Journal of the Economic Geographical Society of Korea
Vol.16, No.3, 2013(472-491)

A Study on Limits to Promoting SMEs Networking Policies for Urban Economic Development in South Korea: Centering on the Case of Daegu City

Taewoon Kim*

도시경제발전을 위한 중소기업 네트워킹 정책 활성화의 한계에 대한 연구 -대구광역시의 사례를 중심으로-

김태운*

Abstract : This research addressed limits to promoting SMEs networking programs, especially with universities, in the context of national and regional policies for urban economic development, centering on the case of Daegu City. In large cities such as Daegu City, the strategy focusing on promoting SMEs networking activities, utilizing the advantages of urban economy, is likely to be necessary for urban economic development in knowledge-based economy. However, national and regional policy direction for urban economic development relied on exogenous strategies attracting firms, and regional S&T policies focused on universities and research institutes rather than SMEs, being strongly initiated by central government. Thus, to promote policies supporting local SMEs networking in Daegu City was seen as being difficult. Under these circumstances, region-specific policies related to support networking activities of SMEs might be dealt with neglectedly.

Key Words : SMEs networking activities, exogenous strategy, regional innovation policy, science and technology policy, Daegu City

요약 : 본 연구는 도시경제발전을 위한 국가 및 지방정책의 맥락에서 중소기업 네트워킹 정책을 활성화시키는 데 있어서의 한계점들을 대구지역의 사례를 중심으로 살펴보았다. 대구시와 같은 대도시에서는 도시경제의 이점을 활용하여 중소기업의 네트워킹 활동을 촉진시키는 전략은 지식기반경제에서 도시경제발전을 위해 필요한 것으로 보인다. 하지만, 기업유치라는 외생적 전략에 의존하는 국가 및 지방의 정책방향과 함께 지방과학기술정책이 중앙정부 주도로 추진되면서 중소기업보다는 대학과 연구소 중심으로 진행되고 있기 때문에 중소기업의 네트워킹 활동을 지원하는 정책을 제고하는 것은 어려운 것으로 보인다. 이러한 환경에서는 중소기업 네트워킹 활동 지원과 관련된 지역 특화 정책들은 소홀하게 다루어질 가능성이 높다.

주요어 : 중소기업 네트워킹 활동, 외생적 전략, 지역혁신정책, 과학기술정책, 대구시

Assistant Professor, Department of Public Administration, Keimyung University(계명대학교 행정학과 조교수, ktwoon7@hanmail.net)

1. Introduction

In general, it is acknowledged that one of the most important urban economic problems is industrial decline. This industrial decline results partly from industrial decentralization that "is intended to signify a general social process involving relative locational shifts of units of capital and employment from the core of the city to the suburbs" (Scott, 1982: 122). In addition, in a globalized economy, a great deal of manufacturing that located in cities in developed countries has been being moved to cities in the newly industrializing countries (Lever, 2002). Such industrial decline is accompanied by the decline of employment prospects and the lack of job opportunities and thus, increases the need for urban economic policies (Temple, 1994). Thus, urban economic regeneration programs are concentrating on attracting firms and private investment, enhancing local enterprise initiatives, and creating new employment, which can be also identified in urban policies of South Korea.

As the importance of innovation in economic development is increasingly emphasized and society becomes increasingly knowledge-based, the focus of such urban economic policy is shifting toward enhancing urban innovation and knowledge capacity. This is also related to the shift from old exogenous strategies centering on the acquisition of firms and investments to endogenous strategies focusing on stimulation of local start-ups and small and medium sized enterprises (SMEs) growth in regional economic development strategies (Moulaert and Sekia, 2003; Rothwell and Dodgson, 1992). The role of SMEs is particularly stressed in urban regions which experienced industrial decline since it become acknowledged that SMEs networks contribute to economic development from some cases of 'industrial districts' such as the Third Italy and Silicon Valley.

In particular, networking activities of SMEs with universities tend to gain importance in the knowledge-based economy era because it is generally acknowledged that universities play a central role in creating new knowledge. That is, many recognize that universities could provide technological advice and knowledge for SMEs, and thus innovation could be developed in the process of interaction between them (Hassink, 1996). Under these circumstances, policies focusing on enhancing the innovation activities of SMEs have tried to encourage collaboration between SMEs and universities (Rothwell and Dodgson, 1992). Given the higher share of SMEs in metropolitan regions of South Korea, such SMEs networking policies seem to be important instruments for restructuring urban economy.

However, exogenous strategies focusing on attracting large firms from other regions are still likely to be considered important in the context of regional economic policies. Also, while policies of central and regional governments for regional innovation and science and technology (S&T) are being conducted, SMEs networking activities are not likely to be dealt with significantly as much as research and development (R&D) activities of universities and public institutes. In this respect, this research addresses limits to promoting programs of SMEs networking, especially with universities, in the context of national and regional policies for urban economic development, centering on the case of Daegu City where a share of SMEs in local economic structure is high throughout South Korea.

Based on the objective, two research questions are formulated: what are barriers to expand and enhance policies supporting SMEs network in terms of regional development strategies of Daegu City?; and what limits do the policies for regional innovation and S&T have in stimulating SMEs networking activities ? In order to achieve the objective, this research starts with the importance of SMEs networking in urban economy. Then, the economic development strategy of Daegu City government is analyzed and the limits of regional innovation and S&T policies are discussed. Then, this research suggests measures for enhancing SMEs networking policies.

2. The importance of SMEs networking in urban economic development in knowledge-based economy

1) SMEs as essential targets of urban economy policies

SMEs tend to gain relatively importance in urban economy as relationships between large firms and localities in urban regions become weakened. Of course, large firms can still influence local and regional economic development strongly because their employment size is large, and many firms are directly and indirectly affected by their activities. In this respect, there are some regions where regional agglomerations are dominated by large firms (Cooke et al., 1998). However, it is probably obvious that the role of large firms in the urban economy has been much weaker than in the past and therefore, city regions are not seen as appropriate areas for the manufacturing sites of large firms. According to Lever (2001: 276-277);

> "The location of large Fordist plants in large urban centres, or at their peripheries, was no longer the most profitable locus of production. The advantage of access to large workforces, large local markets and the range of positive externalities was being offset by the growth of diseconomies such as high wages, traffic congestion, negative externalities and high rents."

