

THE
INDUSTRIAL
COMPLEX
CLUSTER
PROGRAM
OF KOREA

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01. Background

Introduction to the program

What is the industrial complex cluster program?

The industrial complex cluster program focuses on clusters where industries are integrated, such as industrial complexes. Companies, universities, research institutes, and support organizations work together for such purposes as knowledge, experience, and technical exchange to strengthen the technological innovation competencies of SMEs and to develop industrial complexes as high added-value clusters.

The industrial complex cluster program is also referred to as the cluster program. It was launched in 2005 as part of the balanced national development policy. Its purpose is to transform the input-type production-centered industrial complexes into knowledge base-type clusters where there is a virtuous cycle of creation and innovation.

Measure on developing industrial complexes into innovative clusters (45th State Task Meeting, June 3, 2014)

- Choose six national industrial complexes with outstanding innovation capabilities (Changwon, Gumi, Ulsan, Banwol/Sihwa, Gwangju, and Wonju). Strengthen the research and corporate support service functions of the production function-centered complexes to create innovative clusters.
- For the six pilot complexes and the Gunjang National Industrial Complex, the attraction of investment is facilitated and innovative cluster-based policies are implemented.

Why is the industrial complex cluster program needed?

• Joint development through sharing of know-how among industry, academia, and research

A cluster is an SME growth strategy. Industry, academia, research, and government share knowledge and experience to address difficulties that SMEs have difficulty resolving alone, thereby promoting mutual development.

Cluster

- Dictionary meaning: It means to gather objects that have the same attributes into one object, and is done in various areas. An industrial cluster is a group of companies and organizations that perform different functions in related businesses that come together in one area.
- OECD definition: "Clusters are characterized as networks of production of strongly interdependent firms, knowledge producing agents (universities, research institutes, engineering companies,) bridging institutions (brokers, consultants) and customers, linked to each other in a value-adding production chain."

• Industrial policies to recover growth potential

Clusters are a growth strategy that is being adopted all across the world to overcome the global economic crisis and to restore growth potential. Advanced economies, such as the US and Germany, are fostering the manufacturing industry through cluster policies.

The US is implementing a cluster program as a leading policy on fostering the manufacturing industry. By doing so, it is facilitating improvements in industrial competitiveness. Rather than the federal government, regional and state governments are pursuing hundreds of cluster initiatives. They seek to bolster industrial competitiveness through diverse bottom-up strategies. Germany formulated and is implementing policies, such as Industry 4.0, based on the federal government's long-term roadmap. Industry, academia, research, and government are actively participating in the federal government's policies, thus strengthening the connection between industry and science and technology.

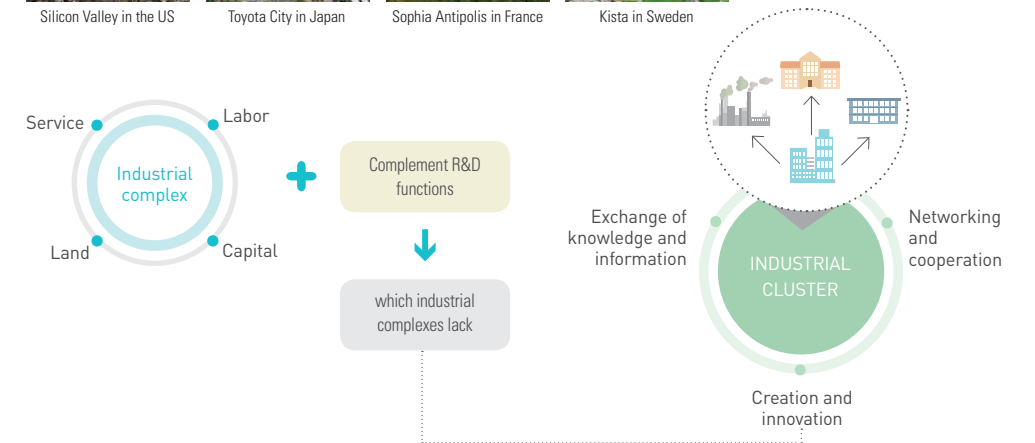
As seen above, countries around the world are adopting clusters as a strategy for enhancing industrial competitiveness, and are bolstering industrial competitiveness based on cooperation among industry, academia, research, and government. Korea is also implementing industrial cluster policies in the name of the industrial complex cluster program.

• Clusters across the globe

Advanced countries are building large-scale clusters to boost national competitiveness. These include Silicon Valley in the US, Toyota City in Japan, Sophia Antipolis in France, and Kista in Sweden.



Changes in industrial complex roles



Changes in industrial location policies

Category	1960s	1970s	1980s	1990s	2000s	2010s
Development phase	Formation of industrial development foundation	Expansion of heavy & chemical industry foundation	Adjustment of industrial structure	Takeoff of industrial development	Growth/expansion of industrial development	Development/expansion of new industries
Major industries	Light industries • Textiles, ports, electrical products, shoes	Heavy & chemical industries • Petrochemicals, steel, ships, automobiles, machinery	Technology-intensive industries • Semiconductors, electronics industry, automobiles	Cutting-edge IT industries • Service-centered software industries: Semiconductors, fine chemistry, automation program development	Knowledge service industries • Information and communication industry, gaming industry, life industry, knowledge-based industry	Cutting-edge convergence industries • Green technology industries: High value-added service industries, creative industries
Location policies	• Attempted planned location development • Export-oriented light industry location	• Established a large-scale industrial complex as a heavy & chemical industrial complex • Restraints on metropolitan area development	• Improved industrial complexes • Executed balanced development of national land • Developed agricultural industrial complexes	• Diversified location types • Eased location regulations • Changed industrial complex names • Simplified the development process	• Specialized clusters • Provided support for establishing a knowledge-based economy and built clusters • Bolstered the competitiveness of existing complexes	• Adopted multiple-purpose districts and expanded cutting-edge urban complexes • Renewed old industrial complexes • Built specialized industrial complexes
Major characteristics	• Established the Ulsan Industrial Center • Korean Export Industrial Complex (Guro)	• Built large-scale industrial complexes in the Gyeongsang area (Pohang, Changwon, Gumi, Ulsan) • Free export zone development	• Built large-scale industrial complexes in the southwest • Developed agricultural industrial complexes • Built apartment-type plants	• Renamed industrial complexes • Simplified the development process • Expanded individual locations • Established technoparks	• Cutting-edge urban industrial complexes • Cultural industrial complexes • Software promotion complexes • Foreign investment regions • Advancement of industrial complex structures	• Multiple-purpose districts and industry-academia convergence districts • Renewal of old industrial complexes • Specialized industrial complexes

02. Program Details

Program outline

Launched in 2005, the industrial complex cluster program is helping improve corporate competencies and stimulate regional economic development by facilitating networking and cooperation among industry, academia, research, and government.

- 
Program period
 Since 2005 (continued program)
- 
Total program costs
 Total KRW 630 billion (Total government contributions between 2005 and 2015)
- 
Program scope
 Industrial complexes across the nation (state, general, cutting-edge city, agricultural industrial complexes) and knowledge-based industrial clusters, etc.
- 
Program details
 Support the execution of R&BD programs to bolster the technological innovation capabilities of SMEs as well as networking activities to promote exchange and cooperation among industry, academia, and research, and build industrial clusters.
- 
Support conditions
 Contributions (Support no more than 70% according to support criteria per detailed program)
- 
Executed by:
 Korea Industrial Complex Corporation
- 
Major programs
 - Operate mini clusters
To promote information exchange and mutual learning, support the networking and joint, cooperative activities of industry-academia-research councils (mini clusters) that consist of a region's innovation leaders, including those of companies, universities, research institutes, and support organizations in different businesses and fields of technology.
 - Support R&BD programs
Support joint R&BD programs, including industry-industry, industry-academia, and industry-academia-research programs, thereby helping to improve the technological innovation capabilities of SMEs.
 - Support R&BD promotion programs
Support the creation of programs that reflect employees' training needs that arise from corporate management and research, such as those on prototype production, application for industrial property rights, marketing and the opening up of new markets, as well as international standards certifications.
 - Corporate Growth Support Centers
For difficulties experienced in the areas of technology, management, and finance, experts in the respective areas stay on the site to coach the member company. This furthers the development of emerging champions.
 - Global cluster exchange and cooperation
Exchange and cooperation among industrial clusters in Korea and abroad is supported.

Vision and strategies

The objective of the industrial complex cluster program is to build self-sustainable clusters that are based on an industry-academia-research network and to build industrial ecosystems.

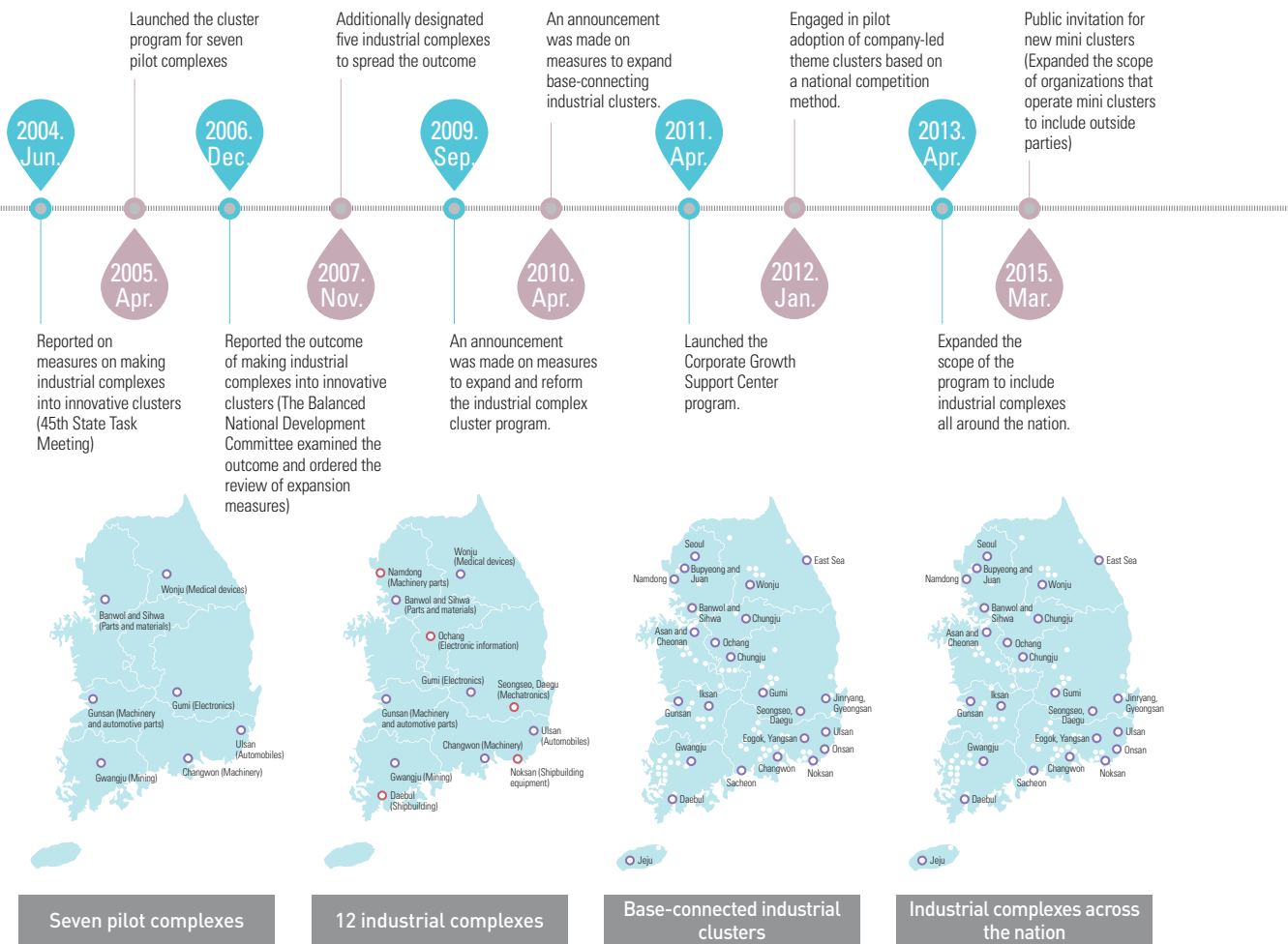


02. Program Details

Progress

After the program was launched in 2005, Korea Industrial Complex Corp. built a Korean-type cluster model and is spreading the outcome all across the nation.

