Endogenous Development Strategy of Technopolis in Korea: Case of Daedeok INNOPOLIS

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Abstract

The development of Technopolis and the establishment of innovative ecosystem have made an important contribution in South Korea’s latest industrial development and economic growth. Particularly, Daedeok INNOPOLIS which is responsible for the central role in the national science technology advancement was founded as the Science Town in the 1970s. Since then, it has undergone three-phases of development: Science Park, Technopolis and Innovation cluster. As the result of the transition, Daedeok INNOPOLIS currently serve as the leading role for achieving sustainable economic growth, employment promotion, national and regional innovation. In order to accelerate the progress for success, Daedeok INNOPOLIS have arranged an opportunity for 21st century new industry development, improved growth of technology-intensive SMEs, reinforced academic-industrial cooperation, and established innovative ecosystem. Daedeok INNOPOLIS is considered as an outstanding case of endogenous development strategy of Technopolis. This study attempts to consider the endogenous development strategy of Technopolis in Korea through the analysis of development characteristics of Daedeok INNOPOLIS in two different perspectives: changes of spatial structure and establishment of innovation ecosystem. A sign of growth of Daedeok INNOPOLIS became apparent when its strategy to reinforce the academic-industry cooperation system by promoting participation from universities helped to overcome a functional limitation as a research institute integrated for the establishment of innovative ecosystem. Since then, the center for creative economy and innovation established in cooperation with large enterprise, has a role to build a startup ecosystem and to promote next level of development such as proactive fostering of venture companies for sustainable technopolis development.

Keywords
Endogenous development, Technopolis, Spatial structure, Innovation ecosystem

1. INTRODUCTION

The establishment of Technopolis and the development of
university and national research institutes. Over 1,300 companies have started and grown in Daedeok INNOPOLIS area through the startups ecosystem established by Daedeok INNOPOLIS.

For past 40 years, Daedeok INNOPOLIS, which is considered as the central area for development of Korea’s science technology, have undergone three-phases of development: Science town, Technopolis and Innovation Cluster. For the national- and regional-level of sustainable growth, the INNOPOLIS have been responsible for the leading role in such fields: Commercialization of research achievements, support for technology-intensive SME’s, establishment and reinforce the business and academic cooperation system, and establishment of innovation ecosystem. Therefore, this study attempts to analyze the characteristics of endogenous development of Technopolis in Korea in two different perspectives: i) Characteristics of spatial structural change of the Technopolis, and ii) Establishment of the innovation ecosystem. As a result, the study will identify the endogenous development strategy of Technopolis in Korea, and deduce implications that are applicable for future Technopolis development cities.

2. RIS & ENDOGENOUS DEVELOPMENT

2.1 Significance of Regional Innovation System (RIS)

With the advent of the era of globalization in which the world is integrated into one gigantic market, although the access to the global market has become easier for enterprises, competition between companies has become stronger. In order to survive, the companies must strive continuously for the investment expansion on development of quality improvement and new technology and cost reduction. The growth strategy based on imitating the advanced technology by intensive input of capital and labor has already reached the limit, therefore a new high-value-added strategy needs to be presented. This means that there is a need for the innovative strategy with core values in knowledge capital based on human resources and advanced technology and features (Ahn et al., 2007). For a company to meet the needs of the market, it must improve its learning ability and technical capabilities. However, because it is very difficult to execute technology innovation solely by the company, a continuous innovation should be achieved through the close industry-academia cooperation. Since competitiveness in the global integrated economy is influenced by the innovation capability, the technology and skills must be made to achieve a high added value by expanding the investment in human capital. Ultimately, the future competitiveness will be more influenced by the technology innovation capabilities to continuously create new technology and products rather than the specific technology retained at some point in time (Ahn et al., 2007). Therefore, the establishment of the innovation system based on a close industry-academia cooperation has an importance as a regional and industrial development strategy in the knowledge-based economy.

