DEVELOPMENT OF SCIENCE AND TECHNOLOGY PARKS IN VIETNAM
ANALYSIS AND LEARNING LESSONS FROM KOREAN CASE

By

Trinh, Thai Trung

THESIS

Submitted to
KDI School of Public Policy and Management
in partial fulfillment of the requirements
for the degree of

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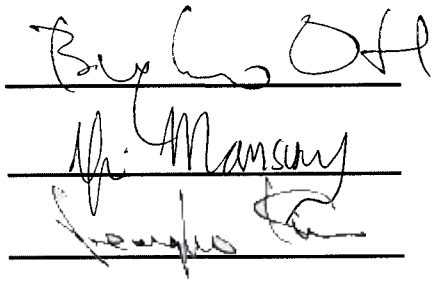

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ABSTRACT

DEVELOPMENT OF SCIENCE AND TECHNOLOGY PARKS IN VIETNAM ANALYSIS AND LEARNING LESSONS FROM KOREAN CASE

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Globalization is the main theme for economic development in the 21st century. "It describes an ongoing process by which regional economies, societies, and cultures have become integrated through a globe-spanning network of communication and exchange"[i]. Regarding to that, regional competitiveness emerges as one of the most important target for every countries.

Science and Technology Parks (STPs) are one aspect of real estate development as well as a part of urban development program. Moreover, STPs are also an effective vehicle to stimulate regional economic development. Since the model is based on investment in knowledge-based industry such as capacity building, infrastructure, educated and trained labor, and export orientation with international production networks.

Since the decision of opening the economy, Vietnam's national strategy also focuses on developing Science and Technology Parks. There have been two centrally multi-national hi-tech parks, named Hoa Lac and Ho Chi Minh (or Saigon), which are located in the two most dynamic cities of Vietnam, Hanoi and Ho Chi Minh City. However, in order to have a sustainable and effective operation, Science and Technology Parks not only have a systematically internal co-operation, but also create a harmonious synergy with the overall regional development strategy. Through researching the typical cases of Korea, this thesis will propose some recommendations for the operation of Vietnam Science and Technology Park.

Dedicated to

My wife, my daughter

ACKNOWLEDGEMENT

First and foremost, I would like to thank my thesis advisor, Professor Oh Byungho, for his illimitable enthusiasm and encouragement. Without his consistent, encouraging support, I would not know how I will conduct this thesis, like a famous Vietnamese proverb says: "Without your teacher, you cannot success".

I am thankful to my parents and parents-in-law who always stand by me and respect my decisions.

Finally, I would like to thank to my wife, Tran Mai Huong for her love, sacrifice and encouragement while I was in the most difficult situations.

This thesis is also a present for my daughter, Trinh Thien Kim, since she was born when I was writing it.

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Chapter 1

Introduction

1.1 Scope of the thesis

Real Estate development is an important part of the national economy and it constitutes to the nation's capital formation needed for economic growth, creates jobs and affects the stability of the whole economy. Developing real estate needs carefully and deeply studying, researching and understanding in many aspects such as geography, demography, national and regional growth, future opportunities…etc.

Becoming the official member of WTO in 2007, Vietnam has proved its capability and eager to participate in the global platform. However, chance is always going with challenges. Therefore, in order to compete in this platform, Vietnam should have carefully steps in every aspects of the economy.

In Vietnam, the real estate development of Science and Technology Parks (STPs) has been conducted from the ending of the 1990s. In an effort to get closer to the world's advanced economies and focus on the national's scientific and technological development program, a formation of two high tech parks in Vietnam, one in the northern regional and the other in the southern region, has been created in the early of 1997 and 2001, respectively. Nowadays, STPs in Vietnam are increasing both in number and scope.

However, to derive the productivity and benefits from these STPs, establishment is not

enough. The management of STPs, conducting an innovative and sustainable strategy is important tasks to Vietnam. Therefore, the scope of this thesis is to propose some recommendations on the development and management of Science and Technology Parks in Vietnam. Besides the main functions of productivity effectiveness and benefit improvement, STPs cluster is also the foundation factor in contributing to the sustainable development of the region. The success of STPs cluster will lead to the strong regional competitiveness. As a result, Science and Technology Parks not only have a systematically internal co-operation, but also create a harmonious synergy with the overall regional development. Factors which affect the productivity of STPs as well as the regional competitiveness will also be discussed in this thesis.

1.2 Thesis Outline

This thesis is divided into five chapters. **Chapter 1** containing introductory remarks proceed to outline the primary objectives that aim at research methodology of this thesis.

Chapter 2 describes thoroughly the formation and characteristic of STPs. Literature review is also introduced. It will comprise different definitions of science and technology parks such as STPs, Science Park, Technopolis, Innopolis, Clusters, regional development… Key roles of STPs to the regional development and competitiveness are carefully analyzed. The development process of STPs is also mentioned since it usually experiences through some

stages with typical features.

Chapter 3 reviews the Korean STPs history. One typical successful case will be carefully studied. This research will produce the important lessons, advantage and disadvantages, which will be the background for the recommendation in Chapter 4.

Chapter 4 contains the procedure for approaching the Vietnam situation. Through reviewing two STPs in Vietnam, Hoa Lac and Hochiminh, problems will be pointed out. With the findings from the Korean experience, recommendations are applied and modified to adapt effectively to Vietnam environment.

Chapter 5 is the conclusions achieved form the current research and some recommendations for further study, in keeping with the hypothesis and objectives of this subject area.

1.3 Methodology

This thesis uses comparison method as the platform to develop. Thanks to the bilateral agreements with many countries, Vietnam real estate has many chances to comprehend and apply the experiences of leading countries, especially the Asian countries such as Korea, China, and India… Because of the subjective condition of the author, South Korea cases will be utilized as the main source of research.

Since the real estate industry contains lots of uncertainty and fragile, we cannot get rid of the usefulness of information beside academic knowledge. Information derived from inter-

net, books, magazines, professional blogs… will be used when searching data for the real estate trends and emerging issues in developing and operating real estate projects.

Collecting multidimensional data from authorized institutions and offices in Vietnam will contribute to the practical and valuable results of the thesis.

Chapter 2

The formation and characteristic of Science and Technology Parks

2.1 History overview

According to Wikipedia, the world's first science and technology park started in the early of 1950s and prefigured the community known as Silicon Valley. While parks vary widely in size and shape, from urban high-rises to suburban or rural locations, a typical American science park is located in a suburban community with a population of less than 500,000 and is operated by a university or a university-affiliated non-profit organization. In the US, the companies in a typical science park are primarily private sector, but the science park is also home to university and government facilities[ii]. The development of STPs in the United States was considered as spontaneous as the natural pressing of the economic. There are nearly no intervention from the government as well as the strategic management. Followed by the success of these STPs, countries such as South Korea, Japan, and Taiwan in Asia and England, Finland, Sweden, France in Europe... started to develop its own STPs with the direction and support from the government.

Nowadays, Science and Technology parks are found all over the world; in North American alone, over 140 STPs are developed.

In Europe, founded in 1960s, Sophia Antipolis in France is considered as the oldest science

park. Cambridge Science Park, founded by Trinity College, Cambridge in 1970, is the oldest science park in the United Kingdom. Cambridge Science Park is a concentration of science and technology related businesses, and has strong links with the nearby University of Cambridge. NETPark (North East Technology Park) is also a success example in County Durham, England. The park is the home to several high-tech companies specializing in fields such as nanotechnology, X-Ray technology, and forensics and semiconductor technology. Amsterdam Science Park is the destination for computer science and life sciences, in charge of being the one of Europe's largest independent Internet hubs, the Amsterdam Internet Exchange (AMS-IX). There are a large number of research institutes as well as having more than 2,000 researchers working.

Tsukuba Science City in Japan, founded in the early 1970s is considered as the oldest STP in Asia. Tsukuba Science City represents one of the world's largest coordinated attempts to accelerate the rate of and improve the quality of scientific discovery. Prominent examples include the Hsinchu Science Park in Taiwan and Daedeok Innopolis in South Korea[iii].

Daedeok Innopolis, formally known as the Daedeok Science Park, is a cluster of institutions in research and development of technology located in Daedeok Valley in northern Daejeon, Korea. The cluster is built around KAIST, Korea's leading technical university, Chungnam University, a group of government research institutes in applied technologies, corporate research centers and more than 900 venture companies[iv].

2.2 Literature survey

Scholars all over the world have been studying on the establishment, development and impact of STPs to the national economy as well as the regional competitiveness. Through researching on the previous studies, prominent findings are described below.

Massey et al. (1992) challenged the success of UK science parks in his research. They stated that the science parks contribute not so much on promoting technology transfer, instead of to create the primarily prestigious real estate development.

Castells and Hall (1994) summary three main driving forces for the establishment of science and technology parks: reindustrialization, regional development, and creation of synergies. Nowadays, developed countries in all five continents started to develop their own STPs with the direction and support from the government.

Storey and Tether (1998) reported that by the mid-1990s, there have been 310 Science and Technology Parks, which are located in 15 countries in the European Union. Those STPs had 14,790 firms and 236,285 employees. UNESCO also reports that there have been 130 STPs in Asia continent, which China is the leading in terms of numbers with 80 STPs.

The science's park role is to "enable academics at the local university to commercialize their research ideas, to provide well-established businesses and small businesses in which sophisticated technologies and prestigious accommodation" are used (Storey & Tether, 1998).

Jacobs & Deman (1996) study found the following:

Three common broad definitions of clusters can be drawn from the literature. Each of which emphasizes different dimensions: (i) the agglomeration of economic activities within related sectors at regional level; (ii) the gathering of production activities based on vertical production chains at industry level: and (iii) the large aggregation of connected sectors in an economy at national level.

Porter (1998) defined STP clusters are as the following:

Geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field that are present in a nation or region. Clusters arise because they increase the productivity with which companies can compete. The development and upgrading of clusters is an important agenda for governments, companies, and other institutions. Cluster development initiatives are an important new direction in economic policy, building on earlier efforts in macroeconomic stabilization, privatization, and market opening, and reducing the costs of doing business. Moreover, he also opposes the idea of top-down cluster mechanism. He notes that competitiveness is fundamentally a bottom-up process in which many individuals, companies and institutions participate.

Lee and Yang (2000) published the paper to access the performance of Hsinchu Science Park in Taiwan. They come to the conclusion that Hsinchu has become the first high tech

industry development model in Taiwan. Hsinchu Science Park also received reputation in the world. Lee and Yang (2000) also added that the success of Hsinchu is certainly supported by the Government in strategy and planning, together with the improvement of human resources.

Furthermore, Gordon & McCann (2000) also proposed in their study the following:

Three typical ideal models to define clustering based upon the nature of the structural characteristics: (i) the model of `pure agglomeration'; (ii) the model of `industrial-complex'; and (iii) the model of `social-network'.

Enright & Roberts (2001) defined the cluster concept focuses on the linkages and the interdependencies among actors in value chains.

Young Ja Bae & Win jin Song & Deok Soon Yim (2002) emphasize on the transition to international open system and domestic cluster-upbringing system, from the formative period system to the development period system. Regional innovation cluster will be the core of changing in technology environment and then social environment. The coordination of clusters will contribute to the national innovation system, and therefore create a regional competitiveness for the nation.

Deadeok Soon Kim (2002) points out the primary value and secondary value of the innovation process which is created by Science and Technology Parks. The primary value is the capability of R&D activities, to the knowledge transfer and application, and leading to the

commercialization of products and services. During that process, STPs also design a foundation or secondary value, which are the high-value human resources, more information, consulting capabilities and financing resources. He concludes the necessary factors which contribute to the national innovation system, government, industry, university, financial institute, management consulting firms, the input are money, people and knowledge, the output will be science and technology knowledge… All these factors will be combined with the synergies of external and internal environment.

Finally, Byungho, Oh (2008) & (2009) comments that by synthesizing much of work on cluster based approach, the key factors on characteristics of clusters are narrowed down as follows: (i) location and spatial factors, (ii) economic and organizational factors, (iii) social and cultural factors and (iv) timing and policy factors. He also adds that it is very important to identify what factors influence Science and Technology Park clusters and redesign the framework for economic impact model. Byungho, Oh (2009) proposes some aspects which contribute to the two key roles of promotion to the regional industries and of support for the technology-based companies. In order to be the strategic builder of regional industries, STPs are in charge of planning of promotion to the regional strategic industries, create the networking of industries, universities and research centers within the regions and the networking roles between supporting institutions for the companies. To support for the high tech companies, STPs are the contact hub, execution to support new business and operation of facilities and equipment.

2.3 Definition and purposes of STPs

The International Association of Science Parks (IASP) is a worldwide network. Its definition embraces the different models, which exist all over the world. An effort has been made to identify the main common denominators of the different existing models, as well as to set the minimum standards and requirements that any project must have in order to be acknowledged as a "Science Park". (IASP)

The IASP has cross-examined and compared the models and experiences of Science / Technology Parks in the 63 countries throughout which its members are located, to ensure the truly global character of its definition.