Many cities, particularly in Western Europe, experienced industrial decline because large firms removed their excess capacity to rural areas or newly industrializing countries such as south-east Asia, India, China and Latin America (Lever, 2001). These phenomena have been identified not only in European countries but also in South Korea. Large cities in South Korea such as Seoul, Busan, and Daegu were dominated by labour-intensive industries such as textiles and apparel, and assembly of electrical and electronic goods. However, they became challenged by China and south-east Asian countries with their much lower wages, and thus some firms relocated their production facilities to suburban areas or other countries with much cheaper production costs (Choe, 2005).

In addition, the globalized economy can weaken the relationship between large firms and localities. Curran and Blackburn (1994) suggest three reasons for this. First, global corporations which operate multinationally are growing. The attachment of such firms to the local economy becomes more tentative due to expansion of capital on the basis of

a global basis (Lash and Urry, 1987). Second, the separation of ownership from locality is increasing in the sense that many large firms are foreign-owned. Third, the geographical mobility of local populations is increasing. In particular, as skilled workers are much more mobile than other workers, managers responsible for local large firms might come from outside the locality.

Under these circumstances, the role of SMEs in the urban economy become increasingly emphasized. In particular, SMEs have been very often characterized by high adherence to regions. Crevoisier and Maillat (1991) argue that SMEs are one group of important protagonists in local milieu due to their generally more marked attachment to the region. In addition, Cooke et al. (1998: 1569) argue that SMEs are "capable of being defined in terms of high regional embeddedness". Given this characteristic, SMEs might be an important economic actors in large cities where the proportion of SMEs in economy is high. Falk (1978, quoted in Storey, 1986: 92) argues that the inner city with its expensive sites might be appropriate for small firms which require only small amounts of land, emphasizing that small firm in the inner city is likely to have easy access to a relatively rich market and more likely to be able to obtain access to supplies than the firm situated in a rural town. Such concentration of SMEs (in particular high-tech SMEs) on metropolitan areas may contribute to form and develop agglomeration economies.

2) SMEs networking activities and urban economy

The rink between SMEs and urban economy seems to be enhanced by the characteristics SMEs have intrinsically and the advantages provided by urban regions in the context of the knowledge-based economy.

(1) The characteristics of SMEs networking

SMEs generally lack the resource, the economies of scale and scope, and qualified technical specialists (Rothwell, 1991). Thus, they tend to need to link up with resource pools of others to gain strategic options (Sengenberger and Pyke, 1992). Moreover, companies are facing an increasing uncertainty and risk due to the rapid changing of new technologies, the growing competition, and shortening of technology life cycle (Geenhuizen et al., 1997). They try to reduce uncertainty and risk by sharing, collaborating and networking (Keeble et al., 1999). Therefore, SMEs generally seem to need other collaborators to help them during different stages of the development of their innovations (Simmie, 2002).

In social-economics, network of social actors can be defined as sets of connected exchange relations (Cook and Emerson, 1978, in quoted Håkansson and Johanson, 1993: 35). Yeung (1994: 480) breaks down network relations in the organization of business operation into three dimensions: 1) intrafirm; 2) interfirm; and 3) extrafirm relations. Intrafirm relation is the necessary ingredients of business operations and its nature is parent-subsidiary and internalized operations (e.g., multidivisions, conglomerates). Interfirm relation means firm-firm transactional and institutional relationship (e.g., joint ventures, subcontracting, strategic alliances, co-operative agreements). Extrafirm relation refers to relationship between the firm and other institution (e.g., government contracts, joint R&D collaboration with universities and research institutes).

Among these networks, Curran and Blackburn (1994) stress that much of the discussion of linkages is extrafirm relations. This is because economic connections are embedded in social, political and cultural relations and structures, and represent the essential external relations which would be required in any locality (Curran and Blackburn, 1994). In particular, according to most modern territorial innovation models such as Innovative Milieu (Camagni, 1991), Industrial District (Sengenberger and Pyke, 1992), Regional Innovation system (Cooke et al., 1998) and Learning Region (Morgan 1997), regional innovation is generally shaped by interactions and networking activities not only between firms, but also between firms and institutions through an institutional milieu characterized by embeddedness.

Furthermore, there are examples that active linkages between SMEs and universities occurred in some regions in which high technology SMEs aggregated, such as Silicon Valley and Route 128 in the USA (Saxenian, 1995), Cambridge region in the UK (Keeble et al., 1999), and the Helsinki region in Finland (Autio, 1997). Thus, it is acknowledged that collaborations between SMEs and universities could play a central role in regional innovation. However, such networking activities might not less frequent than between SMEs and business organizations because of a variety of obstacles such as different aims, cultures and languages (Tödtling and Kaufmann, 2001). Also, with respect to knowledge and innovation, market mechanisms might not function very well because there are uncertainties attached to predicting the future, such as failures to predict the economic value of new technologies, product, sources or firms (Nauwelaer and Wintjes, 2002). This means that collaborations between SMEs and universities might not be necessarily inherent to their behavior in many cases. Consequently, many countries try to facilitate collaborations between SMEs and universities through policy instruments on the basis of belief that these linkages are regarded as essential tools to create and transfer new knowledge.

(2) The advantages of urban economy for SMEs networking activities

SMEs networking activities can be more activated in urban regions where the high level of knowledge activities has been accumulated than in peripheral and rural regions. In general, the economy of cities has been characterized by agglomeration economies and high knowledge intensity (Reichert, 2006).

First, as urban areas can provide the advantage of proximity and the widespread density of networks through developed urban infrastructure (Lambooy, 2002), agglomeration economies, which mean that various economic and other activities have been located within the same region (Lambooy, 1997), are much higher in urban areas than elsewhere (Capello and Veronelli, 2001). Agglomeration economies have two major effects such as the simple reduction of transport and communications costs, and the expression of external economies of scale (Scott, 1982). Such an agglomeration economy has enabled an urban location to provide firms with particular advantages, namely accessibility to the following: infrastructure, and social capital in general; a vast input market; a vast output market; a vast supply of diversified business services; a vast and diversified labour market, highly skilled and qualified; and general information and know-how (Capello, 2001).

