

Networks of Venture Firms around a Science Park: The Case of Taejon in Korea*

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1. Introduction

One of the powerful ways of promoting regional economies is considered to be the transformation of industrial structures into economic activities with higher technological involvement. This is consistent with the national science and technology policies of many countries that attempt to concentrate research and development (R & D) activities into a limited geographical space. The policies were often substantiated into the establishment of science (or technology) parks (Grayson 1998). A common science park provides spaces for high-technology research and educational activities, industrial production, and other supporting activities, such as housing and commercial and administrative services. Prominent examples of these are Sophia-Antipolis in France (Castells and Hall 1994; Longhi and Quere 1993; Longhi 1999), Tsukuba Science Town (Castells and Hall 1994; Masser 1990) in Japan, and Shinju Science-Based Industrial Park (Castells and Hall 1994) in Taiwan.

Korea has also established a major high-technology research centre, called Daeduck Science Park (DSP), in the middle of the country. In 1973, the Korean national government designated an area of 27 square kilometers to develop a national centre for science and research activities. This area was adjacent to the city of Taejeon, which was within the administrative boundaries of Chungnam Province at the time of designation. By the mid-1990s, the park had grown to host some 60 institutions employing about 12,000 scientists and technicians and about another 5000 supporting staff.

Since the inception of the DSP, local planners and some local opinion leaders often argued that the DSP creates little positive impact on the local economy (see Castells and Hall 1994; Oh 1995; Hong 1997)). They argued that local governments cannot control the planning and management of the DSP, since it was planned and managed by the national Ministry of Science and Technology; output of research activities from the DSP research institutions contribute little to the local industries, since the research institutions were chosen to be relocated into the DSP without considering the possibilities of their collaborations with local industries (see Castells and Hall

1994; Shin 1999).

In this context, this paper investigates how the DSP is embedded in the local economy. One of the common approaches to examining the linkages between science parks and local economies has been focused on research activities. However, this paper looks at the local linkages of the DSP's spin-off firms, rather than research institutions. To investigate the linkages between spin-off firms and the local supporting institutions, the network theory (Granovetter 1985; Yeung 1994) is employed, with some modifications, such as an analytical framework.

2. Network Theory as a Theoretical Context

Traditionally, the debates on major factors that affect economic decision-making have been divided into two groups: proponents of the market, and those of hierarchy. The former argue that individual economic actors can make independent decisions under the circumstance of free and perfect competition, and therefore, have the ability to make independent decisions. However, the latter rejects this argument. They propose that economic actors make decisions in accordance with the mechanisms that are set by a hierarchical decision-making structure, which constrains the independent decision making ability.

An economic sociologist, Mark Granovetter(1985), however, has set an intermediate concept, i.e. a network, between the market and hierarchy, rejecting both of the previous arguments (see also Powell 1990; Thorelli 1986, 1990). In his context, networks are the relationships between economic actors and other agencies and individuals. The relationships are formed on contacts and mutual trust maintained for a substantial time. He argues that economic actors are not dependent solely upon the market or the hierarchy. Rather, he sees that the actors make decisions relying upon complex networks that are embedded in the local socio-economic environments.

This network concept was introduced in the investigating of the

dynamic inter-relationships of individual firms, such as the Marshallian industrial district. The research by Piore and Sabel (1984) and Brusco (1982, 1986) on the Third Italy was the first case of that type, and other case studies followed by the Silicon Valley (Saxenian 1991, 1992), the Route 128 in Boston (Todtling 1994), Hong Kong (Yeung 1997), and Australia (Joseph 1989). Along with these case studies, further sophistication in the theoretical aspect of the network concept was accomplished by a group of authors, such as Grabher (1993), Hakansson and Johnson (1993), Yeung (1993), and Uzzi (1997). Yeung, for example, has identified the networks as three kinds: as those of intra-firm, inter-firm, and extra-firm (see also Yeung 1997). Perry and Goldfinch (1996) have distinguished different sets of categories such as agency and individual, formal and informal, and strong and weak networks.