In consideration of population, industry, infrastructure, and historical and cultural homogeneity, 17 cities and provinces were categorized into 11 zones – Seoul, Incheon, Gyeonggi, Chungcheong, Daegu and North Gyeongsang Province, Busan, Ulsan, South Gyeongsang Province, Gwangju and Honam (including Jeju), North Jeolla Province, and Gangwon. To spread the outcome of the cluster program nationwide, the regions that are subject to the program were expanded from seven pilot complexes to industrial complexes all around the nation. Clusters that connect state, general, and agricultural industrial complexes were expanded. Also, programs are being executed to bolster the competitiveness of SMEs, with focus on specialized industries per zone.



Measures on developing industrial complexes into innovative clusters were reported at a State Task Meeting in 2004. They were implemented in April 2005 for seven pilot complexes.

In November 2007, five industrial complexes were additionally designated to spread the outcome of industrial complex clusters. The program was executed for a total 12 industrial complexes.

Since 2010, industrial cluster programs have been executed to use innovative resources that are outside industrial complexes and to expand the scope of activities to cover areas outside clusters.

With the spread of the program outcome starting in 2013, the program scope was expanded to include all industrial complexes across the nation.

Establishment of industrial clusters

Develop a specialized business type in each zone for sustainable development. Establish a connection between regional strategic industries and leading industries in each zone.

Seoul Zone

- * Vision: Global hub of IT-manufacturing convergence-type new-growth industries
- * Specialized industries: IT, parts and materials, knowledge-based industries
- * Strategic industrial complexes: Seoul Digital, Paju Publication

Gyeonggi Zone

- * Vision: Foster a global supply base for cutting-edge, high value-added parts and materials, and develop a regional hub
- * Specialized industries: Parts and materials
- * Strategic industrial complexes: Banwol and Sihwa

Gangwon Zone

- * Vision: Build a base for the medical convergence industry
- * Specialized industries: Medical devices, bio, new materials
- * Strategic industrial complexes: Wonju, Bukpyeong

Daegu Gyeongbuk Zone

- * Vision: Foster a global IT convergence cluster
- * Specialized industries: precision forming, digital machinery parts
- * Strategic industrial complexes: Gumi, Seongseo, Gyeongsan Jinryang, Pohang

Ulsan Zone

- * Vision: Build a global hub of the automotive parts industry
- * Specialized industries: Automobiles, shipbuilding and marine industry, fine chemistry
- * Strategic industrial complexes: Mipo, Ulsan, Onsan, Eogok, Yangsan

South Gyeongsang Zone

- * Vision: Develop an independent global cluster of the machinery industry
- * Specialized industries
- * Strategic industrial complexes: Changwon, Gimhae, Sacheon, Sangpyeong, Jinju

Busan Zone

- * Vision: Develop a cutting-edge parts industry cluster in the industrial belt of the southeast
- * Specialized industries: Shipbuilding, automobiles, parts and materials
- * Strategic industrial complexes: Noksan, Shingpyeong and Jangrim

Chungcheong Zone

- * Vision: build high value cluster with industrial technology convergence
- * Specialized industries: electric electronic, mechatronics, BIO
- * Strategic industrial complexes: Cheonan Asan, Cheongju Ochang, Osong, Chungju

Incheon Zone

- * Vision: Build a globally-competitive convergence parts and materials supply base
- * Specialized industries: Machinery, electricity, electronics
- * Strategic industrial complexes: Namdong, Bupyeong, Juan

North Jeolla Zone

- * Vision: Establish hub of eco-friendly green industry in Northeast Asia
- * Specialized industries: Automotive parts, shipbuilding parts
- * Strategic industrial complexes: Gunsan, Iksan, Pyeongdong, Hanam

Gwangju and Honam Zone

- * Vision: Establish a global hub of regionally-specialized convergence industries
- * Specialized industries: Smart home appliances, automobiles, mining, shipbuilding, petrochemicals, metals
- * Strategic industrial complexes: Gwangju, Daebul, Yeosu, Gwangyang, Jeju

Jeju Zone

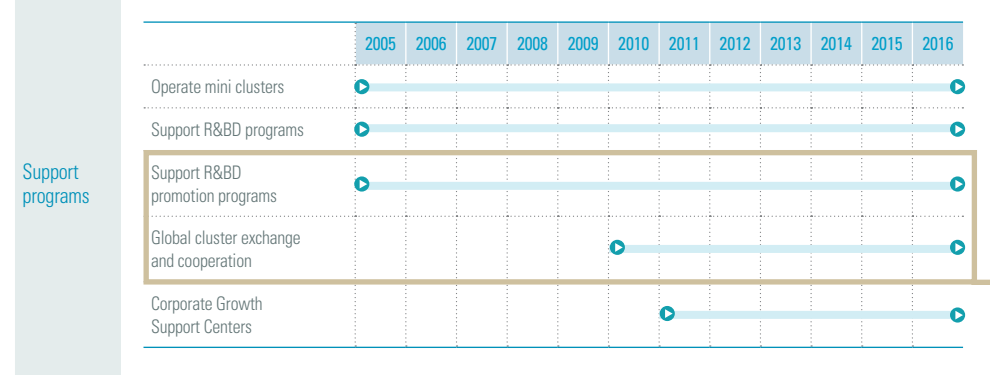
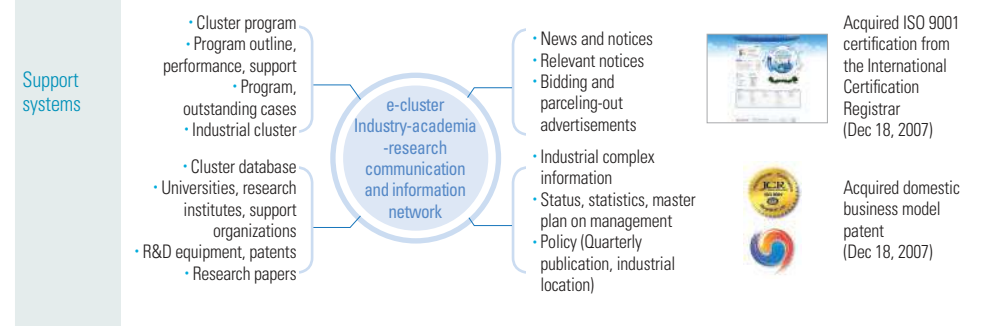
- * Vision: Build an eco-friendly bio-cluster
- * Specialized industries: Bio, food and beverage
- * Strategic industrial complexes: Geumneung

02. Program Details

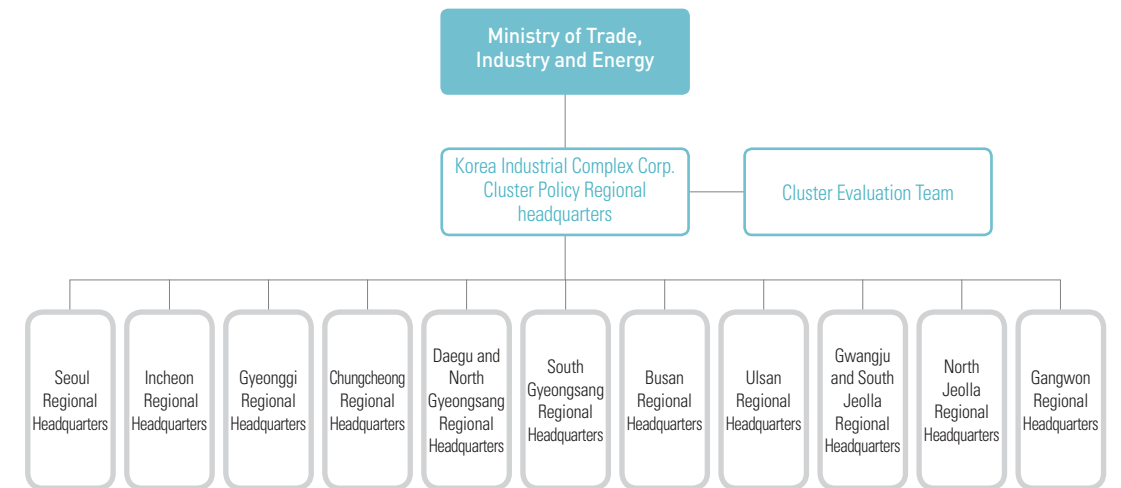
Execution system and support program

Category	2005 (1 st) – 2007 (3 rd)	2008 (4 th) – 2009 (5 th)	2010 (6 th) – 2014 (10 th)	2015 (11 th) -
Program focus	Enact guidelines. Develop a business model.	Expand pilot complexes for clusters. Engage in performance-centered operation and management.	Make clusters into wide areas. Bolster global competitiveness.	Foster creative clusters for generation of high added value.
Execution organization (Governance)	Innovative cluster execution team		Six area headquarters of Korea Industrial Complex Corp.	11 regional headquarters of Korea Industrial Complex Corp.
Complexes subject to the program	7 complexes	12 complexes	193 complexes → Complexes around the nation	Complexes around the nation and selective individual locations
Supported areas (Business types)	One specialized industry per complex		One to four specialized industries per zone	
Execution process	Full cyclical support in accordance with a company's management phase, such as technology development, commercialization, and marketization			

- Integrated industry-academia-research information network (e-CLUSTER) – Industrial complex and cluster news alerts, industrial cluster status, etc.
- CMS (Cluster Management System) – Real-time R&D program management system
- RCMS (Real time Cash Management System) – Real-time program cost management (Ministry of Trade, Industry and Energy)



Execution organization



Details

R&BD programs	Support for commercialization of production technologies	Joint development of core technologies by industry, academia, and research for development of new technologies or new products
	R&BD support for fostering of maverick companies	Development of technologies for the company's brand products to which a new technology or creative, innovative idea was applied Development of technologies for a product whose independence in business relations is guaranteed because it has low dependence on specific large companies or medium-sized enterprises
	Support for product production	Prototype production, application for industrial property rights
R&BD promotion programs	Total marketing support	Advertising and PR, exhibitions in Korea and abroad, market development, foreign standards certification
	Field-customized training	Training to improve productivity and technological innovation capabilities
	Promotion of technical transfers	Try out technologies, Defer licensing fees
	Consulting for R&BD planning	Analysis of niche markets, joint cooperation planning, etc.
	Mini cluster's creative innovation idea support	From among programs that do not fall under any of the above types, these are programs that are needed to realize creative, innovative ideas.