In order to provide the growth power for the region, a new industry-related infrastructure was created, a new industry features were attracted or transferred, and the regional development policies have been enforced to activate the investment. Rather than providing growth power for regional development, the disparities were exaggerated in many cases. In order to achieve a sustainable regional development, rather than investment and effort for regional development flowing out to other regions, a virtuous cycle structure that contributes to regional development through the reinvestment in the region should be created.

In regional policy1, it was common to pursue the exogenous development strategy to attract production facilities of the companies from outside for the regional development and elimination of interregional disparities. Most of the growth-oriented regional development policy that focuses on production facilities has reduced the unemployment rate of the region and contributed in improving the level of income. However, it presented with problems such as a failure to building the industrial development foundation of the region and a failure to strengthen the competitiveness of local industries. In particular, combined with the rapid transition to a knowledge-based society, in order to create sustainable growth and competitiveness for local industries, the most important tasks are to build the foundation of trust and cooperation between innovative actors and to unite the capacity to lead the continuous innovation. In order to lead the ongoing regional development, a change of policy for regional development is required from the growth-oriented policy to the innova-

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1 The regional policy refers to all of the public intervention to induce the geographical distribution of the population and industry to the ideal state or to eliminate the differences in income levels between regions. It is a means to arrive at the spatial dimension to the main decision-making process of the country. (Hwang, 1992)
tion-oriented policy. Therefore, the expansion of the advanced technological infrastructure and the strengthening of the network between innovation entities to build an innovation system are major endogenous development strategy.

2.2 Endogenous Development on Technopolis

The endogenous development is, to find the development power of the region internally, the development strategy for establishing a sustainable foundation for growth by utilizing internal resources of the region to strengthen the regional development capacity. It is a concept symmetric to the exogenous development that pursues greater growth and efficiency with dependency on external resources, such as the development of industrial complex, attraction of enterprises and foreign companies and development of new urban city (Park, 1999). Just because the development power of the region is searched internally, it does not necessarily mean that the growth should be achieved independently from any external support. In general, if the purpose of regional development focused on the economic growth of the region, then the endogenous development is focused on the integrated development of economy, society and environment. The endogenous development is similar to the concept of sustainable development in that it focuses on building a virtuous cycle by retaining the achievement in the region which leads to the ongoing regional development.

The core values of the endogenous development in Technopolis are, rather than the presence or absence of external support, to prepare for a technical infrastructure to strengthen the internal innovative power of the region and to create the ecosystem so as to enable indigenous innovation for the aim of the sustainable development of the region. From this perspective, the strategy to strengthen the innovation capacity of the nation or region by creating the infrastructure to allow world-class basic science research, in addition to utilizing the existing resource of Daedeok, e.g. R&D capabilities and advanced industrial base, is one of the endogenous development strategy. In the field of basic science, the innovation foundation of the region can become even stronger with a research organization and infrastructure to enable the long-term and large-scale study, which were difficult to manage for existing universities and research institutes, and continuous research to ensure the core technology.

In the meantime, Daedeok has been conducting research related to technology development of industrial areas with an aim of pursuit of advance technology. It has contributed greatly in achieving economic growth by development of national and regional industry. However, we have faced the limits of growth in major industrial areas due to the lack of basic science and core technology expertise. Since the 2000’s, the demands to expand the infrastructure for basic science research and development and to develop excellent research environment for securing core technology and fostering new industry sectors have been raised steadily. When viewing the trend of Daedeok R&D, which has carried out the research activities of industrial technology, because the development strategy focuses on the expansion of R&D infrastructure for basic science and the enhancement of innovation capabilities, it is aligned with the endogenous development strategy of science city in terms of focusing on strengthening the area of innovation capability, regardless of the national-oriented industrial promotion and financial support. In addition, the outcome of basic science research allowed expansion of range of industrial technology-related research activities, which enhanced the competitiveness of the existing industries in the region. Moreover, the efforts to unearth and nurture new industries through the activation of entrepreneurship ecosystem are one of the endogenous development strategy.