According to IASP official definition on Science Parks, **"A Science Park is an organization managed by specialized professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions."**

There are many approximate synonyms for Science Park, including Science and Technology Park, Research Park, Technology Park, Technopolis and Cluster. In the beginning, science and technology parks are associated with or operated by institutions of higher education (colleges and universities).

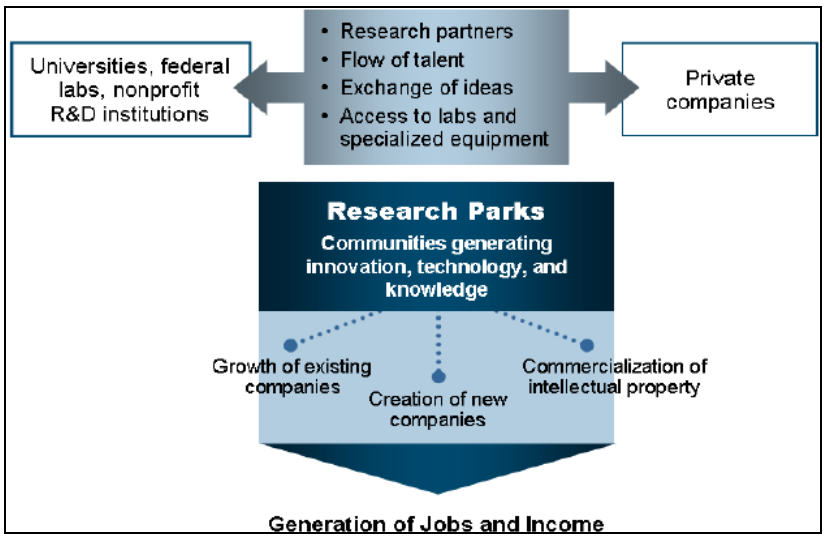
These parks differ from typical high-technology business districts in that science parks and the like are more organized, planned, and managed. They differ from science centres in be-

ing concerned with future developments in science and technology. Typically businesses and organizations in the parks focus on product advancement and innovation as opposed to industrial parks that focus on manufacturing and business parks that focus on administration (Science Park. November, 2007).

"A new model, which is strategically planned mixed-use campus expansions, is emerging and involves shared space in which industry and academic researchers can work side by side. These university-affiliated mixed-use campus developments are not simply real-estate ventures. They embody a commitment by universities to partake in broader activities, offering companies high-value sites for accessing researchers, specialized facilities, and students, and promoting live-work-play environments. Key features of these mixed-use developments include space for significant future research growth; multi-tenant facilities to house researchers and companies; and housing, along with other amenities which are attractive to young faculty, post-doctoral and graduate students"[v].

What all science parks have in common is that they are, at heart, knowledge partnerships that foster innovation. According to International Association of Science Parks (IASP), "the purposes of these parks is to promote the economic development and competitiveness of cities (regions) by creating new businesses, adding more value to companies, and creating new knowledge-based jobs".

Figure 1 Science and Technology Park Concept



(Source: Battelle, October 2007)

2.4 Characteristic of STPs

To enable the goals of promoting regional competitiveness and economic development, a Science and Technology Park (STP) stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, companies and markets. It has to facilitate the creation and growth of innovation-based companies through incubation and spin-off processes; and provides other value-added services together with high quality space and facilities. (Oh, Byung Ho, 2008)

The first characteristic of STP is innovative. STP is the place where sources of innovation begin because all the best universities and research institutes are located. They are the first hardcore of the STP, the significant contributors in innovation networks.

However, having good innovative resources is not enough, the application and commercialization them successfully is the final goal of every innovative idea and product. Therefore,

the collaboration and cooperation among institutions and companies are the second hard-core characteristic.

Science and Technology parks are sources of entrepreneurship, talent, and economic competitiveness for the nation, and are key elements of the infrastructure supporting the growth of today's global knowledge economy. By providing a location in which government, universities and private companies cooperate and collaborate, science and technology parks create environments that foster collaboration and innovation. They enhance the development, transfer, and commercialization of technology. (Science Park, November 2007)

“Science parks are also being developed to leverage the assets of non-university research and development organizations such as federal laboratories. In addition to universities, research centers and organizations can be key drivers of technology-based economic development” (IASP). Science parks can also provide a location for start-up companies created to commercialize technology developed in the labs. (IASP)

Science and Technology Park is also the playground for launching new businesses and venture companies. It provides the launch pad that startup companies need when they split out from an institution or a company. Park-provided training in such areas as intellectual property law and business planning help the fledgling businesses to succeed. Universities, in turn, benefit by exposure to the business world, and the connection to the cutting-edge research being conducted outside their walls in industry. (Science Park, November 2007).

2.5 Key roles of STPs to the regional development and competitiveness

Regional competitiveness and development is often decided by the successful operation of those Science and Technology Parks. According to IASP, “Science and Technology Parks are the perfect habitat for businesses and institutions of the global knowledge economy”. Science & Technology Parks promote the economic development and competitiveness of regions and cities by:

- Creating new business opportunities and adding value to mature companies
- Fostering entrepreneurship and incubating new innovative companies
- Generating knowledge-based jobs
- Building attractive spaces for the emerging knowledge workers
- Enhancing the synergy between universities and companies

STPs are playing roles in showing a pattern on regional centralization and decentralization through employment change on the manufacturing sector. Through having new business growth, manufacturing sector is also developed which leads to the change in population. Certainly, that leads to the increasing of income (Wonseon Kyung Son, 2006).

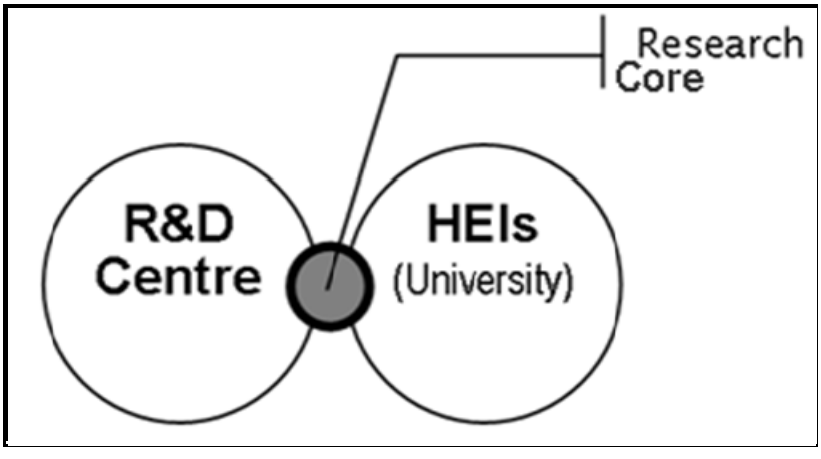
Bennett and Graham (1998) figured out the close tie between manufacturing employment and urban corporate sales are outsourcing strategy. Outsourcing strategy can be achieved when the returns to external economies of scale in service outsourcing exceed the transportation and communication costs. Kim TM (2003) proposed the input-output model which

utilized the number of employees and cost of R&D including patent expenses, rent, building price, etc. Shanzi Ke (1996) showed the company activity, project duration, spatial strategy, company size, location with knowledge industry relationship to demonstrate regional impact. Ray Okey (2007) showed the figure to demonstrate relationship between each service sector and companies through map.

2.6 Development of STP clusters

The development of a STP cluster may originate from a science park, which focuses mostly on R&D. Science Park initially starts from an incubation centre, which only develops within a restricted space. This incubation centre mainly intended for start-up firms, examples are CNU incubation centre, Dortmund Technology Centre in Germany. After that, it moves to a larger scope, which is Science Park or Research Park. These parks occupy a larger area of land and better infrastructure.

Figure 2 Core Function of Science Park and Research Park



(Source: Oh, Byungho. 2009)

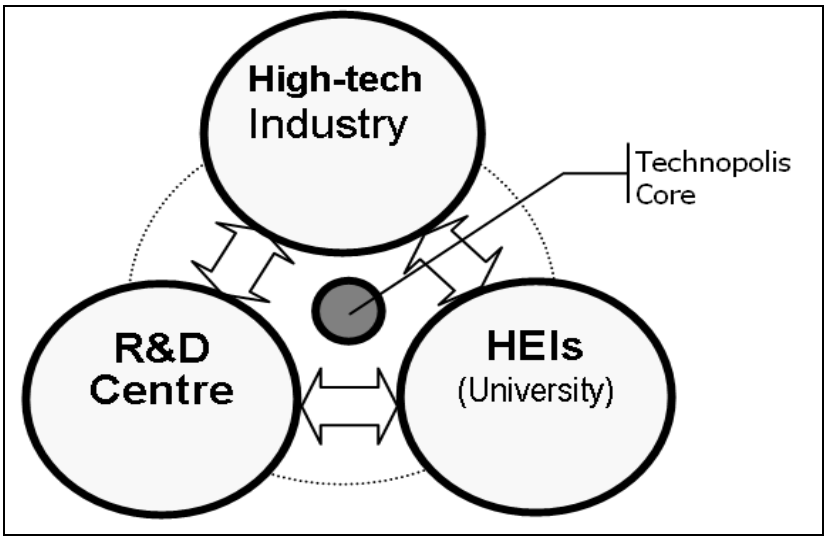
The main purpose of these parks is concentrating most in R&D but permit light prototype development and a small portion of production. Cambridge Science Park and Surrey Research Park in UK are the typical examples. Science Park and Research Park have a formal links with a university or other higher educational and research institutions (HEIs). Knowledge based products and business are encouraged while management takes the important portion in transferring and managing that technology.

Figure 3 Cambridge Science Park, UK

Figure 4 Dortmund Technology Park, Germany

Technopolis is the next development step with the creation of new settlement including production activity. At this level, Technopolis can co-operate and collaborate on both R&D and production. Regarding to the physical feature, technopolis is no longer being restricted in a border but extend to urban development. Technopolis is one of the factors which contribute to the regional development by creating more external jobs outside such as service jobs, or developing buildings and facilities for the employees and their families. The numbers of venture firms will increase dramatically with many new business projects. Technopolis will be the creation of new settlement including production activity. In the area of production, Technopolis still focuses on high-tech production and commercialization. At this stage, the approach of technopolis is the need for a balance between R&D and production.

Figure 5 Core function of Technopolis



(Source: Oh, Byungho. 2009)

Moreover, instead of focusing on technology, Technopolis involves the creation of new settlement, compete with Research Park, new universities, technology centers, housing and cultural facilities (Tatsuno, 1986). Technopolis has “a larger in scale and often linked to the development of infrastructure and facilities on the new town model whereas science parks are more limited in scope” (Masser, 1991; Oh, Byungho, 1997). Finally, techopolis has more production oriented than science parks.

Figure 6 Tsukuba Science City, Japan_ Technopolis Model

Figure 7 Research Triangle Park, USA_ Technopolis Model

The highest level of a STP called regional innovation cluster, which are the “inter-related” firms in both co-location and concentration in a particular field (Porter, 1998). STP cluster focuses on innovative and entrepreneurial benefit in the region. It is the clustered development of Technopolis and Science Park in the region. Good examples for regional innovation cluster are Daedeok Innopolis in Korea, San Diego Bio-Technology Cluster in the United States, Oulu Science city in Finland, Kista Science city in Sweden, etc.

Figure 8 San Diego Biotechnology Cluster, USA

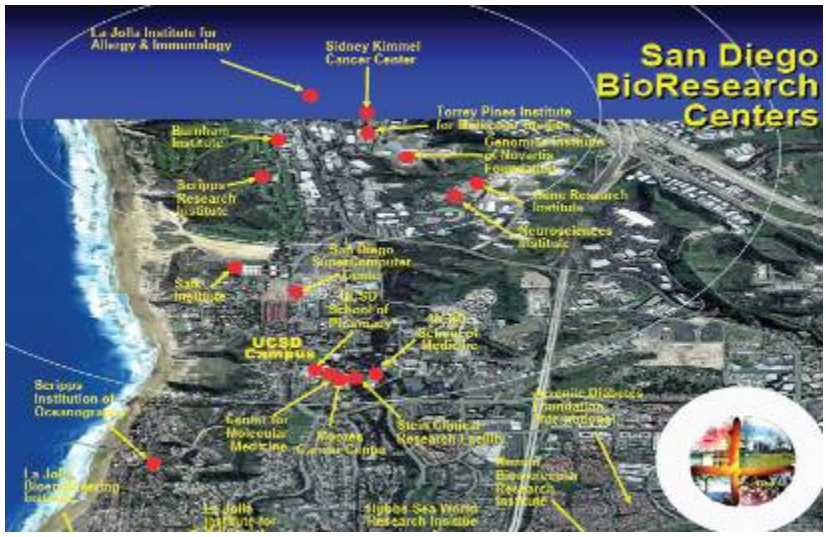
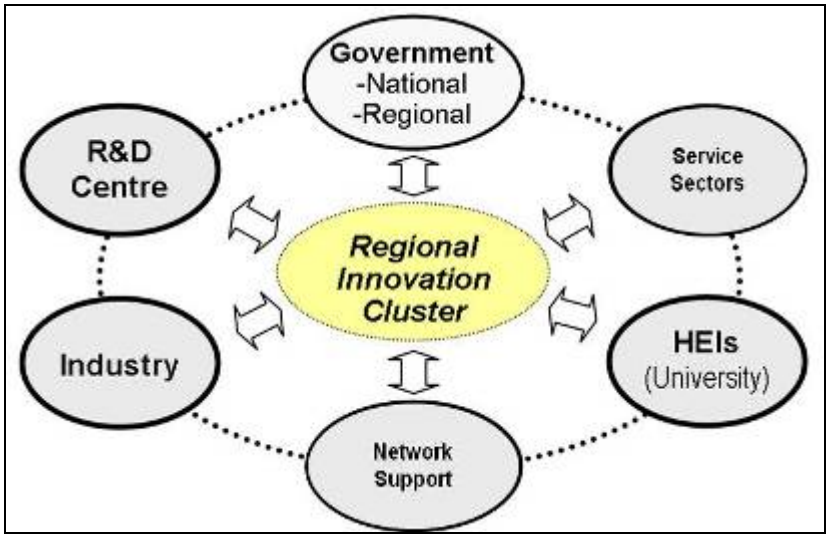


Figure 9 Oulu Science City, Finland

Regional Innovation cluster aims at developing a network building of available intellectual, innovative and entrepreneurial resources, which are the favorable business, social, and political environment. Moreover, innovation clusters must use those resources effectively.