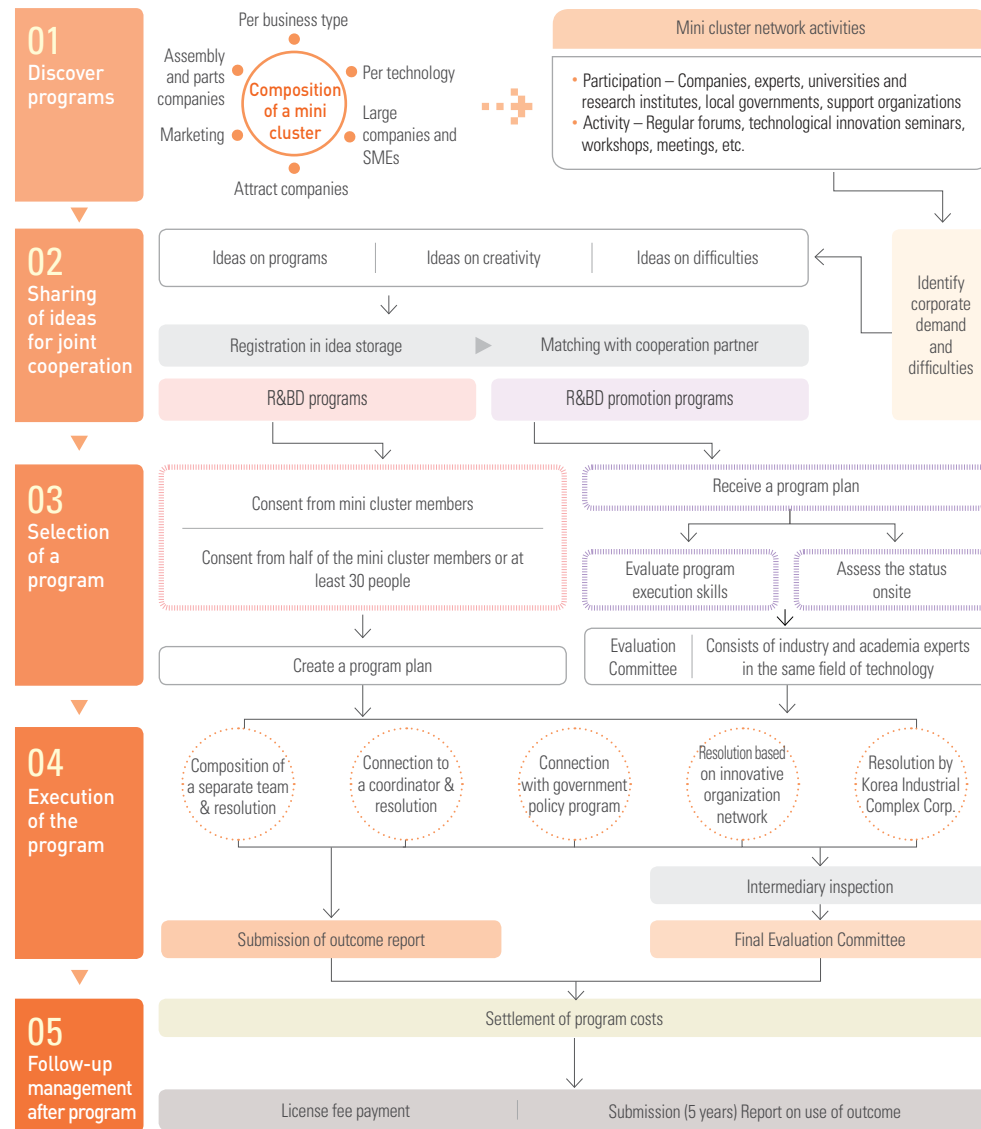
03. Mini Clusters

Introduction to the program

As part of the industrial complex cluster program, mini clusters are created and operated to identify and resolve difficulties that arise in corporate management, ranging from technology development to marketing.

What is a mini cluster? It is an industry-academia-research-government council that is established for a specific business type and field of technology. Innovation leaders of a region, including those of companies, universities, research institutes, and support organizations, jointly participate to engage in mutual cooperation, joint learning, and information sharing on a daily, ongoing basis.

Support process



Direction of

Direction of support

- Identify client (company)-specific programs that are closely related to the field and support them.
- Establish a customized support system to resolve difficulties that arise in corporate activities, ranging from business planning and technology development to prototype production, commercialization, patent, certification, design, and marketing.



Scope of support

Scope of support

Category	Support program	Annual support	Support ratio	Support details	Support conditions	
R&BD program	Development of field-customized technologies	No more than KRW 200 million	SME: No more than 75% Company of middle standing: No more than 66% Large company: No more than 33%	New product or new technology development Transfer and commercialization of developed technologies Development of independent product and brand	At least two companies	
	Commercialization of transferred technologies					
	Fostering of maverick companies					
R&BD promotion program	Prototype production	No more than KRW 50 million	No more than 60%	Prototype development	One company is possible	
	Application for industrial property rights	Domestic patent	No more than KRW 2 million per case	No more than 70%	Support for industrial property right application costs (Registration fee is not supported)	One company is possible
		Utility model	No more than KRW 2 million per case			
		KGMP	No more than KRW 3 million per case			
	Total marketing	Foreign patent PCT	No more than KRW 7 million per case	No more than 70%	PR video, catalogue Basic booth rent, PR material production cost Airfare, buyer discovery costs Costs from using professional organization	Two companies or more Three companies or more
		Advertising and PR	No more than KRW 10 million			
		Domestic exhibition	No more than KRW 3 million			
	Promotion of technical transfers	Foreign exhibition	No more than KRW 8 million	No more than 70%	Technology license costs (Temporary) License-related expenses (Temporary)	One company is possible One company is possible
		Foreign market development	No more than KRW 5 million			
		Professional foreign marketing organization and personnel support	No more than 8 million			
	Field-customized training	Try out technologies	No more than KRW 5 million	No more than 70%	Training to improve employees' work skills (Simple OA, and language excluded)	Two companies or more
		Defer license fees	No more than KRW 50 million	No more than 80%	R&BD program planning costs	Two companies or more
Consulting for R&BD planning	No more than KRW 2 million	No more than 70%	Customized support other than detailed support programs	Five companies or more		
Mini cluster's creative innovation idea support	No more than KRW 3 million	No more than 70%				

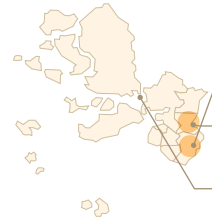
03. Mini Clusters

Seoul Zone



Seoul Digital content / ICT / Green IT/ IT convergence medical / BIC (Big data, IoT, Cloud)

Incheon Zone

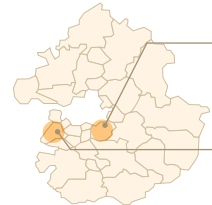


Namdong Industrial machinery and parts / Production base parts / Automotive modules / Information convergence parts

Bupyeong and Juam SMT

Incheon Futuristic convergence parts and materials

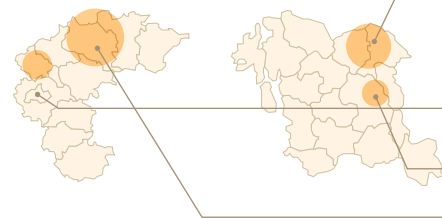
Gyeonggi Zone



Banwol and Sihwa Automotive parts / Mechatronics / Electricity and electronics / Fine chemistry / Green / M&S

Seongnam Smart convergence

Chungcheong Zone



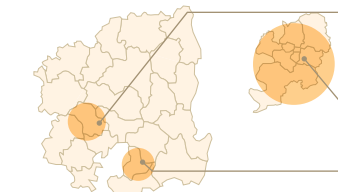
Asan and Cheonan Convergence electronic equipment / Industrial materials and parts / South Chungcheong Agricultural Industrial Complex

Ochang and Cheongju Semiconductors / New and renewable battery / Mechatronics

Osong Bio

Chungju Machinery parts and materials

Daegu and North Gyeongsang Zone

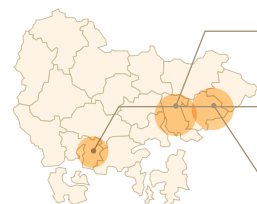


Gumi Mobile / Electronic parts mold / E&H / IT equipment / Energy display / North Gyeongsang Agricultural Industrial Complex / 3D printing

Daegu Machinery and metals / Intelligent automotive parts / IT electricity and electronics / Bio convergence materials

Gyeongsan Machinery and automobiles

South Gyeongsang Zone

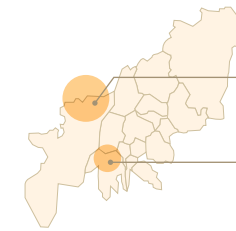


Changwon Mechatronics / Machinery and parts / Transport machinery / Machine tools / Masan Free Trade Zone / South Gyeongsang Agricultural Industrial Complex

Sacheon Aerospace

Gimhae Knowledge convergence machinery

Busan Zone



Noksan Parts and materials / Plants / New and renewable energy / Shipbuilding and marine equipment

Shinpyeong and Jangrim New technology convergence plating

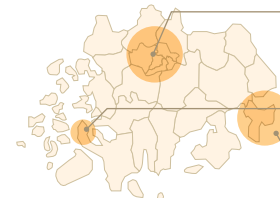
Ulsan Zone



Ulsan Production base / Green materials / Automotive green technologies

Yangsan Forming and processing

Gwangju and South Jeolla Zone

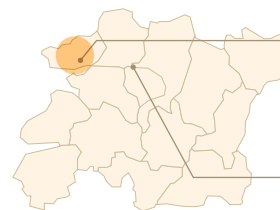


Gwangju Optical communication / Optical convergence / Smart electronics / Automotive convergence / Medical parts and materials

