

Regional Innovation Policy and Venturing Clusters in Japan

Masayuki Kondo

*Graduate School of Environment and Information Sciences,
Yokohama National University, Japan (mkondo@ynu.ac.jp)*

Summary

This paper reviews regional innovation policy in Japan. "Technopolis" policy, the first technology-based regional development policy in the world, was implemented in Japan. Nonetheless, technology-based regional endogenous development did not occur. Then, regional technology transfer was pursued. In order to make use of universities and public research institutes in a region for development, university-industry collaboration and cross-over, such as university spin-offs, were promoted. Within this background, new technology-based regional development policies have been introduced based on a cluster approach. These policies are the knowledge cluster Initiative and the industrial cluster program.

However, existing companies have difficulty in carrying out innovation. This paper argues that a cluster to create new start-ups that carry out innovation is also needed and explains a new concept of venturing cluster. Based on this new cluster concept, this paper analyzes the situation of Sapporo in Japan, where many university spin-offs are being created in the biotechnology field.

Key Words: technopolis, regional innovation, venturing cluster, biotechnology, Japan

1. Introduction

A region, on one hand, draws attention regarding competitiveness. The reason is that competitiveness is based on a region though competition is global. On the other hand, innovation is the engine of growth and a source of competitiveness. Thus, regional innovation is one of the key issues for global competitiveness.

Though regional development is an old topic in economics, technology-based regional development or regional innovation is fairly new. This paper reviews the regional innovation policy in Japan from the oldest regional innovation policy in the world, "technopolis" policy, to current regional innovation policies. It also discusses a new concept of "venturing clusters"

to compliment current policies and provide an example of a venturing cluster, Sapporo venturing cluster.

The next section analyzes technopolis policy and its results. Then, current regional innovation policies, Knowledge Cluster Initiative and Industrial Cluster Program, are discussed. These policies try to solve remaining issues of technopolis policy, such as university-industry linkage, but creating new players for innovation are still needed. Thus, the last part of this paper proposes a concept of a venturing cluster and discusses its example to understand the dynamics in a venturing cluster. Finally, some concluding remarks are presented.

2. "Technopolis" Policy¹⁾ of Japan

2.1. The First Technology-based Regional Development Policy

Technopolis policy was the first technology-based regional development policy in the world, though many regional development policies were formulated in the past. The concept of this policy was proposed in "the Vision of International Trade and Industry in the 1980s" by the Japanese Ministry of International Trade and Industry in 1980. Its special law was enforced from 1983²⁾. The Japanese government approved 26 regions as technopolis regions, although the government originally intended to construct just one technopolis. The word was the combination of "techno-", which means technology, and "-polis", which means a city in Greek.

The objective of technopolis policy was to construct a region with harmonized functions of industry, academy and living amenities. For the industry function, technologically-advanced industries were to be developed. They were - aircraft and parts industry, space industry, optoelectronics industry, biotech industry, mechatronics industry, electronics industry, new materials industry, fine ceramics industry, general machinery industry and software industry. For academy function (R&D function), constructed or reinforced were public research institutes, universities, corporate R&D centers and third-sector research institutes. For living amenity function, the location was important. A technopolis should be a part of large cities of 200-300 thousand inhabitants, and within a day-trip distance to the three large cities: Tokyo, Osaka and Nagoya.

For technology-based regional development, the main approaches were introducing high-tech

1) The information contained in this section is largely based on Itoh (1988), Japan Industrial Location Center (1999) and the author's presentation of "Japanese Experiences in Academic-Business Collaboration," Keynote Speech, Ukraine Japan Center Memorial Seminar "Japanese Experiences in University-Government-Industry Collaboration," Kiev Polytechnic Institute, Ukraine, October 26, 2005.

2) The law was abolished on December 18, 1998.

industries from other regions and enhancing the technologies of existing companies in a region. Implementing this policy, the technological aspect and regional autonomy were emphasized.

Policy instruments to promote technopolis policy were as follows. Financial measures were subsidies to technopolis foundations, research grants and conditional loans for product development and so on. A technopolis foundation was a core organization in a technopolis region. This foundation had to be established by local government and companies. It had functions of credit guarantee, training and consulting, study and research, R&D, information provision, R&D support and so on. No-interest loans were provided for constructing R&D facilities and training facilities of technopolis foundations. Fiscal measures were tax incentives for capital investment, land ownership and donations.