Second, the urban economy has high knowledge intensity originated from the presence of many advanced service businesses, universities, research institutes and high-tech SMEs and "the advantages of proximity and the prevailing density of networks" (Lambooy, 2002: 1029). In general, there are many service businesses(e.g. monetary and financial services, computer service, R&D activities) in urban areas and thus, the proportion of tertiary industry is considerably high. Such services could contribute to establishing convenient environments, compared to the areas on the outskirts of the metropolitan area (Frenkel, 2001). Moreover, the institutions of higher education such as university, technological research facilities, which could enable firms to access information, tend to gather in urban regions (Frenkel, 2001). Accordingly, it can be assumed that the urban economy could provide more appropriate places and circumstances for local learning and knowledge transfer than other regions. Simmie (2002) argues that as medium and large-sized urban regions could provide agglomeration economies in which innovative SMEs have chance to more easily collaborate with organizations having the different types of knowledge than rural or peripheral areas. That is, such environments could provide external sources of technological, financial, managerial expertise and advice for SMEs. Due to the strong institutional presence, agglomeration economies and the relative easiness of networking activities in the urban areas, uncertainties encompassing SMEs such as financial and technological problems could be tackled by their networking activities with non-economic organizations.

Considering the characteristics of the urban economy, it has been important to derive competitive advantage from the presence of many institutions of governance in economic, political and cultural life for urban economic development (Amin and Thrift, 1995). Urban economic regeneration policies, of course, are not always limited to enhancing knowledge creation and diffusion focusing on SMEs. The physical planning of improving the quality of living and business conditions for workers and firms, and the attraction of external investment and firms are also important elements of economic regeneration policies. Moreover, the policies for fostering knowledge activities have been stressed not only in city regions but also in other regions. However, for city regions these policies have tended to become more important because of relatively high density of knowledge activities as mentioned above. In particular, in knowledge-based economies where knowledge generation and diffusion are perceived to be a major goal, urban development needs networked organizational structure (Lambooy, 2002). Accordingly, the policy related to knowledge activities focusing on SMEs has been regarded as a key instrument for urban economic regeneration in the era of the knowledge-based economies.

3. Limits to fostering SMEs networking through policies in Daegu City

1) Local economy in Daegu City

Daegu City was the fourth large city in South Korea, having 2.5 million population. Daegu had a typical urban industrial structure showing the high proportion of service business. As indicated in

Table 1. Industrial structure by GRDP in Daegu City

Year	Primary industry (%)	Secondary industry (%)	Tertiary industry (%)
1986	1.1	34.0	64.9
1997	0.9	23.6	75.5
2005	0.5	19.3	80.2
2010	0.4	19.7	79.9

Source: Korea National Statistic Office (http://kosis.kr)

Table 2. SMEs' share in manufacturing sector by regions (2011)

Region		Number of SMEs in total firms(%)	Number of SMEs workers in total employment(%)
Whole country		99.0	73.7
Metropolitan City	Seoul	99.7	92.1
	Busan	99.5	89.9
	Daegu	99.4	89.9
	Incheon	99.4	83.1
	Gwangju	98.8	64.2
	Daejeon	98.2	73.6
	Ulsan	97.5	48.7
Province	Gyeonggi	99.4	76.7
	Gangwon	98.6	80.9
	Chungbuk	98.0	72.7
	Chungnam	97.6	62.2
	Jeonbuk	98.6	74.0
	Jeonnam	98.4	67.0
	Gyeongbuk	98.3	66.1
	Gyeongnam	98.9	71.9
	Jeju	100.0	100.0

Source: Korea National Statistic Office (http://kosis.kr)

Table 1, Daegu's GRDP (Gross Regional Domestic Product) consisted of 0.4% of primary industry (agriculture), 19.7% of secondary industry (manufacturing), and 79.9% of tertiary industry (service business). Like other metropolitan cities, the proportion of manufacturing industry in Daegu's economy had been declining. This was likely to result from urbanization, increase of land price and difficulties in establishing industrial complexes. On the other hand, service industry was continuously increasing (see Table 1). Its share in Daegu's GRDP accounts for 64.9% of in 1986, but it grew to occupy 79.9% in 2010

As seen in Table 2, a proportion of SMEs with below 300 employees was much higher in Daegu than other regions. Daegu was a region where a

proportion of SMEs was the highest after Seoul throughout Korea. In particular, the average proportion of SMEs in metropolitan areas, which was investigated in terms of number of workers working in SMEs, was higher than that of province areas.

Given these urban locational and economic situations of large cities such as Daegu City, the growth and competitiveness of SMEs are seen as more crucial policy targets rather than the acquisition of large firms' investment in substantial and feasible aspects. That is, the enhancement of networking activities centering on SMEs might be one of the most essential policy targets for urban growth strategies in knowledge-based economy. However, this strategy was not considered important in reality because central and local governments tended to prefer the attraction of firms from other regions for regional economic development. Also, although a variety of SMEs-related policies of central government were performed in regions, they had limits in fostering SMEs networking substantially, as mentioned below.

2) Urban development policies relying on exogenous strategies

According to Stöhr (1990), regional industrial policies in Europe has shifted from re-distributive or exogenous strategies to endogenous ones. Exogenous strategies focus on attracting firms and investment from other regions, while endogenous ones rely on stimulating local start-ups and SME growth for regional economic development (Isaksen, 2003). Exogenous strategies have a serious problem that is a lack of structural linkages between new investments including large firms' branches and the economic tradition of the areas (Martinelli, 1998). The failures of such policies have been observed in many areas of the world (Cuadrado Roura, 1994). In this respect, endogenous strategies focusing on the stimulation of knowledge activity and capability in local firms and clusters have increasingly become important, particularly in knowledge-based economy.

However, central and local governments in South Korea still believed that the acquisition of firms from other areas was the most important to regional development. They thought the absence of firms that could lead manufacturing basis, was a crucial problem of regional economic development. This cognition appeared explicitly in 'Vitalization Measures for Regional Economies (2008)' which were announced in the third National Balanced Development Commission meeting presided by the President (see Table 3).