Figure 10 Regional Innovation Cluster Model



(Source: Oh, Byungho. 2009)

Porter (1998) also emphasizes that cluster is not an industry with one product or one service. It is the serial of related industries, from suppliers, service providers, manufacturers… Cluster breaks down the traditional boundary between manufacturing and services, which are not separated but connected to each other's. Regional innovation cluster can redraw the economic definition. The suppliers now have the horizontal related, not vertical because they also have strong skills and capacity, for examples pharmaceutical may go with skin care industry. Even though the firms take the important roles in the successful of the innovation cluster, institutions are still the hardcore with new formations such as specialized training providers, standard setting agencies… In productivity perspective, cluster is in between industry and sectors.

Chapter 3

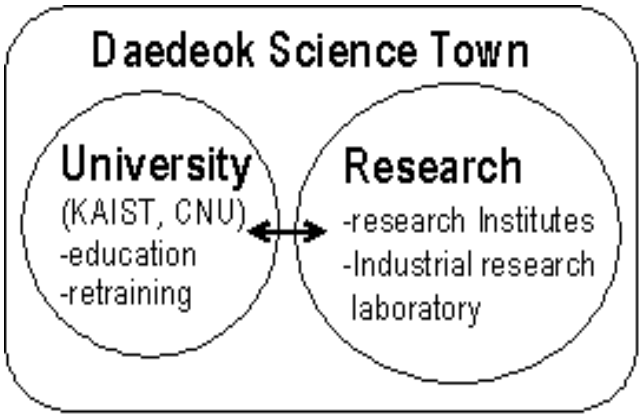
Daedeok Innopolis: Successful Case of Korea

3.1 Daedeok Innopolis Model

Daedeok Technology Town becomes the first STP, established in 1973 with the support and orientation from the Korea government. Through its development history, Daedeok Innopolis has experienced through three stages. The first stage is the Science and Technology Town, which assembled government research institutes and KAIST in the area of 17.8 square kilometer. After that, it moved to Technopolis during the 1990s with the participation of the ventures firms which focusing on technology commercialization. At this stage, the size of the park is enlarged by the having more players such as CNU, ICU in university segment and ETRI, KSSR, KCR…in government research segment. In 2002, central government has designated Deadeok Science Town and its vicinity as Deadeok Valley. Daedeok changed comprehensively to Innovation cluster special zone, with 70.4 square kilometer area. Daedeok Science Town, Deadeok Techno Valley, Venture Parks, Industrial Complex, all of them is accommodated within the Daejeon Metropolitan city. Nowadays, Daedeok Innopolis has 843 organizations including 20 government research institutes, 40 private institutes and 741 private companies. Its major research areas are Information Technology (40%), Biotechnology (14%), Material Science (9%), Chemical Engineering (8%) and Energy resources (8%).

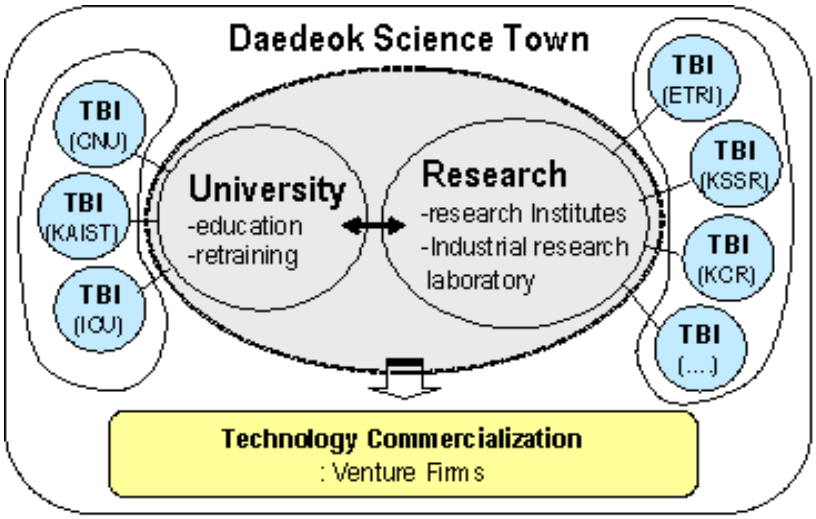
Oh, Byungho (2008) has outlined the development procedure of Daedeok Innopolis through time in the figure 11, 12 and 13.

Figure 11 Daedeok Model from 1973 to 1996



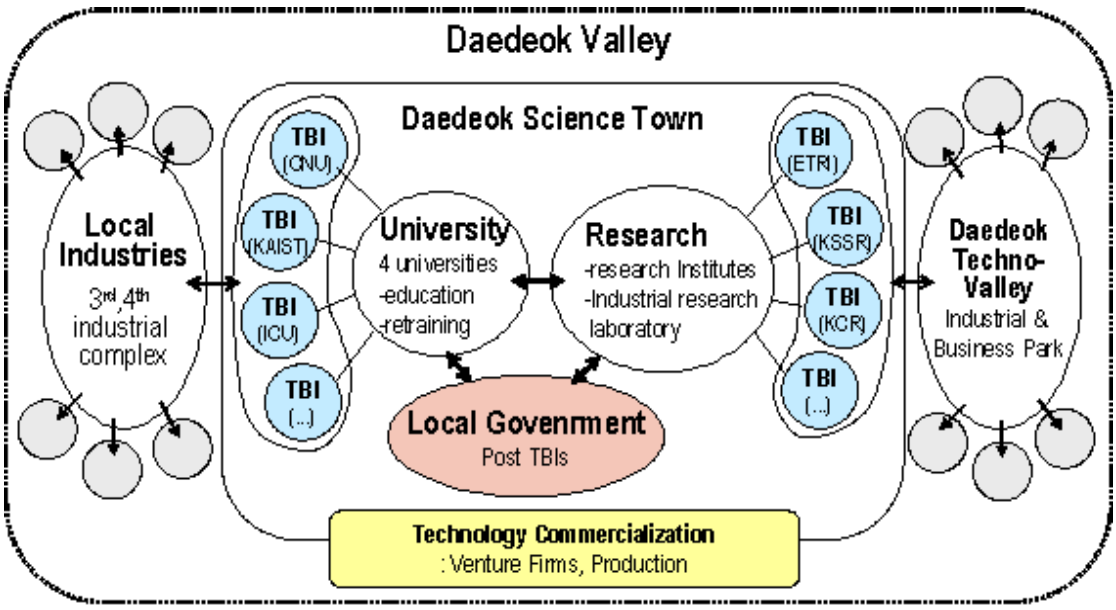
(Source: Oh, Byungho. 2009)

Figure 12 Daedeok Technopolis from 1996 to 2002



(Source: Oh, Byungho. 2009)

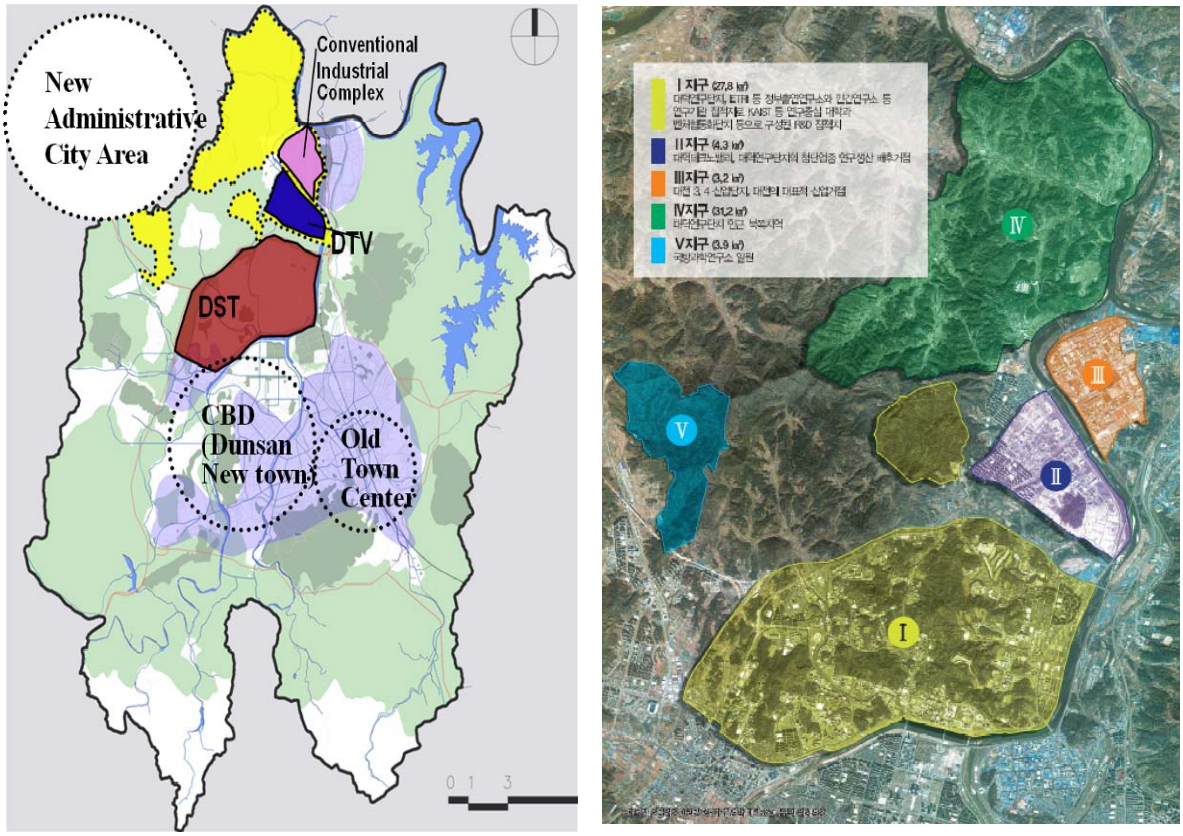
Figure 13 Daedeok Innopolis Model from 2002 up to now



(Source: Oh, Byungho. 2009)

When Deadeok Science Town was incorporated administratively into Daejeon in 1983, it was merely a secondary urban center. Year 2000 marked the new turning point in terms of Daedeok's role for urban structure, high tech support regional growth and linkage between mother city and new capital. Unlike other science and technology parks, the more developed the Dadeok Innopolis are, the more important the role of government supervise, support and orient the park. Moreover, from the core factor, which is the collaboration between universities and research institutes, the development of the park is not within the its border but expand to the cluster with the induction of 3rd, 4th tier of industrial complexes and business park. The affect of Daedeok Innopolis has changed from the local development to the regional development. (Oh, Byungho 2009).

