Chapter 1 Diversity and Potential of Regional Industrial Innovation

1-1. Stimulation of Regional Industrial Innovation

1-1-1. Regional Industrial Innovation Issues from an Industrial Cluster Policy Perspective

(1) The Focus of Industrial Cluster Policies

Since the mid-1980s, amid fluctuating levels of demand and other "structural environment-related" changes, regional industries (including produce-growing areas and company towns) are in a state of decline. Furthermore, this situation has worsened due to the globalization of economies and Japan's prolonged economic recession, causing decline and pullout of business in the regional economies that these industries have always supported. This trend has also had a damaging effect on urban industrial agglomerations, which comprise a diverse array of industries. Both regional and urban industries are currently fighting for their survival.

In an effort to curb this trend, the national government and regional agencies have developed a variety of countermeasures. Unfortunately, however, no conspicuous recovery has been observed so far as business and economic environments continue to undergo major changes. Consequently, policy planners are beginning to move away from trying to promote regional industrial development through measures aimed at promoting SMEs and industrial agglomeration, and are now shifting their focus toward new measures designed to create new regional industries from an "industry cluster" perspective, which is based on competitive strategy theory. These new measures are different from traditional ones that focus on the promotion of regional economic development by attracting new businesses to the region. Instead, they place an emphasis on industrial innovation that is promoted through the formation of human networks in each region. This type of industry cluster policy aims to help regions revitalize their economies from the "inside," as opposed to efforts to lure outside resources.

In 2001, the Ministry of Economy, Trade and Industry (METI) launched 19 projects in nine regions nationwide to promote the development of industry clusters – industrial agglomerations comprised of newly-emerged businesses in markets with international demand. At the same time, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) created a program, aimed at the nation's universities (sources of regional knowledge), to establish intellectual clusters comprised of research organizations and venture businesses. Under this program, MEXT provides funding to 13 clusters located in 15 regions nationwide.

(2) Issues Related to Industry Cluster Policies

However, in light of the conditions that exist today, it is difficult to say that these industry clusters have been able to achieve their intended results: the creation of new regional industries and the development of existing industries. Naturally, it is not realistic to expect the creation of new regional industries in such a relatively short period. It may be too early to discuss results since only several years have passed since METI first took action; a much longer period of time is need to nurture new industries. Still, based on the following four points, it appears that issues preventing industry clusters from achieving their desired results are being ignored.

Issue No. 1

Industry cluster projects established in each respective region are being led by the government and not by private businesses. Normally, industry clusters form organically, and regional participation is voluntary. However, industry cluster projects in Japan are influenced significantly by regional government agencies, and final approval must be given by the national government. Furthermore, most of the universities (and research organizations) that are substantially involved in these projects are national universities that have been converted into independent administrative corporations. Consequently, Japanese industry cluster projects are strongly shaped by the interests of the government and not the private sector, whose interests may not necessarily be reflected.

Issue No. 2

Many industry cluster projects are centered on industries in the fields of biotechnology, information technology, semiconductors, the natural environment, and other "future technologies." As a result, cluster projects are primarily concerned with research; consequently, it is universities and research organizations that receive the most benefit from these projects, and not the numerous SMEs that comprise regional industries. Cluster projects related to newer types of industries focus on the creation of venture businesses, so existing SMEs do not directly benefit. Priority has not been given to the revitalization of existing regional industries.

Issue No. 3

Because numerous organizations participate in industry cluster projects, it is difficult to establish clear leadership for promoting them. Furthermore, the organizations that do play coordinating roles are primarily regional government agencies and affiliated extra-governmental organizations, which means that the interests of regional businesses – particularly SMEs – are poorly represented. Obviously, interaction between a diverse variety of organizations and networks is important for the effective development of industry clusters, but efforts should not be directed by just one type of organization. Japan's industry clusters are not being allowed to form in an organic manner; too much intentional planning is currently involved. Moreover, in each cluster project, there is a managing organization that receives government funding to promote the project; however, the level of interaction between primary organizations involved has so far been inadequate.