3. GROWTH AND STRUCTURAL CHANGE OF DAEDEOK INNOPOLIS

3.1 Growth and Spatial Structural Change

1st Phase (1972~1999): Science Town

The initial Daedeok research center began as the Science Town, which consisted of national public research institutes

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1 The “Endogenous development”, an economic development model of virtuous cycle, was first used by the Japanese sociologist Kazuko Tsurumi when he criticized the modernization theory at the American Sociological Association in 1976. It was highlighted as ‘projects that create autonomous regions with the cooperation of local residents, conform to the local ecosystem, reflect local traditions and consider the need of local residents’. Hereafter, Japanese Professor Hobo Takehiko later proposed a modified theory that both internal and external resources and capital should be used appropriately. In other words, the “Endogenous development” promotes the local industry and culture by taking advantage of the resources, technology, industry, human resources, etc. in the area. However, it is not a closed regionalism that is confined within the area. It refers to the concept that can activate the local industries in many forms, such as development of existing industries and regional enterprises, creation of industries and businesses that take advantage of local resources, external support, etc. (Kang, 2015)
and research-oriented universities. In the 1st phase, the focus of the research institutes and universities was to work on the national policy research assignment and foster intellectual elites. The focus was irrelevant to the commercialization of research development or promotion of startups (Fig. 1, left image). Beginning in 1993, national public research institutes and research-oriented universities (CNU, KAIST) founded the TBI. TBI supported researchers and professors to begin startups, which led into the activation of technology transfer and research development commercialization. For additional support, the General Support Center for technology commercialization was founded (Fig. 1, right image). The reputation of Daedeok Science Town is highly regarded for its leadership role in advancement of Korea’s knowledge and technology innovation, which was accomplished by establishing science and technology center that increased the nation’s research capacity and technology.

2nd Phase (2000–2004): Technopolis

Along with the primary function, the central role for the national R&D center, Daedeok Science Town accepted the leadership role to establish the industrial cluster that can advance the regional high-tech industries. Daedeok was responsible for its role in technology innovation through R&D. In addi-
tion, its role was to achieve technology transfer to the industrial cluster via technology commercialization. The structure of the city consisted of Daedeok Technovalley, high-tech industry center, built around the R&D center of Daedeok Science Town. The regional industrial town was revitalized, and its productivity was developed to manufacture products developed from research. The development model described above was later developed as Technopolis, which consisted of research institutes, high-tech industry center, and urban city.

3rd Phase (after 2005): Innovation Cluster

The innovation cluster, which will connect Sejong and Osong cities, will be established around Daedeok INNOPOLIS. The newly built innovation cluster is expected to be the new driving force for the nation’s growth. Technopolis was developed into the Innovation Cluster, which connects the academia-industry cluster at Sejong city, biovalley at Cheongju and Osong cities were achieved in 3 stages. The R&D foundation that was achieved in between 1975 and 1992 by the national public research institutes and research-oriented university was decided as insufficient to satisfy the demand of the future science technology development. Thus, the international science-business belt project is to establish the new R&B foundation that is capable of supporting 21st century new industry.

3.2 Functional Linkage and Development Strategy

The development axis of Daedeok INNOPOLIS, the Innovation Cluster that connects Daejeon, Cheongju, Sejong cities, can be depicted in 4 types.
The first development axis includes an attempt to connect the knowledge and innovation technology developed from research with commercialization, startups, and fostering enterprises. In order to accomplish the plan for commercializing the R&D achievements of Daedeok INNOPOLIS, the strategy of regional innovation and fostering enterprises was formulated. The aim of the strategy was to develop high-tech industrial complex and general industrial complex, that are connected with the Science Town, so to strengthen the regional industrial function and to prepare optimal conditions for fostering venture companies and SME’s. The effect of strengthening the innovation function is expected from development of the multiple complexes that are near workplaces. This type of multiple complex will facilitate in making cooperation between R&D function and companies, encouraging startups within research institutes via commercialization of research, activating startups from universities, and fostering SME’s.

