

The role of universities in the regional economic development in Korea

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Recently universities are acknowledged as the most important asset for building regional innovation systems and the development of regional economy since the success of the Silicon Valley, Route 128, and Research Triangle Park. Nowadays, for the development of regional economy, universities are required to perform two roles: the direct contribution through setting-up firms, technology transfer, and technical assistance and the indirect contribution through developing regional innovation capabilities, analysis of regional economy and development of innovation norms of openness, trust and cooperation. However, there is wide variation in the substantial outcomes of the roles performed by universities. It is unveiled that the role of universities is influenced by four types of factors: university factors, regional factors, common factors, and environmental factors, which are used as the framework for the case analysis. The university factors are the orientation of a university's management to the regional engagement and its ability to perform the role of a contributor. The regional factors are the industrial base of a region and its cultural characteristics. The common factors, which are related to both a university and a region, are the history of university-region linkages and the presence of champions within a university and in the region. Finally, the environmental factors are changes in the economic and political environments, or in the government policy. Analyzed with this framework, Kyungpook National University in Daegu, Korea is assessed that it did not play an active role in the development of Daegu's economy because of its indifference in the regional economic development, the absence of an industrial base in Daegu, Daegu's very conservative culture, the insufficient experience of university-region linkages, the absence of champions, and deeply centralized economic power and regulation authorities in Seoul though the university had a considerable ability and there were a number of government programs. For Kyungpook National University to perform an active role in the development of Daegu's economy, the university should explicitly include contributions to regional economic development as its important mission. Second, Daegu City should focus on the promotion of the industry sectors in which Kyungpook National University has strength and has to make more efforts to change its very conservative culture into a more venture-friendly culture. Third, both Kyungpook National University and Daegu City need to find out and cultivate their champions to play a key role in building linkages between the university and the Daegu's industries on purpose. Finally, government policies should be more systematic to achieve their goals.

1. Introduction

In recent years regional innovation systems are strongly stressed as a strategy for regional economic development in both developed and less developed regions. That movement has been largely stimulated by the success cases from the United States such as the Silicon Valley, Route 128, and Research Triangle Park cases. Gunasekara (2004) asserts that regional innovation systems are engines of economic development. Looy et al (2003) argue that the interaction between innovation, entrepreneurship and regional economic development has become a central theme in many policy circles.

Regional innovation systems may be understood as sub-systems of national innovation systems (Edquist 1997). In the “garden argument”, Pacqut (1994) compares the economy to a garden with a variety of trees and plants, explaining that, as there are no simple rules likely to apply to all plants, there is no simple rule likely to apply to all levels of economies. Growth, therefore, is best orchestrated from its sources at the level of cities and regions. Responding to this argument, regional and central governments in both developed countries and less developed countries are making great efforts to build innovation systems to develop regional economies. Among the center of discourses about building regional innovation systems are universities. Universities are widely acknowledged as one of the most important entities in building regional innovation

systems to develop regional economies. The importance of universities derives from their role in generating knowledge and the transfer process that underpins the success of regions in attracting and retaining high value-added activities in the form of mobile capital and talent (Florida, 2005).

In recent studies, some universities were shown to have made great contributions to development of regional economies. Goldstein et al (2004) conclude that universities' research and technology development activities generate significant knowledge spillovers that are captured within the regional environment, and result in enhanced regional economic development. At the era when technology is the most important factor that determines the growth of entrepreneurs as well as economic development of a region, universities are regarded as a unique asset to support regional economic development, especially in non-capital regions in South Korea where there is no competent R & D institution besides universities. Though universities are requested to play a great role in developing regional economies, the consequences cannot meet our expectation.

There are various studies to analyze the role of universities in developing regional economies in the European Union, the United States, and Taiwan (Goldstein and Renault, 2004; Feldman and Desrochers, 2003; Hu et al, 2005; Smith, 2003). But there is no

literature about the role of Korean universities. Therefore, this study will, first, describe the role that modern universities are requested to play in developing regional economies. Next, it will construct a framework to analyze the role of universities in developing regional economies. The framework will be used to analyze the case of Kyungpook National University in Daegu, Korea. Finally, the finds of this work will be summarized and I will offer a conclusion and some recommendations.