Issue No. 4

Competition between companies is the driving force that promotes the development of industry clusters and transforms businesses. In each industry cluster in general, companies are engaged in fierce competition; this competition will be driving innovation on a constant basis. Instead of competing, these companies in Japan seem to be cooperating with each other on various levels. Cooperation only in the field of research is not enough to develop the leading-technology industries that will help Japan compete in the global market.

(3) Regional Industries Rely on SMEs

According to Michael Porter, Japan's industrial policies have been traditionally government-led, "top-down" policies that have prevented the private sector from assuming any leadership roles. The fact is, however, that Japan's industrial policies have traditionally targeted SMEs. In ways both direct and indirect, the Japanese government has always acted in support of SMEs. Current cluster projects, on the other hand, do not apply to a large number of them.

It is true that traditional industrial policies were unsuccessful in revitalizing regional industries. On the other hand, industry cluster policies, which were positioned as "breakthrough" measures, have also been unable to overcome the problems faced by regional industries and help once-thriving regional economies to recover. Furthermore, they have thus far been unable to create new industries. Based on these perspectives, let us discuss below what is needed to promote innovation in regional industries that are in a state of decline.

Unfortunately, no magic pill exists that will solve the problems currently faced by regional industries. The only way to mitigate or overcome them is for regional industries and SMEs to make steady efforts while leveraging their particular strengths. The only way for industries to develop is for companies to devote themselves to better meeting the needs of their customers. Based on this perspective, one may consider this report as an attempt to determine what types of measures and activities are needed for regional industrial revitalization.

What is important to remember here is this: regional industries are comprised of businesses, many of which are SMEs. We believe that it should be SMEs that drive regional industrial innovation. These SMEs must engage in a variety of experiments designed to promote innovation, and only after their innovations begin to solidify should universities and research organizations become involved in a supporting capacity.

1-1-2. New Concepts Must Come from Regions' Peripheries

(1) What Is "Innovation?"

Incidentally, by what methods are innovations realized? Economist Joseph Schumpeter in his well-known book entitled "Theory of Economic Development" states that economic development is driven by the emergence of new combinations (innovations) in five areas: 1) the introduction of a new good or a new quality of good, 2) the introduction of a new method of production (including methods for the commercial handling of a good), 3) the opening of a new market, 4) the acquisition of a new source of supply of raw materials or semi-finished products, and 5) the carrying out of the new organization of any industry. Schumpeter also states that it is entrepreneurs that are capable of realizing innovations by creating these new combinations.

Schumpeter's contentions provide us with a variety of pointers that are useful in discussing regional industrial innovation. Japan's industrial policies today place an emphasis on 1) above: introduction of a new product or product quality. In particular, they prioritize the introduction of remarkably innovative new products – ones that have the potential to generate large demand that leads to the creation of new industries and enable companies to maintain long-term competitive strength. Furthermore, these policies emphasize that products should be developed in fields that are characterized as globally competitive.

The more innovative the products to be developed are, the further companies venture into the realm of fundamental research (as opposed to applied or practical research). Such research is feasible for universities and major corporations that possess their own research organizations but is not a realistic option for many existing SMEs.

Innovative product R&D may be feasible for venture businesses that have been spun off from major corporations or university research institutes. Even though Japanese universities have spun off a number of venture businesses in the past, however, it is relatively difficult to find examples of ventures that are now selling products and operating as stable companies. Many have yet to generate sales revenues. Furthermore, there is a noticeable absence of business mindset

among such ventures, regardless of the fact that not just "know-how" but an "entrepreneurial spirit" – the desire and ability to leverage new technology and pioneer new markets – is crucial to the very success of venture businesses.

(2) A Broad Range of Innovation Is Necessary

Moreover, today's cluster projects have placed too high a priority on innovative products and technology, and the "new combinations" that are currently under development are not effectively positioned to promote regional industrial growth. For example, the development of new combinations in the fourth area specified by Schumpeter – acquisition of a new source of supply of raw materials or semi-finished products – is being made possible by economic globalization. China in recent years has gradually been evolving into what many refer to as the "world's manufacturing plant;" Japanese companies have played a major role in the development of China's manufacturing industry by transferring their own manufacturing operations to this nation. Even though Japanese companies have worked hard to establish these new suppliers in China, they have not taken advantage of these achievements to promote innovation in their home country.