In recent years, the network theory has been popularly used as a method of analysing relationships between institutions and actors, especially in relation to high-technology industrial districts. It is often assured of being a powerful tool in such research. The concept, in addition, is used as a policy tool for assisting small-scale industries, that are often not as strong as the large corporations that can command various recourses. Some governments have created special programs for promoting networks to strengthen institutional assistance to small firms, rather than directly providing resources to them. Britain, for example, has created a program, called "Training and Enterprise Councils" (see Huggins 1999) using the network concept to assist small firms in specially designated areas by promoting learning, commercial and innovative networks.

The network theory is employed in this paper to identify local institutions that affect venture firms that are operated in the city of Taejon, and also to investigate the degree of embeddedness of the firms in the locality. The following section provides some information on research samples and methods of collecting data.

3. Venture Firms of Taejon and the Data

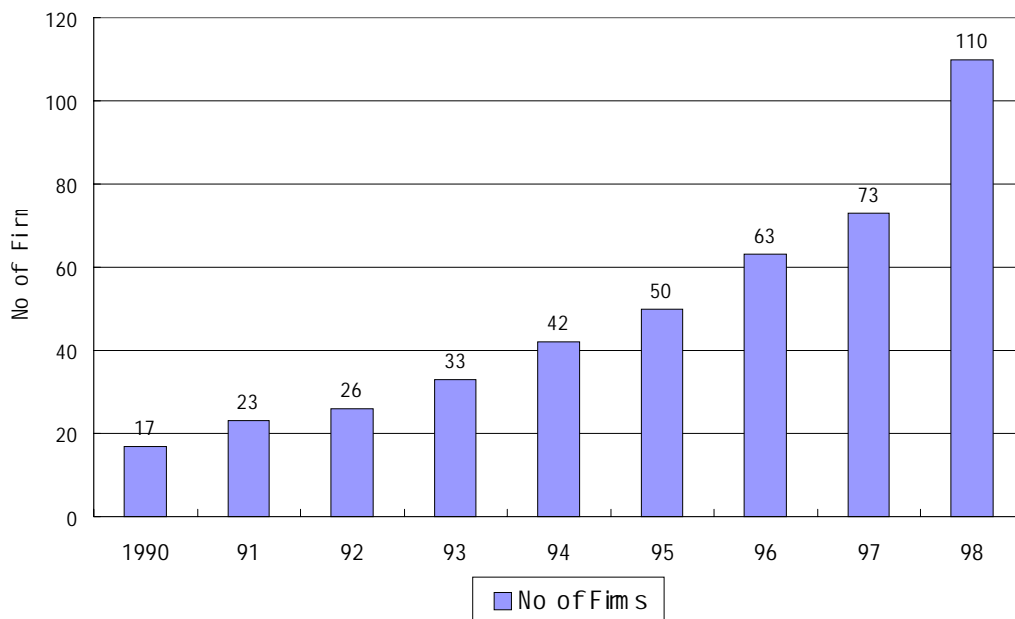
1) Venture Firms of Taejon

In Korea, the policy interests in venture firms are a very new phenomenon. However, the interests have been rapidly escalated in recent years, mainly because of two reasons. First, massive lay-offs from the major industries have resulted in many competent entrepreneurs. The Asian economic crisis has heavily hurt the Korean economy since late 1997, and in turn many large companies both in the public and private sectors, laid off their employees, often of qualified manager ranks. This was also true for the Daeduck Science Park where there is a large accumulation of research institutions. The laid off personnel could be thought of as potential entrepreneurs who could establish small firms. The entrepreneurs could use high technology since many are scientists. Another reason for policy concerns with venture firms in the Korean government is that the government has seen that large corporations are ineffective in adjusting the Korean economy to the rapidly changing international economic order, and that technological advancement is essential in strengthening national competitiveness. In this context, the promotion of high-technology venture firms is thought of as being a major alternative.