Figure 14 Daedeok Physical Planning (right) and map of Daejeon Metropolitan city

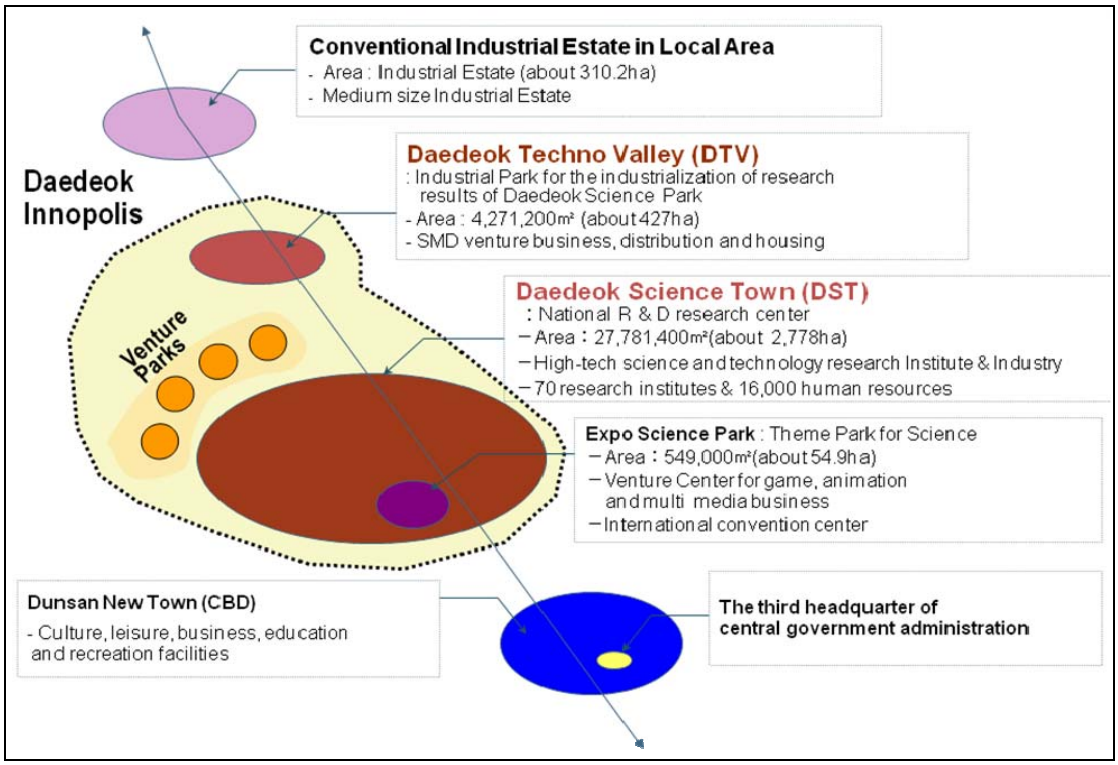


(Source: Oh, Byungho. 2009)

3.2 Contribution to the regional development and competitiveness

Oh, Byungho (2008 & 2009) clearly proved the contribution of a Science Park to the success and development of a region. Daejeon province through the history has turned in to the metropolitan city in South Korea, with the development of Daedeok Science and Technology Park. The city was not only become a leading city in science and technology but also become the center of culture, education, entertainment, leisure and sustainable environment. Figure 15 clearly shows the growth axis of the urban conurbation of Daedeok district in Daejeon metropolitan.

Figure 15 Composition of Daedeok Innopolis and Growth Axis: Urban Conurbation

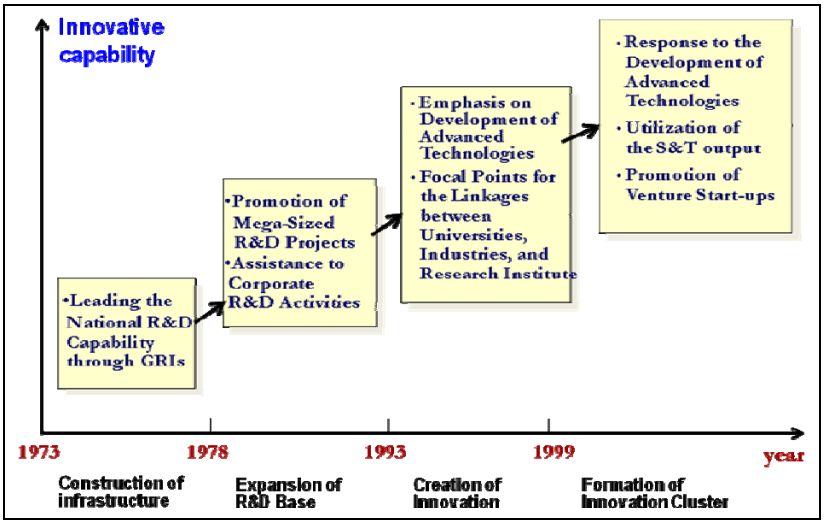


(Source: Oh, Byungho. 2009)

Through the years of development, Daedeok Innopolis has improved itself rapidly and successfully. In the early years, Daedeok Science Town has achieved the goal of being the leading national research and development center through the establishment of government research institutes. These institutes were the basement for the next generation. Six years after the debut, Daedeok Science Town had the capability of promoting and conducting mega-sized R&D projects. Transferred itself to Techonopolis during the 1990s, Daedeok had emphasized on the rapid changing of advanced technologies, which leaded the world economy later on. Moreover, it accomplished the task of being the linkages among universities, industries and research institutes. This period was also witnessed the rapid growth in both

quantity and quality of private institutes. Daedeok Innopolis was also structured with the Administration Law enacted and management plan. In the 2000s, Daedeok Innovation Cluster now has the full capacity in responding to the development of advanced technologies. Moreover, science and technology output are now utilized and commercialized. The number of venture start-ups increases rapidly. Figure 16 illustrates the development of Daedeok Innopolis through its history.

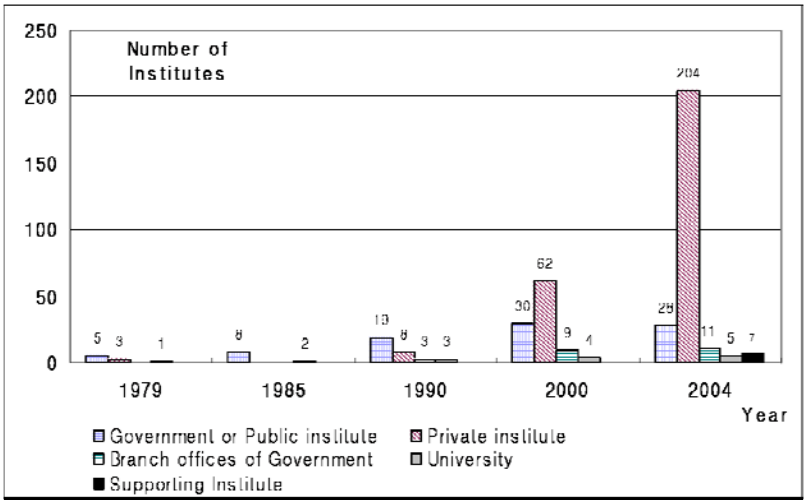
Figure 16 Development of Daedeok Innopolis



(Source: Yim, D.S, 2008))

The figure 17 and table 1 shows the number of institutes increased in Daedeok as well as the number employees it created until Dec 2007.

Figure 17 Number of Institutes in Daedeok Innopolis



(Source: Oh, Byungho. 2009)

Table 1 Number of Employees in Daedeok (Dec 2007)

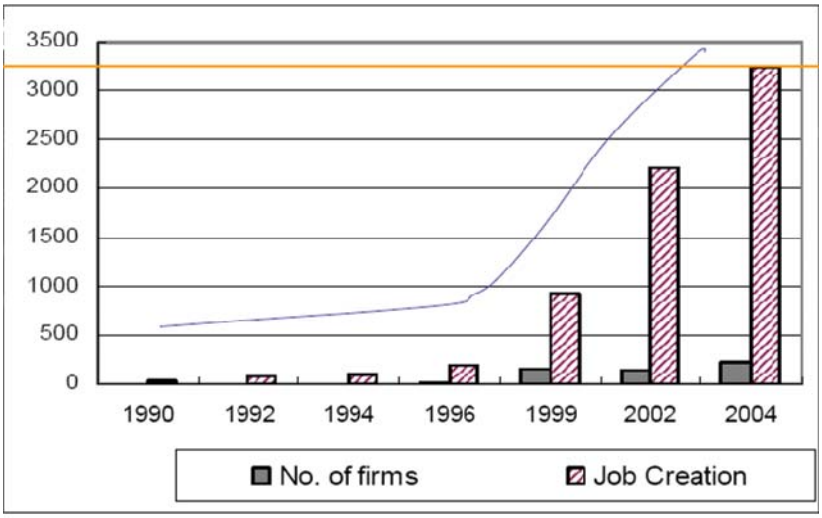
Description	Public Sector	Private Sector	Total
Comprehensive R&D	4 (1,230)	1 (83)	5 (1,313)
Bio-technology	4 (482)	5 (455)	9 (937)
Information technology	3 (2,655)	5 (848)	8 (3,503)
Precision chemical	1 (403)	9 (1,672)	10 (2,075)
New material (including high molecule)		5 (549)	5 (549)
Meccatronics (including marine science)	2 (571)	2 (305)	4 (876)
Resource, Energy development	5 (2,173)	2 (76)	7 (2,249)
Astronomy, Aerospace, Astronautics	3 (806)	1 (109)	4 (915)
The others	6 (2,483)	2 (112)	8 (2,595)
Total	28 (10,803)	32 (4,209)	60 (15,012)

(Source: Oh, Byungho. 2009)

Daedeok Innoplis proved its impact on the regional development in almost all segment of the economy. With the development of research, it had transferred and improved knowledge and technology to the region. The establishment rate of new venture companies increased speedily; bring about the increase of jobs. The increase in number of the companies is not

very fast but there have been the rapid increase in the jobs, means that the those small and medium enterprises have been growing up in a short time and attract many high skilled employees, a successful investment in quality with the human resources development. The region is modernized with the rapid speed. Moreover, third parties can utilize that knowledge and technology free when they stay in the region.

Figure 18 Increase in the number of firms and jobs in Daedeok



(Source: Oh, Byungho. 2009)

Table 2 Growth of Venture firms from major R&D centers

Growth of Venture Firms from major R&D centers in DV

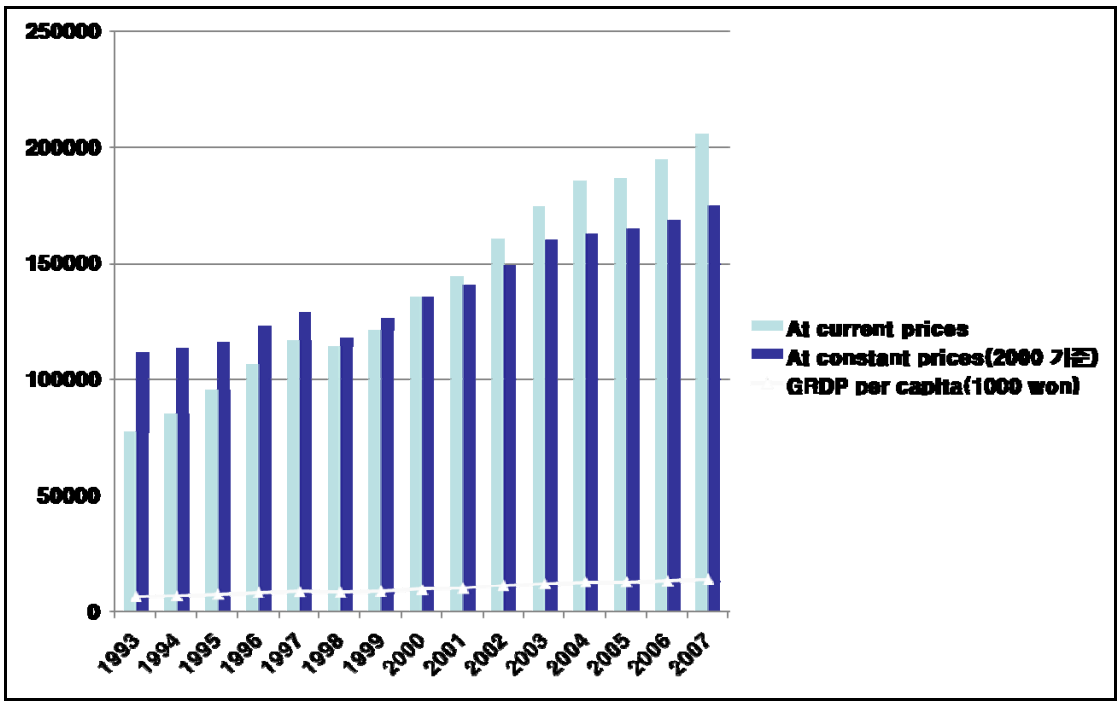
Year	*1990*	*1992*	*1994*	*1996*	*1999*	*2002*	*2004 (DV total)*
No. of firms	2	6	7	20	154	130	**219 (824)**
Job Creation	35	84	96	187	924	2,212	**3,237 (22,395)**

(Source: Oh, Byungho. 2009)

Second, after the R&D projects succeeded, they are brought in to life and they certainly went to Daejeon first. It means that Daedeok has improved the productivity of the region

through producing products and commercializing them. In indirect impact, higher productivity means that there will be more jobs created with higher living standard.