The second development axis is the strategy to establish the R&D foundation for future new industry, and to strengthen the R&D function for fostering the new industry. The R&D infrastructure that was established in 1970s is determined as insufficient to meet the demand of future industry development. Therefore, the plan to establish the R&D infrastructure that can satisfactorily assists in future industry development. The objectives of the plan include development of heavy ion accelerator, establishment of basic science institute to research future new industry, and preparation of high-tech industry complex that is in charge of commercialization of research achievements.

The third development axis is the development strategy for Daedeok INNOPOLIS to be functionally connected to nearby cities, Sejong and Osong, so it becomes the clusters. The strategy makes connections between neighboring high-tech industries and research achievements of Daedeok, the center of Korea’s R&D and driving force of Korea. The research achievements are maximized through reinforcement of cooperation. As a result, the growth of the cluster is accelerated. Recently, the plan to establish academia-industry cluster in Sejong city,
Development Axis 1: Commercialization of Research Achievements, Startup and Fostering SMEs

Supplementation of the function of Daedeok INNOPOLIS that is crucial for R&D function, commercialization of research achievements, and activation of high-technology startups are the main objectives for establishment of Daedeok Techno-valley, a multiple high-tech industry complex. The establishment of Daedeok Techno-valley led to construction of high-tech industry complex. The high-tech industry complex supplemented the R&D function, created the venture cluster, organized the foundation for technology commercialization through building technopark and support center for startups, and stimulated the regional industry advancement. Recently, Daedeok Techno-valley has reached the saturated state, therefore the need to develop high-tech industry complex was realized for technology commercialization and fostering startups and SME’s. Considering the potential in growth of Daedeok, the two-stage plan to establish 5 multiple high-tech industry complexes is formulated. The first stage of the development plan has completed. (see Fig. 5)

The purposes of the five multiple complexes are to improve the insufficient problem of industry complex for fostering venture and SMEs, and develop futuristic high-tech industry complex to prepare for the foundation of future new industry. Through the development of the complex for research development and venture, the conditions (in charge of post-incubation function) for fostering startups and SMEs was organized, and the work-home in vicinity type of city planning was initiated to simultaneously develop research, productivity, residence, and support facility.
Development Axis 2: Preparation of R&D Foundation for the Future New Industry

It is the development strategy to reinforce the basic R&D for fostering future new industry through the construction project of the international science-business belt branching site, which is a nationally supported work. The purpose of the international science-business belt project is to supplement the basic research capacity for fostering future new industry through the development of rare isotope accelerator (heavy ion accelerator), basic science institute, and multiple high-tech industry complexes. In addition, it is a national level of project to prepare the optimal residential environment for attracting intellectual elites, and to set up the support facility for stimulating the commercialization of research achievements. The ultimate goal of the project is to develop a driving force of future growth for the nation. The main aspiration is to organize the outstanding conditions for creative economy through the establishment of world standard research branch site, at which science, business, and attractive residential conditions coexist. The construction project is divided into 3 districts. (see Fig. 6) The heavy ion accelerator and R&D functions will be prepared at Shindong district, while the high-tech industry complex and the residential conditions, business facility, and support facility will be located at Dunkok district. In addition, the existing Expo Science Park will be revitalized at which the basic science institute will be relocated. The regeneration work is in progress to organize the international exhibition and convention function, Institute of Patent Information, hotel, and commercial facility at Expo Science Park. As a result, the international science-business belt will be equipped to provide support for Daedeok INNOPOLIS.

Development Axis 3: Development into the Regional Cluster

The sustainable growth and development of Daedeok Science Town have exceeded the regional boundary, and achieved the regional level of growth through the cooperation with neighboring high-tech industry complexes. The development of Daedeok INNOPOLIS began with the foundation of Daedeok Science Town R&D, and resulted in the foundation for Technopolis through its growth into cluster as linked with Daedeok industrial park. Now it has been developed regionally through the formation of regional cluster with Sejong academia-industry cooperation complex, Osong Bio Valley, and high-tech industrial park in Cheongju city. Osong Bio valley is the biomedical industry branching site that is consisted of life science complex, advanced medical complex, research, and business. It is becoming the center of Korea’s bio industry.