My methodological approach will do meta-analysis. That is, this study will be based on secondary analysis of a number of existing studies. In addition, I will draw on my professional experiences as a public official in Korea.

2. The role of universities in regional economic development

Traditionally, universities have been performing the two main functions of teaching and research for a long time. In recent years universities are required to play the third role of animating regional economic and social development. The concrete contents of universities' third role of animation of regional economic and social development are different according to scholars. Walshok (1997) argues that research universities can make a unique contribution to regional economic development through the following key knowledge-based activities: ①new product development, industry formation, and job

creation, ②expansion of regional capabilities in relation to access to advanced professionals and management services, sources of capital, marketing, distribution links, quality of life, and so forth, ③assessment of market needs and opportunities, ④assurance of a supportive public policy environment among citizens and officials, ⑤development of flexible organizations and industries capable of continuous change, ⑥development of social networks and human capital resources, ⑦encouragement of a culture of change, innovation, and trust. He also asserts that it is important for universities to contribute not only to technology capabilities or workforce readiness, but to the enhancement of key regional capabilities and the culture of innovation essential to the forms of economic development characterizing knowledge-based economic operating in a global context.

Chatterton and Goddard (2004) assert that to respond to regional needs, universities must provide locally-relevant education that meets regional labor needs. In addition, universities should focus more on application of established knowledge for the regional community and on collaboration in terms of research activities and funding. He also stresses the service role to the local community through volunteering, project work, mentoring, leadership, commentary, and provision of school facilities to the public such as libraries, sports centers, and arts and cultural venues.

As the key elements of a regional innovation system, Gunasekara (2004) enumerates regional agglomeration or clustering of industry, human capital formation, associative governance, and regional cultural norms of openness to learning, trust and cooperation between firms. To contribute to development of the above four elements of a regional innovation system, he explains that universities play two kinds of roles, the generative role and the developmental role. First, in terms of the generative role, universities are key drivers of economic development through academic entrepreneurial activities (a range of boundary-spanning, knowledge capitalization mechanisms), such as incubators, new firm formation and science parks, as well as universities research centers and participation in the governance of firms. Second, in terms of the developmental role, universities adapt their traditional roles in teaching and research to better support regional knowledge needs, not necessarily linked to capital formation projects. He, however, admits that the dual categorization of university roles is not mutually exclusive.

In their case study of the Katholieke Universiteit Leuven, as activities for universities to transfer scientific and technological knowledge to society-at-large and to the business world, Looy et al (2003) reveal that the university offers support in the areas of innovation advice and technology mediation, information exchange and training, contracts for consultancy, research and development, an active patenting and licensing

policy, the creation of new, research-oriented and innovative companies, the creation of business activities for national and international research-intensive firms in the science park through activities such as encouraging entrepreneurship, elaborating a business plan, seeking sources of financing and industrial partners, protecting intellectual properties, supporting company set-up and management, and providing infrastructure.