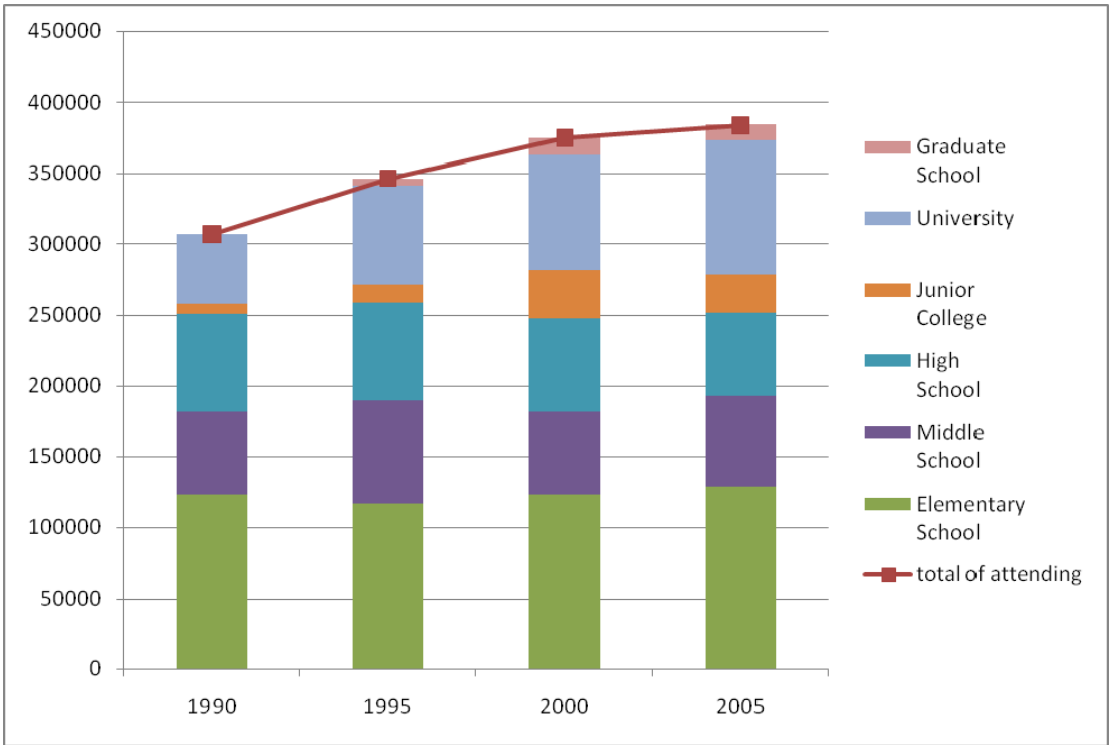
Figure 19 Gross Regional Domestic Product in Daejeon



(Source: Oh, Byungho, 2009)

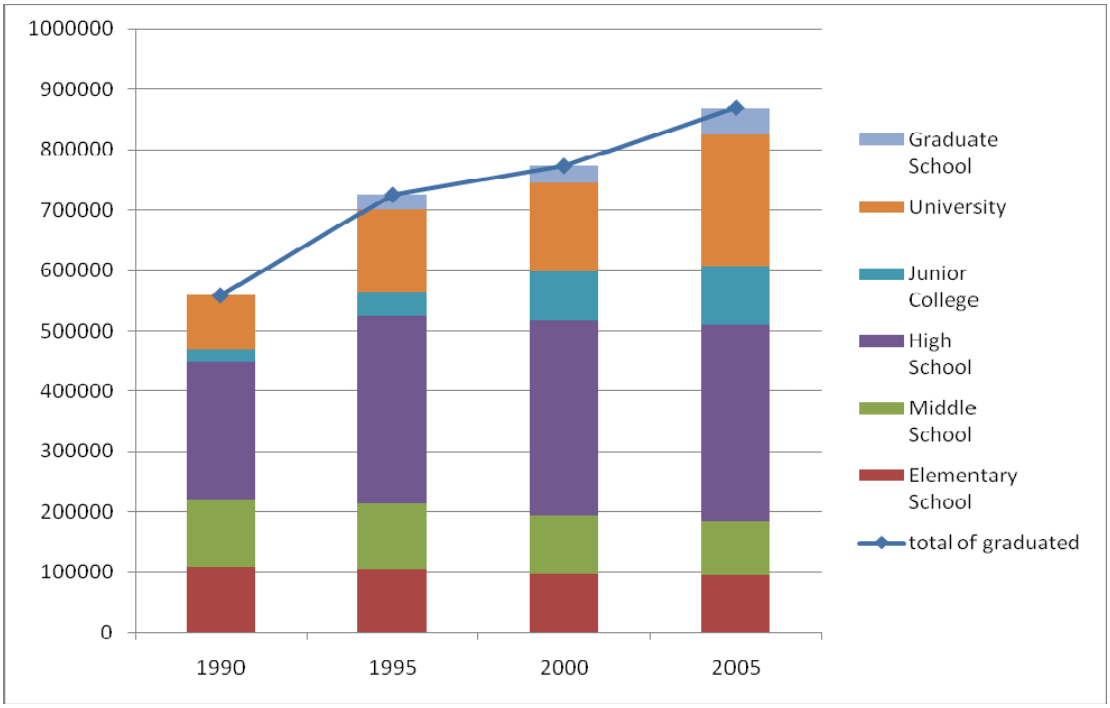
Oh Byungho (2009) also proposes that Daedeok Innopolis also took a role in incubation. It actually reinforced the stabilization of marketability, increasing sales and creativity as well. Finally, it contributed to the formation and development of the education system in the region, which means that the labor productivity will be the competitive advantage of the region in the future. Having a good environment education, the region can have advantage in incubating entrepreneurship and also improving in culture and social formation.

Figure 20 Segmentation of attending education in Daejeon city



(Source: Oh, Byungho, 2009)

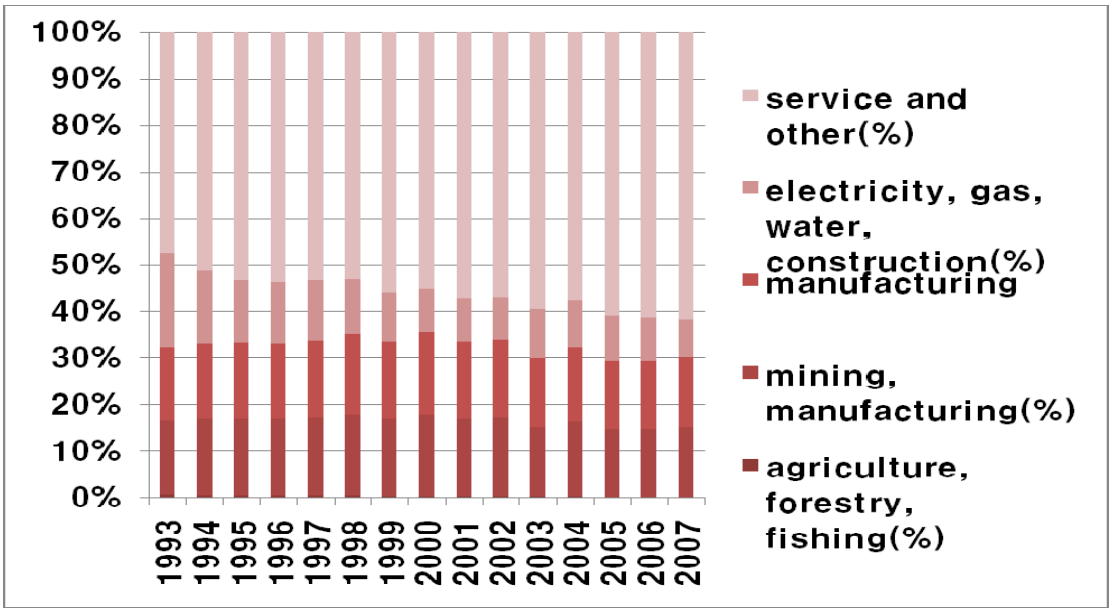
Figure 21 Segmentation of graduated students from Daejeon



(Source: Oh, Byungho, 2009)

The Daedeok Innopolis also helped to shape the industrial structure of the region.

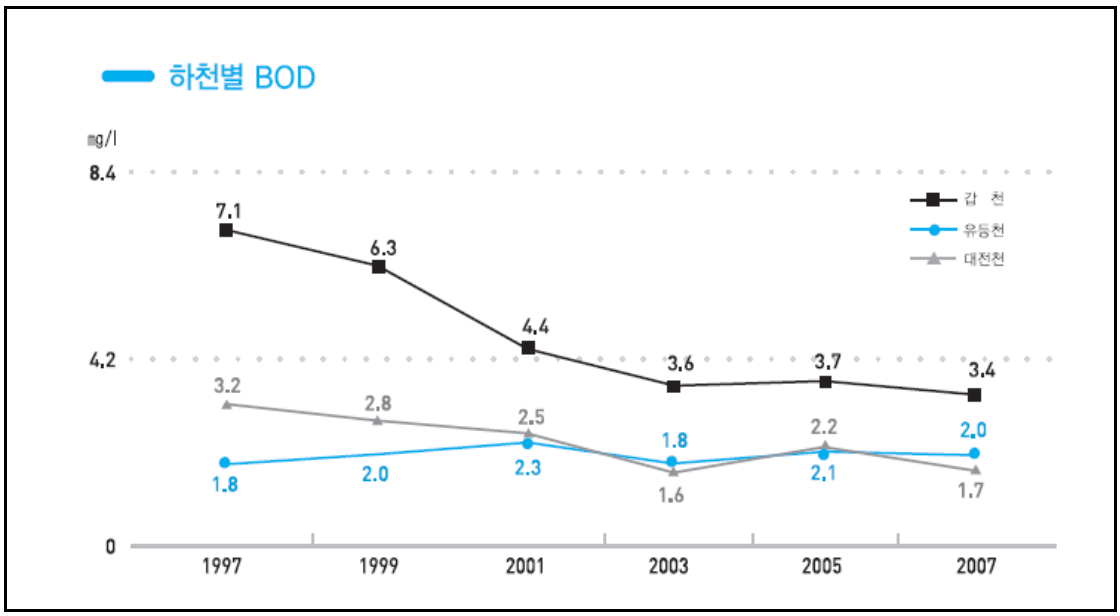
Figure 22 Industrial Structure in Daejeon



(Source: Oh, Byungho, 2009)

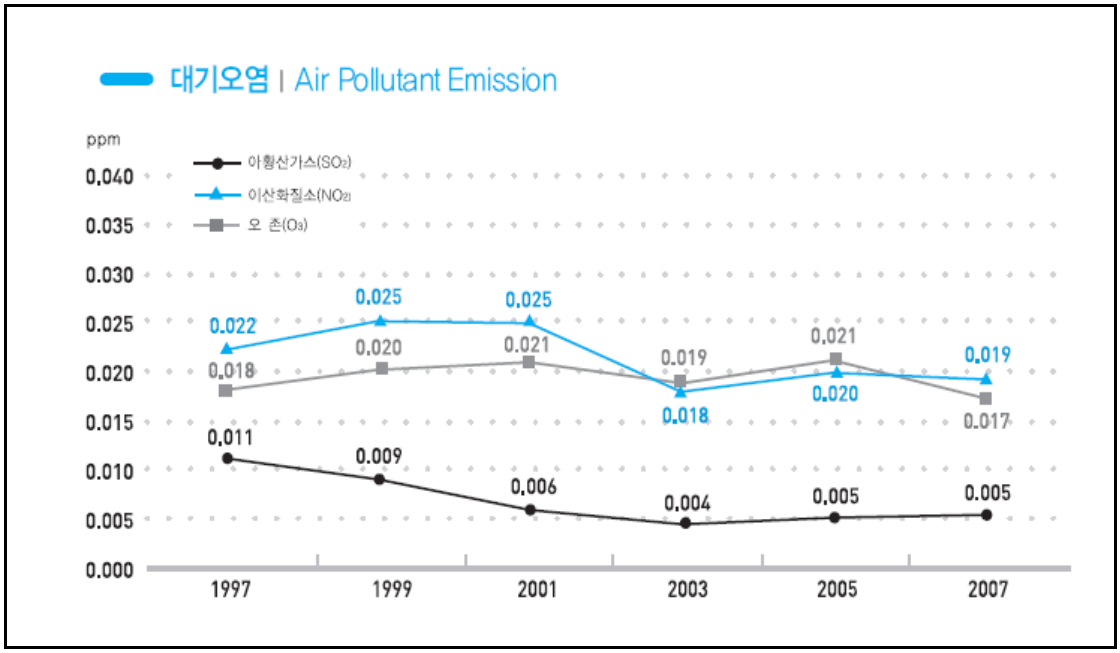
From the regional development perspective, population increase rate had been decreased until 1997 but return to stability during 1998-2000 due to the many new activities of Daedeok. There are more students chose Daejeon as the education destination rather than Seoul, especially in science and technology segment. The number of students attending graduate schools and universities in Daejeon is increasing every year. Gross regional domestic product rebound quickly just about 02 years from the Asia economic crisis in 1997. Industrial structure changed to services industry, which help to reduce the environmental pollution. The development of R&D and advanced technology of Daedeok in the early years lead to the advanced formation of the knowledge-based economy.

Figure 23 Water pollution (BOD level in rivers of Daejeon)



(Source: Oh, Byungho, 2009)

Figure 24 Air pollutant emission data



(Source: Oh, Byungho, 2009)

3.3 Summary

Daedeok Innopolis is a successful case of Korea Science Park with historical regional impact and effects of 36 years. Daedeok model shows what historic impacts and effects it brings to the regional development and competitiveness. Daedeok Innopolis had experience of downturn during the Korean economic crisis in 1998 and it actually overcome this difficulty successful. (Byung-ho, Oh. 2009).