By simply transferring manufacturing operations overseas, Japanese companies are instead promoting stagnation in their own local economies. If it is true that the globalization of economies is a permanent global trend that cannot be reversed, then the process of globalization must somehow be tied to the development of regional economies through corporate activities and government policies. It is possible that the damaging effect that economic globalization is having on regional economies could serve as a catalyst for industrial innovation. However, if Japanese companies do not leverage overseas procurement (the "new economic framework") in promoting innovation, then the future development of Japan's industries may be severely limited.

Instead of business management innovation, Japan's industry cluster policies focus overly on technological innovation; consequently too much emphasis has been placed on research activities. Business management innovation requires other elements not related to technology or products. After World War II, Japan's regional industries developed their local economies from the ground up. They were able to compete well in overseas markets, too, because the five types of "new combinations" defined by Schumpeter were realized to a certain degree at that time. In order to revive regional industries, synergy must be created between these five types of combinations.

(3) Innovation Activities in Marginal Companies

Based on the above observations, we may draw the conclusion that regional industrial innovation should be approached from a variety of angles, not just from the perspective of developing new products and technology. For example, progressive efforts such as kaizen activities, too, will provide existing companies, such as product manufacturers, that comprise stagnant industries with various opportunities to innovate. And this could lead to further innovation among companies in other industries, such as the ones that provide product manufacturers with equipment and peripheral devices. Small efforts aimed at improving status quo conditions can have an amplifying effect that stimulates innovation in other industries. Regions with a high level of activity are likely to attract businesses and human resources, and this in turn can promote regional industrial innovation.

There is no question that the future of Japanese industry relies on innovative products and technologies that will create new industries. The problem is that we cannot expect a large number of such products and technologies to emerge.

Certainly, as Schumpeter points out, mature companies themselves may no longer possess the ability to achieve major breakthroughs. Still, we know that a large variety of companies exist in each region, and that these companies have been able to survive and grow in the past by developing innovative new products and technologies.

Some of these mature companies probably started out as ventures that not only formed new businesses but created new fields of industry as well while alternately serving as regional leaders with other companies. Atsushi Yamazaki points out in his book "Japan's Local Industries" that, although the history of Japanese regional production centers is a long one, the average lifespan of the companies themselves is short. The history of Japan's regional industries is characterized by switching from one type of business to another. It was not the regional core businesses that aimed for such a change (business conversion); new companies emerged to replace the mature ones that were unable to accommodate change, and in doing so transformed regional industrial landscapes.

As changes occurred in business and economic environments and core businesses in regional industries fell into decline, marginal companies emerged with new ideas concerning business management and transformed existing industries while creating new types of business. Furthermore, amid demands for the development of new technology, companies with new ideas succeeded in helping to revive non-mainstream technologies, and a new style of business management was implemented. Newly-emerged companies transformed small markets so that they were able to accommodate current needs and trends, thereby enabling the markets to grow and develop.

Companies that were able to generate demand and win customers through various market-development efforts grew stronger and stimulated regional industrial growth while forming new business frameworks. There are many things that we can learn by studying the effects of such dynamism in industrial agglomerations. We must remember that, by providing support that enables industrial agglomerations to develop and express dynamism, it is possible to revitalize regional industries.

Support must be given to those obscure companies on the periphery that are trying to develop new products or implement new styles of management. Ideally, small efforts to promote and develop regional industries should gradually build into major efforts that are able to transform entire regions.