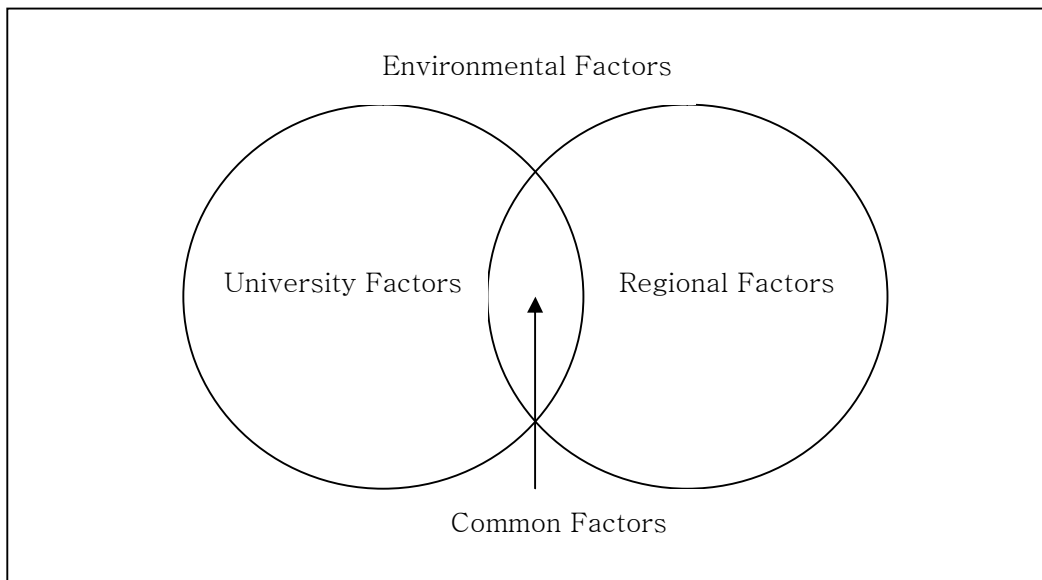
Synthesizing the above arguments, the role of universities in developing the regional economy can be roughly classified into two roles. The first role is to contribute directly to regional economic development through setting-up firms by faculty and students, technology transfer, and technical assistance. The second role is to contribute indirectly to regional economic development through activities to develop regional innovation capabilities such as formation of networks between important stakeholders of regional economy, analysis of regional economy, and development of innovative norms of openness, trust and cooperation.

3. Analysis framework: factors influencing the roles of universities in regional economic development

While universities are called on to roughly perform the above two roles in regional economic development, there is wide variation in the actual performances of universities

in the contributions that they make to the development of regional economies in different regions. Many scholars explain the variation of universities' performance with a variety of explanatory factors. The factors may be broadly classified as university factors, regional factors, common factors, and environmental factors as below in figure 1.

Figure 1. Factors influencing the role of universities in regional economic development¹



University factors are factors peculiar to a university itself. For example, the orientation of a university's management to regional engagement or the ability of a university to perform the role of contributor to regional economic development may be included in university factors. Regional factors are factors peculiar to the specific region.

¹ This figure is developed by the author.

The industrial base of a region or its cultural characteristics may be included in regional factors. Common factors are factors related to both a university and a region. The history of university–region linkages or the presence of champions within a university and in the region may be classified into these factors. Finally, environmental factors are outside factors that have influence upon a university and its region. Changes in the economic and political environments or in government policy may be classified into these factors.

Category	Factors
University Factor	<ul style="list-style-type: none"> ● Orientation of a university’s management ● Ability of a university
Regional Factor	<ul style="list-style-type: none"> ● Industrial base of a region ● Cultural characteristics of a region
Common Factor	<ul style="list-style-type: none"> ● History of university–region linkages ● Presence of champions
Environmental Factor	<ul style="list-style-type: none"> ● Changes of economical and political environment ● Changes of government policy

Existing literature indicates that the orientation of a university’s management to regional engagement has a pervasive influence on the role that the university performs in the development of the regional economy (Gunasekara 2004). A university with an entrepreneurial approach to engagement, which places a strong emphasis on industrial linkages, institutionalized through a focus on the commercialization of inventions, may be expected to perform a broader role in regional agglomeration than a university that

eschews or minimizes the importance of knowledge capitalization (Keeble et al, 1999).

Looy et al (2003) explain that Stanford University played a key role in the accomplishment of today's Silicon Valley and right from the beginning of the university there was openness towards technical venturing in its orientation. Feldman and Desrochers (2003) conclude in their case study of Johns Hopkins that one of reasons why Johns Hopkins University has not generated highly visible economic benefit for the local area is that it had a founding mission reluctant to the practical application of the faculty's research work, preferring basic scientific research. Consequently there was a general lack of incentives and encouragement for commercial activities that might have potentially benefited the local area.

The ability of universities to meet the needs from a region is the second university-peculiar factor that explains the role a university performs in the region economic development. Firms seek out knowledge from universities that hold the most suitable expertise even though universities may be located outside the geographical boundaries of the region within which the firms are located (Blade and Nerlinger 2000). Etzkowitz's study of MIT highlights the importance of science-based research strengths of that University as a key explanation of its role in the development of regional economy (Etzkowitz 2002). In addition, Geuna (1998) found empirical evidence that supports the

idea that scientific research productivity of universities influences both the probability of joining an EU-funded R & D cooperative project with firms and the number of times an institution has participated in these projects. The ability of universities to meet regional needs includes research ability and commitment of faculty and abundance of research equipment.