Daedeok Innopolis model is part of urban development program with three stages of development: Science and Technology Town (R&D island), Technopolis (R&D and commercialization), and Innovation cluster. Daedeok Innopolis received strong drive and dedication from central government with the Regional decentralization policy. Its success has proved that Innovation cluster is the effective vehicle to stimulate regional economic development. Daedeok Innopolis model is based on investment in knowledge based industry capacity building, infrastructure, educated and trained labor, and export orientation with international production networks.

After the IMF bailout in 1998, venture firms spin-off increased dramatically due to the massive lay-off scientists and researchers. They then became the main force in productivity formation. Daedeok Innopolis had experienced through 35 years to develop and mature as regional innovation cluster. This achievement results in the skillful synergy between appropriate strategies and effectively actions. Daedeok Innopolis has proved its impact on the regional competitiveness through global marketing, labor resource development, and commercialization.

Chapter 4
STPs Development in Vietnam: analysis and lesson learned

Starting from the tenth general meeting of Vietnam Communist party, Vietnam aimed at improving Science and Technology infrastructure, and to help shaping innovative capabilities for development purposes. Currently, 21 science and technology parks are operating in 18 provinces of Vietnam but the actual efficiency and effectiveness are negligible. Within this chapter, the author aims at researching and analyzing the two biggest S&T parks in Hanoi and Ho Chi Minh City, which can be the representatives for the others. During 1997- 2007, efforts have been made in Hanoi and Ho Chi Minh city, with the purposes of relocating R&D laboratories and facilities of the campuses of the national universities to the center of the Hoa Lac and Ho Chi Minh (Sai Gon) High Tech Parks, in order to create a close connection between academic institutions, researching centers, international laboratories and commercial companies, venture firms, and international groups.

4.1 Hoa Lac Hi-Tech Park and Ho Chi Minh Hi-Tech Park overview

The linkage among universities, industries and government in a hi-tech park will improve innovation, a key factor in competitiveness among countries. Hoa Lac and Ho Chi Minh hi-tech parks are located in the two metropolitan areas, which set them differ from export

processing zones and industrial area. Investors, tenants, developers will benefit from more advanced infrastructure, such as telecommunications and power supply, specialized research centers and academic institutions, technology and business incubator.

4.1.1. Hoa Lac High Tech Park

Experiences from many countries throughout the world showed that development of hi-tech park is an important measure to further promote the process of national economic development, namely Silicon Valley hi-tech park, Hsinchu Science park, Daedeok Innopolis….Catching this trend, development of hi-tech park is one of breakthrough measures to enhance national domestic technological capacity, help Vietnam narrow the gap of economy and science technology with other countries in the region and throughout the world and also contribute to speeding up nation's deeper integration into the challenging global economy today.

Base on the result of general project on developing Hoa Lac Hi-tech Park supported by Japanese Government, former Prime Minister Phan Van Khai promulgated Decision No. 198/1998/QĐ-TTg dated on October 12th 1998 on establishing Hoa Lac Hi-tech Park – an important project of Vietnam's Government in Thanh That district, Ha Noi Capital.

Hoa Lac Hi-tech park located in the west of Hanoi, 30 kilometers far from Hanoi capital, 47 kilometers from Noi Bai International Airport and over 100 kilometers from Hai Phong Port. It is near many new areas of big universities such as Hanoi National University; Hanoi University of Technology …Vietnam Government decided to upgrade Lang-Hoa Lac high way to 10 lanes, connecting Ha Noi Center with Hoa Lac Hi-tech Park and expect to complete at the end of 2010. After completing, Lang-Hoa Lac will become the most modern high-way in Vietnam connecting Hoa Lac with Ha Noi with only 15 minutes. Along this highway is a chain of main projects of Vietnam Government such as Trung Hoa – Nhan Chinh new urban area, National Convention Center, My Dinh National Stadium, New campus of Hanoi National University, Culture Village of Vietnam, small and medium-size industrial areas, Vinaconex Water Plant, residential areas and new entertainment centers, etc.

Figure 25 Hoa Lac Hi Tech Park Location

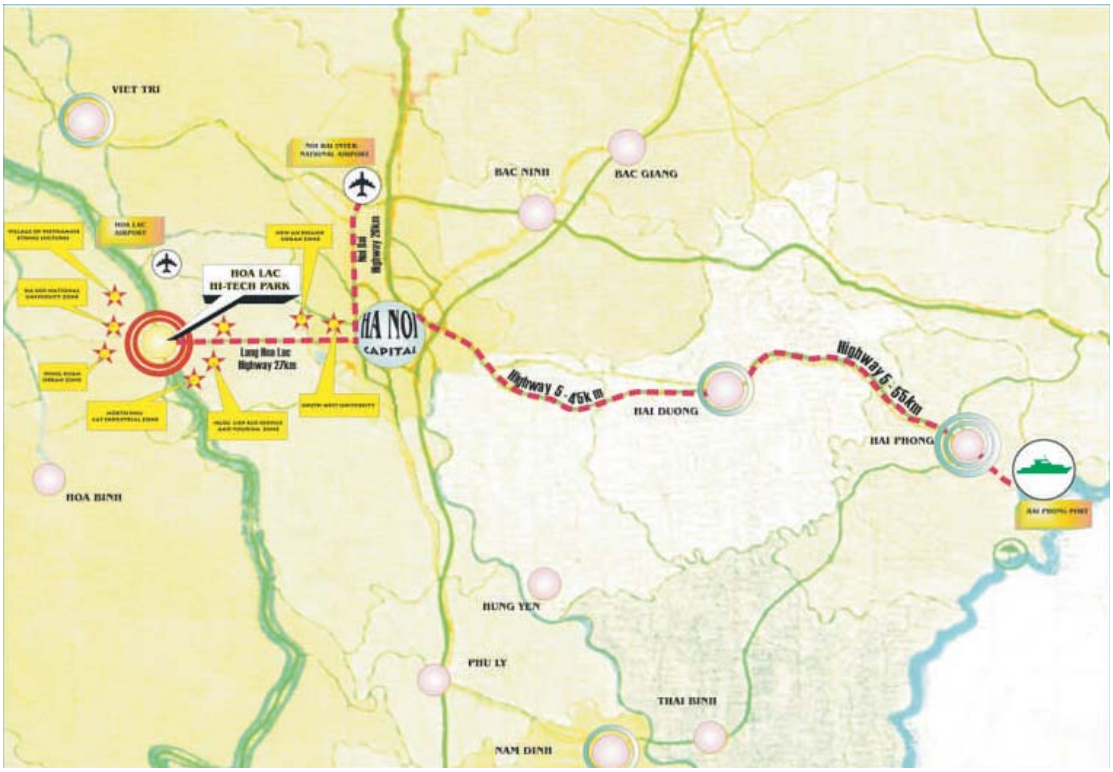
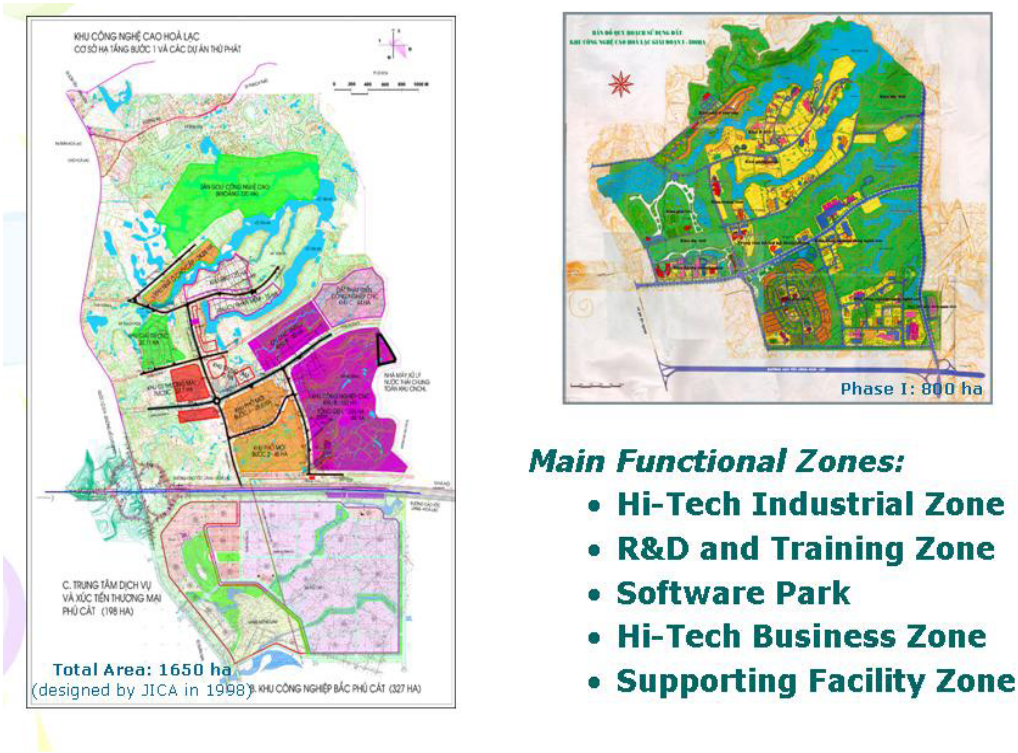


Figure 26 Master Plan of HHTP (1650ha)



Hoa Lac Hi-tech Park is built as the model of center of development, research and hi-tech applications at national scale where germinate hi-tech business incubation, human resource training, product manufacturing and commercialization. The high and priority technologies in Hoa Lac Hi-tech Park are information and communication technology and software technology; bio-technology for Agriculture, aquiculture and health; microelectronics technology, precision machinery, optoelectronics and automation technology, new material technology, nano-technology; environmental friendly technology, new energy technology…and some other special technologies.

According to the revised master plan designed by Japanese International Cooperation Agency (JICA) and approved by Vietnamese Prime Minister in Decision No 621/QD-TTg dated on May 23rd 2008, Hoa Lac Hi-tech Park has the following main functional zones:

Table 3 Hoa Lac main functional zones

Functional Zones	**Area (hec-tare)**	**Percentage (%)**
Software park	76	4.79
R&D	229	14.44
Hi-tech industrial zone	549.5	34.65
Education and training	108	6.81
Center Area	30	2.15
Mixed use zone	87.5	5.52
Apartment and Office	42	2.65
Housing area	26	1.64
Amenity zone	110	6.93
Park and sport area	33.5	2.11

(Source: Hoa Lac hi-tech management board)

4.1.2. Ho Chi Minh Hi-Tech Park

Established in 2002 and being one of Vietnam's only two national hi-tech parks and considered one of Ho Chi Minh City's five focal economic projects serving as the driving force for the city's development until 2010, Saigon Hi-Tech Park (SHTP) has received exceptional supports from both the central, local governments, and from other relevant state agencies. As a result, the Park has been authorized to offer the highest tax incentives and one-stop investment application service to investors[vi].

At the same time, the Park has a number of advantages, such as close proximity to many educational institutions, airports, and seaports and close connection with local universities, while its dedicated and experienced stall creates an environment conducive to tenants operating successfully. SHIP also offers a "one-stop-shop" application service and highest tax incentives allowed by the law to help investors conduct their businesses.

SHTP’s location present the easy access for almost everyone with 15 km north east of downtown Ho Chi Minh city, 18km to Tan Son Nhat International airport and 12 km to Sai Gon harbor, in proximity to Tan Cang port, Thi Vai port and Cai Lai port. Moreover, it locates in the center of the Focal Economic Region in the south of Vietnam.

Figure 27 Ho Chi Minh Hi-Tech Park location

(Source: maps.google.com)

4.2 Analysis

4.2.1. Achievements

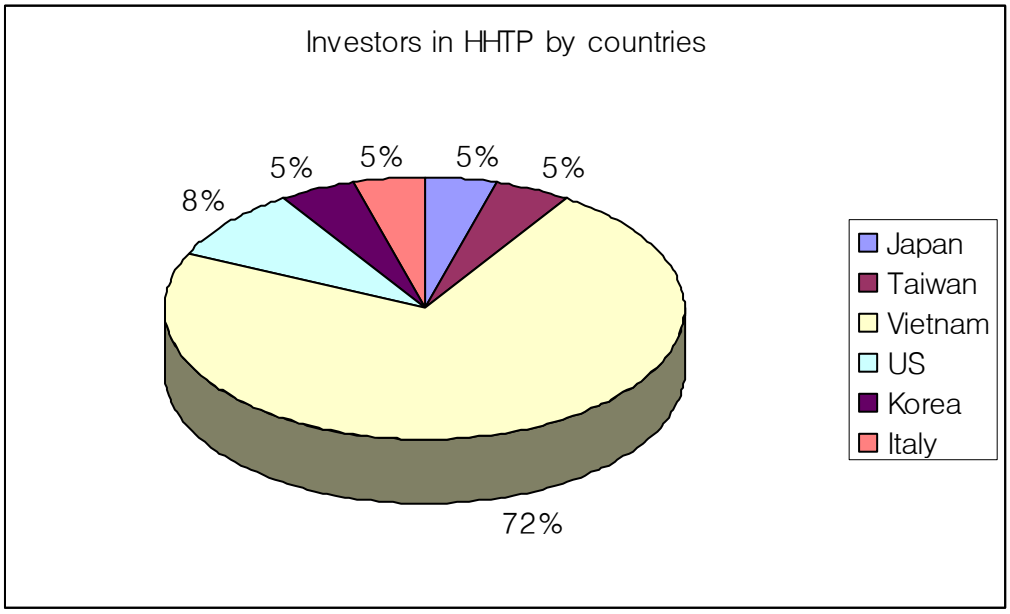
The decision to establish High Tech Parks is breaking strategy in order to improve the country's technologies capacity, so that Vietnam can narrow economic and sciences & technologies gaps with regional and global countries quickly, to develop the national economy as well as to contribute to speeding up Vietnam's deeper integration into the challenging global economy today.