Daebul Marine leisure / Shipbuilding and marine parts / Naju Agricultural Industrial Complex / Jeju Agricultural Industrial Complex (Bio industry)

Yeosu and Gwangyang Steel materials and parts processing / Petrochemical convergence materials

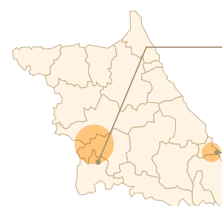
North Jeolla Zone



Gunsan Machinery and shipbuilding parts and materials / Green parts and materials / Automotive parts and materials / Gunsan Free Trade Zone / Gunsan Agricultural Industrial Complex

Iksan and Jeonju Auto & Elec Part / Cutting-edge convergence materials

Gangwon Zone



Wonju Medical devices / Medical care and bio / Gangwon Agricultural Industrial Complex / SLC (Safe Life Car)

Bukpyeong New convergence materials / Functional bio

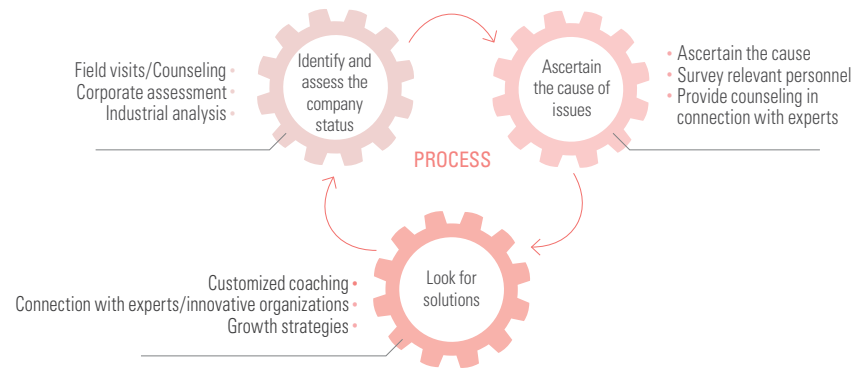
04. Corporate Growth Support Centers

Introduction to the program

What is a Corporate Growth Support Center?

It is a company-customized program that is closely connected to the field, and is intended to foster world-leading professional, medium-sized enterprises. Experts in various fields are stationed in a complex to provide coaching to member companies on difficulties concerning technology, management, and finance that arise at production sites in industrial complexes.

Support process

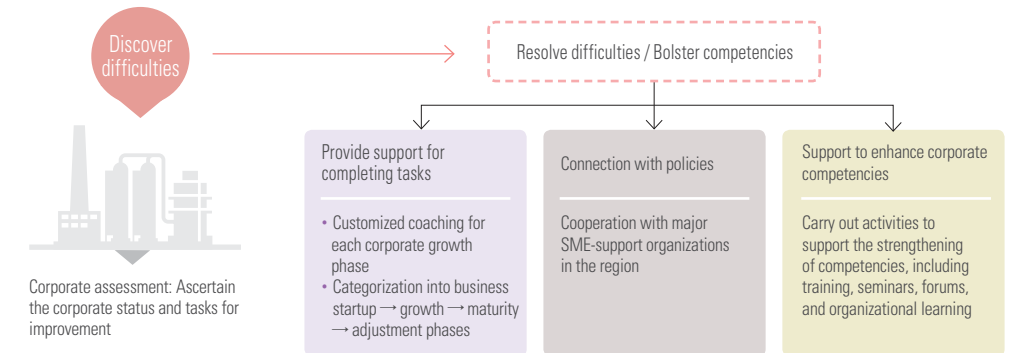


	Identify and assess the company status	Ascertain issues and causes	Look for solutions	Derived outcome
Technology	<ul style="list-style-type: none"> Lacks strategies on developing future growth technologies Does not have core original technologies Low product quality Rise in product defect rate 	<ul style="list-style-type: none"> Lacks the capabilities needed to choose promising R&D areas Lacks R&D funds Lacks technological prowess Production personnel cannot keep up with technology 	<ul style="list-style-type: none"> Provide coaching on growth driver areas Make a connection to cluster R&D support programs Enable technical transfers through a connection with government-funded research institutions Make a connection with innovation training programs 	<ul style="list-style-type: none"> Formulate new technology strategies Receive R&D support funds Improve product performance Improve the technical skills of production personnel
Management	<ul style="list-style-type: none"> Stagnant business growth Rise in inventory levels Increase in cases of dereliction of duty High percentage of production costs 	<ul style="list-style-type: none"> Does not have market positioning capabilities Lacks sales routes Working-level personnel have low motivation and engagement toward work Inefficiencies in acquiring raw materials 	<ul style="list-style-type: none"> Formulate marketing strategies Participate in industrial expos Develop a performance-related pay system Propose group purchases 	<ul style="list-style-type: none"> Develop new markets Acquire foreign distributors Improve labor productivity Curtail nuclear energy purchasing costs
Finance	<ul style="list-style-type: none"> Chronically lacks working capital Financial ratios dropped after purchasing business sites The profit structure does not keep up with rate of growth Large business losses owing to the financial crisis 	<ul style="list-style-type: none"> Slow collection of accounts receivables Business operation excessive in size for planned production Negligent in establishing a systematic internal infrastructure Poor response to global economic changes 	<ul style="list-style-type: none"> Establish revenue source management measures and conduct credit checks Provide guidelines on stabilization/credit rating improvements Responsible management system/Present a real evaluation Make suggestions on ways to respond to emergency situations 	<ul style="list-style-type: none"> Reduce the working capital turnover period Improve financial ratios Overcome corporate growth pains Build a foundation for growth

Support program

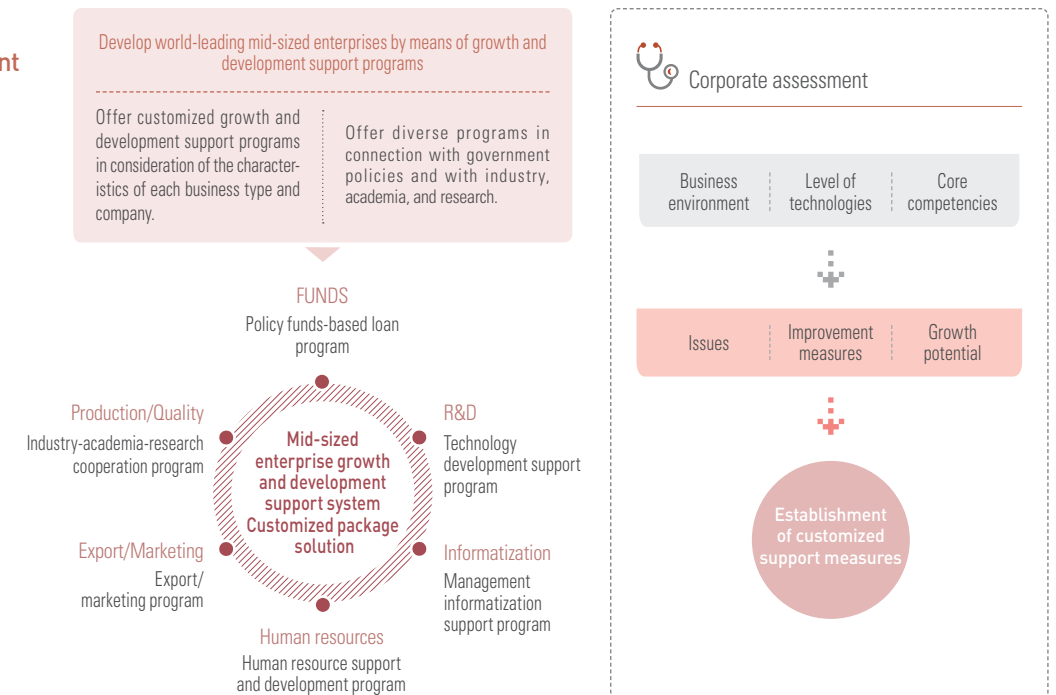
Support the resolution of corporate difficulties

The competitiveness of a target company is identified by an onsite corporate assessment that is conducted from a comprehensive perspective. Afterwards, improvement measures are determined to address the company's vulnerabilities and tasks. Also, a connection is made with support policies to support the company in its efforts to overcome difficulties.



Support to companies subject to focused development

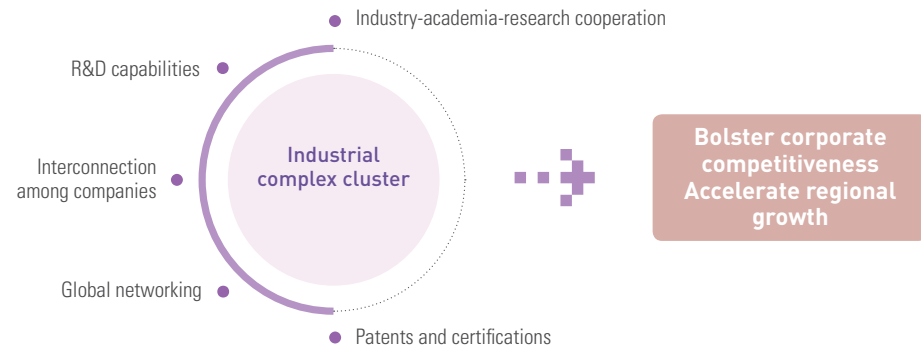
Promising companies by region are chosen based on corporate assessment results. These companies are developed into globally-competitive mid-sized enterprises through ongoing, systematic growth and development support programs.



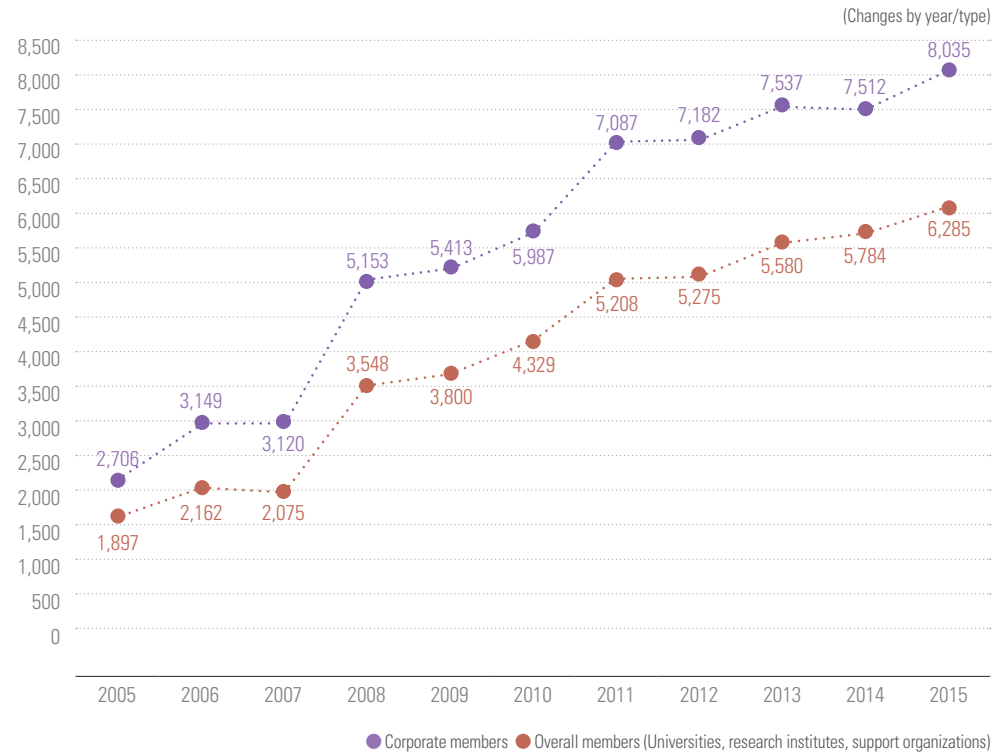
05. Outcome and Cases

Major performance

The industrial complex cluster program continually lured corporate participation in establishing and operating mini clusters for each business type and technology that reflect each zone's characteristics. Tasks that can be supported by industry, academia, and research, based on cooperation among the three, were continually identified and support was provided. Various network activities are carried out to strengthen corporate competencies, such as support for identifying tasks and technology seminars. These contribute to the establishment of a consensus on cooperation among innovation leaders in the region.