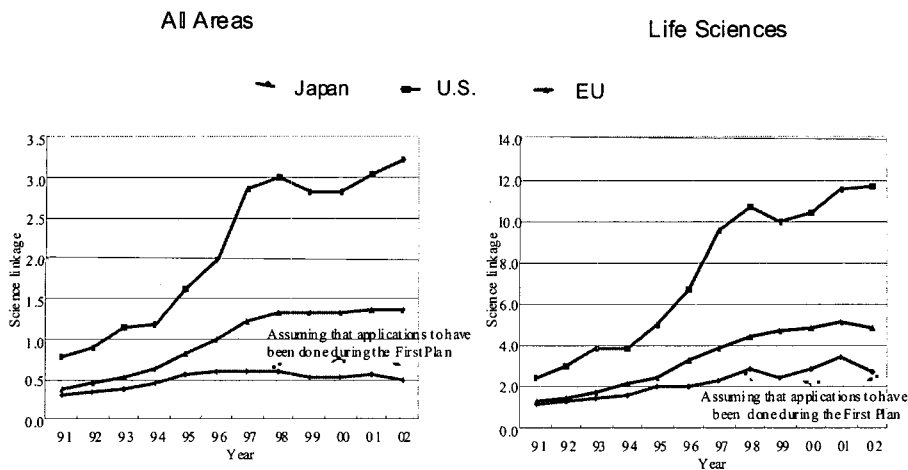
The changes of technopolis policy occurred twice. The first revision of development policy took place in March 1991. This revision newly introduced strengthening service functions including inter-industry exchanges, putting more emphasis on regional originalities, supporting start-up activities of new businesses, increasing interactions among regions and making regions attractive for living and leisure. The second revision took place in April 1997. It included the items of more collaborative R&D among universities, companies and public research institutes including organizations outside the region, constructing a support network for starting-up activities using regionally accumulated technologies, leveling up of fundamental technologies to support high-tech industries, and inviting companies conducting high-tech R&D including overseas companies.

As a result of technopolis policy, technopolis regions, compared with other regions, showed a higher increase of population, employees of manufacturing industry, new manufacturing factories, industry outputs, technologically-advanced industry development and new research institutes.³⁾ However, the level of labor value-added productivity was the same as other regions. Among technopolis regions, the performances were different.⁴⁾

Technopolis policy was successful to some extent. Still, there were some remaining issues. Though the first revision of development policy introduced support for start-up activities of new businesses, inviting new factories was a major path for development. Innovation capability and networks to utilize regional R&D capacity was not well constructed and the chain from R&D to market was not established (see Figure 1). In addition, regional autonomy did not work well, though it was emphasized from the beginning. The policy was, in reality, an extension of industry reallocation policy in the past.

3) See Japan Industrial Location Center (1999) for the data and details.

4) Hamamatsu is one of the most successful Technopolis Regions.



*: "Science Linkage" is the number of cited scientific papers in the U. S. patent examination reports per registered patent. it indicates a frequency of the use of scientific knowledge among patents.

Data: CHI Research Inc. "International Technology Indicators 1980-2002"

Source: NISTEP (2004), "Study for Evaluating the Achievements of the S&T Basic Plans in Japan"—FY2003 Highlights—(in Japanese), NISREP REPORT No.74.

Figure 1: Science Linkage in U.S. Patents

The concept and phrase of "technopolis" was used in other parts of the world.⁵⁾ Smilor, Kozmetsky and Gibson (1988) proposed a technopolis wheel that shows the various players needed to create and maintain a Technopolis.