Fig. 6. International Science & Business Belt (ISBB): preparation of R&D foundation for the future new industry
Recently, the development plan for the academia-industry cluster at Sejong, a city in vicinity of Daedeok NODEOPLE, has been accepted. The plan is to enhance the self-sufficient capability of the city. Venture park, research park, academia-industry support center, joint campus of multiple universities, and research-oriented university are expected to be established at Sejong academia-industry complex. (see Fig. 7)
Development Axis 4: Regeneration of Conventional Industrial Park and Readjustment of its Function

For commercializing the R&D achievements of Daedeok and maintaining sustainable advancement as the innovation cluster, expansion of high-tech industrial park with productivity needs to be achieved. The strategic plan to regenerate old conventional industrial parks in Daejeon city will facilitate in preparation for the foundation of growth of Daedeok. (see Fig. 8)

Through the revitalization of old industry complexes, the conditions for high-tech industries are prepared, the functions of city are readjusted, types of industry are induced to change to assist the high-tech industry, and industry hindrance to city
environment are encouraged to relocate. For improvement of accessibility to the city and Daedeok INNOPOLIS, the infrastructure, such as road, startup supporting center, apartment-style factory, is required. The expansion of the infrastructure will set up conditions for growth of venture and SME’s. In addition, the function of Daedeok industry complex, which is located inside of Daedeok INNOPOLIS, will be readjusted, and its type of industry will be encouraged to change. Industries that produce environment pollutants will relocate, and the function of Daedeok industry complex will be readjusted to become the center for high-tech industries. For improvement of its function to resemble the eco-friendly industrial structure of urban industrial complex, the energy circulation system, water recycling system, by-products recycling system need to be established. Thus, environment load of the industry complex can be reduced, and eco-efficiency can be increased.

The main features of each development axes are organized in the table below.

### 4. INNOVATION ECOSYSTEM IN DAEDEOK

#### 4.1 Structural Change of the Innovation Ecosystem

The basic structure of ecosystem at Daedeok INNOPOLIS is comprised of 3 actions (R&D, business, and management) and the infrastructure. The basic structure of ecosystem exhibits different characteristics of development at each development stages.

1**

**Stage: Science Park Model**

The 1st stage is characterized as the period when the ecosystem, based on activity of the Science Park, is established. Basic research of public research institute and university, and applied research of private companies and research institutes allowed beginning of startups and technology commercialization. However, the 1st stage is described as the initial stage of the ecosystem. The cooperation system among research institutes, universities, and companies was merely passive. The only appreciable activity is limited to the basic and applied research and startups by researchers. In addition, the effect on regional innovation and economic growth was minimal.

2**

**Stage: Technopolis**

At 2nd stage, the cooperation system among public research institutes, private research institutes, research-oriented university was strengthened. It provided optimal growth conditions for technology-intensive SME’s that have proactive startup background. The entrepreneurship is also stimulated. The advancement of regional high-tech industry was stimulated. Technology commercialization and sustainable fostering of venture companies achieved successful settlement of the large and small businesses and job creation. The effect of science technology city on regional economy is becomes prominent. In the management aspect, financial support pro-
The ecosystem of general service support, that can actively support the development of technopolis, was established.

3rd Stage: Innovation Cluster

At 3rd stage, the R&D and startup activities by research institute and university support the regional special industry. The development of innovative human resources becomes the most critical success factor for the growth of the cluster. The relative importance of basic and applied research is magnified.

The innovation support system was established to assist the successful startup companies to be equipped with global competitiveness, and develop into large and small companies (Support activity and program of Daedeok INNOPOLIS are reinforced). Additionally, various support activities were achieved to strengthen the competitiveness of technology-intensive SME’s through the cooperation among the creative economy innovation center, government, and enterprise. The infrastructure was ensured to provide not only the hardware aspect, such as industry complex, but also things that can promise quality of life, such as research and residential conditions.