These measures were jointly formulated by the Commission and six ministries including the Ministry of Strategy and Finance, the Ministry of Knowledge Economy and the Ministry of Land, Transport and Maritime Affairs which had strong authorities and sources for regional development. In the Measures, the central government explained that the essential points of regional development were to attract firms creating jobs and incomes. Therefore, it stressed that local locational conditions for firms should be improved, so it was necessary to enhance the supports of a tax system and finance, and to improve social circumstances. As shown in Table 3, in order to achieve such goals, government would try to stimulate firms to move into local areas by providing such policy instruments as grants, tax exemption and reduction, and provision of low price industrial complexes.

These policy directions and programs seem to

Table 3. Practical subjects for activating regional economies (2008)

Policy areas	Contents
Expansion of local financial basis	- Reorganization of local finance supporting system - Establishment of local development incentive - Induction of block grant
Improvement of firm's locational circumstances	- Expansion of tax exemption and reduction for firms moving - Establishment of tax exemption and reduction for local lagging firms - Expansion of moving grant for local firms - Expansion of establishing grant for local manufacturing firms - Provision of low price industrial complexes for regions - Preparation of comprehensive countermeasures for local education
Cultivation of local growth base	- Early development of the Saemangum Project - Enhancement of self-sufficiency function of the Innovative Cities - Authorization of permitting operation plans of the Free Economic Zones - Preparation of regeneration measures for local cities
Support of local core industries	- Increase of local limit criteria of public construction - Preparation of activating measures for local firms joint contract in government contracts - Provision of vitality for local traditional markets - Alleviation of act restriction in natural parks

Source: National Balanced Development Commission (2008)

be based on exogenous strategies. In particular, since central government explained this policy was formulated on the basis of the requests of regional governments, they also seemed to rely on exogenous strategies for regional economic development strongly. This point of view was also shown in Daegu City's economic development strategy strongly. Bumil Kim, the mayor of Daegu City, often emphasized that the first priority task for regional economic development was the acquisition of investment, as follows:

"In 2012, since the first priority of Daegu City's policies is regional economic revitalization and job creation through attracting firms' investment, we make the best efforts for attracting outstanding companies into our region." (Maeilsinmun, 2011. 12. 23)

"The establishment of the Investment Promotion Center is a starting point for regional economic revitalization through attracting firms' investment as a essential project." (Yonhapnews, 2012. 1. 17)

In accordance with the belief of the Mayor, the acquisition of investment from other regions was the highest rank in regional development policies of Daegu City. According to Daegu City's development plans in 2012, the economy vitalization for people and the job creation for young people was the primary emphasis policy. In order to achieve this policy goal, Daegu City government suggested the expansion of investment attracting as

Table 4. Daegu City's development plans in 2012 and 2013 year

Year	2012
Primary emphasis policy	Economy vitalization and job creation
Sub-policies	1. Expansion of investment attracting - Attracting large and high-tech firms - Attracting foreign investment 2. Achievement of 10 billion dollars export 3. Job creation - Creating jobs for young people - Creating jobs for ordinary people - Solution of job mismatch and infrastructure establishment 4. Competitiveness enhancement of economy for ordinary people's life - Competitiveness enhancement of traditional market - Price stabilization - Expansion of financial support for small traders 5. Promotion of local construction industry
Year	2013
Primary emphasis policy	Active creation of new growth engines
Sub-policies	1. Creation of outcomes of large scale projects 2. Investment attracting and enhancement of export support 3. Enhancement of regional main industries 4. Establishment of R&D hub in Yeongnam region 5. Promotion of medical industry

Note: There were several emphasis policies in Daegu City's development plans, but only the primary emphasis policy was shown here.
Source: Daegu Metropolitan Government (www.daegu.go.kr)

the first important sub-policy (see Table 4). This strategy was also shown in 2013 year. Daegu City government explained that the active creation of new growth engine was the most important policy. For this, it was trying to establish robust regional economic infrastructure by attracting outstanding firms in the National Industrial Complex, the High-tech Medical Complex, and the Technopolis which were large-scale industrial complexes, newly established.

In this respect, the Daegu City government seemed to concentrate its potential on attracting firms' investment preferentially. Under these circumstances where there is a widespread recognition that regional development can be achieved by attracting investment on the basis of exogenous strategy, policies related to support networking activities of SMEs might be dealt with neglectedly.

In fact, considering economic and locational circumstances of Daegu city, such strategy does not seem to be achieved easily. Daegu City was characterized by high prices of industrial sites and insufficient industrial complexes, and thus it is difficult to attract the investment of large firms. The prices of newly established industrial sites in the Daegu City region were over 1,300 thousands KRW per a $3.3m^2$. These prices were quite high, given that the prices in peripheral regions such as Gumi, Gyeong-

Table 5. Comparison of land prices between newly established industrial complexes in Daegu City and in peripheral regions in Gyeongbuk province

(unit: 1,000 KRW/3.3m^2)

City	Industrial Complexes	Sale year	Sale price	Distance from downtown
Daegu	The 5th Seongseo Industrial Complex	2009	1,330	10km
	Esiapolis	2008	1,700	6km
	High-tech Medical Cluster	2012	1,970	12km
	Daegu Technopolis	2009	720	20km
Gumi	Gumi Mold Industries Complex	2012	770	
Yeongchen	High-tech Components & Materials District	2012	430	
Gyeongsan	The 2nd Jinrang Industrial Complex	2007	480	

Figure 1. Location of industrial complexes in Daegu City

san, and Yeongcheon Cities located in Gyeongbuk province were 400~800 thousands KRW (see Table 5). In particular, the land prices of existing industrial complexes in the Daegu City region were over 3,000 thousands KRW and (Maeil Shinmun, 2012. 9. 12). This is seen as a natural phenomenon occurring in the process of urban growth, but the high prices of industrial sites might weaken the locational competitiveness of Daegu City for large firms.