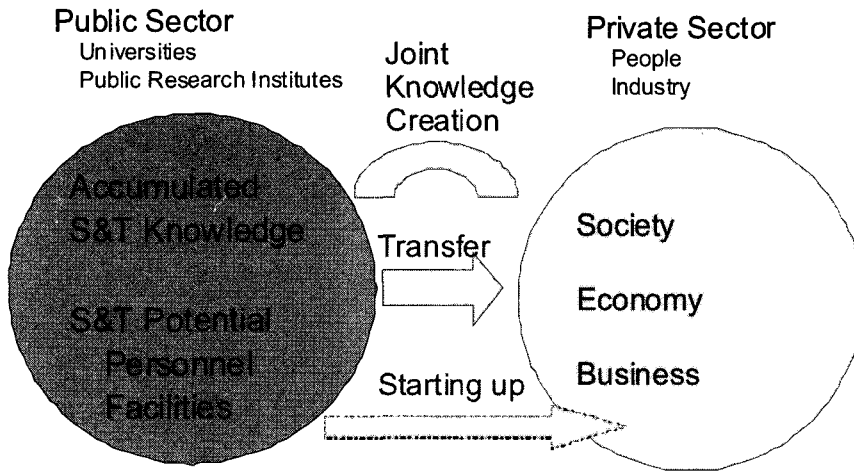
3. Recent Regional Innovation Policy in Japan

3.1. Industrial Clusters and Knowledge Clusters

In Japan two new regional innovation policies were recently started based on a cluster approach. These are the Knowledge Cluster Initiative and the Industrial Cluster Program. Both of these two policies include the promotion of university-industry collaboration and cross-over including university-spin-offs to transfer technologies from universities to the industry and connect the chain from R&D to the market. The use of knowledge in universities and public research institutes is important for industrial development (see Figure 2)⁶⁾.

5) See, for example, Bozzo, Gibson, Sabatelli and Smilor (1991) and Gibson and Smilor (1991).

6) See Kondo (2006).



Source: Kondo (2006), "University-Industry Partnerships in Japan", Proceedings of Symposium on "21st Century Innovation System for Japan and the United States", Tokyo, January 10-11.

Figure 2: Using S&T for Society, Economy and Business

The Knowledge Cluster Initiative was authorized in the Second Science and Technology Basic Plan in 2001. The Initiative, promoted by the Ministry of Education, Sports, Culture, Science and Technology (MEXT), started with ten clusters in 2002. In 2005, the Initiative was implemented in 16 clusters.

The objective was to create internationally competitive knowledge-concentrated systems for technological innovation, paying proper attention to regional autonomy. The Initiative provides policy support for establishing headquarters in knowledge clusters, hiring science and technology coordinators as staff and mobilizing external experts such as patent attorneys, conducting joint research among universities, public research institutes and companies mainly at universities, patenting and developing research results towards commercial use and holding seminars to present research results.

Since the Initiative is a policy of MEXT, it can not cover commercial activities such as new business creation or new company creation. This limit on activities is enforced by budgetary authority. As a result, people concerned with the Knowledge Cluster Initiative and those concerned with the Industrial Cluster Program meet fairly often and consult each other since the Program covers the commercial aspect of regional innovation.

The Industrial Cluster Program, promoted by the Ministry of Economy, Trade and Industry (METI), started with 19 projects in 2001. Its objective is to realize endogenous regional economic

development, through constructing an innovation environment with the emphasis on constructing regional human network. The Program provides policy support for forming industry-academic-government networks, promoting technological development using regional characteristics, strengthening incubation functions, marketing in cooperation with trading firms, and financing in cooperation with "industrial cluster support financial fora."

4. Concept and Model of "Venturing Clusters"⁷⁾

The Knowledge Cluster Initiative and Industrial Cluster Program can contribute to the construction of regional innovation systems. However, as Christensen (1997) points out, existing companies have difficulty to carry out innovation. Start-ups are needed to carry out innovation. Unfortunately, entrepreneurial activities of starting up companies are not active in Japan according to the Global Entrepreneurship Monitor⁸⁾. Thus, policy efforts to promote creating start-ups are needed.

Although Industrial Cluster Program has some component to promote creating start-ups, its focus on entrepreneurial activities is weak. Here the concept of venturing cluster comes up. This new concept differs from the concept of a traditional industry cluster, which is the target of Industrial Cluster Program and that of innovation cluster, which is the target of Knowledge Cluster Initiative.