Taejon can be considered to be a major centre of high technology venture firms since the city is host to the Daeduck Science Park. One of the largest research institutes located in the science park, Electronics and Telecommunications Research Institute (ETRI), for example, was established in 1973, and now employs more than 2000 people, of whom 350 scientists hold doctoral degrees. ETRI has begun research activities and produced considerable successes in developing various communication and telecommunication equipment, such as several stages of Korean style automatic telephone switchboards and cellular phone systems. It began to produce spin-off companies in 1989 by allowing its scientists to establish new firms using minor technologies obtained during the processes of developing major technologies, and also by providing various services and opportunities that it generates without major costs. Since then 110 firms have been produced through 1998. These firms often employ from three to ten researchers and a few

secretaries and are engaged in research and development activities, often serving the ETRI. The firms are operated mainly in the Seoul and Taejon areas. Since the mid-1980s, ETRI has established a department, called the small firms promotion centre, with a small number of staffers to assist its employees in generating new firms and coordinating with the parent institution and its spin-off companies. This process is considered to be very successful in the recent years.

<Figure 1> Spin-off Companies From ETRI



<Source> Shin(1999: 14)

While there are other research institutions that produce spin-off companies, the Korea Advanced Science and Technology (KAIST), one of the major Korean advanced research and educational institutions stationed in Taejon, established a business incubator in 1994. The main purposes were to provide small high-technology firms with spaces for R & D activities, business services, computer networking services and opportunities for taking advantage of KAIST's research staff and facilities. KAIST started with its spaces available in redundant buildings that were sufficient to house about 30 small firms. It has been successful in recruiting a sufficient

number of firms, and it saw that there existed an additional demand, so it expanded the space for 100 additional firms by renting out one of the buildings that was used by the Korean Telecommunications Corporation located in the DSP. By mid-1999, about 80 firms had moved into this new business incubator.

<Table 1> Business Incubators in Taejon

Business Incubators	Date of Establishment	Capacity	No of Firms Host
Small Business Supporting Centre (The City of Taejon)	98. 10. 28.	25	25
Taejon Software Supporting Centre	97. 11. 27.	11	11
KAIST	94. 12.	116	116
ETRI	98. 12. 14.	66	60
Korean Atomic Energy Research Institute	98. 7. 16.	22	11
Research Institute of Korean Electric Company	98. 12. 16.	4	4
ChungNam National University	98. 10. 27.	24	23
Hannam University	98. 12. 23.	19	13
Paejae University	98. 9. 21.	16	16
ChungNam Business Incubator Centre	98. 2. 1.	15	10
Total		318	289

Source: Centre for Promoting Medium and Small Businesses in Taejon (1999),
revised from (Jin, SI 1999: 79).

In addition to ETRI and KAIST, local universities, such as

Chungnam National University and Hannam University, have also established similar kinds of institutions on much smaller scales. The former has provided spaces available for 30 high-tech firms with a new building named the University-Industry Liaison Centre. The latter has also built a new building to host 13 firms. The City of Taejon and the national government's Bureau of Medium-and-Small Businesses have also joined such activities. By mid-1999, the institutions that operate business incubators amounted to thirteen within the Taejon area, hosting 300 firms. It is estimated that there are 200 or so additional firms of the same kind that are operated in the Taejon area, but outside the institutional business incubators. All of these are small scale with employees of from three to ten, with special technologies related to computer science, genetics, chemistry, and physics.

2) Data

This research is based on a questionnaire survey. During the month of August 1999, 300 questionnaires were distributed to high-tech venture firms that are housed by the business incubators in Taejon and, 135 (46.7% respondent rate) usable ones were collected with the help of officers of the business incubators. The questionnaires were to be filled by an entrepreneur from each firm. (Most of the entrepreneurs were founders, one of the co-founders, the owners, or one of the joint-owners of each firm.) This survey was conducted during August, 1999, using the author's institutional or private connections to mobilize officers of the business incubators. Results of the initial analysis of the questionnaire survey are as follows.

<Table 2> Year of Establishment

Year	Percentage
1989-95	5.3
1996-98년	56.8
Since 1998	37.9
Total	100.0

Source: 1999 Survey, n=132

<Table 3> Scale of Initial Capital

Amount (Million Korean)	Percentage
Under 100	72.4
100 - 200	14.6
200 and over	13.0
Total	100.0

Source: 1999 Survey, n= 123

No. of Employees	Percentage
1-3 Persons	36.4
4-7	33.6
8-14	19.9
15 and Over	8.3
Total	100.0

<Table 4> Scale of Surveyed Firms: Number of Employees

Source: 1999 Survey, n= 121

It has been found that most of the surveyed firms were established in the recent years and are operated on a small scale in various ways. Out of the total of 135 firms, 94.7% were established later than 1995, and 72.4% of the total started with capital smaller than 100 million Korean Won (equivalent to US 83,000 dollars). However, a few exceptions were found to be operating at a medium scale since one of the largest firms reported that it started with 640 million Korean Won (530 thousand US dollars) as its initial capital. But they should be considered small scale if one considers the number of employees of the firms. Seventy percent of the responding firms had seven or less full-time employees.