The industry base of a region is the first regional factor that influences the role of universities in a developing, regional economy. The more technology-intensive firms there are in a region, especially start-ups and SMEs (small and medium enterprises) in technology-based industries, the greater contribution research universities can make to the development of the regional economy. This is so because knowledge-based, high technology industries, start-ups and SMEs in these industries appear to exhibit a stronger demand for external knowledge than other industry sectors, including service industries within the high technology sector (Bagchi-Sen et al 2001). Miotti and Sachwald (2003) found empirical evidence that firms from high-tech sectors tend to cooperate on R & D with research institutions more than firms in less R & D intensive sectors. Mohnen and Hoareau (2003) unveil that firms that belong to scientific sectors such as chemicals, machinery and equipment, vehicles, electrical and electric products, computer services and engineering services, with a higher intensity of innovation and

R&D keep more linkages with universities and government labs in sourcing knowledge.

The second regional factor of the role of universities in the development of regional economy is the cultural characteristics of a region. An abundance of entrepreneurship and a tolerant atmosphere for failure in a region makes university–industry linkages more intimate because these conditions tend to yield more new ventures in science-based industries and attract firms from outside. The tolerance for failure and the culture of entrepreneurship, and the ability to learn from failures has turned Silicon Valley into a success story which today we all recognize, admire and to some extent envy (Looy et al 2003).

The history or experience of university–region linkages is the first common factor related with both universities and regions. Almost all literature points this out as a factor influencing the role of universities in the development of regional economy. It is evident in the literature that some universities are more embedded in their regions than others as a consequence of a longer historical tradition of engagement (Gunasekara 2004).

Lawson et al (2001) find, in their comparative study of innovation in the Cambridge and Oxford regions, that Cambridge University had had a deeper tradition of formal and informal engagement with regional firms compared to Oxford, where the emphasis on engagement tended to be operationalized, largely, through formal technology transfer

institutions that had developed in more recent years. Similarly, Mora-Valentin et al (2004) find, in the study of factors on the success of cooperative R&D agreement, that previous cooperative experience have a positive influence for both firms and research institutions on the success of cooperative R&D agreement between firms and research institutions.

The presence of champions within a university and in a region is the second common factor influencing the role performed by a university. A champion is defined in the process of product innovation as:

“an individual who is intensively interested and involved with the overall objectives and goals of the project and who plays a dominant role in many of the research-engineering interaction events through some of the stages, overcoming technical and organizational obstacles and pulling the effort through its final achievement by sheer force of his will and energy” (Chakrabarti 1974, p. 58).

The champion plays a key leadership role in advocating strong university-industry/region linkages. A number of studies stress the importance of champions in shaping the role that a university performs in the development of a regional innovation system. Santoro and Chakrabarti (2002) prove that the presence of an I/U champion at the industrial firm is associated with higher intensity relationships between universities

and industrial firms compared to the presence of an I/U champion at the university research center.

The first environmental factor influencing the role of a university in regional economic development is the change in the economic and political environments. Chatterton and Goddard (2000) argue that regionalization of the economy and regionalized economic regulation accelerated universities to make greater contributions to the development of a regional economy. They argue that regionalization of the economy replaces the client base of universities in terms of teaching and research from large nationally-based firms and research organizations to regionally-based clusters of firms and supply chains of small and medium sized enterprises (SMEs).

The second environmental factor influencing the role performed by a university in the development of a regional economy is the change of government policy. A number of studies indicate that the cut-back of public funding and introduction of institutional measures to facilitate entrepreneurial activities of universities made universities more deeply engaged in the development of their regional economies. Garlick (1998) asserts that public funding constraints have forced universities to seek out private sources of funding and market niche areas for their non-core activities and, increasingly, for their core functions. The Bayh-Dole Act of 1980 allowed and promoted universities' activities

focusing on locating, patenting, and licensing university-developed intellectual property and sometimes on spinning off inventions to start-up companies (Schmoch 1999). Most universities with substantial research activities have developed financial incentive programs to encourage their faculty to innovate.