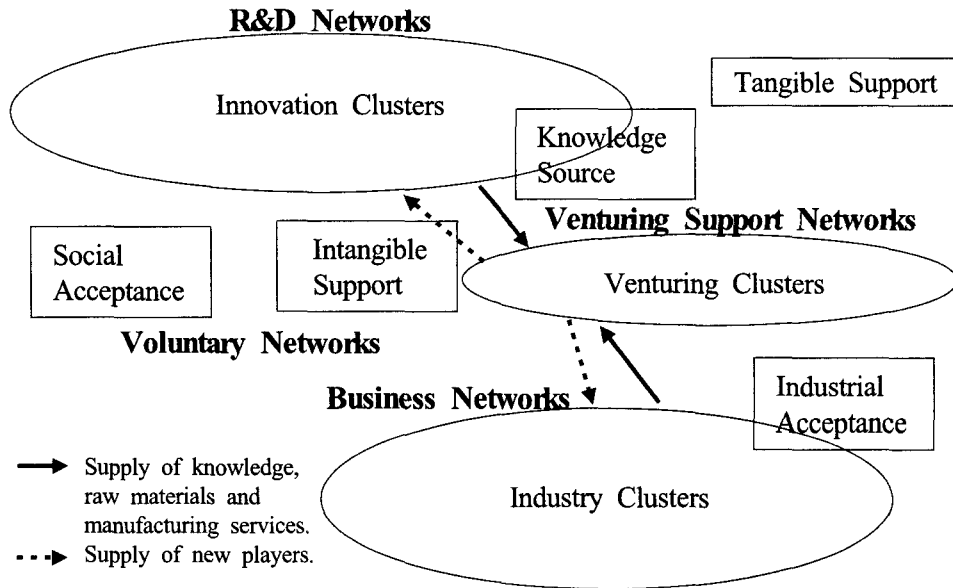
A venturing cluster is defined as "the whole of regional concentration of institutions that possess start-up creating (or assisting creation) functions in the state where these functions work well in an organic way". A venturing cluster focuses on the functions to create or assist creating start-ups. These functions do not necessarily exist within a venturing cluster. It is sufficient that they can be reached through institutions in a venturing cluster.⁹⁾

A venturing cluster is related to an industry cluster and an innovation cluster. A venturing cluster provides players to an industry cluster and an innovation cluster. In return a venturing cluster is supported by an industry cluster and an innovation cluster (see Figure 3).

7) This section is largely based on Kondo (2003). See Kondo (2003) for a discussion on the theoretical differences among industry clusters, innovation clusters and venturing clusters.

8) See Reynolds, Bygrave, Autio and Hay (2002).

9) For example, in the case of Sapporo, some advisors live in Tokyo but their services are available in Sapporo through a coordination agency in Sapporo. They are contracted advisors to this agency.



Source: This is based on Kondo, Masayuki, "Bio-Clusters and University Spin-offs." International Symposium on Biotechnology Clusters in Japan and Germany, Tokyo, April 21, 2006.

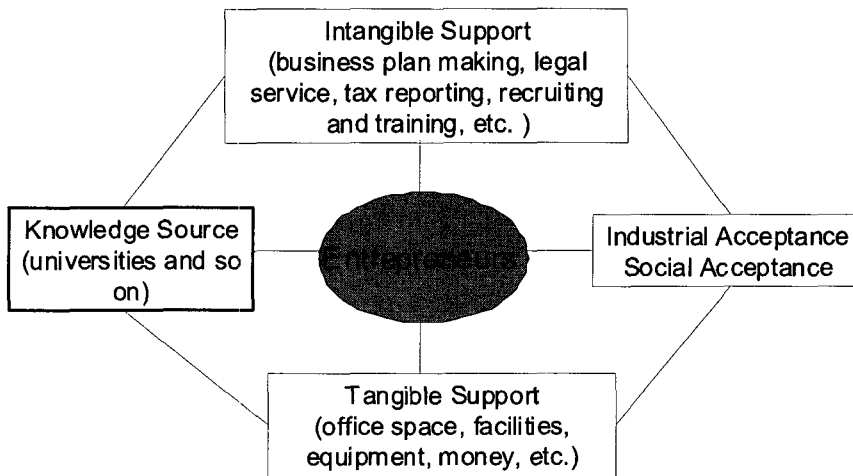
Figure 3: Clusters and Regional Networks

A venturing cluster consists of four functions: knowledge sources, tangible support, intangible support, and industrial and social acceptance¹⁰⁾ (see Figure 4). 'Knowledge sources' have a function to supply technology seeds, based on which start-ups are created. These sources are universities, public research institutes and private research institutes including company research institutes. Moreover, R&D networks in an innovation cluster can be knowledge sources. For example, inter-industry exchange groups can be sources of new businesses and start-ups¹¹⁾.