Showing the nature of the venture firms, most of the entrepreneurs were young. It is reported that 34.6% of the entrepreneurs were in their thirties, while 36.8% were in their

forties. It is also interesting to note that 9.0% of the respondents were in their twenties, while none were in their sixties and older.

4. Networks of the Venture Firms

1) Local Embeddedness of Firm Formation

Most of the previous research has argued that the DSP holds little linkages with the Taejon area. Oh (1994) and Hong (1997), for example, have argued that employees of research institutions of the DSP are recruited mainly from the capital region of Seoul, and that the results of the R & D activities of the institutions are distributed to the industries outside Taejon, rather than those within the locality. In order to examine this issue, the survey asked a few questions in relation to the entrepreneurs' personal, educational, and occupational backgrounds. The respondents reported that 40.9% of the total grew up in the Taejon area, while only 22.0% were from the capital region. This was also consistent with the result that 67.9% of the total respondents worked for an institution that was located in the Taejon Area. The response from another question related to work experience confirmed that firm formation is strongly linked to Taejon by showing that 35.1% of the respondents' former jobs were located in the Taejon area. (This is compared to 49.6% for its counter-part, the capital region.)

<Table 5> Scale of Sales Amount (1998)

Amount (Million Korean	Percentage
Under 100	21.8
100 - 300	31.1
300 - 500	17.2
500 - 1000	20.7
1000 and Over	9.2
Total	100.0

Source: 1999 Survey, n= 87

<Table 6> Ages of Entrepreneurs

Age	Percentage
20 -29	9.0
30 -39	34.6
40 - 49	45.1
50 - 59	11.3
60 and Over	0
Total	100.0

Source: 1999 Survey, n= 133

<Table 7> Regional Backgrounds of Entrepreneurs

Regional Category	Regional Background of Living (a)	Regional Background of University Education
Capital Region	22.0	49.6
Taejon Area	40.9	35.1
Southwestern	14.4	8.4
Southeastern	22.7	6.9
Total	100.0	100.0

Source: 1999 Survey, n= 132 for "a", n= 131 for "b"

<Table 8> Entrepreneurs' Former Occupati ons

Occupation	Percentage
Researcher at Public Research Institution	39.4
Researcher at Private Research Institution	14.4
Employee of Private Company	16.7
Manager of Private Company	7.6
Public Officer	3.0
Students	8.3
Others	10.6

Source: 1999 Survey, n= 132

<Table 9> Location of Former Employers

Location	Percentage
Science Park	44.0
Taejon Area	23.9
Korea	29.1
Overseas	3.0
Total	100.0

Source: 1999 Survey, n= 134

<Table 10> Source of Initial Capital

Source	Percentage
Private Savings and Loans	59.1
Family, Friends and Former Employers	16.6
Banks and Venture Capital	5.3
Governmental Office	6.8
Co-founder	8.3
Others	3.8
Total	100.0

Source: 1999 Survey, n= 132

<Table 11> Source of Information on Generating Capital

Source	Initial (a)	Operational (b)
Venture Capitals	6.8	34.7
Banks	15.2	8.1
Related Firms	6.1	19.3
Family and Friends	39.5	8.1
Social Organizations	13.6	17.7
Internet	18.9	5.6
Others		6.5
Total	100.0	100.0

Source: 1999 Survey, n= 132 for "a", n= 124 for "b"

Based on these survey results, it can be said that the venture firms in the Taejon area are formed with a strong hold on the Taejon locality. The entrepreneurs of the surveyed firms maintained personal links with the Taejon area, and they obtained their working experience often from the research institutions located within the science park. As a result, it can hardly be said that the science park has no linkages with Taejon, in contrast to the arguments of previous researchers.