1-1-3. Innovation in SMEs Begins with the Discovery of New Customer Needs

(1) Competition Should Emphasize Differences

In retrospect, the decline of regional industries in Japan cannot be attributed only to changes in business/economic environments, such as changes in the quality or volume of customer demand due to changes in lifestyles, or the introduction of cheaper products from overseas. A decrease in the vitality of Japanese companies themselves is also a major factor behind industrial stagnation. This is due to an inability to develop and implement new styles of management, inadequate desire to challenge the status quo, and inadequate desire to innovate. Why? Because Japanese companies tend to model their styles of management on styles subscribed to by successful companies in the regions in which they are located; eventually, it becomes hard to distinguish the activities of one company from another. Granted, Japan's regional industries have grown in the past because companies emulated the products, manufacturing methods, and sales methods of their successful counterparts instead of trying to compete with them by implementing

different styles of business management. Due to this lack of distinguishing characteristics, companies seek to compete with each other by boosting efficiency (i.e. improving product quality, cutting costs, etc.); similar companies competed with each other for new market creation. By emulating other businesses, companies have been able to win customers by offering better quality and cheaper prices.

On the other hand, emulation can easily lead to price wars as well. Many companies find it easier to distinguish their products from a rival's similar offering by lowering its price. As a result, it becomes harder for these companies to generate profits, their stability suffers, and it becomes more difficult to invest in new product development or new manufacturing equipment.

Because Japanese companies have not traditionally competed with each other by offering different products or implementing different production/sales methods, the nation's industries have fallen into a steep decline because companies are engaged in cutthroat competition while only being able to offer products that are virtually the same as their rivals' offerings. At the same time, increasing economic globalization has promoted low-cost manufacturing in developing nations, and this has all but pulled the rug out from under Japan's regional industries.

Additionally, since many companies have subscribed to the same style of business management, when one company suffers due to its inability to accommodate changes in business and economic environments, then the same effects are felt throughout the entire industry in the region. Companies are unable to plan ahead for and are ill-equipped to accommodate unforeseen changes and market diversification. Various experiments are needed to help companies find suitable means of dealing with such changes. Companies in the field of cybernetics have always held that industries should cope with diversification by diversifying themselves. However, companies that have emulated each other in the past will adopt similar measures for coping with change. Consequently, entire regions have found themselves unable to deal with change in an effective manner.

These observations seem to stress the importance of companies within a region competing with each other by producing different products, using different production and sales methods, and creating different styles of management. In order to create different management styles, companies should begin by taking a close look at their customers' needs. Customers' needs are diverse and change over time. Therefore, if companies are able to discover a broad range of customer needs, focus on meeting only those needs to which their business resources are best suited, and then continue to search for new needs, heterogeneity will eventually develop within their industries.

Innovation may also be realized in situations where various players compete with each other to achieve a single objective. Still, it is not uncommon to discover new businesses that are able to meet customer needs in situations where various players are working toward different objectives as well. It is not uncommon for innovation to occur as the result of interaction between the individual experimentations of different companies.

It will certainly be necessary to formulate an industry cluster policy and strategically help businesses to develop themselves. On the other hand, priority should also be given to measures that promote a variety of business experimentation as a means of discovering new customer needs.

(2) Discovering Customer Needs

The development of tomorrow's innovative products and the development of both innovative and new technologies are inextricably linked to each other – not because this link is useful in meeting specific, clear customer needs, but mainly as a result of efforts to determine techno-

logical potential. It is a process of development in which manufacturers conduct R&D in search of technology seeds and try to locate a prospective field where these technology seeds can be effectively applied. The more "unknowns" involved in a research project, the more time required to obtain research results, which means a lesser probability that the technology will become a reality. There is also a greater possibility that the progress of other technologies will make the technology in question obsolete before the desired results are obtained. Naturally, major risks are required to achieve major results. Obviously, existing SMEs – and many venture business as well – do not have the resources to engage in highly innovative research.

The kind of innovation that is feasible for many SMEs involves new development aimed at meeting the confirmed needs of customers that cannot otherwise be met using existing technology or business methods. The higher the level of certainty that demand exists, the higher the probability that the desired results of such new development efforts will be realized (although the level of innovation drops at a rate commensurate with the degree of certainty).

What is really important for Japan's industries today is the ability of industry players to survive and continue operating in their respective regions; rapid growth is not so much a priority as survival. Also important is competition among companies within a region to win customers, and competition to generate new demand. Such competition will encourage companies to challenge the status quo and thus promote regional industrial development.