In this chapter, I constructed a framework with the factors which influence the role of a university in developing the regional economy in four aspects. In the next chapter, I will analyze the role of Kyungpook National University in developing the regional economy in Daegu, Korea with this framework.

4. Case analysis: the role of Kyungpook National University in the development of regional economy

Kyungpook National University is the largest of four universities located within the boundary of Daegu Metropolitan City in South Korea or near Daegu Metropolitan City. Daegu Metropolitan City is a city which has the same level of autonomy as any other province in Korea. It is located in the southeastern part of the country. Its population is over 2.5 million. Daegu has been suffering from a serious economic depression since the 1980's. Starting from 1993, its GRDP (Gross Regional Domestic Product) per capital has been ranked the lowest among the sixteen metropolitan municipalities such as Seoul

Special City, other metropolitan cities, and other provinces in South Korea (Korea National Statistical Office 2007).

Figure 2. The location of Daegu City

Though there is not objective data to assess the contribution of Kyungpook National University to the development of Daegu's economy, its contribution may not be assessed as great, considering the condition of Daegu's economy. That is it is hypothesized that the university has not actively and sufficiently played the two roles mentioned in the chapter 2. Now, I will



use the framework described in chapter 3 to analyze the role of Kyungpook National University in influencing the development of Daegu's economy.

1) The orientation of a university's management to regional engagement

It was not until a few years ago, since being founded in 1951, that Kyungpook National University had the explicit orientation of its management to the regional

engagement. The mission of Kyungpook National University can be found both in the Higher Education Law of Korea, which is the basis of its foundation, and in its school regulation. In the law, the mission of universities is described as the cultivation of one's character, teaching and research of theory and its application, and the contribution to the country and human society². In its school regulation, its mission is almost the same as the mission of universities in the Higher Education Law of Korea³. As shown in the law and in its school regulation, the university was not interested in the regional development, but in the contribution to the country. As it did not have the will to make a contribution to Daegu's economic development, it could not play a significant role in Daegu's economic development.

It was the end of the 1990's that Kyungpook National University began to show some interest in regional economic development. From that time, words like contribution to regional society and cooperation with regional industries began to appear in its education goals. As the period that Kyungpook National University included the contribution to regional economic development in its mission and positively tried to achieve this mission was very short, its contribution to Daegu's economic development did not seem so great until now.

² Art. 28 of the Higher Education Law of Korea

³ Art. 1 of the regulation of Kyungpook National University.

2) **The ability of a university to perform the role of a contributor to regional economic development**

Kyungpook National University is a general university with sixteen schools. It has schools which can make direct contribution to region economic development such as the Engineering School, Medical School, School of Electrical Engineering and Computer Science, and the School of Natural Science⁴. This university is specialized in electrical engineering and computer science. Since this university was designated as a specialized school in electronic and electric engineering from the Ministry of Education of Korea in 1973, it has been receiving huge amounts of support from the Korean government to promote its Electronic and Electric Engineering Department. There are over 400 bachelors, masters, and doctorate degrees recipients in electronic engineering and computer science every year.⁵ There are eighty one professors in the School of Electronic Engineering and Computer Science, who very often published their work outcomes in prominent science journals as well as take part in a number of cooperative research projects with major companies such as Samsung and LG. Besides professors from the School of Electronic Engineering and Computer Science, professors from the Engineering School, Medical School, and School of Natural Science also actively

⁴ This is cited from the website of the Kyungpook National University (<http://www.knu.ac.kr>).

⁵ This is cited from the website of the School of electronic engineering and computer science (<http://eecs.knu.ac.kr>).

participate in cooperative research with companies. Synthesizing these facts, Kyungpook National University is assessed to have the sufficient ability to perform a significant role of a contributor to Daegu's economic development. Therefore, the ability of the university was not the factor which negatively influenced performance of role to contribute to regional economic development.