A researcher, who possesses technology seeds, needs to have a will to start up a company or to provide his/her seeds to and cooperate with an entrepreneur to be in a knowledge source. The mere existence of technology seeds is not enough for a knowledge source. Since 80 percent of university spin-offs established main offices in the same state where their mother universities existed in the United States according to AUTM (2001), it is important for a region to possess 'knowledge sources' to be a venturing cluster.

10) Though the functions of a venturing cluster resemble the components of Economy Two of Kenney and von Burg (2000), Economy Two does not include "research institutes" and "industrial acceptance." They are included in Economy One.

11) See Kondo (2005) for inter-industry exchange groups.



Source: M. Kondo, "Bencha Kurasuta (Venturing Clusters)", *Japan Ventures Review*, No.3 (2003), pp.101-107.

Figure 4: Venturing Cluster Model

‘Tangible support’ is the function to support entrepreneurs in terms of finance, space and facilities. Initial capital is mainly provided by founders at least in the case of university spin-offs¹²⁾, although they are also provided by venture capitalists and angels. Spaces are provided by incubators. Many public incubators have been constructed in Japan. Facilities, such as wet laboratories needed for biotech research, are provided by universities and public research institutes as a part of incubators or joint research facilities. Some independent incubators also possess such facilities.

‘Intangible support’ is critical for successful start-ups. This function includes supporting business plan making, providing information on public support measures, such as research grants and subsidies, introducing potential staff, marketing channels, financial sources, and providing legal advice, tax report advice, and accounting support. The institutions that provide intangible support range from public authorities and universities to for-profit organizations such as accounting firms and venture capitalists. Venturing support networks to link various intangible support organizations is important for various functions to work in an effective and harmonious way. Intangible support is in some cases provided by tangible support institutions such as incubators and venture capital funds.

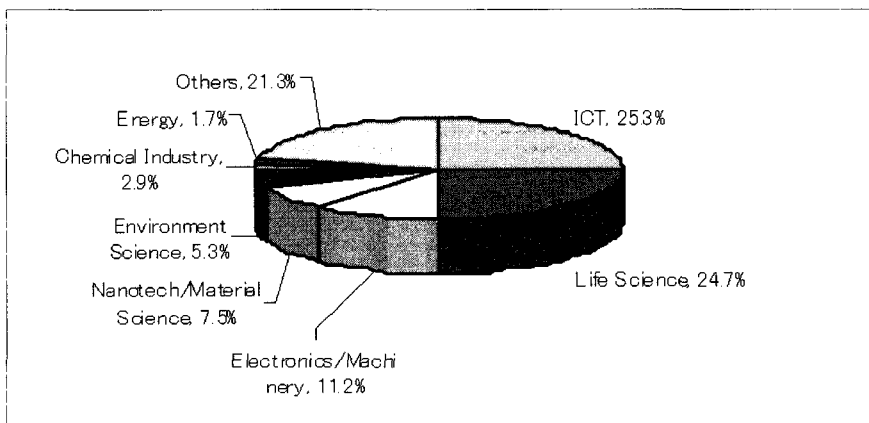
‘Industrial and social acceptance’ is also an important constituent to form a venturing cluster. Industrial acceptance means that some companies compliment start-ups functionally and that

12) See Kondo (2002).

the recruitment of new staff is feasible regionally. Since start-ups typically possess only the R&D function, they need collaborators who provide manufacturing and marketing functions in the industry sector to which they belong. In addition, the supply of staff is needed as start-ups grow. Business networks in an industry cluster need to function to realize industrial acceptance. Social acceptance means that regional culture and values support entrepreneurship and that the acceptance of new R&D activities, such as genetic research, exists in a region.

5. The Case of Venturing Clusters: Sapporo for Biotech University Spin-offs¹³⁾

Based on the venturing cluster model developed above, Sapporo venturing cluster, where biotech university spin-offs have accumulated, is discussed in this section. In Japan, the second largest number of university spin-offs belongs to the life science as of August 2005 (see Figure 5). The largest number of university spin-offs belongs to life science since 2002 based on annual data.



Source: The survey conducted by the author and Prof. Kikumoto and Dr. Shinya in 2005.

Figure 5: Areas of University Spin-Offs (as of August 2005)

¹³⁾ This section is also largely based on Kondo (2003).