In order to fully grasp customer needs, companies must get in touch with their customers (the end users). The more contact that companies have with their customers, the better they will be able to understand their needs. In many regional industries, most companies specialize only in manufacturing operations and leave sales up to wholesalers and "larger" manufacturers. Consequently, manufacturers are traditionally somewhat removed from their end users and are therefore unable to accommodate changing customer needs in a timely manner. Furthermore, by relying on wholesalers, general trading firms, and larger manufacturers to sell their products, manufacturers have been unable to discern customer needs through direct contact with the customers. By remaining out of touch with customer needs and focusing primarily on selling products at low prices, regional manufacturing companies created price wars that eventually led to their decline.

While it is important to pursue the development of innovative technology through industry-academia-government partnerships, Japanese companies must place a higher priority on direct communication with consumers and retailers in an effort to better understand end user needs. This is crucial not only to developing new and innovative technologies, but also to developing networks with "different" types of people and organizations that will enable companies to discover customer needs. The keys to success are understanding customer needs, planning and developing new products, and developing new business systems.

1-1-4. The Role of Government Policy in Regional Industrial Innovation

Next let us discuss the roles that government policy should play in promoting innovation in regional industries. Government policies are created to encourage companies to innovate under their own initiative; these policies are driven by the private sector and not by the government. The role of the government is to encourage and stimulate innovation activities, not lead them; it is a strongly supportive role aimed at promoting industrial development.

(1) A Two-angle Approach: Strategic Industries and New Experimentation

Granted, traditional government policies concerning SMEs were aimed at specific industries or regions; generally, these policies targeted many different kinds of SMEs. Their objective was to enhance SMEs as a whole by restructuring small-scale SMEs that are characterized by a small business scale by a large number of players. However, the policies we discussed at the beginning of the chapter are narrowly aimed at nurturing strategic industries in specific fields. Furthermore, amid worsening financial conditions, regional agencies, too – whose budgets are limited – are becoming more inclined to narrow the focus of their policies in an effort to utilize their limited resources more effectively.

It is true that strategic, highly-targeted policies, such as industry cluster policies, are needed to encourage the development of regional industries. Moreover, the narrow focus of such policies is necessary in order to encourage the development innovative technologies that will help to create the industries of tomorrow; strategic industry-nurturing policies are indispensable.

However, there are a considerable number of companies operating outside the focus of these strategic policies that conduct innovative activities as well. Obviously, for companies that rely on themselves and not government support to innovate, existing policies may suffice.

Still, there is a need for policies that provide clear support to companies that are conducting various experiments in an effort to innovate. Aggressive support should be given to companies that are experimenting with innovation and companies that are trying to get involved in entrepreneurial activities; their efforts should be praised and publicized. Companies that seek to innovate themselves through new concepts should be supported through government policies. More than the "newness" of a company's product, what really matters is new business concepts. Companies trying to innovate their business systems must be supported through government policies.

(2) Industrial Networks

It is not possible to revitalize regional industries unless regional companies become more independent and start to exercise leadership abilities. Both industrial structure and the companies that comprise them are in a state of change. Consequently, industrial networks need to be reorganized in conjunction with the emergence of new products and businesses. New businesses can be created by such means as reorganizing the broad range of specialized SMEs that exist in an industry, or by promoting reforms or introducing new companies into an industry network. This is the job of the industrial network leader.

In addition to developing business systems based on new concepts, network leaders also aggregate and coordinate a wide variety of companies, human resources, and business management resources. Network leaders do not simply win jobs for network members; they also make new information available to network members concerning new processing or manufacturing technologies, changes in product materials, technological innovations in manufacturing equipment, management technology, trends in other companies, and other important topics.

As opposed to simply providing information concerning the activities being conducted within the limited scope of a particular industrial agglomeration, network leaders supply a broad range of information from a diverse range of sources in order to stimulate new competition and cooperation with an industrial agglomeration.

Network leaders that develop and sell products have existed in regional industrial agglomerations in the past. They might be wholesalers or product manufacturers. In recent years, however, a significant number of network leaders have either moved out of their home regions or fallen into a state of decline due to inadequate ability to accommodate changes in business and economic

environments. Moreover, there are few examples of former industrial giants that have attempted to challenge the status quo.