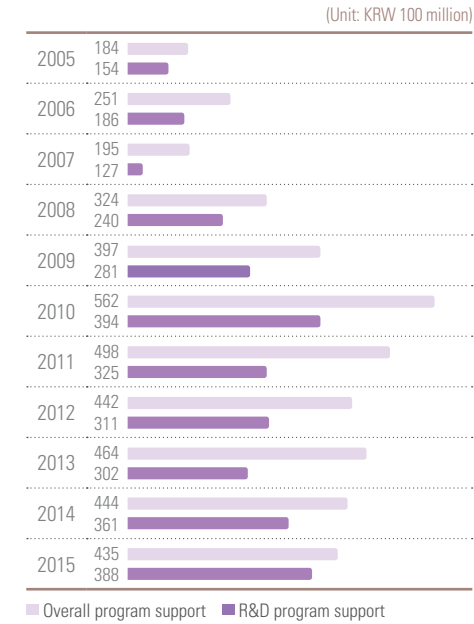


Total number of mini cluster members (Persons)

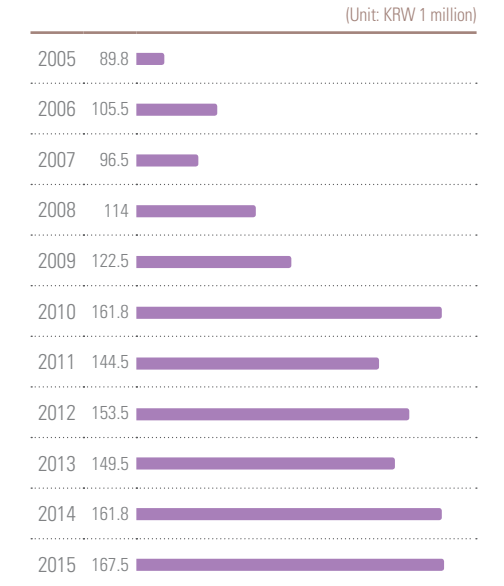


Program support

<Program support by year>



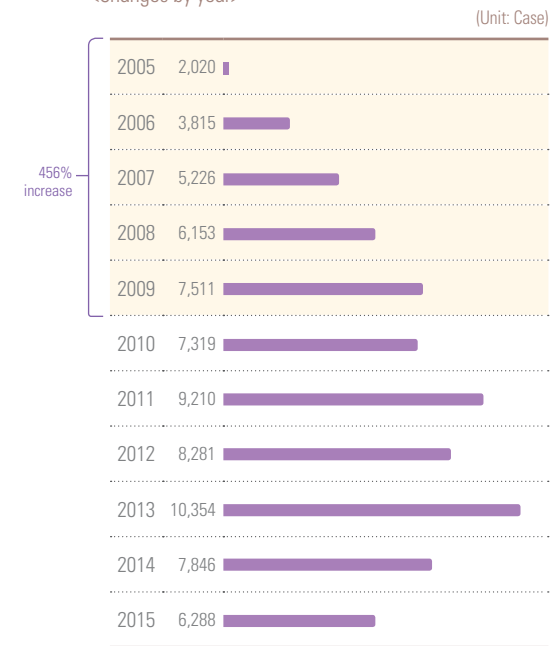
<Support per R&D program>



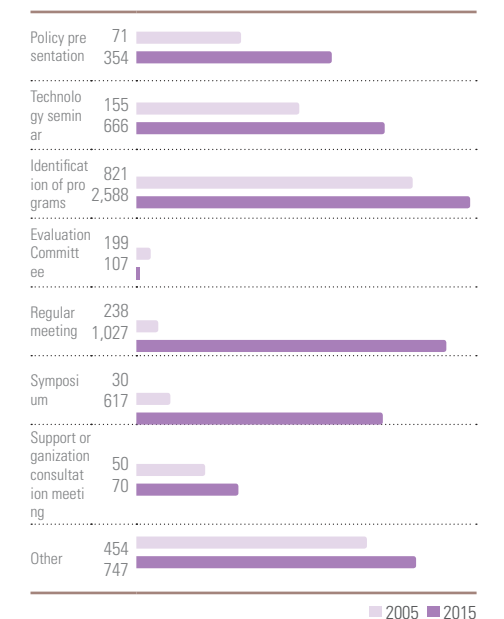
Network activities

Network activities are carried out to bolster technological innovation competencies. These include technology symposiums, policy presentations, technology forums, and program meetings.

<Changes by year>



<Changes by type>

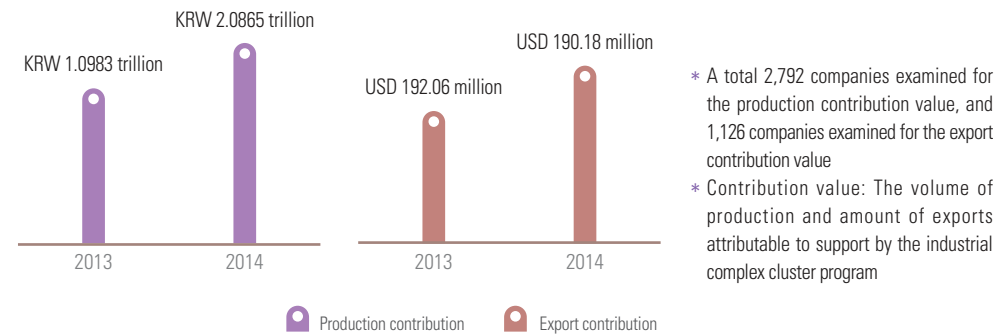


05. Outcome and Cases

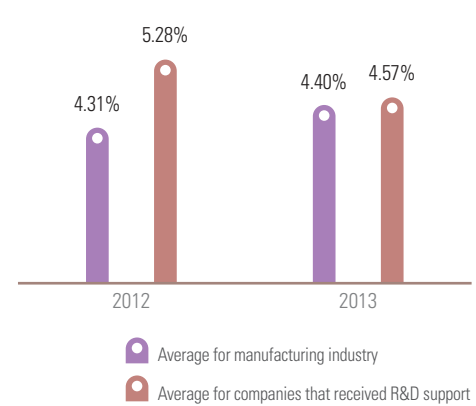
Major outcome

Economic outcome

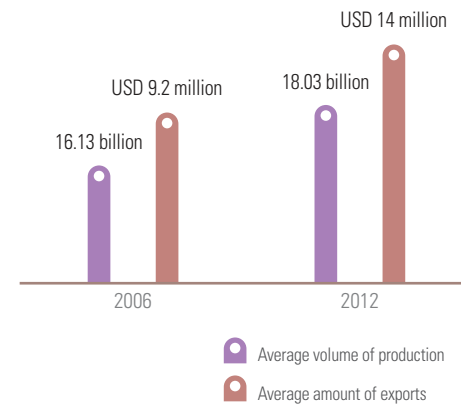
[Increase in production contribution value and export contribution value from program participation]



[Rise in operating profit margin of companies that received R&D program support]



[Average rise in production and exports of companies that participated in the program]



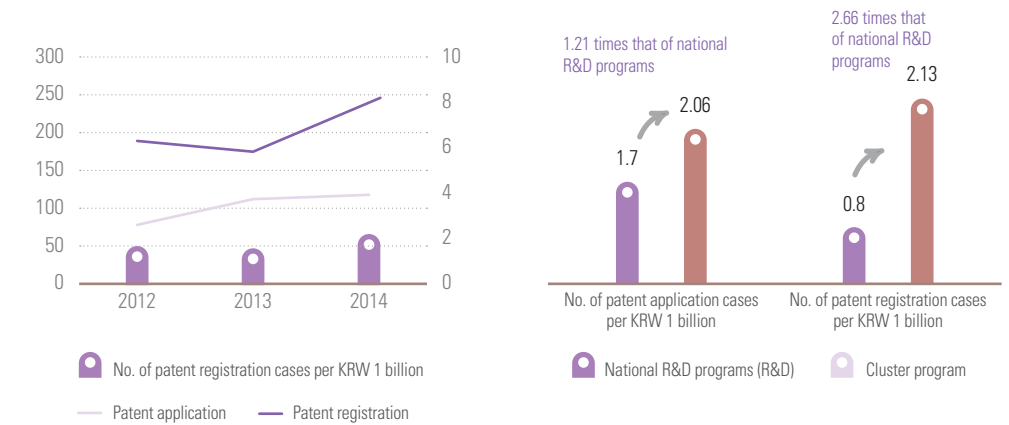
Technological outcome

[Patent outcome per KRW 1 billion in government support funds]

Category	No. of patents		Program budget (KRW 100 million)	No. of patents per KRW 1 billion	
	Application	Registration		Application	Registration
2012	76	110	580.5	1.30	1.89
2013	108	62	544.0	1.98	1.13
2014	119	123	577.3	2.06	2.13

[Comparison with national R&D programs]

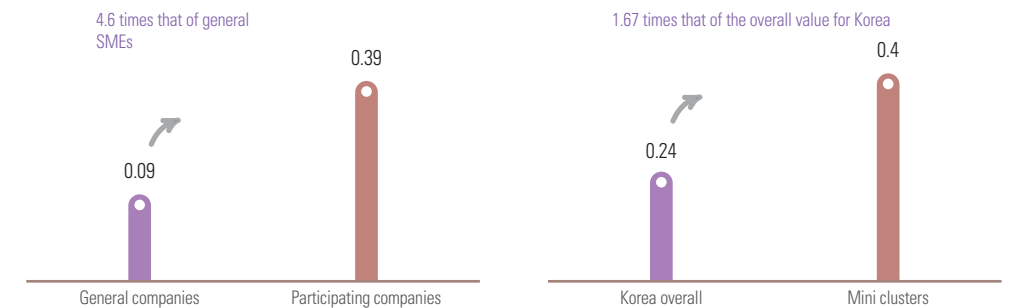
• No. of patent application and registration cases & Comparison with national R&D programs



* Referred to 2012 National R&D Program Outcome Analysis Report (December 2013)

• Patent applications and technology concentration level of cluster-participating companies

According to intellectual property statistics of the Korean Intellectual Property Office, the number of patent applications by participating companies is 4.6 times that of general SMEs. Also, the technology concentration level* of participating companies is 1.67 times higher (2013).