Sapporo the a capital of Hokkaido Prefecture and has a population of 1.8 million with various amenities and functions, such as cultural activities, the variety of eating and drinking services and outdoor sports facilities including golf courses. At the same time, these functions are concentrated in small districts as a planned city. Sapporo is a part of an industrial cluster.

Sapporo is creating many biotech university spin-offs. There were 19 biotech university spin-offs as of September 2004. At the prefecture level, Hokkaido had the second largest number of biotech start-ups next to Tokyo at that time. These 19 university spin-offs include the first university spin-off with board members of national university professors¹⁴⁾. These biotech university spin-offs are growing. Those in Hokkaido increased their sales 8.8 times and their number of employees 5.7 times from 2000 to 2004 according to Hokkaido METI Bureau. In addition, the first venture capital fund with a university name was established in Sapporo, HOKUDAI (Hokkaido University) Ambitious Fund.

5.1. Knowledge Sources

For ‘knowledge sources,’ there exist many institutions in Sapporo. They include Hokkaido University, Sapporo Medical University, Hokkaido Tokai University, and the Advanced Institute of Industrial Science and Technology (AIST) Hokkaido Center. Hokkaido including Sapporo has the second largest number (around 1,000) of biotech researchers next to Tokyo; and these researchers are concentrated in Sapporo.

Table 1: Entrepreneurial Mind of Biotech Researchers in Hokkaido in 2001

	Ratios (%)
Those who want to start up a company within a year	4.6
Those who want to start up a company within 2 to 5 years	13.3
Those who are interested in starting up a company	59.8
Those who are not interested in starting up a company	20.7
Those who are already involved in university spin-offs	0.4
Unknown	1.2

Note. The questionnaire was sent to 869 bio-researchers, of whom 241 researchers filled out and returned the questionnaire.

Source: Hokkaido METI Bureau (2002).

14) Before April 2000, it was prohibited for national university professors to become board members of private companies. This regulation was also applied to public university professors.

These biotech researchers are highly entrepreneurial. According to Hokkaido METI Bureau (2002), 4.6 percent of them wanted to start up a company within a year and 13.3 percent of them wanted to start up a company within 2 to 5 years. Moreover, 59.8 percent were interested in starting up a company (See Table 1).

5.2. Tangible Support

There are several incubators in Sapporo. The AIST Biotech Start-up Center is one of them and is the first biotech incubator with intangible support in Japan. In addition to a low rental fee, it has the following features:

- biotech research facilities,
- joint biotech R&D with AIST and
- an attentive incubator manager and professional advisors.

For biotech research facilities, Joint Research Center of Hokkaido University and a research center established by a private foundation on Hokkaido University campus are also available if start-ups have joint research with Hokkaido University.

For incubators without research facilities, incubating offices in Human Capital Management Co. and Sapporo Incubation Zone 'SIZ' are available. These two incubators have intangible support functions as well. Human Capital Management Co. provides consultancy services, management training and a head hunting service. SIZ also provides some advice since it is managed by a locally-supported venture capital company, Hokkaido Venture Capital.

For funding, the share of founders' own investment in initial capital is highest in Hokkaido according to Kondo and Hasegawa (2005). Still, biotech university spin-offs need more investment. Initial investors are mostly fellow researchers and small company owners who are in the business of biotech research by supplying research materials and equipment in Sapporo.

For later stages, biotech university spin-offs need funding from venture capital companies for growth. The HOKUDAI Ambitious Fund was established by JAFSCO, the largest venture capital company in Japan, as the first venture capital fund with a university name in Japan in 1997. Hokkaido Venture Capital Co. was established with the support from local credit unions for Hokkaido development in 1999. Hokuyo Venture Fund was established by Hokuyo Bank in 2002. Hokkaido Prefectural Government provides growth capital through Hokkaido SME (small and medium-size enterprise) Support Center.

Since biotech university spin-offs invest heavily in research, research funding from outside

is most welcome. Many biotech university spin-offs apply for research grants of the central government with the assistance of local bureaus of the central government.

5.3. Industrial and Social Acceptance

Biotech start-ups are well accepted industrially in Sapporo. Two explanations are possible. One explanation is that there already exist biotech companies using conventional bio technologies and some DNA-related companies established in the 1980s, when the first biotech boom occurred. The existence of these companies has built infrastructure of biotech-related services for recent biotech start-ups.

