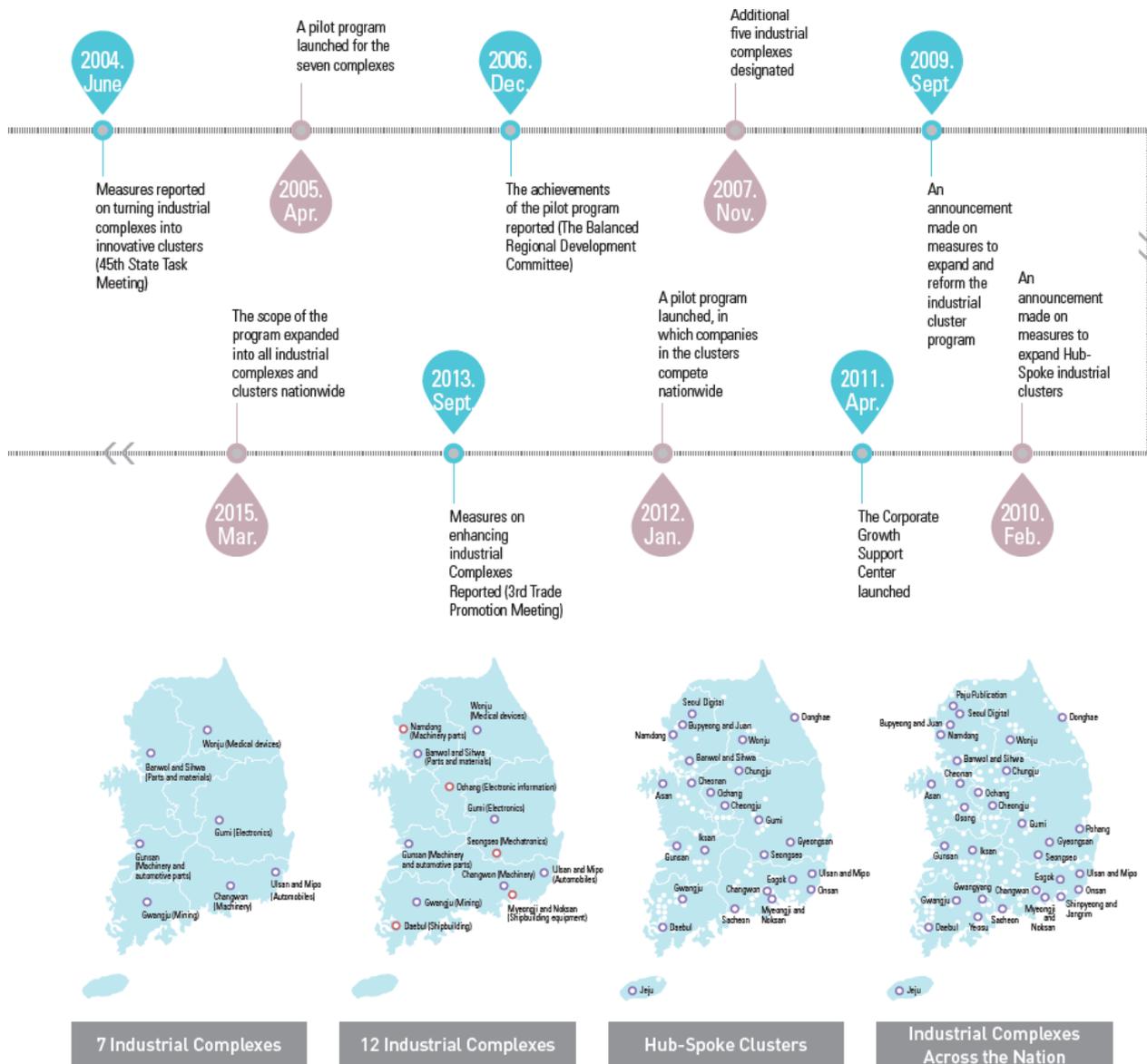


FIGURE 14 – PROGRESS OF THE ICCP FROM 2004 TO 2015<sup>106</sup>

<sup>106</sup> Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p.8



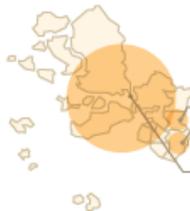
## 5.4. Current state of Mini Clusters

### Seoul Zone



**Seoul** Digital content | ICT | Green IT | Medicine converged with IT | Big data, IoT, and Cloud (BIC)

### Incheon Zone

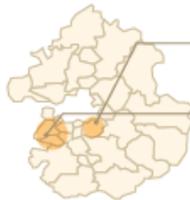


**Namdong** Industrial machinery and parts | Production base parts | Automotive modules | Information convergence parts

**Bupyeong and Juam** SMT

**Incheon** Futuristic convergence parts and materials

### Gyeonggi Zone



**Banwol and Sihwa** Automotive parts | Mechatronics | Electrical and electronics | Fine chemistry | Green M&S

**Seongnam** Smart convergence

### Daegu and North Gyeongsang Zone

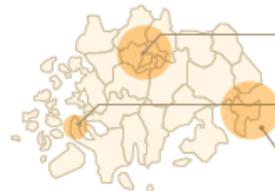


**Gumi** Mobile | Electronic parts mold | E&H | Technology equipment | Energy display | North Gyeongsang Agricultural and Industrial Complexes | 3D printing