4.2 Creative Economy Innovation Center and New Industry Promotion

1) Role of HEI’s for Innovation Ecosystem: Source of Innovation

The important agenda for establishment of the ecosystem are categorized into three types: Source of Innovation, Activation of Academia-Industry Cooperation, and Support Mechanism. The features of each category are described below. (Oh et al., 2014)

**Source of Innovation**

- The goals of innovative ecosystem construction are to form the basis of creative economy, develop higher employment rate, promote economic growth through enhancing innovation capacity of universities and research institutions, promoting business, reinforcing industry-academia cooperation, and nurturing technology-intensive SMEs.

**Activation of Academia-Industry Cooperation**

- To reinforce innovation capabilities for the universities and research centers, startup education, characterization,
technology transfer and business, industry-academia cooperation activation, etc. are being achieved.

- To activate industry-academia cooperation, establishment of cooperation system through family business partnership, business support consulting, industry-academia business conference, etc. are taking place.
- The government has arranged concrete support, such as LINC business, INNOPOLIS Campus, etc., to help achieve the specific projects.

**Support mechanism**

- In terms of promotion and development of entrepreneurship, sustainable promotion programs connecting ‘pre BI - TBI - post BI’ exist, and universities focus on the pre BI role to activate startup.
- Entrepreneurship Development Center installed in each university is the agency to systematically support the role.
- Universities are providing aggressive support for college students to participate in startups through launching startup student club, founder leading universities, and etc.

The image below describes that the support mechanism that assist in discovery of innovation resources from university research labs located within Daedeok INNOPOLIS are comprised of 4 separate mechanisms: Startup club, LINK program, Startup leading university, and Innopolis campus. The support organizations that assist in the support mechanism are Creative Economy Innovation Center, Business Incubation, and Entrepreneurship development center. Especially, the Creative Economy Innovation Center is responsible as the hub of regional innovation.

2) **Support Organization for Innovation Ecosystem: Creative Economy Innovation Center**

The function of the Creative Economy Innovation Center can be described in two components (MSIP, 2014). The first function is the role of innovation control tower that promotes regional economic innovation. The second function is the role as the hub for activation of startups.

- The Creative Economy Innovation Center works to en-

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1 18 centers have been established from 2014 to July, 2015.
Table 2. Functional features in innovation cluster model

<table>
<thead>
<tr>
<th>Function</th>
<th>Main Features</th>
<th>Key Role</th>
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<tbody>
<tr>
<td>R&amp;D</td>
<td>• An innovative cluster to be created to promote the growth of strategic</td>
<td>Collaboration among firms, HEIs, and research institutes</td>
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<tr>
<td></td>
<td>industries</td>
<td></td>
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<tr>
<td></td>
<td>• The collaborative network among firms, HEIs and research institutes is</td>
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<td></td>
<td>enhanced</td>
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<td></td>
<td>• Local governments should actively support the creation of innovative clusters.</td>
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<td></td>
<td>• Regional innovative projects are conducted by central and local governments.</td>
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<tr>
<td></td>
<td>• International Science &amp; Business Belt: Institute for Basic Science, Rare Isotope Accelerator, etc.</td>
<td></td>
</tr>
<tr>
<td>Business Activities</td>
<td>• A support system for business incubation activities: in addition to providing business incubation space, technology support, marketing support and other professional support was provided.</td>
<td>Strategic industrial projects led by local governments</td>
</tr>
<tr>
<td>/ technology</td>
<td>• Clusters of strategic industries are created by the cooperation between</td>
<td></td>
</tr>
<tr>
<td>commercialization</td>
<td>science park and local governments.</td>
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</tr>
<tr>
<td></td>
<td>• Business activities such as technology marketing, technology commercialization, and technology transaction are managed by specific centers of regional innovation.</td>
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<tr>
<td></td>
<td>• The Techno-park was established as the core of regional platform.</td>
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<td></td>
<td>• The Strategic Industry Planning Team prepared future oriented strategy.</td>
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<tr>
<td></td>
<td>• Creative Economy Innovation Center was established by central government and the large enterprise</td>
<td></td>
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<tr>
<td>Management</td>
<td>• Integrated education programs to train R&amp;D experts and to support professors: specialized education programs, customized education programs and etc.</td>
<td>Global business infrastructure (management facilities, local governments, and international organizations)</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>• Land-use system to promote business activities and R&amp;D activities in the innovation cluster: clusters of strategic industries, multi-purpose sites and etc.</td>
<td></td>
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Source: Oh (2008): p.66, as modified by authors