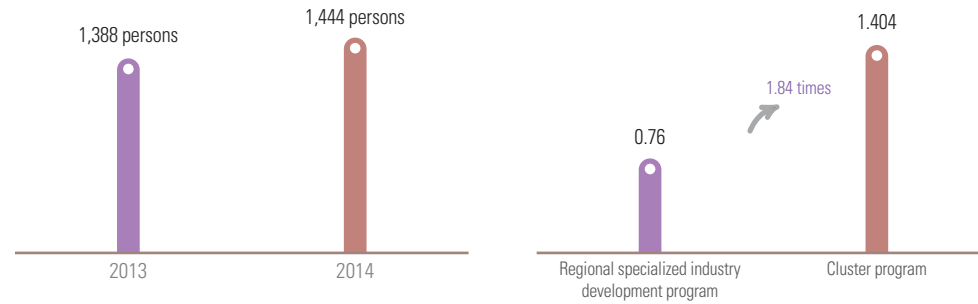


* Intellectual Property Statistics FOCUS Volume No. 4 (October 2014, Korean Intellectual Property Office)

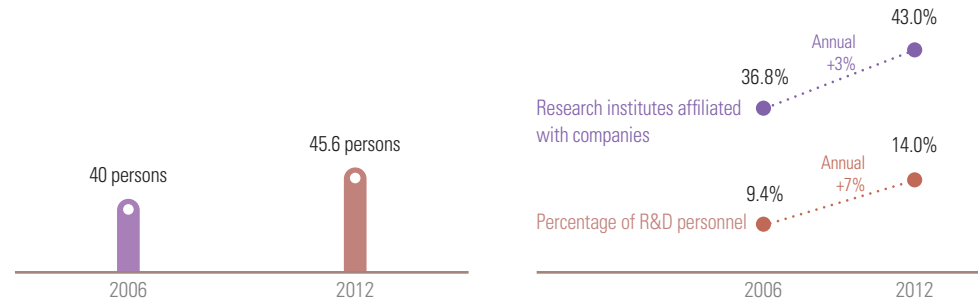
05. Outcome and Cases

Social outcome

[Contribution to job creation]



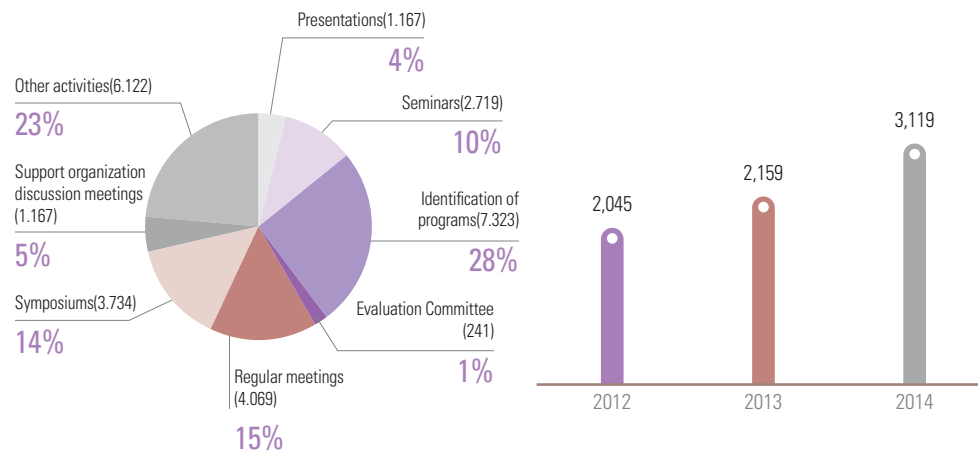
[Average rise in employment and R&D personnel percentage of participating companies]



[Spread of R&D cooperation culture]

- Spread the R&BD cooperation culture by establishing and operating industry-academia-research councils, carrying out network activities, and engaging in joint R&D and marketing
- Network activities were carried out on a total of 26,481 occasions over a period of three years, from 2012 to 2014

[Types of network activities & Percentage of meetings held to identify programs]



Outstanding cases

Outstanding case 1

Establishment of industry-academia-research network

Entry into the offshore plant valve market: Wings created by the large company-SME cooperation network!

NK co., Ltd

Offshore plant valves are key parts for the offshore plant industry, which is garnering attention as Korea's new growth driver, following the shipbuilding industry. Korean SMEs are making efforts to develop relevant technologies and obtain foreign certifications, but these efforts are not leading to sufficient outcomes. Korea is 80% dependent on imports for offshore plant valves. Localization of offshore plant valves would lead to cost reductions for shipyards as well as reduced building time from stable valve supply/demand. This would substantially increase competitiveness.



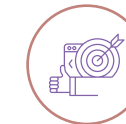
Difficulties

Offshore plant valves need to perform various functions even in extreme circumstances. This is why their stability needs to be verified through fastidious certification and they require high-level specifications. Even when a company successfully develops an offshore plant valve, it is difficult for an SME to enter the market by its own efforts alone. This is because shipowners designate the items that will be applied in the field.



Resolution process

To establish a foundation for localization, outstanding valve production companies in Korea, shipyards, and Korea Industrial Complex Corp. joined together and identified valve companies with good technology. They cooperated in the overall process of product stability certification and shipowners' item approval. Shipyards are working on localization of the engineering phase. SMEs with adequate capabilities are making efforts on supplying offshore plant valves and on localizing equipment, thus striving to make inroads into foreign markets. The cluster manager identified common industrial difficulties. A valve localization program was jointly carried out at the mini cluster with shipyards. Localization presentations were held. Completion of technological development or urgent tasks for technological development were identified as part of full support for localization. Tasks that were common among large companies and SMEs and that could be handled through cooperation were defined, after which solutions were applied in accordance with corporate competencies. Demand assessments and consulting were carried out on several occasions before task execution, presentations, and symposiums to set a direction that would result in actual benefits to companies. This led to a high level of satisfaction among companies.



Success points

- To make inroads into the offshore plant market, which companies found difficult to enter individually, shipyards, relevant organizations, and small- to mid-sized valve production companies came together and established a cluster.
- Meetings were arranged between the cluster's leader, shipyards, member companies and foreign companies for OEM production and the establishment of a joint venture with outstanding foreign valve companies. These meetings built trust.
- A foundation was established for localization of offshore plant valves, which Korea is 80% dependent on imports.



Outcome

Some of the ball valves used for a recent project carried out by Daewoo Shipbuilding & Marine Engineering were successfully localized. This laid the foundation for receiving recognition for the excellent quality offered by Korean valves and for localizing other valves as well.

05. Outcome and Cases

Outstanding case 2

Technology development

Received new technology certification in 2013 for developing a high-stiffness, lightweight hybrid frame

Webasto Donghee Holdings co., Ltd

Webasto Donghee Holdings actively participated in the green automotive technology mini cluster's network activities and support programs. As a result, it successfully localized a panorama sunroof that has maximized ventilation and sense of openness compared to other sunroofs. It also successfully developed a high-stiffness, lightweight hybrid frame and received new technology NET certification (No. 0765, August 29, 2013).



Difficulties

As a result of tightening of regulations on fuel efficiency and exhaust emissions, 'lightweight' and 'improvement in fuel-efficiency' have become major issues in the global automotive industry. The panorama sunroof was around 35 kilograms heavier than other sunroofs and thus needed weight reduction. The primary materials used for panorama sunroof frames were steel and plastic, and the frame is a factor in passenger safety. There was, therefore, a great need to develop technology that would make the frame lightweight while maintaining its stiffness.



Resolution process

What was critical was to develop a technology that would retain only the advantages of steel and plastic frames, while ensuring measurement stability, high-stiffness, and weight reduction. A measure was devised that involved inserting steel parts to a plastic frame, followed by injection molding, thus resulting in a hybrid frame. The structural design needed for hybrid frame development could be handled in-house. However, difficulties were experienced in the process of finding a partner that would jointly handle verification as well as large plastic injection molding and performance evaluation. The personnel network of the mini cluster was used to recruit an organization that would jointly conduct the program. In this process, the cluster manager rendered active support in introducing experts in various fields for hybrid frame development and in establishing a joint development team.



Success points

- Became Korea's first to gain panorama sunroof development experience
- Exchange and cooperation with Hyundai Motor and other relevant organizations
- Developed technology in relevant fields, including two patents



Outcome

The world's first large injection-molded product mass production technology to apply CFRP was developed, leading to the receipt of new technology (NET) certification in 2013. This is planned for application to Hyundai Motor's new cars. A sales increase of KRW 9.7 billion is expected for 2014. Thirty-five new employees will be hired to run the new production lines.

Outstanding case 3

<Development of technology>

Successful localization of a full spade rudder results in an export contract

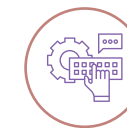
DHMC co., Ltd

DHMC's mother company is DHHI, which was established in 1986 and manufactures generating unit parts. Founded in 2006, DHMC is in the shipbuilding equipment business. It has produced and delivered rudders and blocks to several shipyards for many different types of ships, including VLCCs, container ships, bulk ships, and LNG carriers. It is gaining recognition for its technology and quality from shipyards, shipowners, and classification societies. It is emerging as a significant player by putting the customer first, placing top priority on quality, and engaging in technological innovation with passion, creativity, and inventiveness.



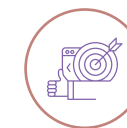
Difficulties

The standard practice in Korea and abroad is to use a semi-spade as the rudder. A shortcoming of the semi-spade is that there is gap cavitation between the rudder and rudder horn. This damage is mostly caused by long-term use, but it was not a big issue. However, today's large high-speed, high-horsepower ships suffer serious erosion due to gap cavitation, and they must undergo major reinforcement work about every five years. The number of orders for large and ultra-large container ships is now rising, and there are limitations in using the standard semi-spade rudder. There is also an urgent need to localize the spade rudder, for which Korea has been dependent on imports.



Resolution process

While engaging in shipbuilding parts mini cluster activities, Hyundai Samho Heavy Industries presented a localized item in relation to shipbuilding. Hyundai Samho Heavy Industries is a large corporation and joined hands with shipbuilding experts at Mokpo National University. It held a meeting on R&D that it would do on the condition that it would afterwards receive orders for products developed thereby. To develop rudder design skills, nine design personnel were put through 93 hours of CAD and CATIA design training, held twice a week from November 2010 through April 2011. In mini cluster activities, the cluster manager identified and supported cooperation projects between large companies and SMEs in the region. The cluster manager also supported various programs (training programs, etc.) that would enable corporate growth in connection with support organizations in the region, thereby helping train up technical personnel.