In addition, available industrial sites for manufacturing have been insufficient in the Daegu region because it has been difficult to make industrial complexes. Thus, Daegu City government have been constructing some industrial complexes such as the Daegu Technopolis and the Daegu National Industrial Complex in Dalsung county which was consolidated into Daegu City in 1995 and had the feature of rural areas. However, the locational circumstances of the complexes were not attractive because Dalsung county was far from the center of Daegu City and its urban infrastructure was not well constructed..1) The land price of the Daegu Technopolis seemed to be much lower than other complexes near the center of city, but its price competitiveness was not strong, compared with the prices of complexes in Gyeongbuk regions. That is, although Daegu City could supply good living conditions including educational and cultural environments as a large city, it was not likely to have good advantages to attract large firms, given its whole locational circumstances. Nevertheless, if the Daegu City government sustains the exogenous strategy as a top priority strategy, the opportunities for policies related to support networking activities of SME can be hampered.

3) Limits of regional innovation and S&T policies

Regional innovation policies aim "to support regional endogenous potential by encouraging the diffusion of new technologies from universities and public research establishments to SMEs, between SMEs and large enterprises and between SMEs themselves" (Hassink, 2001: 1375). In this respect, policies fostering SMEs networking with universities or research institutes can be an essential area of regional innovation policies. In addition, science and technology (S&T) policies related promotion and management of S&T include such programs as joint research and development (R&D), human resources exchange, and industry-academia collaboration. Thus, they are connected with SMEs networking policies. In fact, regional innovation polices are mixed with S&T policies practically and it is not easy to classify them clearly. Regional innovation policies are mainly operated at the national-level applying the same measures and criteria for all types of region in many countries (Fritsch and Stephan, 2005). That is, national level policy remained the most important factor to enhance regional innovation, even though this might vary according to national political systems and administrative set-ups.

South Korea has had a long tradition of centralism, and many regional innovation and S&T policies have been driven by the strong initiatives of central government despite more recent current political devolution process (Hassink, 2001). A majority of regional governments were largely dependent on the central government in terms of financial resources, so the national programs were regarded as important opportunities for promoting

Table 6. Science and technology budget of 16 upper-level local authorities (2011)

(million won, %)

Region	Total Budget	National Fund	Regional Fund		Finance independence degree
				Ratio	
Total	3,982,380	1894,602	1,339,963	33.6	
Seoul City	166,170	28,267	137,571	82.8	83.4
Busan City	452,205	207,787	188,353	41.6	54.1
Daegu City	504,643	305,309	142,410	28.3	52.1
Incheon City	457,315	178,269	221,958	48.5	70.0
Gwangju City	168,892	93,651	47,237	28.0	43.2
Daejeon City	96,854	51,709	37,515	38.7	52.1
Ulsan City	143,566	89,109	44,977	31.3	60.2
Gyeonggi Province	586,575	94,541	146,035	24.9	59.3
Gangwon Province	160,843	73,555	38,118	23.7	20.8
Chungbuk Province	146,044	83,594	46,462	31.8	25.1
Chungnam Province	105,747	61,322	29,873	28.3	24.0
Jeonbuk Province	268,755	173,144	49,249	18.3	17.3
Jeonnam Province	150,336	93,019	35,811	23.8	19.5
Gyeongbuk Province	346,060	198,100	114,889	33.2	21.7
Gyeongnam Province	166,170	117,049	37,173	19.7	34.2
Jeju Province	72,205	46,177	22,332	30.9	25.7

Source: Regional Science and Technology Yearbook 2011 (National Science and Technology Commission, 2011a)

regional innovation. According to Regional Science and Technology 2011, total science and technology budget of 16 upper-level local authorities was co-financed by central government (47.5%), local governments (33.6%), and other sources (18.9%).

However, 13 regions except Seoul City, Incheon City, Gyeonggi Province, whose financial independence was relatively high, invested much less budget than central government (see Table 6). This implies that many regions in South Korea were trying to attract the policies of the central government to stimulate regional innovation activities. Hassink (2001) who researched South Korea's regional innovation support systems, also argues that agencies in the regions are strongly dependent on national ministries in Korea.

As shown in Table 7, among whole S&T policies of Daegu City in 2012 year, national programs which the Daegu City government co-financed were 73.4% and this ratio was incrementally growing. That is, a majority of S&T policies implemented in the Daegu region were initiated by central government and Daegu City's independent policies were relatively rare. Of course, these national policies could contribute to stimulating local SMEs networking with universities or research institutes since they had a variety of programs including building R&D institutions, providing R&D grant, and establishing science parks.

However, these programs are likely to have limits

Table 7. The number of national and regional programs in Daegu City's S&T policies

Year	Total	National program	Regional program
2010	128(100.0%)	75(58.6%)	53(41.4%)
2011	163(100.0%)	115(70.6%)	48(29.4%)
2012	154(100.0%)	113(73.4%)	41(26.6%)

Source : National Science & Technology Commission (www.nstc.go.kr)

Table 8. The ratio of the R&D programs of Daegu City by managing bodies(%)

Total	Daegu City	Universities	Firm support organizations	Public research institutes	Firms	Other
100.0%	2.2%	44.6%	25.9%	19.4%	0.7%	7.2%

Note: Firm support organizations are the Daegu Technopark, the Daegu Digital Industry Promotion Agency, the Daegu Regional Intellectual Property Center, etc.
Source: Daegu Metropolitan Government (www.daegu.go.kr)

to promoting the programs of SMEs networking substantially despite the effectiveness of the programs for stimulating regional innovative activities and enlarging R&D potentials.

First, these programs were generally operated in university and research institute-oriented ways. Daegu Research and development Support Agency (2011) indicated that these S&T policies were focusing on supporting research institutes and universities rather than firms, and centering on future technology-oriented R&D programs which could be realized after a long period of time. According to the Annual Expenditure Instruction of Daegu City in 2013 year, the R&D programs of Daegu City were mainly managed by local universities (44.6%), firm support organizations (25.9%) such as the Daegu Technopark, and public research institutes (19.4%) (see Table, 8). These managing bodies usually played a main role in making research proposals and executing public budget in the implementation processes of the programs. This means that the operation of the programs could be centered around their activities and interests.