**Daegu** Machinery and metals | Smart automotive parts | IT electrical and electronics | Bio convergence materials

**Gyeongsan** Machinery and automobiles

### Gwangju and South Jeolla Zone

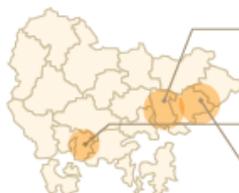


**Gwangju** Optical communication | Optical convergence | Smart electronics | Automotive convergence | Medical parts and materials

**Daebul** Marine leisure | Shipbuilding and marine parts | Naju Agricultural and Industrial Complexes | Jeju Agricultural and Industrial Complexes (the bio industry)

**Yeosu and Gwangyang** Steel materials and parts processing | Petrochemical convergence materials

### South Gyeongsang Zone

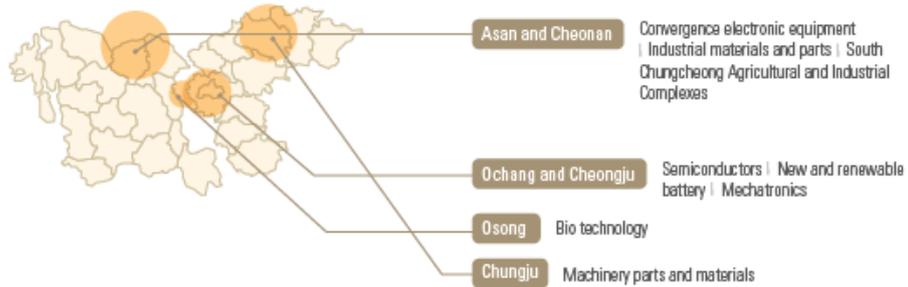


**Changwon** Mechatronics | Machinery and parts | Transport machinery | Machine tools | Masan Free Trade Zone | South Gyeongsang Agricultural and Industrial Complexes

**Sacheon** Aerospace

**Gimhae** Knowledge convergence machinery

### Chungcheong Zone



### North Jeolla Zone



### Busan Zone



### Ulsan Zone



### Gangwon Zone



**FIGURE 15 – CURRENT STATE OF THE MINI CLUSTERS**<sup>107</sup>

<sup>107</sup> Current state of Mini Clusters in Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p.14f





Category	Programs	Annual Subsidies	Amount (of the Total)	Details	Requirements	
R&BD support programs	Commercialization of production technologies Development of field-customized technologies	KRW 200 million or less	SMEs: 75% or less Middle-standing Companies: 66% or less Large corporations: 33% or less	New product or new technology development	Two companies or more	
	Commercialization of transferred technologies			Transfer and commercialization of developed technologies		
	Bolstering maverick companies	KRW 300 million or less		Development of independent products and brands		
R&BD promotion programs	Prototype production	KRW 20 million or less	60% or less	Prototype development	One company or more	
	Application for industrial property rights	Domestic patent Utility models	KRW 2 million or less per case	70% or less	Support for industrial property application costs (Registration fee not supported)	One company or more
		Foreign patent	KRW 7 million per case			
		PCT				
	Marketing	Advertising and PR	KRW 10 million or less	70% or less	PR videos and catalogues	Two companies or more
		Domestic exhibitions	KRW 3 million or less		Booth rents, PR material production costs	
		Foreign exhibitions	KRW 8 million or less			
		Market expansion overseas	KRW 5 million or less		Airfare, costs occurred to identify buyers	Three companies or more
		Marketing overseas	KRW 8 million or less		Costs from consulting professional organizations	
		Certificates from foreign authorities	KRW 7 million or less	Certification fees	One company or more	
	On-the-job training	KRW 50 million or less	80% or less	Employee training (Simple OA, and language skills excluded)	Two companies or more	
	Promotion of technology transfers	Use of technologies for potential transfers	KRW 7 million or less	Technology execution costs (temporary)	One company or more	
		Deferment of license fees		License-related expenses (temporary)		
	R&BD planning consulting	KRW 3 million or less	70% or less	R&D support program planning costs	Two companies or more	
	Support for mini cluster's creative, innovative idea	KRW 3 million or less	70% or less	Customized support except for detailed support programs	Five companies or more	

FIGURE 16 - SUPPORT SYSTEMS AND SUPPORT PROGRAMMES OF THE ICCP (INCLUDING BUDGET)<sup>108</sup>

<sup>108</sup> Ministry of Trade, Industry & Energy et al, The Industrial Cluster Program of Korea, March 2016, p. 10ff