The other explanation is that there are no large manufacturing companies. For recruiting fresh university graduates, it is easier in Sapporo because university graduates in Sapporo prefer to work in Sapporo because of its nature and large-city amenities and no large manufacturing companies exist.

Social acceptance is also good. Hokkaido is the land of frontier spirit and openness to new comers. Hokkaido is the region that developed last in Japan. Like California in the United States, many people moved from various parts of the main islands of Japan to Hokkaido to set up new farms since the end of nineteenth century. Thus, new start-ups including university spin-offs are supported mentally by local communities. According to Chrisman, Hynes and Fraser (1995), the university attitude and atmosphere to support university spin-off are more important than concrete supporting measures.

Another aspect of social acceptance is that Hokkaido has a tradition of livestock industry. This tradition helps in accepting biotech start-ups when they use animals for testing.

The other aspect is that many awards were received by local biotech start-ups and mass media treated these kinds of news favorably. For example, Genetic Lab, the first university spin-off with board members of national university professors, received Bio-Sector Award at the International Nanotechnology Exhibition in 2002 and this news was favorably treated by the local mass media.

5.4. Intangible Support in Sapporo

In Sapporo, intangible support functions are being formed dynamically and the resulting venture support networks are multi-layered. First, the formation started by intentional efforts. Two organizations were key players of these initial intentional efforts. They were the Center for Business Creation (CBC), Otaru University of Commerce¹⁵⁾ and Hokkaido METI Bureau in

Sapporo.

CBC made intentional efforts to foster human resources to support start-ups dynamically. CBC organized study groups at its satellite building in Sapporo to establish a venturing support network in Sapporo. At the same time, CBC recruited potential supporters, such as bankers, venture capitalists and accountants, as part time students of its business school in Sapporo. After getting MBA degrees, these professionals became contracted advisors of CBC and provided advice to entrepreneurial university professors and others. Some of them became board members of university spin-offs and advisors of various incubators as some faculty members of CBC did. One of the graduates has established Human Capital Management Co. which manages an incubator as stated above.

CBC staff also played an active role in creating the first university spin-off with national university professors on board. In earlier days, it was almost impossible for professors of national universities to start up a company with them as board members. This became legally possible after April 1, 2000, but bureaucrats were extremely cautious in approving such activities because it was new to them. CBC staff actively jumped into this bureaucratic process and negotiated with these bureaucrats and made the first case in Japan.

Hokkaido METI Bureau intentionally constructed support networks for start-ups. From earlier days, it employed a cluster approach to promote regional industries and it had some experiences in network making. In addition, it is easier in a local compact city like Sapporo to construct new human networks, since people in the same circle encounter each other frequently in the city. With these backgrounds, the staff of Hokkaido METI Bureau staff frequently visited professors who were interested in starting up companies and companies who were interested in biotech business. When they visited these professors, they went by bicycle to the university from the Bureau and moved around freely within campus.

The Bureau also organized networks in a formal way. It organized 'University Spin-off Creation Support Network' to support potential founders of university spin-offs, 'University Spin-off Network', which make managers of university spin-offs to exchange information easily, and 'Hokkaido Bio-industry Cluster Forum' to promote the bio-industry. Some members in these networks overlap. Thus, networks were multi-layered. Based on these networks, voluntary networks were also organized in the private sector. This dynamic movement made networks multi-layered further.

Other dynamism was also seen. Pioneering entrepreneurs who started up companies became

15) This university is located Otaru is a city 30-minute train-ride away from Sapporo.

advisors to later-generation entrepreneurs who intended to start up companies since the pioneers learned by doing and they had a will to contribute to their region.

6. Concluding Remarks

This paper reviewed the technopolis policy, the first technology-based regional development policy in the world, to the current Knowledge Cluster Initiative and Industrial Cluster Program. Though technopolis policy brought some favorable results and the two new policies are trying to solve the remaining issues of the policy, more attention needs to be paid for creating start-ups as innovation players.

The paper has proposed a new concept of 'venturing clusters' paying attention to the regional function of starting up companies. This venturing cluster consists of four functions: knowledge sources, tangible support, intangible support, and industrial and social acceptance. This concept is markedly different from the concepts of industry clusters and innovation clusters which are objects of the two new policies.