3) The industrial base of a region

Though a university has strong will and sufficient ability substantially to perform a positive role in regional economic development, there should be an appropriate industrial base which can absorb the university's knowledge assets.. While Kyungpook National University was specialized in electrical engineering and computer science, unfortunately, Daegu did not have the industrial base which can absorb the knowledge assets from the university. For a long time since the 1960's, the main industry of Daegu had been textile industry until the 1980's. Even after that time when the textile industry began to go downhill, the IT industry did not hold a great deal of weight in Daegu's economy until recent years. In conclusion, as there were not enough industrial bases related with the strong fields of Kyungpook National University, the university would not be able to perform an active role in the development of Daegu's economy.

4) The cultural characteristics of a region

In the chapter 3, for a university to play an active role in regional economic development, a region should be filled with entrepreneurship and have a tolerant atmosphere for failure. This factor has had a negative influence upon the role of Kyungpook National University in the development of Daegu's economy. Traditionally, the people of Daegu have been recognized to be very conservative compared to people in other regions in South Korea. For example, according to a survey of Lee (2007), the most peculiar disposition of the people of Daegu is conservativeness. Their conservativeness resulted in the deficiency of entrepreneurship and intolerance of failure in terms of economical activities. Consequently, traditional enterprises stubbornly adhered to the textile industry for too long. It was impossible for new industries such as telecommunication, computer, software, and flat panel TV industries, which are based on a gamble spirit, to be developed.

5) The history of university-region linkages

Kyungpook National University does not have much experience cooperating with private firms in Daegu. Lee (2006) argues that in the past cooperation processes

between the university and regional firms, regional firms thought that the university should serve them and freely be able to use the knowledge of the professors and researchers at the university. The university had to provide all services throughout the entire process, from technology development to its commercialization for the small and medium sized enterprises in the Daegu. Because of this, the university only focused on the cooperation with the outside large companies or on the basic scientific researches which could be used for their theses. It was not until the 2000's that Kyungpook National University began to cooperate with firms in Daegu. The absence of a relationship between Kyungpook National University and regional firms is a serious contributor as to why Kyungpook National University could not perform active role in development of Daegu's economy.

6) The presence of champions within a university and in the region

There had been no champion who played a key leadership role in advocating strong university-industry/region linkages in both Kyungpook National University and Daegu until the end of the 1990's when Daegu Technopark was founded. Daegu Technopark was founded, in 1998, to promote the development of new industries and to mediate the relationship among firms and research institutes, funded by Daegu's city government,

three universities and one junior college in Daegu⁶. In the process of the groundwork for Daegu Technopark, Jonghyun Lee, a professor of Kyungpook National University, played a key leadership role and became the first president of Daegu Technopark. Serving as the president, he made great efforts in promoting the cooperation between universities and firms in Daegu and in building innovative systems for Daegu. He might be named as the first champion for contribution from universities to the development of Daegu's economy. Before the presence of Jonghyun Lee, there was no person who could have been recognized as a champion for building a cooperative relationship between universities and firms.. In conclusion, the absence of champions both in Kyungpook National University and in Daegu resulted in the insufficient performance of role of Kyungpook National University in developing Daegu's economy.

7) The change of economic and political environments

In Korea, from the past, most economic power has been centralized in big company groups called "Jaebal" located in Seoul, the capital of South Korea. Though their factories were located in non-capital areas, most of their management and R&D departments were located in Seoul. In addition, most authorities, to regulate economic

⁶ This is cited from the website of Daegu Technopark (<http://www.ttp.org/>)

activities of economic bodies, have been centralized in the central government. After substantial local autonomy had again been put into effect in 1995, when the chiefs of municipalities were selected by election in Korea, some economic regulation authorities were transferred to local autonomous entities. However, most regulation authorities are still held by the central government. Therefore, it was not necessary for universities to consider regional firms and municipalities as their cooperative partners and to make great efforts in making deep relationships with their regions. In conclusion, centralized economic power and economic regulation authorities made a negative influence in the university's role of contribution to developing regional economy. This situation can be applied to Kyungpook National University.

