International Science Business Belt to the future Korean Nobel Prize winner

Introduction

In 2005, an association of professors of science, art and humanities suggested creating a science-art combined place where the world-class scientists can discuss and debate freely. They named it ‘The Milky Way Project’. This conception was delivered to presidential candidate Myungbak Lee who is the current president of Korea. The Milky Way Project was changed to the International Science Business Belt and became one of the presidential election pledges in 2007. Two years after the election, the Parliament passed the special law for International Science Business Belt, however, due to the confrontation of political parties, the law faced a crisis to be rescinded.

In May 2011, the Ministry of Education, Science and Technology (MEST) announced that International Science Business Belt had chosen Daejeon as site for the science-business complex and Cheongwon, Yeongi and Cheonan as supporting cities. A major portion of total budget will be spent on housing the Korea Basic Science Institute (KBSI) and a large-scale particle accelerator in Daejeon. The focus of the three selected cities will be finance, training and industry, supporting the science-business complex in Daejeon.

Putting the 7 years of controversy behind, the first step to the world top class science-business cluster has made.

Details

1. Background

For the past 30 years, Korea has been chasing scientifically advanced countries using ‘Catch-up’ strategy and it led Korea to accomplish a rapid economic growth. The strategy was mainly short-term performance-oriented industrial technology developments therefore, there was a lack of research on the fundamental technologies such as material and new substance studies. It resulted in an increase of dependence on foreign technology and a decrease of potential growth power. The deficit of technology trade balance has increased from 1.4 billion Euros in 2002 to 2 billion Euros in 2007. The potential growth power dropped from 8% in the '80s to 6.1% in the ‘90s and then to 4.1% after the year of 2000. Notwithstanding the expansion of the national R&D investment, Korea’s research quality and condition fell behind.
2. Plan

Plans for investment and four projects were made for the Belt. The four projects are Establishment of Basic Science Institute, Installation of heavy ion accelerator, Laying the business foundation, Building a global city environment.

Project 1: Establish a world-class Basic Science Institute

The Korea Basic Science Institute (KBSI) will consist of 50 laboratories and each laboratory will receive 8.5 million Euros by 2017. Only 25 laboratories will be located in KBSI in Daejeon and another 25 laboratories will be diffused in several cities which are strong in science, to become an open-end research system.

**Figure 1. Network system of the Korea Basic Science Institute**

KAIST: Korea Advanced Institute of Science and Technology
D-U-P: Daegu Gyeongbuk Institute of Science & Technology (DGIST)
Ulsan National Institute of Science and Technology (UNIST)
Pohang University of Science and Technology (POSTECH)
GIST: Gwangju Institute of Science and Technology
Project 2: Install a heavy ion accelerator as a large scale research facility

The heavy ion accelerator will be built to conduct a frontier research and experiment that overcomes the limitation of current technology. It is expected to be the nucleus of the international research networking and to attract outstanding workforce.

Figure 2. Concept map of the heavy ion accelerator
Project 3: Lay the business foundation for the sustainable and urban growth

The Belt will foster a business environment to attract high-tech companies and to support them to be commercially successful.

A. To invite high-tech industries & leading enterprises

- To build a high-tech industry complex in order to invite global enterprises to the core cities, which is essential for those cities’ self-led growth

- To attract enterprises focusing on R&D in Nano Technology, Bio Technology, Information Technology and Green Technology, so that their research can be linked to the basic science research and create a synergy effect in the mid and long term

- To seek various measures to improve the technology innovation capacity of the tenant enterprises and facilitate convergence between industries and businesses within the Belt

B. To lay the ground for commercialization of science and technology research achievements

- Efficient management, transfer and utilization of research achievements by the Korea Basic Science Institute (KBSI)
  - To operate a department responsible for the management and transfer of research achievements (tentatively the IPR Strategy Center) within KBSI

- As for technology commercialization, existing programs of the Korean Ministry of Knowledge and Economy (MKE), rather than new programs, will be utilized, because the new ones might overlap with other nation-wide programs or cause a development imbalance between Belt areas and non-Belt areas. The relevant budget may increase, if necessary.

Project 4: Build a global city environment combining science, culture and art

The Belt will foster an educational, global and creative environment which will attract manpower and make the Belt outstanding.