2) Local Embeddedness of Firm Operations

In order to investigate the linkages of the venture firms with the Taejon area, the survey asked two types of questions: one is about the linkages with supporting institutions, such as the government, financial institutions, universities, and business associations. The survey was designed to ask the entrepreneurs to choose one of the listed five answer categories, ranging from "very helpful" to "not helpful at all," for each supporting institution. For example, they were asked, "How helpful is the assistance from the city of Taejon in running your business?" <Table 12> reports the results, showing the share of the sum of the respondents who replied with a positive answer, either "very helpful" or "somewhat helpful." It is found that the surveyed firms were receiving helpful assistance from local research institutions, universities, and firms. Fifty-six percent of the entrepreneurs replied with one of the positive answers to the question on local research institutions, while 27.1% did so to the question about research institutions outside Taejon. However, there were not many respondents who showed positive answers in relation to local government offices, financial institutions, and business associations. These results show that the various policies that the city of Taejon has created to promote the local economy with a strong focus on the high-technology venture firms has so far been unsuccessful in creating genuine assistance to its client firms.

<Table 12> Institutional Networks of Firms Operation

Source: 1999 Survey

Institutions	Within Taejon Area	Outside Taejon
Research Institutes	56.3	27.1
Universities	34.1	22.8
Government Offices	17.0	36.8
Financial Institutions	13.4	9.8
Related Firms	32.6	19.5
Firm Association	8.8	5.3
Internet	85.7	79.5

Another way of investigating the linkages between the firms and their supporting institutions that was used in the survey was asking the degree of mobilizing input from each of the four regional categories, such as the DSP, the Taejon area, Korea outside Taejon, and overseas. The result was that the responding firms maintained strong linkages with the science park and Taejon. This contrasts to the general arguments made by the previous research saying that the DSP had not have established linkages with the locality of Taejon (Castells and Hall 1994; Oh 1995), but consists with other studies such as Jung(1995) and Ko and Kim(1999).

One of the questions was "Given the following regional categories, what is the major source of your company's technical and secretarial staff?" In response to this question, 14.9% chose the science park, while 38.5% did so of the Taejon area. In response to a similar question regarding mobilizing capital, 8.5% and 38.5% chose the science park and the Taejon area, respectively. Similar results were found when the questions related to obtaining managerial and technological information were asked.

<Table 13> Networks of Mobilizing Inputs

Input	Within Science	Within Taejon Area	Within Korea	Overseas	Un-
Market	7.6	10.6	66.7	6.8	8.3
Employees	14.9	53.0	27.6	0	4.5
Capital	8.5	38.5	40.0	0	13.1
Techno. Infor.	36.1	7.5	33.8	12.0	10.5
Managerial Infor.	21.8	24.8	39.8	0.8	0
Raw Materials	0.9	15.9	58.9	17.8	6.5

Source: 1999 Survey

To see what kind of agencies are frequently contacted by ventures firms of Taejon, the questionnaire included several questions, "what source do you mainly rely on to obtain information on product market?", for example, including similar ones in relation to financial resources, production technology, and firm management. The list of potential answers to each question included local governments, financial institutions, universities, research institutions (of the DSP), family members, former employers, and so on (see Table 13). In relation to product market, the most frequent answer was the Internet (33.6%) followed by "related firms" (24.4%). In regards to the information on obtaining financial resources, banks and venture capital was most frequent answer (22.0%) followed by the Internet (18.9%) again. It has also been found that the venture firms heavily rely on the Internet for their information on technology (34.8%) and management (40.9%) as well.

However, the linkages with the local government of the city of Taejon, were found to be very weak. Only 0.8% - 8.3% of the respondents have said that they were receiving such sorts of information through the government. Therefore, it can be said that although the Taejon metropolitan government has been trying to assist venture firms with various programs, it has not been very successful in creating helpful assistance for its target group.

Information	Local Government	Financial Institutions	Universities and Research	Family	School Alumni	Former Employer	Related Companies	Company Assoc	Internet	Others
Market	5.3	1.5	N.L.	0.8	7.6	10.7	24.4	6.1	33.6	9.9
Financial Res.	15.2	22.0	N.L.	14.4	3.8	6.1	6.1	8.3	8.9	5.3
Techno. Info.	0.8	N.L.	28.0	0.8	7.6	4.5	15.9	3.0	34.8	4.5
Mngt. info.	8.3	N.L.	N.L.	0.8	8.3	9.1	18.2	9.6	40.9	6.8

<Table 14> Sources of Information by Institutions

Note: "N.L." means "not listed" as a potential answer to each question.