This phenomenon was also identified in national

Table 9. The ratio of national R&D investment by research bodies(%)

Reserach Body	2010 year	2011 year
Total	100.0	100.0
Public R&D institute	45.5	43.3
University	24.8	25.4
Large firm	9.0	9.3
SME	12.0	12.4
Others	8.7	9.6

Source : National Science & Technology Commission (2011b)

R&D programs. According to National Science & Technology Commission (2011b), around 70% of national R&D investment was used in public R&D institutes and universities (see Table 9).

In fact, as it is acknowledged that research institutes and universities can play a more important role in creating new technology and knowledge than other organizations, regional innovation and S&T policies are generally conducted, focusing on research institutes and universities. However, under this circumstance, it is difficult to promote the policies supporting firm-oriented R&D activities including networks of SMEs. Of course, SMEs can take part in the programs managed by research institutes and universities. However, if research institutes and universities might operate S&T policies, pursuing their interests, the voice of firms might not be taken into account. According to Kim (2010), Korean industry-academia collaboration programs for regional innovation are generally university-led and thus, firms do not have legitimate roles in conducting the programs.

In addition, the programs focusing on research institutes and universities are seen as being related to cutting-edge and future technology-oriented R&D activities. The number of SMEs participating in such programs might be circumscribed because the technological capability of local small firms is not likely to be high. Given these problems, although there are many regional innovation and S&T policies are implemented in the Daegu City region, it might be difficult for many SMEs to expand networks with universities or research organizations effectively through the policies. The report on demand investigation about policy support of firms in the Daegu Science and Research Complex, conducted by the Daegu Technopark (2011), indicated that small firms in Daegu region needed to collaborate with other firms and research organizations more than large local firms in the process of research and development. That is, it is likely that there are the needs of local small firms about policies supporting networking activities to some degree. Accordingly, regional S&T programs are required to respond this needs effectively.

Second, these national programs might not consider regional specification and demands properly. In fact, although the central government in Korea stressed region-specific regional policies, they tended to be standardized and uniformed throughout the entire country (Kim, 2012; Lee, 2007). Regions are heterogeneous due to their different firm and industrial structures as well as varying social and cultural conditions (Asheim and Isaksen, 2003). Also, SMEs sector is heterogeneous in terms of their innovation activities, resources employed, partners used, and problems they have (Kaufmann and Tödtling, 2003). Accordingly, innovation policy attempting to treat all regions in a similar way may not be implemented efficiently (Tödtling and Trippl, 2005). That is, in the standardized approach, the needs of firms might not be adequately taken into account, even if it is not possible that innovation policies can deal with all kinds needs of SMEs and regions.

In addition, as local government's discretion was so limited in the national programs, it was so difficult for it to adapt the programs to local conditions in the implementation process. Many stress that regional innovation policies by the Korean government were still conducted in a top-down approach, even though it emphasized a shift into a bottom-up way (Lee, 2007; Hassink, 2001). That is, the specific contents of the programs might be in many cases

decided by the central government in advance, and also the contents of proposals suggested by local actors were strictly restricted by the rules and regulations of the programmes. Local actors including local governments are generally better able to reach target groups and find out specific innovation problems of the target groups (Christensen et al., 2003). Thus, if they are not actively involved in the programs, there might be limits in achieving user-oriented policies which can appropriately target characteristics of SMEs and industrial structure of the regions.

Accordingly, as long as these fundamental problems arising from national policies conducted in a holistic way and a top-down approach exist, national policies might not be effective for enhancing SMEs networking as much as expected because local needs including firms' needs might not be reflected on the policies appropriately. In this respect, the policies initiated by local governments which are in a position to be able to notify local needs are needed to a large degree. However, even though there were some Daegu City's independent policies as shown in Table 7, they were mainly focusing on supporting S&T exhibition and fairs, the operation of local research institutes, and forum activities, which were rarely related to SMEs networking activities. In conclusion, it might be difficult to facilitate SMEs networking activities with the current regional S&T policies of Daegu City.

4. Conclusion and policy implications

In large cities such Daegu City, the strategy focusing on promoting SMEs networking activities, utilizing the advantages of urban economy, is likely to be necessary for urban economic development in knowledge-based economy. In particular, given the higher share of SMEs in metropolitan regions of South Korea, policies stimulating SMEs networking activities can contribute to facilitating urban innovation capacity conducive to city competitiveness. However, to promote SMEs networking programs, especially with universities, in the context of national and regional policies in Daegu City is seen as being difficult. This is, at first, because national and regional policy direction for urban economic development was still relying on exogenous strategies attracting firms from other regions. Under this strategy, policies related to support networking activities of SMEs might be dealt with neglectedly. In addition, although regional S&T policies were conducted, they are focusing on universities and research institutes rather than SMEs, and they are mainly operated by central government. Under these circumstances, it might be difficult to promote policies related to firm-oriented R&D activities including programs supporting SMEs networking activities and to formulate region-specific policies which can fulfil the needs of local SMEs.

In order to enhance region-specific policies for SMEs networking activities, these problems need to be improved and some measures can be suggested. First, recognition that the networking activities of SMEs is one of the most important factors to develop regional economy must be spread widely. Under the circumstance that exogenous strategies are crucial solutions to problems of lagging regions, policies supporting SMEs networking do not seem to be considered as an important agenda. Thus, it is essentially necessary for policy makers and opinion

leaders in regions to have shared understanding about that. For this, a variety of success stories of SMEs networking activities in regions need to be found and known explicitly and thus, this should lead to constant learning among regional actors. Through this process, paradigm about regional economic development should shift from exogenous strategies to endogenous ones. Also, constant concern of central government about regional innovation based on networking and collaborating activities is necessary. Since local governments are still dependent on central government, the role of central government is quite important in order to make local governments involve in networking policies for local SMEs actively.

Second, diverse local governments-initiated policies for SMEs networking need to be formulated. Since local governments might understand the needs of local SMEs better than central government, policies that local governments design and plan can be more substantial supports to them than central government's policies. That is, local governments do not need to fit the need of local SMEs into the programs of central government, rather need to develop region-specific innovation policies which can meet the needs properly. For this, the financial conditions of local governments should be improved. For example, 'reverse matching program' in which central government responds to local government-initiated programs and 'exclusive grant system' in which local governments can use the grant of central government discretely, need to be conducted as soon as possible.[2] Moreover, it is important to enhance the innovative capacity of local government officers to deal with regional innovation and S&T programs since a lack of their innovative ability might make it difficult to utilize the given legitimate authority effectively.