8) The change of government policy

Seen in the Higher Education Law of Korea, in the beginning, the South Korean government was not interested in universities' role in the development of regional economy. However, starting from the 1980's, a number of policies which intended to encourage universities to perform an active role in development of regional economy have been implemented. In the 1980's, the government began to regularly support cooperation between industry and academia through policy alternatives of the national

research programs such as Special Research Program and Industrial Fundamental Technology Development Program (The Ministry of Science and Technology of Korea 2005). In the 1990's, new programs to support cooperation between industry and academia such as SRC/ERC, RRC, Industrial Technology Foundation Building project, TIC, Technopark were started. In the 2000's, together with the operation of Industry-Academia Cooperation Agency of universities, programs intending to activate the networks between regional innovation entities such as forums and conferences are being put into practice (The Ministry of Science and Technology of Korea 2005). In conclusion, there were a number of government programs to encourage Kyungpook National University to play an active role in the development of the city's economy.

Though Kyungpook National University had a considerable ability to play an important role in the development of Daegu's economy and there were a number of government programs to encourage the university to actively engage in the development of regional economy, Kyungpook National University did not perform an active role in the development of Daegu's economy because of the indifference of the university in the regional economic development, the absence of an industrial base in Daegu which could utilize the assets of Kyungpook National University, Daegu's very conservative culture, the insufficient experience of university-region linkages, the absence of champions, and

deeply centralized economic power and regulation authorities in Seoul. In chapter 5, I will conclude this paper by making some policy recommendations for universities to perform an active role in the development of the regional economy.

Category	Factors	Evaluation
University Factor	● Orientation of a university's management	● Negative
	● Ability of a university	● Positive
Regional Factor	● Industrial base of a region	● Negative
	● Cultural characteristics of a region	● Negative
Common Factor	● History of university-region linkages	● Negative
	● Presence of champions	● Negative
Environmental Factor	● Changes of economical and political environment	● Negative
	● Changes of government policy	● Positive

5. The conclusion

For Kyungpook National University to perform an active role in the development of the regional economy, the university should explicitly include contributions to regional economic development as one of its important missions. The university, which is still suffering from conflicts between the contribution to the whole country and the contribution to its region, should recognize that it has to more focus on its region to survive because the university will increasingly draw on the economic development of Daegu. Economical regulation authorities will increasingly be transferred to municipalities. In addition, universities will gradually depend upon funds from their

regions because the number of students is anticipated to dramatically decrease in the future considering the current demographic structure of Korea⁷.

Second, Daegu City should focus on the promotion of the industry sectors in which Kyungpook National University has strength, such as electronic engineering and computer science. As explained in chapter 4, the reason why Kyungpook National University could not perform a more important role in the development of Daegu's economy even though it has strength in electronic engineering and computer science is largely due to the fact that there was no industrial base for those sectors in the city. Therefore, responding to the strategy of "selection and concentration," Daegu City should concentrate its whole efforts on the promotion of the industry sectors in which Kyungpook National University can perform an active role. In addition, Daegu City has to make more efforts to change its very conservative culture into a more venture-friendly culture to create new companies in the high-tech sectors such as electronic engineering and computer science.

Third, both Kyungpook National University and Daegu City need to find out and cultivate their champions to play a key role in building linkages between the university and the Daegu's industries on purpose. Though not well known to the public, there are a

⁷ According to the Korean Statistical Office, the estimated number of people aged eighteen is 629,360 in 2008, 690,519 in 2011, 619,173 in 2016, 471,522 in 2021, 424,172 in 2026, 365,995 in 2036, and 320,782 in 2050.

number of faculty and government agents who are making great efforts in building intimate linkages between the university and Daegu's society. If they obtain more trust and more support from the region, they can better perform this mission. The opinion leaders of Kyungpook National University, Daegu City, and regional media should take lead in cultivating regional champions.

Finally, government policies aimed to facilitate universities' engagement in the regional economic development should be more systematic to achieve their goals. Though government programs are abundant in terms of quantity recently, there are a lot of redundancies among them and their performances are not satisfactory because of their poor assessment systems.

Universities are the unique knowledge assets in which municipalities in areas outside of Seoul can use for development of the regional economy in a knowledge-based society. In the past, the universities in South Korea did not perform an active role in this type of development because of the insufficiency of internal incentives and the absence of the external pressure. Recently, responding to the changing environments, the universities are actively taking part in the efforts of the development in the regional economy. For the universities to perform greater roles in the development of the regional economy, universities, municipalities, and government should work together.

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