Success points

- Localized development of the full spade rudder
- After the completion of the project, contracts totaling KRW 8.5 billion were signed with Korean and Chinese shipyards
- Bolstered competitiveness through joint R&D with a large corporation



Outcome

Korea was fully dependent on imports for full spade rudders. A full spade rudder was successfully developed, and it has been recognized as being the most technologically advanced in the world. The rudder was aggressively marketed toward large shipyards and shipowners in Korea through such means as a localization development presentation. After the project, contracts totaling KRW 8.5 billion were signed with large shipyards, including Samsung Heavy Industries and Hyundai Heavy Industries. There has been a rise in contracts with foreign shipyards as well, including those in China. This has resulted in a substantial rise in sales.

05. Outcome and Cases

Outstanding case 4

Prototype production

Localized an eco-friendly integrated dental articulator, and entered the American market

Geoseung co., Ltd

Geoseung is an active part of a global supply network that includes the e-business market, and is growing into an international company in the area of plastic products, including automotive parts, medical treatment supplies, and industrial supplies. It is contributing to the development of the dental technology industry by developing and supplying its EASY-ONE system.



Difficulties

Improvements in the articulator production environment and precision: The use of plaster during model assembly resulted in dust and loss of process time. This, in turn, led to extended work hours and degraded the work environment. There was a need to completely offer original articulator functions while addressing plastic articulator shortcomings, including stability and precision.



Resolution process

Various eco-friendly medical treatment materials that can replace plaster were developed. A product design was created that could absorb the plastic tolerance. A fair was held on a prototype for each raw material. Through such product field tests, material quality was optimized. The cluster manager agreed on the need to develop an articulator prototype that addressed the shortcomings of the previous EASY-ONE system through an onsite forum. The cluster manager rendered active support so that the company could be chosen for a project that supports prototype production in order to bolster the company's export capabilities.



Success points

- Obtained patents and technologies for dental articulator production
- Established a standardized system through field testing



Outcome

The 14-step process was reduced to a 7-step process to result in annual cost reduction of around KRW 1.2 billion (market share of 2%). Sales are expected to substantially rise in 2015 to KRW 800 million in Korea and KRW 3 billion in foreign markets, including the US.

Outstanding case 5

Marketing support

Hello Jadoo records top ratings on Tooniverse in both 2012 and 2013

Atoonz co., Ltd

Atoonz is a venture company that became famous with the Hello Jadoo series. After recording a top rating on Tooniverse, which is a specialized animation channel, Hello Jadoo was exported to Asian countries, including China and Taiwan, and became a major hit. Character products were produced, and mobile services are offered. Since Season 2, Atoonz has been planning and producing a special series.



Difficulties

There were doubts over whether a business presentation or event for a specific character (company) could become a mini cluster project under Seoul Regional Headquarters due to a lack of awareness of content. Companies in a complex moved forward with signing licensing contracts, leading to many cases of collaboration on specific details.



Resolution process

Awareness was raised when Hello Jadoo recorded top ratings on Tooniverse in both 2012 and 2013. A sense of harmony was created among residents in the region and cooperative relations were built among companies by holding events, exhibitions, and presentations. Korea Industrial Complex Corp. rendered support and served as a mediator. This was a high-risk project, and it required at least three years from planning to production and commercialization. Notwithstanding, the cluster manager showed unwavering interest and strived to provide assistance.



Success points

- Video production support
- Participation in domestic exhibitions (Seoul Character Licensing Fair 2013)
- Business presentations
- Broadcast celebration event hosted by the mini cluster in Seoul Regional Headquarters



Outcome

After recording top ratings in Korea, export contracts were signed. The company is now actively engaged in the character business. It is planning and producing a special series after Season 2.

05. Outcome and Cases

Outstanding case 6

Corporate Growth Support Center

“Develop into a global health care-specializing company through the Step-Up Project!”

Dentis co., Ltd

Dentis (CEO Sim Gi-bong) is a medical solution company that was founded in 2005. It has focused primarily on the implant business over the past decade, and it launched a medical device business. The company developed a surgical light (Luviss) in 2010. This light is installed in hospital surgery rooms. It does not create shadows even when a surgeon's hand or head is in between the light and the surgery area. Dentis was awarded the Minister of Trade, Industry and Energy Award for Good Design (grand prize) for Luviss in 2013. The company also received the Export Tower Award on Trade Day in 2012, was designated as the KODIT Star Company in 2013, and received the Design Technology Innovation Award in 2014. Dentis is now determined to take the lead in the medical 3D print market, thereby becoming a global health care-specialized company.



Difficulties

Dentis focused on the implant business before launching its medical device business in 2010. It developed the surgical light Luviss as part of its new business, but experienced a number of difficulties. Luviss was expensive compared to the product offered by Germany's MARQUE, an advanced company, and the company's product lineup did not include large and mid-sized product groups. There was, therefore, an urgent need to develop various products. Another problem was that the company's medical device-specific sales network was not systematically established. The company actually used its previous dental sales network to sell Luviss in Korea and foreign markets. There was clearly a need to build a new international sales network and a new business organization, and to establish new business relations.



Resolution process

To overcome such difficulties, Dentis signed a development company agreement with the Gumi Corporate Growth Support Center in 2014. The Corporate Growth Support Center assessed Dentis and came up with a growth roadmap. It came to the conclusion that the company launched the surgical LED light business in 2010 to achieve further growth based on the success of the implant business, but that the company failed to move forward. The Corporate Growth Support Center, therefore, decided to implement the Dentis Step-Up Project.

The first task was developing a surgical light called M200 for the global market. This new product had better functionality than products offered by foreign competitors, and was competitive in the global market. This product was submitted to the K-hospital Exhibition and Germany's MEDICA medical device exhibition. The second task was reducing the prices of existing products. Price reductions of around 12% were made through structural changes, diversification of buyers, and localization of parts. The third task was related to sales and marketing. The company developed foreign surgical light markets and established a domestic distribution network.

These efforts made the company competitive in the global market by both price and quality. It also acquired new customers by developing a new business.



Outcome

Dentis engaged in diverse efforts together with the Corporate Growth Support Center to achieve growth, and the company accomplished an outstanding sales performance of KRW 26.3 billion in 2014. This was enabled by strategic cost reductions and attraction of new customers. The company also conducted an ERP unit cost analysis on existing product groups and Pareto analysis on purchasing costs to reduce costs by 12%, or KRW 160 million. The company developed an aggressive new business model and generated sales of KRW 270 million from 15 companies in Korea and KRW 70 million from 13 foreign companies.

Pareto analysis and submission of product at exhibitions



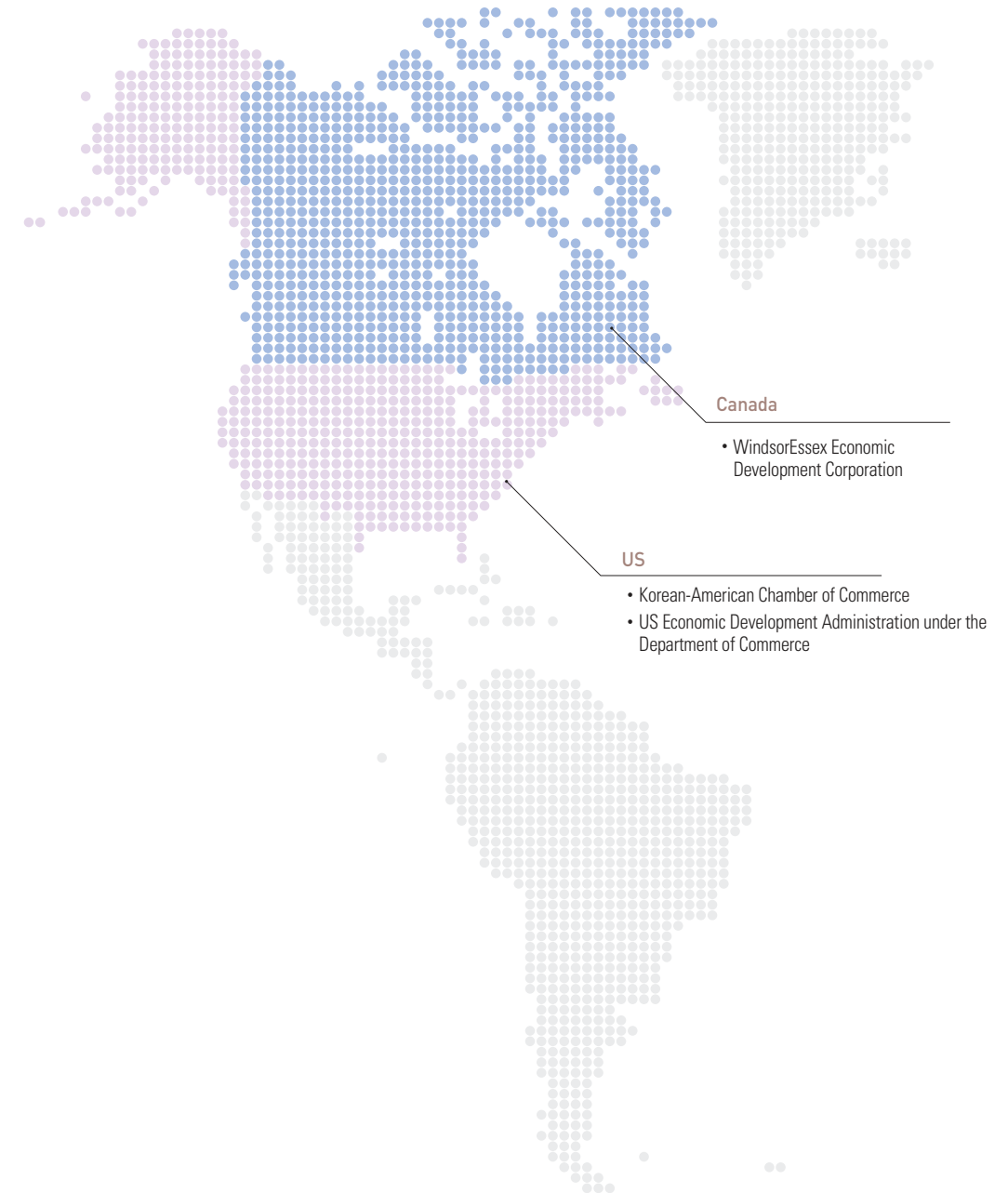
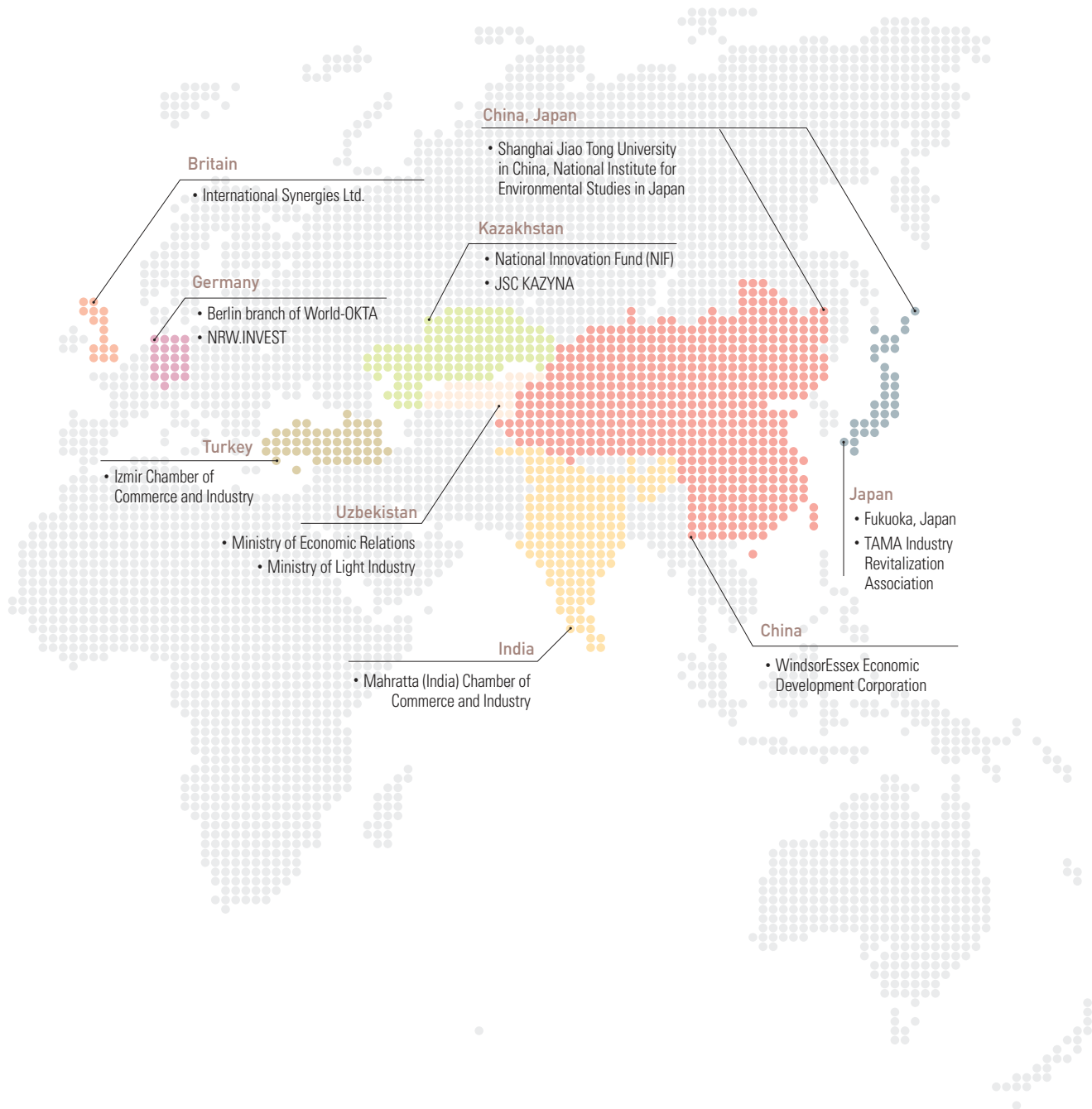
After four months of development, the company unveiled the M200 product and achieved cost reductions of KRW 98 million. The company's new LED plant and business expansion led to job creation, in addition to greater financial performance. Dentis achieved growth of 9% in sales, 9% in employment, and 17% in exports compared to 2013.