Third, there is a need to stimulate the creation of local SMEs' needs for networking activities. The increase and expression of the needs can influence the formulation of policies which target groups can be more satisfied with. In general, SMEs have a tendency to participate in government programs only in order to obtain government grants without expressing specific demands. Thus, their needs of networking activities might not be explicitly circulated. This problem can make it difficult to design diverse programs for supporting SMEs networking activities. According to Choi (2012), in order to stimulate active R&D networking of firms, government needs to entice firms to have absorptive capacity to establish research facilities, to employ research human resources, and to invest research activities. That is, in addition to supporting grant for R&D activities, programs targeting the basis of research networking including human resources, information, and planning capacity need to be also essentially dealt with. This approach might be useful to induce the motivation of their networking activities.

Footnotes

1) According to Yeongnam Ilbo news (2012. 8. 21), firms which bought the land of the Daegu Technopolis are worried about securing employees because of difficulties of commuting and bad settlement environments.

2) According to National Science and Technology Commission (2011), many asser that 'reverse matching program' or 'exclusive grant system' is required, but communication between central and regional governments is not activated.

References

Asheim, B. T. and Isaksen, A., 2003, SMEs and the regional dimension of innovation, In Asheim, B. T., Isaksen, A., Nauwelaers, C. and Tödtling, F. (eds), *Regional Innovation Policy for Small-Medium Enterprises*, Glos: Edward Elgar, pp.21-48.

Amin, A. and Thrift, N., 1995, Globalisation, institutional "thickness" and the local economy, In Healey, P., Cameron, S., Davoudi, S., Graham, S. and Madani-Pour, A., (eds.), *Managing Cities: The New Urban Context*, Chichester: John Wiley & Sons Ltd, pp.91-108.

Autio, E., 1997, University links and technology based SMEs in the Helsinki region, in Keeble, D. and Lawson, C., (eds), *University research links and spin-offs in the evolution of regional clusters of high-technology SMEs in Europe*, ESRC Centre for Business Research, University of Cambridge, pp.51-82.

Camagni, R., 1991, Local 'milieu', uncertainty and innovation networks: towards a new dynamic theory of economic space, in Camagni, R., (eds), *Innovation Networks: Spatial Perspectives*, London: Belhaven Press, pp.121-144.

Capello, R., 2001, Urban Innovation and Collective Learning: Theory and Evidence from Five Metropolitan Cities in Europe, In Fischer, M. and Fröhlich, J., (eds.), *Knowledge, Complexity and Innovation Systems*, Berlin: Springer, pp.181-208.

Capello, R. and Veronelli, D. V., 2001, Dynamic urbanisation ecnomies vs. milieu economies, In Simmie, J., (eds), *Innovative Cities,* London: Spon Press, pp.97-128.

Choe, S.-C., 2005, The impacts of globalization on the urban spatial–economic system in Korea, In Richardson, H. and Bae, C.-H., (eds.), *Globalization and urban development*, Berlin: Springer.

Choi. K. H., 2012, "The Policy of Industry-University Network Building and the Firm Networking: A Focus on the Daegu-Gyeongbuk Region", *Journal of Economic Geographical Society of Korea*. 15(3), pp.404-423.

Christensen, P. R., Cornett, A. P. and Philipsen, K., 2003, Coherence of innovation policy instruments, In Asheim, B. T., Isaksen, A., Nauwelaers, C. and Tödtling, F., (eds.), *Regional Innovation Policy for Small-Medium Enterprises*, Glos: Edward Elgar, pp.166-192.

Cooke, P., Uranga, M. G. and Etxebarria, G., 1998, "Regional systems of innovation: an evolutionary perspective", *Environment and Planning A*, 30, pp.1563-1584.

Crevoisier, O. and Maillat, D., 1991, Mileu, industrial organization and territorial production system: towards a new theory of spatial development, In Camagni, R., (eds.), *Innovation Networks: Spatial Perspectives*, London: Belhaven Press. pp.13-24.

Cuadrado Roura, J. R., 1994, Regional disparities and territorial competition in the EC, in Cuadrado Roura, J.R., Nijkamp, P. and Salvá, P. (eds.), *Moving Frontiers: Economic Restructuring, Regional Development and Emerging Networks*, Aldershot: Avebury, pp.3-22.

Curran, J. and Blackburn, R., 1994, *Small Firms and Local Economic Networks: The Death of the Local Economy?* London: Paul Chapman Publishing Ltd.

Daegu Research and development Support Agency, 2011, *Policy direction for enhancing research and development potentials in Daegu region* (in Korean).

Daegu Technopark, 2011, *The report on demand investigation about policy support of firms in the Daegu Science and Research Complex* (in Korean).

Frenkel, A., 2001, "Why high-technology firms choose to locate in or near metropolitan areas", *Urban Studies*, 38(7), pp.1083-1101.

Fritsch, M. A. and Stephan, A., 2005, "Regionalization of innovation policy – Introduction to the special issue", *Research Policy*, 34(8), pp.1123-1127.

Geenhuizen, M. van., Nijakamp, P. and Rijckenberg, H.,

1997, Universities and knowledge-based economic growth: the case of Delft(NL), *Geo Journal*, 41(4), pp.369-377.

Håkansson, H. and Johanson, J., 1993, The network as a governance structure: interfirm cooperation beyond markets and hierarchies, in Grabher, G., (eds), *The Embedded Firm: on the socioeconomics of industrial networks*, London: Routledge. pp.35-51.

Hassink, R., 1996, "Technology transfer agencies and regional economic development", *European Planning Studies*, 4(2), pp.167-184.

Hassink, R., 2001, "Towards Regionally Embedded Innovation Support Systems in SouthKorea? Case-Studies from Kyongbuk-Taegu and Kyonggi", *Urban Studies*, 38(8), pp.1373-1395.