Hoalac High-tech Park, was built as a national center of research, develop and apply high technologies to incubate high technology enterprises, to train in human resources, to manufacture and deal in high technological production, consist of functional zones such as: high tech industrial zone, research & development zone, software park, education & training zone, office & apartment and general services… to focus on development of priority high technology fields such as Information Technology, Telecommunication, Software, Biotechnology applied in Agriculture, Aquaculture and Pharmacia, Microelectronic, Precision mechanics, Optoelectronics, new material, nano technologies, new energies, environment technologies... and other special technologies.

For nearly 10 years of operation, HHTP now has attracted 500 companies, both overseas and domestic, to invest in the park. The investors mostly are from Asia, such as Japanese,

Korean, Taiwan, Singapore… which has the advantages of proximity and culture. Moreover, investors beyond the ocean also don't miss the chance of entering an attractive market, with more and more Europeans and United States are coming. Registered capital accumulated till 2009 is US $ 600 million; with US $ 200 million is from new license.

Figure 28 Categories of Investors by countries



(Source: Hoa Lac hi-tech management board)

Table 4 Numbers of companies invest in HHTP by sectors

Sectors	Numbers of Companies
Hi-tech service	01
Electronic and Communication	11
Research and Development	03

New material	02	
E-banking	01	
Hi-tech medical equipment	01	
Education and Training	01	
Pharmaceutical product	01	
Precision Machinery	01	**Total: 22**

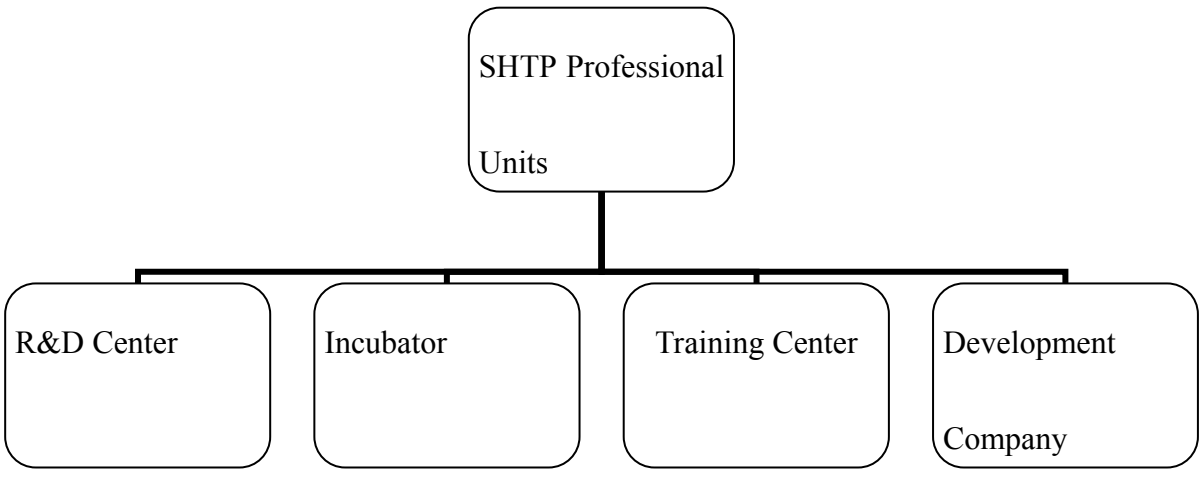
(Source: Hoa Lac hi-tech management board)

In 2008, HHTP also severely restructured the administration system and the management mechanism so that it could support investors, customers at the highest level. In calling for infrastructure investment, HHTP also called for US$ 110 million in 2008 and target US$ 400 million to US$ 500 million in 2009 and 2010. Planning activity evolves drastically after the world recession in 2007. Started with the bilateral agreement between Japan government and Vietnam government, JICA (Japanese International Cooperation Agency) has been working with HHTP in updating and completing the general planning of the park, with the area of 1,600 hectare, 3 times bigger than current phrase. In international relations, HHTP also becomes the 31 member of the Asian Science Park Association (ASPA). By entering this organization, HHTP may inquire many things from the success as well as the failure of Science and Technology Park in developed countries such as Korea, Japan, and Taiwan…

Hoalac Hi-tech Park play an important role to improve the industrialization and modernization of the local and national economy, as a bridge from absorbs the technology transfer to innovate new technologies. Hoa Lac aims at promoting research and development, producing and commercializing high technology products, incubating high technology enterprises, and developing human resource for high technologies.

With the similar concept, Ho Chi Minh Hi-Tech Park aims at developing a technopolis that greatly enhance the regional as well as national economic.

Both HHTP and SHTP have similar missions as well as other high tech parks in the world. They position themselves as Vietnam's premiere manufacturing, research and development facility to enable a range of high technologies, attract major international firms to invest money and transfer technology, and foster collaboration between commercial part and institution part (Universities, research institutions) to incubate innovation.

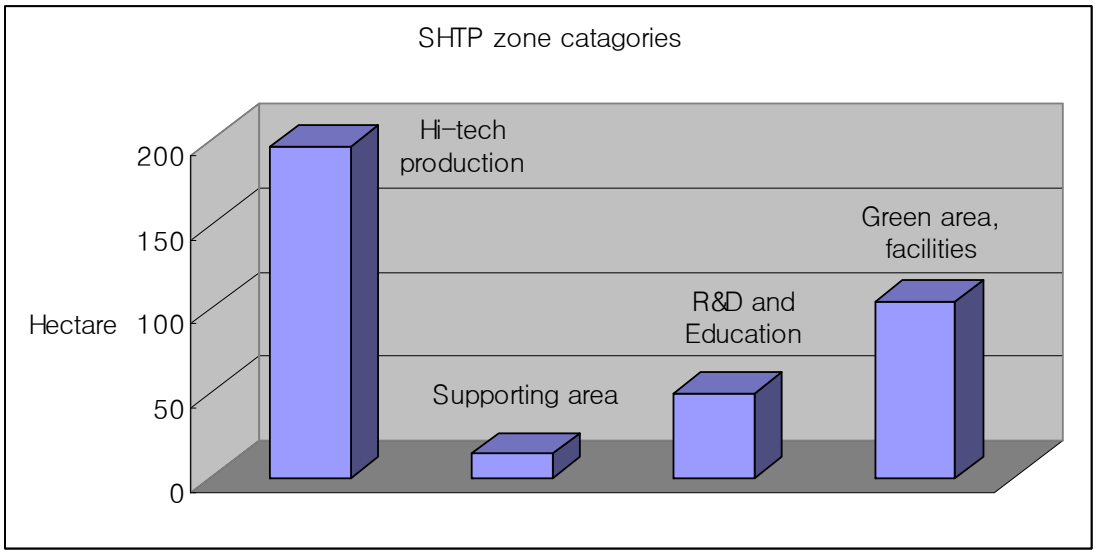


Ho Chi Minh hi-tech park (SHTP) now has a higher developing speed compare to Hoa Lac hi-tech park. After seven years of establishment, SHTP has solved almost all problems in planning, land retrieval, infrastructure and architecture investment, calling for investment capital and improving international relation. Up to 2009, SHTP has attracted US$1.718 billion in 38 projects, with the attendance of many high technology international companies; especially US-based Intel Corporation invested the US$ 1 billion semi-conductor production chain in 2006. In 2009, SHTP has created a revenue of US$ 318 million, and hand US$ 10 million in national budget. In 2009, SHTP also have finished the planning and design of extended-phase II of to the completed hi-tech park.

Figure 29 SHTP Master Phrase 2

(Source: Saigon Hi-tech Park management board)

Table 5 SHTP area categorized by zones- Phrase I



(Source: Saigon Hi-tech Park management board)

After about ten years of development, Hoa Lac Hi-Tech Park and Sai Gon (or Ho Chi Minh) Hi-Tech Park has achieved success. This success is defined as the creation of a milestone for the high technology development in Vietnam, contribute to the industrialization and modernization procedure of the country, improve society living standard and evoke a competitive advantage for regional competitiveness.

However, HHTP and SHTP are stumbling in many obstacles which may hold back the development process as well as misalign the initial strategy and plan. Through the next part, the author will analyze to figure out those problems.

4.2.2. Viet Nam Hi-Tech Parks' problems

1. Strategy and planning: For developing countries such as Vietnam, economic development is always a crucial issue since each nation is on the production link under competitive pressure and also cooperative relations with its neighbors. Moreover, moving from low-tech production to high-tech production will upgrade the industrial ability of the country, and then increase its regional competitiveness. To initiate development, Vietnam should have a clear vision together with a sound leadership and an appropriate strategy. Absorbing lessons from developed countries or neighboring countries are just the references, if we just imitate their models without having a profound feasibility study and a strictly research, we cannot reach to the target. Vietnam's strategy for developing hi-tech parks was an appropriate action, but this strategy is completed without careful studies on the conditions, including infrastructure system, management ability, economy and human resources…Therefore, the target of completing the hi-tech parks within 10 years have failed when almost all works are incomplete. One of the first stage in executing the hi-tech park is designing the detail planning for the park, but this planning is not only incomplete but also is not in harmony with the overall planning of the city and surrounding. Development orientation also was not implemented thoroughly. The core factor of the hi-tech park is the growing of the university and educational centers, which then will boost the innovation and linkage with commercial firms. In case of these two hi-tech parks, National University has not been given a whole

mind in developing in order to be the platform for the science parks. According to the plan, national university will be launched in 2005, where thousands of students will have a new studying and researching environment as well as have chance to access job opportunities with both prestige domestic and companies. However, this plan does not come true till this day. Thirdly, development strategy of Hoa Lac and Saigon hi-tech parks also are not appropriate according to the definition of technology and science parks. In general, the improvement of research laboratories, institutions and small venture companies play a significant role in its success but HHTP and SHTP are emphasizing the importance of investment, FDI and of money flow in to the parks as the main indicator. In order to be recognized as a science and technology park, self motivation and self development are the crucial factors.

2. **Management, execution and marketing:** A good strategic is not enough without a professional management skills and the use of marketing tools. Management mission seems too difficult for the board of hi-tech parks. Land release which serves for the construction work was delayed year by year. In case of Hoa Lac hi-tech park, for ten years of establishment, only 200 ha have released, compared to the target of 1600 ha according to the general planning. Only in 2007, 500 ha have been released, which is a big success but again there is no improvement in 2008 and 2009. The cooperation among functional organizations and between government bureaus and citizens has not achieved expected results because of the compensation policies for the people were not satisfactory. The park planning has not be-

longed to the general planning of the city leads to the compensation price of land in each phrase, each location varied in great amount. Detail planning seems standing at its point when only five per ten functional zones have the detail planning.

Figure 30 Insufficient infrastructure in HHTP

In case of Ho Chi Minh hi-tech parks, though there are improvement in land release but unclear phenomenon in business licensing, land authorization, government budgeting, etc are delaying the schedule of the park. Moreover, regulation and policy for the foundation of Hi-tech Park are becoming undisciplined. There are more and more industrial zones put on the title of Science and Technology Park or high technology Park in many provinces in Vietnam, meanwhile they really are not hi-tech park. 21 hi-tech parks established in 18 provinces of Vietnam, without the carefully assessment in many aspects, from the economic condition of the province, human resources, management skills, competitive advantage... to the influence

of the park to the surrounding environment, to the society and people. Regional partial and tenure thinking still engrave in to the leaders' mind-set. Keeping this situation, like one government officer said, all hi-tech parks in Vietnam will soon become low-tech parks.

Figure 31 Defects occur during the execution of SHTP

(Source: vnchannel)

Figure 32 Construction and planning works in SHTP are still in troubles

Though not being a key factor, marketing is also an important issue in accelerating the development procedure of the parks. Government budget nowadays maintain just a small portion in the financing scheme, board of management should act to call for investment and development. However, incomplete infrastructure both within the park as well as transportation and communication facilities leading to the park are the resistance factors to the investors and developers. Moreover, redundant procedure, uncompetitive investment incentives and unclear information are adding to the negative points.

4.3 Applying the Korean lessons to Vietnam

Through studying the Daedeok Innopolis in Chapter 3, the author has the benchmarks in analyzing and summarizing lessons for the success of a science and technology park in general. Unlike US-based and European-based science and technology parks, which are born the natural promotion, Daedeok Innopolis has been taken form and developed by the orientation and support from the government.