courage regional economic innovation by uniting the innovators and resources of the regions, which were divided by its function or departments.
• The Creative Economy Innovation Center provides the one-stop service for providing ladder of growth or technology innovation of the SME’s or mid-sized enterprises.
• New policies are created to improve various restrictions that hinder the regional new industry or new market entrance.
• As the hub for activation of startups, the Creative Economy Innovation Center supports the SME’s and mid-sized enterprises in the strategic industry field, commercializes the innovative ideas, and acts as the startups supporter.
• Through the education on entrepreneurship and technology commercialization, the startup capacity of the regional elites was strengthened.
• The discovery and fostering of the regional accelerator was supported to activate the startup ecosystem and to connect the startup investment to the area that lacks support.
• The Creative Economy Innovation Center attempts to discover unused patents of the government-funded research
institute, university and companies, and devise measures to commercialize the patents. In addition, the Creative Economy Innovation Center supports the companies with entrance into the global market through the global startup support center.

### 5. CONCLUSION

The study analyzes Daedeok INNOPOLIS, which has 40 years of history and characteristics of endogenous development strategy of Technopolis in Korea. The characteristics are summarized below.

**First, the development growth from Science Town to Innovation Cluster was achieved through the growth and structural changes of the city.**

Initially as the research park that is responsible for the central role of R&D, Daedeok INNOPOLIS have achieved 3-phases of development, ‘Science Town-Technopolis-Innovation cluster’, by activation of sustainable innovation capacity, supplementation of insufficient function for establishment of the innovation ecosystem, and expansion of spatial structure. Currently, Daedeok INNOPOLIS pursues sustainable growth and development through 4 development axes: expansion of area, enhancement of R&D function, commercialization of research achievements, and revitalization of industry complex. The role of the innovation cluster was strengthened through city revitalization and multiple complex development, which led to city development and area expansion to nearby cities. The area expansion includes the international science business belt functional area, Chunan, Sejong, Chungwon. The administrative capital of Korea, Sejong city, is considered to have the most important role. To achieve global competitiveness of research development, adding the international science-business belt project to the R&D function at 1st stage strengthened the basic R&D function.
Second, the industrial function of the city is readjusted through the revitalization of the old industrial complexes. The conditions that attract and foster the technology-based companies are being established. The issue of lack of productivity is suggested as Daedeok INNOPOLIS is developed into the innovation cluster. In order to set up the industrial conditions that supports high-tech industry growth and regional economy development, the functions of old industrial complexes are readjusted. The demand of the city for revitalization of old industrial complexes and the demand of Daedeok for expansion of ecosystem foundation coincided with each other. Therefore, the function of the complexes were readjusted through the revitalization of industrial complex, and the optimal conditions were set up for fostering of startups and SMEs.

Third, the establishment of innovation ecosystem exhibits 3-phases of development. The development of Daedeok, from research park to innovation cluster, allowed a change in its function, from passive cooperation to systematic cooperation among innovators.

The cooperation among university, research institute, and companies were strengthened through the development of Daedeok into the innovation cluster. The systematic cooperation was established for R&D function of 21st century strategic industrial field and for research development and company fostering in the new industry field. The important agenda for establishment of innovation ecosystem are categorized into three types: Source of Innovation, Activation of Academia-Industry Cooperation, and Support mechanism. The innovation human resources is considered as the critical success factor for establishment of the ecosystem. The Creative Economy Innovation Center improved the existing academia-industry cooperation system among university, research institute, and SMEs, and established the systematic cooperation system that encourages participation of central government and enterprises. In addition, the Creative Economy Innovation Center plays an important role in research development of new industry, and fostering of startups and companies.

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