A. Creation of a desirable education environment

- To build a high quality education environment with diversity so as to attract highly-competitive enterprises and human resources
  - To provide various education services through science-specialized high schools, independent private high schools, etc. to meet the needs of education customers
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- To attract prestigious domestic or overseas universities and graduate schools to the Belt in order to provide high quality college education
  - To establish branch campuses of prestigious Korean or foreign universities

B. Creation a global living environment

- To build a global living environment for long-term residence of overseas human resources
  - To establish more international schools or expand support for existing international schools
  - To construct residential buildings in various forms and provide housing for foreigners

C. Establishment of a creative space

- To build a creative urban environment
  - To build an advanced city through creative urban design that meets the demands of scientists, artists and entrepreneurs
- To create a place for world-class science, culture and arts
  - Construct landmark structures and a world-class cultural space with museums, art museums and theaters

Investment plan:

**Table 1. Government investment: 3.4 billion Euros (’11~’17) (Unit: Million Euro)**

<table>
<thead>
<tr>
<th></th>
<th>’11</th>
<th>’12</th>
<th>’13</th>
<th>’14~’17</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting Basic research</td>
<td>4</td>
<td>213</td>
<td>280</td>
<td>1867</td>
<td>2364</td>
</tr>
<tr>
<td>Establishment of a research base</td>
<td>-</td>
<td>27</td>
<td>153</td>
<td>400</td>
<td>580</td>
</tr>
<tr>
<td>Construction of particle accelerator</td>
<td>3</td>
<td>30</td>
<td>67</td>
<td>207</td>
<td>307</td>
</tr>
<tr>
<td>Supporting sub-branches</td>
<td>-</td>
<td>3</td>
<td>27</td>
<td>173</td>
<td>203</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>273</td>
<td>527</td>
<td>2647</td>
<td>3453</td>
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</tbody>
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3. Selection process:

Keen competition between cities became a hot issue of the country during the selection process and appeared day after day in media. Some cities tied up together to make up for their weakness.

- Gyeonggi province claimed Gwacheon should be the central city of science, education and research.

- Daegu-Kyungpook-Ulsan claimed International Science and Business Belt (ISBB) should be located on east coast where industrial base is well developed. They claim that the investment in science and technology should not be centralized for balanced national development.

- Daejeon-Chungcheong claimed that the president should stick to his presidential election pledge to build ISBB in Daejeon. Tying up Daedeok Innopolis (DDI) with Yeongi, Gongju, Ochang and Osong city can make the Korean Silicon Valley.

- Gwangju-Jeonnam claimed to make a triangle belt. The triangle belt will consist of headquarter in Gwangju, second campus in Daegu-Kyungpook and third campus in Chungcheong area.

- Kyungnam-Changwon claimed that they are the best site for ISBB because of the well developed base of research and industry, accessibility, space availability, settlement environment.

Figure 3. Candidate cities of the International Science Business Belt
Table 2. Site selection

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Criteria</th>
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<tbody>
<tr>
<td>Establishment and concentration of research base</td>
<td>R&amp;D investment, Stability of research workforce, Readiness of research facilities and devices, Quantitative and qualitative excellence of research achievement</td>
</tr>
<tr>
<td>Establishment and concentration of industrial base</td>
<td>Development of the overall industry, Development of knowledge-based industry, Industry productivity, Activeness of companies</td>
</tr>
<tr>
<td>Settlement environment</td>
<td>Educational, cultural, healthcare and consuming environment</td>
</tr>
<tr>
<td>Accessibility</td>
<td>Accessibility of international airport and other cities, Distance of the main cities to cities</td>
</tr>
</tbody>
</table>

4. Vision and Goal

Vision:

Goal:

01  Establishment of world class basic science base
02  Creation of future new industry through science and business convergence
03  Realization of low carbon green growth
5. Expected effects

- Challenge the Nobel prize by realizing ‘Basic science power of Korea’
  - Increase competitiveness of basic science by running KBSI
  - Win a novel prize based on the world top research result by utilizing cutting-edge research facilities such as large-scale particle accelerator
- Create high quality jobs in natural science and engineering
  - Create high quality jobs with world-class research environment to solve shortage of workforce
  - Prevent brain-drain
- Attract highly qualified workforce from abroad
  - Provide an autonomous and stable research environment to attract outstanding workforce who studied abroad
  - Provide excellent settlement conditions to attract outstanding foreign scientists
- Synergy effect from win-win strategy of universities and institutes
  - Vitalize personnel exchange providing domestic professors and students the opportunity to research together with world class scholars.
  - Connect basic and applied research in order to obtain ultimate fundamental technology
- Innovation model for universities and institutes
  - Proliferation of advanced system such as autonomous research organization and open-end network operating system

Closing remarks

The International Science Business Belt is finally on the rails, after years of argument. Construction of Korea Basic Science Institute and a large-scale particle accelerator, the core of the belt, will be started in 2012. Total 3.4 billion Euros will be invested over the next six years to complete the belt including the supporting cities, Cheongwon, Yeongi and Cheonan. Once the belt is completed in 2017, Korea expects to become a strong basic science country and produce Nobel Prize winners. It will not only produce high level scientist, but also attract high quality scientists from abroad. An excellent research facilities will bring more opportunities for an active cooperation among industry-academy-institute in Korea and also between Korea and overseas. Korea invites the world to the International Science Business Belt, a playground of world’s top scientists.

Sources and more information