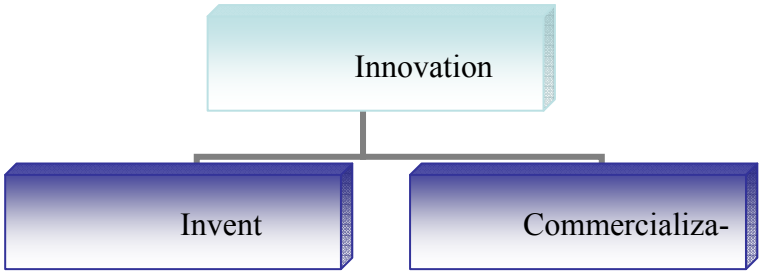
1. **Development procedure:**

HHTP and SHTP are in the first step of development, which is on the route to become a science and technology park. At this stage, the most important thing is to create an academic environment where R&D activities are pushed up since new idea is the most important factor for the success of a STP at this stage. Daedeok during the 1970s have created a scientific research center with the present of both current and new academic institutions such as universities (ex: KAIST: Korea Advanced Institute of Science and Technology, ICU, CNU) and government research centers such as ETRI, KSSR, KCR… Those institutions have contributed an enormous quantity of new ideas, innovation, new prototypes which then be used for the success of the new products later on. In case of HHTP and SHTP, all two parks have only National University taking role of the educational and research center for the park. Moreover, National University educate many careers, occupations while a science and technology park need only the concentration on the development of science and technology.

Therefore, HHTP and SHTP should restructure the number of R&D institutions, not only in quantity but also in quality. An international and professional working environment with sufficiency of facilities is indispensable.

2. Innovation:

The term “innovation” has been the key word of the world nowadays. Economic recession has been affected to almost all industries. In developing Science and Technology Park, the importance of innovation always put on the first-rate. There are two factors affect to innovation. The first factor is idea, and invents which usually comes from research lab. In STP, university and research institutions are usually in charge of producing ideas and invents. But ideas and invents cannot be applied in reality without the second factor, commercialization. These two factors, ideas and commercialization will then generate innovation. Commercialization should be conducted by a separate entity; if it is done by the researchers it can not be commercialized. Venture companies will be responsible for the second factor. These venture firms can not belong to the government because it will create a rely-mental. Venture firms should come from private companies, with aggressive and ambitious people who desire to change the ideas to reality, desire to change the world. Even though the number of venture companies in HHTP and SHTP is increasing, board of management needs more motivation to attract them to participate in the cycle of creating innovation.



3. Incubation:

In order to accelerate innovation, to attract commercialization activities in hi-tech parks, the incubation work is very important. Science and Technology Park is the ideal environment for the incubation job. In many cases, the incubation companies will become powerful company in the near future. In Vietnam, according to a research from the small and medium enterprises (SMEs) center, there are 67% of SMEs has difficulty in finance, 51% in expanding market, 45% in acquiring real estate for operation, 20% in lacking information and 18% difficulty in human resources training. Therefore, SMEs in Vietnam are likely to go bankrupt which causes waste and damage for the national economy. Consequently, the selection, acceptance and support and establishment of these companies are required to have a particular understanding both in procedure and incubation activities. Incubation center will be the tool for commercializing the innovations, science and technology research results, and new high technology products, services and applications.

4. Networking:

The success of economic and competitiveness of the hi-tech parks in particular and of Vietnam in general depends on the productivity. Productivity is the combination of various fac-

tors and social conditions. In science and technology parks, company depends much on business environment such as laboratories, universities and even competitors. These companies and institutions have a geographical co-location in a particular field. A hi-tech park may contain of related industries, from institutions, business companies to suppliers and service providers. All of them have a networking. It breaks down the boundary between manufacturing and services. Moreover, it connects all together and accelerates the cycle of an idea to a product; therefore increase the productivity of the park. Constructing a continuously system of related participants (research labs, venture companies, logistics companies, law companies, suppliers, providers…) is also a necessary action for HHTP and SHTP when they target to improve productivity of their parks as well as their regional competitiveness.

5. Regional development:

The success of HHTP and SHTP in the future cannot be separated from regional development. HHTP and SHTP has been developing in the capital and the biggest city of Vietnam, respectively, in order to strengthen the competitiveness of the two cities, then bring to the competitiveness of Vietnam in the South East Asian area. Daedeok Innopolis is a clearly example of increasing regional competitiveness when Daedeok Science and Technology park has transformed Daejeon province to the science city, increase the position of Daejeon with other provinces in the country as well as contribute to the regional competitiveness

of Korea to other nations. In the world, Silicon Valley is also a famous example where people working there have changed the State and commit to the US economy. According to Michael Porter 1998), regional economy can be understood in three buckets, the local economy which is exclusively to the local market, like customers local, retailing local., natural resource dependent and traded part (producing good and services across regional and nation). HHTP and SHTP's board of management besides having the strategy for the development of their parks, they should establish a strategy and a mechanism of regional development so that the expansion of the parks will go along with the development of the region.

Chapter 5

Summary and Conclusion

5.1 Introduction

Through this paper, the author would like to generate some findings from the development process of Science and Technology Park in Korea, where Daedeok Innopolis is the representative, and propose some recommendations for the case of Vietnam. Development procedure of Daedeok Innopolis has given many lessons which help the author to analyze and sum up to recommendations for the development of Science and Technology Parks in Vietnam. Hoa Lac Hi-Tech Park (HHTP) and Ho Chi Minh (Saigon) Hi-Tech Park (SHTP) are the representatives for the development of science and technology parks in Vietnam. Analyzing the current status and drawbacks of these two parks will come up with the tendency of all parks in Vietnam.

Chapter 1, the main objectives of the thesis was proposed. Consequently, presented in Chapter 2, the formation and characteristics of STPs has been discussed. Chapter 3 reviewed the success study from Daedeok Innopolis, point out some advantages and lessons to apply for Vietnam. Current situation and achievements of two hi-tech parks in Vietnam, Hoa Lac hi-tech park and Ho Chi Minh hi-tech park, have been studied in Chapter 4. With the findings from the Korean experience, recommendations are applied and modified to adapt effectively to Vietnam environment.

5.2 Discussions

Having the chance to study in Korea, the author had made use of opportunities to research on the development process, success and failure of the establishment and development of Science and Technology Parks in Korea. During the time working on this thesis in Vietnam, the author also had chances to visit the Hoa Lac Hi-tech Park in Hanoi and met some government officers who are in charge of strategic planning as well as mangers in the management board of the park. The author has collected much useful and realistic information on the development of the park which helped to contribute this paper.

Among many examples from Korea Science and Technology Parks, Daedeok Innopolis emerged as an excellent one because it has been developing throughout the development process of Korea and the first STP which was oriented by the government. Moreover, Daedeok Innopolis also successful overcame the most difficult period, the IMF bailout crisis in 1997, and then took off to those achievements as today. Experience through 03 development stages, Deadeok Innopolis has become the typical example for Hoa Lac High Tech Park (HHTP) and Saigon High Tech Park (SHTP) in planning, strategy, and management issues. The first stage is the Science and Technology Town, which assembled government research institutes and KAIST. This stage focused on upgrading the research ability of the Park, research institutions, laboratories and science and technology based universities are the core factors of the Park. The second stage came in the 1990s with the participation of the ven-

tures firms which focusing on commercializing technology products. Hundreds of ideas, prototypes have been tested to the reality. Moreover, there has been the increasing in the size of the park with participators such as CNU, ICU in university segment and ETRI, KSSR, KCR…in government research segment. Passing through the IMF crisis in 1997, many venture companies have been tested and grown up. In 2002, central government has designated Deadeok Science Town and its vicinity as Deadeok Valley. Daedeok changed comprehensively to Innovation cluster special zone, with 70.4 square kilometer area. Daedeok Science Town, Deadeok Techno Valley, Venture Parks, Industrial Complex, all of them is accommodated within the Daejeon Metropolitan city. This cluster has helped to change the face of Daejeon city from a agriculture based city to a modern technology and science-based city, increased its regional competitiveness.

As analyzed in Chapter 4, Hoa Lac High Tech Park (HHTP) and Hochiminh/Saigon High Tech Park (SHTP) are in the first development stage. This stage takes the most important role in the successful of the Park to become a cluster, if not it will easily become a normal industrial zone or low tech park. Besides, Vietnam High Tech Park also should avoid performance and achievement disease, but to concentrate wholeheartedly on the success or failure of the Park. Lessons learned from the Korean case include a thoroughly feasibility study and research on the strategy and planning of STPs, the important of universities and research centers to be as the core of the science parks, the necessary of creating a perfectly

and scientifically networking between institutions and other parties, the attention on the social and environment factors when those STPs were created and finally the correlation between STPs and regional development as a whole contributing to the regional competitiveness. Moreover, the policy makers and managers should not be hasty even though HHTP and SHTP are behind the schedule. The incubation period, preparation and equipment are important in the first stage. In achieving the second stage, which to become a science and technology commercialization, core factor should be the upgrade rising and grown up of domestic, venture companies when they absorbed the technology skills and management skills of international firms in the first stage. Keeping the idea that attracting investment, considering the amount of investment, the number of international companies coming to the Park may not appropriate to the sustainable development of the Park. In becoming a cluster, which are the third stage, the Park not only enlarge itself both in quality and quantity, but also it needs the connection to the regional area, in many issues, from urban planning, regional development strategy, demography, infrastructure development, human resource… Orientation and support from the government are highly required.

Nevertheless, a good strategy, good planning may not guarantee for the success of the work without action. Action, though usually is not mentioned in most research, are contributing significantly. Researching the Daedeok Innopolis case, the author found out some intangible factors which were the backbone for the strategy, planning and management. The first in-

tangible factor is the desire to learn, experience new things of the Korean people, which reflect in the educational zeal of young generation. All students understand that education is the critical factor which helps them to build their fortune. Keeping that thought in mind, they continue to be a hard working person when they left school and join the companies or institutions. Diligent character, which nearly grasped in each Korean person, is the second factor. Laboratories, company's office are the second home. Especially when all these facilities are organized within a systematic planning and management, the Science Park, it really fosters the researching passion and business success desire in each people. Their research are recognized and appreciated, even whether they become a real product, a practical application in the future. The number of patents in Korea flourishes during the 80s and 90s make Korea becomes a leading country in the number of patents, ideas and innovative applications. Thirdly, Korea has the leaders which contribute their whole life to the destiny of their country. They used to work much harder than their followers, being the examples for them and always be responsible for every decisions and actions they made.

Since STPs also participate in the regional development and competitiveness then it is not only the responsibilities of the STPs' managers but also of the Vietnamese government. Of course, each region has different socio-economic, spatial and historical construct, such as: population density difference, urban centers at the core or in close proximity, proportion of high-educational workforce, infrastructure level difference, reputation on a high living stan-

dard or not, but in general it is possible to divide the factors that influence the regional competitiveness in three broad themes: infrastructure and accessibility, human resources and productive environment. Governance in the region where STPs are located should act as the subsidiaries and grants, the networking and re-alignment of interest and the orchestrator. Regional leadership resources should be upgraded so that the regional strategy will match with the STPs strategy. Secondly, cultural and educational are also the important ingredients to the region. They can build up a strong workforce for the requirement of the institutions in the Park. Moreover, the development of the Park together with its human resources will create a unique culture for the region, such as hard working, mutual learning, so that it can upgrade the living standard of the whole region.

5.3 Recommendation for ongoing work

This thesis has proposed the analysis on the development of science and technology parks in Vietnam. Comparison method has been used in this paper, together with the searching and findings from academic journals and from searching the internet. Development stages have been analyzed in Korea case so that to filter lessons and apply them to the Vietnam High Tech Park cases. The success of Daedeok Innopolis showed the combinations, collaborations from the government, STPs' board of management who were in charge of strategy planning, orientation and the people who carry out those plans. The thesis has proposed rec-

ommendations on the development procedure of Vietnam High Tech Parks as well as suggestions in planning and executing the Parks. However, upgrade is always recommended. For the next step of this work, the author hopes to propose a complete model on the development strategy of science and technology parks in Vietnam which will combine all the recommendations of this paper. This model will reflect and analyze all three development steps, from the science town to the commercialization town and finally reaching to the innovation cluster, according to the studies from Korean cases. Moreover, more case studies from Korea also need to be studied in order to suggest a more objective, equitable and thoroughly vision.

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FOOTNOTES

[i] See Wikipedia, Globalization, especially the definition http://en.wikipedia.org/wiki/Globalization

[ii] See Wikipedia, Science Park, http://en.wikipedia.org/wiki/Science_park, especially Chapter 1, history

[iii] See Wikipedia, Tsukuba Science Park, http://en.wikipedia.org/wiki/Tsukuba,_Ibaraki, Chapter 1, history

[iv] See Wikipedia, KAIST, http://en.wikipedia.org/wiki/KAIST, Chapter 6, Daedeok Innopolis

[v] See Wikipedia, Science Park, http://en.wikipedia.org/wiki/Science_park, especially Chapter 2, for the insightful understanding about the purpose of Science Park

[vi] See Overview of SHTP. Retrieved from: http://www.shtp.hochiminhcity.gov.vn/