5. Conclusions

1) Theoretical Implications

Since the completion of the DSP, it has been said that the Park does not create any economic impact on the locality of Taejon. This could be true if one considered only the Park's research activities. However, this can not be true as long as the city's venture firms are concerned. The survey has identified strong links between the firms' formations and the locality of Taejon. A significant portion of the entrepreneurs of the surveyed firms also is found to have acquired their employment and educational experience from the institutions located in the Taejon region. The research also found that they receive useful assistance from both the local research institutions and universities. Therefore, it can be said that the science park does play important roles in the formation and operation of the venture firms, in contrast to the popular arguments of the earlier studies such as Castells and Hall (1994), Oh (1995), and Hong (1997).

In relation to the analytical framework of this research, the network theory is considered to be a useful tool in analysing the links between the region and the firm activities. This research modified Yeung's concepts (1994) of intra-firm, inter-firm, extra-firm relationships and used them in investigating the business links of

Taejon's venture firms with the locality. The concepts, that can be grasped by the network theory were useful in structuring the survey questionnaire and guiding the interpretation of the survey results. The embeddedness thesis, pioneered by Granovetter (1985) is also believed to be a useful concept for analysing the embeddedness of the firms into the locality and the entrepreneurs of educational and living experiences, as was done in this research.

One of the important findings of this research is that high-tech venture firms heavily rely on the internet as a source of information. The respondents of the survey were sure that internet is becoming a very important source of obtaining the management, financial, and technical information required for running their firms. In the literature of the network theory, government agencies, financial institutions, higher educational institutes and research institutions are often considered to be important factors that make differences in running the venture firms. The Internet, however, has not been sufficiently dealt with by the conventional literature.

2) Policy Implications

Based on the theoretical observations above, and the survey results, the following can be suggested as policy recommendations. First, the Taejon Metropolitan Government needs to alter its strategies for promoting venture firms, since the traditional strategies have not created helpful assistance for the venture firms. Considering the survey results of this research, the local government should either assist or cooperate with local universities and research institutions, rather than directly design and implement its own programs. Second, any policies for venture firm assistance have to place higher priorities on the internet system, as it is the system found to be providing useful, various information to the venture firms. Thirdly, the science park is not an "island of high-technology." It plays important roles in producing experienced entrepreneurs and technological assistance that are essential for the formation and operation of Taejon. Therefore, the science park has to be assisted not only by the national science policies, but also by the local government's economic and planning policies.

References

- Brusco, Sebastiano. 1982. "The Emilian Model: Productive Decentralization and Social Integration," *Cambridge Journal of Economics* 6: 167-184.
- Brusco, Sebastiano. 1986. "Small Firms and Industrial Districts: The Experience of Italy," in Keeble, D. and F. Weever (eds.), *New Firms and Regional Development*. London: Croom Helm. pp. 184-202.
- Castells, Manuel and Peter Hall. 1994. *Technopoles of the World: The Making of the 21st Century Industrial Complex* London: Routledge.
- Grabher, G. 1993. "Rediscovering the Social in the Economics of Interfirm Relations," in Gernot Grabher, ed., *The Embedded Firm: On the Social Economics of Industrial Networks*, London: Routledge.
- Granovetter, Mark. 1985. "Economic Action and Social Structure: the Problem of Embeddedness," *American Journal of Sociology* 91(3) : 481-510.
- Grayson, Lesley. 1998. "Science Parks and Innovation in the UK," *Science, Technology and Innovation* (June) 17-22.
- Hakansson, H. and J. Johanson. 1993. "The Network as a Governance Structure: Interfirm Cooperation beyond Markets and Hierarchies," in Gernot Grabher, ed., *The Embedded Firm: On the Social Economics of Industrial Networks*, London: Routledge.
- Hong, Hyung-Duck. 1997. "The Strategy of Establishing Regional Innovation Systems: The Case of Daeduck Science Park and the City of Taejon (in Korean)," *Journal of Korean Policy Studies* 6(2): 101-127.
- Huggins, Robert. 1998. "Local Business Cooperation and Training and Enterprise Councils: The Development of Inter-firm Networks," *Regional Studies* 32(9): 813-826.
- Joseph, R. A. 1989. "Silicon Valley Myth and the Origins of Technology Parks in Australia," *Science and Public Policy* 16(6): 353-365.
- Joseph, R. A. 1992. The Silicon Valley Factor: Australia's Technology Parks in *A Head of White Elephants?: Some Big Technology Projects in Australia*, ed. Pam Scott (Sydney: Hale & Iremonger). pp. 75-88.