Based on this model, Sapporo venturing cluster to create biotech university spin-offs has been analyzed. It has been found that intangible support function is especially important and that this function is dynamically developed in a multi-layered way. In this dynamic process some key actors play important roles.

In developing countries, a large portion of R&D activities is conducted in the public sector. To use the public sector R&D capability for industrial development for technology-based regional development, spin-offs from universities and public research institutes are good vehicles. To create these spin-offs, venturing clusters need to be developed. The author hopes that the concept of a venturing cluster and the case of Sapporo, Japan, will be of some help for developing countries to create venturing clusters.

References

- AUTM (2001), *Licensing Survey: FY 2000*, Northbrook, U.S.A.: The Association of University Technology Managers Inc.
- Bozzo, U., Gibson, D. V., Sabatelli, R. and Smilor, R. W. (1991), "Socioeconomic Development through Technology Transfer: Technopolis Novus Ortus" in A. M. Brett, D. V. Gibson and R. W. Smilor (eds.), *University Spin-off Companies*, Savage, U.S.A.: Rowman & Littlefield Publishers, pp. 71-82.
- Chrisman, J. J., Hynes, T. and Fraser, S. (1995), "Faculty Entrepreneurship and Economic Development: The Case of the University of Calgary", *Journal of Business Venturing*, Vol. 10, pp. 267-281.

- Christenson, C. (1997), *The Innovator's Dilemma*, Cambridge, Mass.: Harvard Business School Press.
- Gibson, D. V. and Smilor, R. W. (1991), "The Role of the Research University in Creating and Sustaining the U. S. Technopolis", in A. M. Brett, D. V. Gibson and R. W. Smilor (eds.), *University Spin-off Companies*, Savage, U.S.A.: Rowman & Littlefield Publishers, pp. 31-70.
- Hokkaido METI Bureau(2002), *Hokkaido ni Okeru Baiosangyokurasutakeisei ni Kannsuru Chosahoukokusho (Report on Bio-industry Cluster Formation Study)*, Sapporo, Japan: Hokkaido METI Bureau.
- Itoh, T. (1998), *Tekunoporisuseisaku no Kenkyu (The Study of Technopolis Policy in Japan)*, Tokyo, Japan: Nihon Hyoron Sha.
- Japan Industrial Location Center (1999), *Kigyo Donyu Sokushin Taisaku Chosa (Study on Company Introduction Promotion Means)*, Tokyo, Japan: Japan Industrial Location Center.
- Kenney, M. and von Burg, U. (2000), "Institutions and Economies: Creating Silicon Valley," in M. Kenney ed., *Understanding Silicon Valley: Anatomy of an Entrepreneurial Region*, Palo Alto, U.S.A.: Stanford University Press.
- Kondo, M. (2002), "Kyutenkaisihajimeta Nihon no Daigakuhatsubencha no Genjo to Kadai (Current Status and Issues of Upsurging Japanese University Spin-Offs)," *Japan Ventures Review* No.3, pp. 101-107.
- Kondo, M. (2003), "Bencha Kurasuta (Venturing Clusters)," *Japan Ventures Review* No.4, pp. 25-36.
- Kondo, M. (2004), "University Spin-offs in Japan," *Asia Pacific Tech Monitor* (March-April 2004), pp.37-43.
- Kondo, M. (2005), "Networking for Technology Acquisition and Transfer", *International Journal of Technology Management*, Vol. 32, pp. 154-175.
- Kondo, M. and Hasegawa, K. (2005), "Nihon no Daigakuhatsubencha no Sangyobetsu-Tiikibetsu-Kigyoshabetsu Tokusei (Characteristics of Japan's University Spin-offs by Industry, Region and Founder-Type)", *Journal of Science Policy and Research Management*, Vol.20, No.1, pp. 90-102.
- Reynolds, P. D., Bygrave, W. D., Autio, E. and Hay, M. (2002), *Global Entrepreneurship Monitor 2002 Summary Report*, Babson College, Ewing Marion Kauffman Foundation and London Business School.
- Smilor, R. W., Kozmetsky, G. and Gibson, D. V. (eds.) (1988), *Creating the Technopolis: Linking Technology Commercialization and Economic Development*, Cambridge, Massachusetts: A Subsidiary of Harper & Row, Publishers Inc.