Isaksen, A., 2003, National and regional context for innovation, In Asheim, B. T., Isaksen, A., Nauwelaers, C. and Tödtling, F., (eds.), *Regional Innovation Policy for Small-Medium Enterprises*, Glos: Edward Elgar, pp.49-77.

Kaufmann, A. and Tödtling, F., 2003, Innovation patterns of SMEs, In Asheim, B. T., Isaksen, A., Nauwelaers, C. and Tödtling, F. (eds.), *Regional Innovation Policy for Small-Medium Enterprises*. Glos: Edward Elgar, pp.78-118.

Keeble, D., Lawson, C., Moore, B. and Wilkinson, F., 1999, "Collective learning processes, networking and 'institutional thickness' in the Cambridge region". *Regional Studies,* 33(4), pp.319-322.

Kim, T. W., 2010, "A study on obstacles to policy coherence of national policies supporting local industry-academia collaboration". *Journal of The Korean Regional Development Association*, 22(3), pp.165-190 (in Korean).

Kim, T. W., 2012, "The characteristics and substantial limitations of user-oriented regional innovation policies", *Journal of Korean Association of Governmental Studies*, 24(1), pp.161-182 (in Korean).

Lambooy, J. G., 2002, "Knowledge and urban economic development: an evolutionary perspective", *Urban Studies*, 39(5-6), pp.1019-1035.

Lash, S. and Urry, J., 1987, *The End of Organised Capitalism*, Cambridge: Polity Press.

Lee, C. W., 2007, "The Evaluation of Regional Innovation and Innovative Cluster Policies in Korea", *Journal of Economic Geographical Society of Korea*, 10(4), pp.377-393 (in Korean).

Lever, W. F., 2001, The Post-Fordist City. In R. Paddison (eds.), *Handbook of Urban Studies*, London: Sage, pp.273-284.

Lever, W. F., 2002, "Correlating the knowledge-base of cities with economic growth", *Urban Studies*, 39(5-6), pp.859-870.

Maeil Shinmun, 2011, Investment attracting of Daegu City, one trillion KRW, 12. 23.

Maeil Shinmun, 2012, Escaping from Daegu industrial complexes to suburbs, 9. 12.

Martinelli, F., 1998, The governance of post-war development and policy in Southern Italy: notes for a critical reappraisal, Paper presented at the Second European Urban and Regional Studies Conference, September 1998, Durham.

Morgan, K., 1997, The learning region: institutions, innovation and regional renewal, *Regional Studies*, 31(5), pp.491-503.

Moulaert, F. and Sekia, F., 2003, "Territorial innovation models: a critical survey", *Regional Studies*, 37(3), pp.289-302.

National Balanced Development Committee, 2008, *Vitalization Measures for Regional Economies* (in Korean).

National Science & Technology Commission, 2011a, *Regional Science and Technology Yearbook 2011* (in Korean).

National Science & Technology Commision, 2011b, *A report on survey and analysis of national research and development programs* (in Korean).

Nauwelaers, C. and Wintjes, R., 2002, "Innovation SMEs and regions: the need for policy intelligence and interactive polices", *Technology Analysis & Strategic*

Management, 14(2), pp.201-215.

Reichert, S., 2006, *The rise of knowledge regions: emerging opportunities and challenges for universities*. European University Association Publication 2006.

Rothwell, R., 1991, "External networking and innovation in small and medium-sized manufacturing firms in Europe", *Technovation*, 11(2), pp.93-112.

Rothwell, R. and Dodgson, M., 1992, "European Technology Policy Evolution: Convergence Towards SMEs and Regional Technology Transfer", *Technovation*, 12(4), pp.223-238.

Saxenian, A., 1994, *Regional Advantage: culture and competition in Silicon Valley and Route 128*, Harvard University Press, USA.

Scott, A. J., 1982, "Locational patterns and dynamics of industrial activity in the modern metropolis", *Urban Studies*, 19, pp.111-142.

Sengenberge, W. and Pyke, F., (1992) Industrial districts and local economic regeneration: research and policy issues, In Sengenberger, W. and Pyke, F., (eds.), *Industrial districts and local economic regeneration*, Genova: ILO, pp.3-29.

Simmie, J., 2002, "Knowledge spillovers and reasons for the concentration of innovative SMEs", *Urban Studies*, 39(5-6), pp.885-902.

Stöhr, W.B., 1990, (eds.). *Global Challenge and Local response: Initiatives for Economic Regeneration in Contemporary Europe.* NewYork: The United Nations University and Mansell Press.

Storey, D., 1986, Entrepreneurship and the new firm, in Curran, J., Stanworth, J. and Watkins, D., (eds), *The survival of the small firm: the economics of survival and entrepreneurship*, pp.81-101.

Temple, M., 1994, *Regional Economics*, London: The Macmillan Press Ltd.

Tödtling, F. and Kaufmann, A., 2001, "The role of the region for innovation activities of SMEs", *European Urban and Regional Studies*, 8(3), pp.203-215.

Tödtling, F. and Trippl, M., 2005, "One size fits all? Towards a differentiated regional innovation policy", *Research Policy*, 34, pp.1203-1219.

Yeongnam Ilbo, 2012, Labor shortage in Daegu Technopolis, 8. 21.

Yeung, W. C. H., 1994, "Critical reviews of geographical perspectives on business organizations and the organization of production: towards a network approach", *Progress in Human Geography*, 18(4), pp.460-490.

Yonhapnews, 2012, Establishing Daegu City Investment Attracting Center, 1. 17.

http://www.daegu.go.kr(last accessed date: November 13, 2012)

http://kosis.kr(last accessed date: January 15, 2013)

http://www.nstc.go.kr(last accessed date: December 12, 2012)

Correspondence: Taewoon Kim, Department of Public Administration, Keimyung University, 704-701, 1095 Dalgubeoldaero, Dalseo-gu, Daegu City, South Korea, Tel: 82-53-580-5497, E-mail: ktwoon7@hanmail.net

교신: 김태운, 704-701, 대구광역시 달서구 달구벌대로 1095, 계명대학교 행정학과, 전화: 053-580-5497, 이메일: ktwoon7@hanmail.net

최초투고일 2013년 7월 12일
수 정 일 2013년 8월 1일
최종접수일 2013년 8월 5일