- Jung, Jin-Ho. 1995. "Formation and Networks of Spin-off Companies of Daeduck Science Park (in Korea)," *Journal of Geography* (Seoul National University) 25: 57-80.
- Ko, Suk-Chan and In-Whan Kim. 1999. "The Incidence of High Technology Spin-offs Regional Innovative Milieu: The Case of Taedok Science Town, Korea," *Journal of Korean Planners` Association* 34(1): 259-272.
- Longhi, Christian. 1999. "Networks, Collective Learning and Technology Development in Innovative High Technology Regions: The Case of Sophia-Antipolis," *Regional Studies* 33(4): 333-342.
- Masser, Ian. 1990. Technology and Regional Development policy: a Review of Japan's Technopolis Programme. *Regional Studies* 24(1): 41-53.
- Oh, Deog-Seong. 1995. "High-technology and Regional Development Policy: An Evaluation of Korea's Technopolis Programme," *Habitat International* 19(3): 253-267.
- Park, S. O. and A. Markusen. 1995. "Generalizing New Industrial Districts: A Theoretical Agenda and an Application from a Non-Western Economy," *Environment and Planning A* 27: 81-104.
- Park, S. O. 1996. "Networks and Embeddedness in the Dynamic Types of New Industrial Districts," *Progress in Human Geography* 20(4): 476-493.
- Park, S. O. 1996. "Local and international Networks of Korean High-Technology Industry (in Korean)," *Journal of Korean Planners` Association* 31(1): 27-42.
- Perry, M and S. Goldfinch. 1996. "Business Networks Outside an Industrial District," *Tijdschrift Voor Economische En Sociale Geography* 87(3): 222-236
- Piore, M. and C. Sabel. 1984. *The Second Industrial Divides*. New York: Basic Books.
- Powell, Walter W. 1990. "Neither Market nor Hierarchy: Network Forms of Organization," *Research in Organizational Behavior* 12: 295-336.
- Saxenian A. 1991. "The Origins and Dynamics of Production Networks in Silicon Valley," *Research Policy* 20: 423-437.

- Saxenian, A. 1992. "Contrasting Patterns of Business Organization in Silicon Valley," *Environment and Planning D* 10: 377-391.
- Shin, Dong-Ho. 1999. **An Evaluation on the Process of Developing a Research Park: The Case of Daeduck Science Park in Korea**, Paper Presented at the Conference of the International Asso. of Science Parks, Sept 1 - 4, 1999, Istanbul, Turkey
- Thorelli, Hans B. 1986. Networks: Between Markets and Hierarchies," *Strategic Management Journal* 7: 37-51.
- Thorelli, Hans B. 1990. "Neither Markets nor Hierarchy: Network Forms of Organization," *Research in Organizational Behavior* 12: 295-336.
- Todtling, Franz. 1994. "Regional Networks of High-technology Firms: The Case of the Greater Boston Region," *Technovation* 14(5) 323-343.
- Uzzi, Brain, 1997, "Towards a Network Perspective on Organizational Decline," *International Journal of Sociology and Social Policy* 17(7, 8): 111-155.
- Yeung, H. W. C. 1994. "Critical Reviews of Geographical Perspectives on Business Organizations and the Organization of Production: Towards a Network Approach," *Progress in Human Geography* 18(4): 460-490.
- Yeung, H. W. C. 1997. "Business Networks and Transnational Corporations: A Study of Hong-Kong Firms in the ASEAN Region," *Economic Geography* 73(1): 1-25.