The company's execution of suggested tasks led to the establishment of a full lineup. It became truly competitive in the small, mid-sized, and large surgical light markets.

Based on these accomplishments, Dentis is continuing efforts to grow into a global health care-specialized company.

05. Outcome and Cases

Global cluster network cooperation

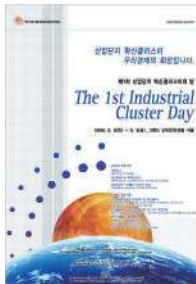


05. Outcome and Cases

Industrial Cluster Day

Korea Industrial Complex Corp. holds Industrial Cluster Day every year to share and publicize the outcomes of the industrial complex cluster program, and to examine various agenda items for growth into a global cluster.

1st Industrial Cluster Day, Thursday, June 8 – Friday, June 9, 2006



Slogan
An innovative cluster is our country's hope!

Venue
Grand InterContinental Seoul

Hosted by
Ministry of Trade, Industry and Energy, Balanced National Development Committee

Major programs

- International conference on innovative clusters
- Academic seminar of the Industrial Cluster Society
- Contest of outstanding cases
- Encounter between industrial complexes and innovative clusters
- Export consultation meeting per strategic industry

Organized by
Korea Industrial Complex Corp.



4th Industrial Cluster Day, November 13, 2009

Slogan
Bolster global competitiveness through connection and cooperation among industrial complexes
"Develop global competitiveness by establishing an industrial cluster"

Venue
InterContinental Seoul COEX

Hosted by
Ministry of Knowledge Economy, Presidential Committee on Regional Development

Major programs

- Industrial complex-centered industrial cluster establishment strategies
- Presentations on cluster experience memoirs and showing of video on outstanding cases of activities
- Industrial cluster development and global competitiveness
- Seminar per major specialized industry of industrial complexes

Organized by
Korea Industrial Complex Corp.



6th Industrial Cluster Day, Wednesday, November 16, 2011

Slogan
Communicating companies, changing industrial complexes, and sharing clusters!

Venue
Daegu EXCO

Hosted by
Ministry of Knowledge Economy, Presidential Committee on Regional Development

Major programs

- Cluster conference
- Boasting About Our Mini Cluster
- b2b Tech Talks (consultation meeting)

Organized by
Korea Industrial Complex Corp.



8th Industrial Cluster Day, Thursday, November 14, 2013

Slogan
Base of the creative economy – Industrial cluster

Venue
63 Convention Center in Seoul

Hosted by
Ministry of Trade, Industry and Energy, Presidential Committee on Regional Development

Major programs

- Cluster conference
- Export consultation with invited foreign buyers
- Industrial complex photo exhibition

Organized by
Korea Industrial Complex Corp.

2nd Industrial Cluster Day, June 7, 2007

Slogan
The "Industrial complex" innovative cluster is our country's hope!

Venue
Grand InterContinental Seoul

Hosted by
Ministry of Trade, Industry and Energy, Balanced National Development Committee

Major programs

- International conference on innovative clusters
- Purchase policy presentations by invited global companies
- Export consultation meeting per strategic industry
- Key strategies on global technical transfers and commercialization
- Beautiful industrial complex photo exhibition

Organized by
Korea Industrial Complex Corp.



3rd Industrial Cluster Day, November 12, 2008

Slogan
Recreation of industrial complexes as autonomic, cooperative, and creative development network space

Hosted by
Ministry of Knowledge Economy, Balanced National Development Committee

Major programs

- Showing of a video on cluster outcomes and visions for industrial complexes
- International conference, etc.

Organized by
Korea Industrial Complex Corp.



5th Industrial Cluster Day, Wednesday, November 17, 2010

Slogan
Establishment of an autonomous cluster that can achieve sustainable growth

Venue
Kimdaejung Convention Center

Hosted by
Ministry of Knowledge Economy, Presidential Committee on Regional Development

Major programs

- Contest on successful cases
- Major industry conference
- Korea-China-Japan mining industry technology exchange symposium

Organized by
Korea Industrial Complex Corp.



7th Industrial Cluster Day, Monday, November 26, 2012

Slogan
with The clusters, Innovation is yours

Venue
InterContinental Seoul COEX

Hosted by
Ministry of Knowledge Economy, Balanced National Development Committee

Major programs

- Korea-China-Japan Business Cooperation Forum
- A presentation on outstanding cluster companies to invited members of press corps
- UCC presentation
- b2b Tech Talks (consultation meeting)

Organized by
Korea Industrial Complex Corp.

9th Industrial Cluster Day, Monday, November 26, 2012

Slogan
50 years of passion, 100 years of hope

Venue
Guro Digital Complex in Seoul, Daegu Headquarters of Korea Industrial Complex Corp.

Hosted by
Ministry of Trade, Industry and Energy

Major programs

- Academic conference
- International forum
- Office Worker Necktie Marathon
- Unveiling ceremony for restoration of the Export Lady Award

Organized by
Korea Industrial Complex Corp.



05. Outcome and Cases

TCI 2015 Global Conference

* The 10th Industrial Cluster Day was held as the TCI 2015 Global Conference.



A global conference was held from November 3 to 6, 2015 at EXCO in Daegu. It was attended by around 900 economic development and cluster experts from 86 countries across the globe. The conference addressed the 'Creative Economy and Cluster: Business model and policy agenda.' Experts in various fields shared insights and information on new industrial cluster policies and strategies. They included economic development experts, international organization members, policymakers, entrepreneurs, and researchers from all around the world.



Event outline

Date and venue : Tuesday, November 3 – Friday, November 6, 2015 / Daegu EXCO, Daegu and Gyeongsang Zone Industrial Complex
Attendance : 900 persons from 86 countries (300 persons from Korea, 600 persons from foreign countries)
 *Initial plan (450 persons)
Hosted by / Organized by : Ministry of Trade, Industry and Energy / Korea Industrial Complex Corp., TCI Network
Theme : Creative Economy and Cluster: Business model and policy agenda



Execution process

March 5, 2014 : Submitted a proposal on holding the conference (Korea Industrial Complex Corp. → TCI)
 June 16, 2014 : Signed a cooperation agreement (Korea Industrial Complex Corp. ↔ TCI)
 November 10 – 13, 2014 : Participated in the 2014 conference in Mexico and made a presentation



Major programs

Conference
 Keynote speech, theme lecture, parallel sessions, special debate, cluster lab, etc.
 * From among the 84 research papers that were received, 70 papers were selected. Twenty academics from Korea and abroad were invited to give presentations on the theme.

Cluster tour
 Three-hundred persons attended a tour of the Daegu and Gyeongsang Zone Industrial Complex that consisted of seven courses.

Official events
 Opening and closing ceremonies, welcoming reception, official luncheon and dinner, TCI General Meeting and BOD meeting, etc.

Subsidiary events
 * 1) Consisted of 18 booths of mini cluster member companies
 2) 114 companies made an application, and 36 companies were matched
 3) Seven mini cluster member companies gave presentations

1 day_Cluster Tour, Welcome Reception



2 day_Opening Ceremony, Keynote Speech, Trade Meeting



3 day_Cluster Lab, Parallel Session, Conference Dinner



4 day_Wrap up Session, Closing Ceremony