A need exists to create network leaders that are ready to take on new challenges. While it is important to wait and see what results companies will be able to obtain through their own efforts, at the same time, the government should develop strategic policies for nurturing companies that can become network leaders. If network leaders do not already exist in a certain region, steps must be taken to lure leaders from other regions or to develop leaders with the support of government policies.

We believe the government should assume a coordinating role in the nurturing of regional industries by helping to develop network leaders. Decisions concerning future directions and strategic fields should be left to the initiative of an industry's companies and network leaders. However, it should be the role of the government to assist in the nurturing of highly-skilled network leader human resources, and to make it easier for these human resources to exercise their abilities.

As mentioned above, network leaders gather information from sources both inside and outside their respective regions, and supply this information to other companies in their networks in order to stimulate competition and growth. At the same time, they also supply regional information to external parties. The job of the government is to support the role of network leaders as "gatekeepers," which use internal and external information to achieve various results.

When various different leaders exist within a regional industry, developing new concepts while competing and cooperating with each other, the industry in question will grow and develop. That is exactly how the Asahikawa area's furniture industry and the hot springs resort town of Yufuin were able to develop and attract customers from other regions. Information from outside areas and industries had an impact on them, and this encouraged them to adopt new styles of management. As these efforts are repeated, regional industries move closer to recovery.

(3) Industry Promotion Efforts that Accommodate SME Conditions

A close look at government policies designed to promote the creation of new industries and venture businesses shows that too much importance is placed on technology while business management is somewhat ignored. Furthermore, the considerable absence of policies that take into account SME conditions is also alarming.

There is no problem with universities prioritizing leading research programs regardless of the resources required. In the case of private sector companies, however, research must be reconciled with feasibility and fiscal responsibility. Innovative projects in fields such as IT and biotechnology are eligible to receive financial aid. There are a considerable number of companies and groups that receive grant money from a broad range of business support organizations. Recently, companies that rely solely on financial assistance to operate have emerged; these companies lack the ability to improve their own business management abilities, pour all their efforts into creating attention-grabbing plans, and eventually destroy themselves.

Companies must become profitable to survive. No matter how important the product or service is to society, the company must be able to deliver it at a socially acceptable price or else it will fail. Nevertheless, development plans that are not fiscally responsible and regional industrial promotion plans that fail to address competitive strength are still being created. Granted, companies may be able to boost their competitive strength by devoting many of their resources to an innovative technology while still in the research stage. However, if customers are not satisfied with the results, the technology will never be commercialized. Regardless of how superior a new technology is, companies will never be able

to generate profits using it as long as it does not meet customer needs.

As seen often in industry-academia-government partnerships, many organizations and people that provide and coordinate financial assistance are technology-oriented. Without staff who can provide guidance to help companies implement effective management systems, financial aid applied to research projects could be wasted if companies fail to become commercially viable. As a result, regional industries will not benefit from the financial assistance.

In recent years, the government has increasingly devoted more resources to promoting the use of the private sector's abilities as well. This itself is not an issue. In many cases, however, major corporations fail to provide SMEs with any marketing guidance and instead focus primarily on advice concerning how to gather information required to develop technology; this advice is given without an adequate understanding of the conditions that exist in SMEs. Some major corporations that do not understand SME conditions are even on financial assistance review boards. SME support should involve both technological and management guidance. Representatives who used to be technical staff in major corporations should visit the various SMEs that operate in their regions in order to gain a better understanding of the conditions they are dealing with so that both parties can better coordinate their efforts.

In 2003, the Osaka prefectural government established Creation Core Higashi-Osaka, a comprehensive support facility for manufacturing SMEs. The first floor of the building features booths with regional product exhibits. Although some easy-to-understand product information is written on exhibit signboards, the helpful descriptions of product features and possibilities given by enthusiastic, highly-knowledgeable staff are similar to effective sales presentations. Creation Core Higashi-Osaka is a one-of-a-kind facility of which there should be more in Japan.

1-1-5. Stimulate Business, Not Product Innovation

In the past, regional industries have been supported by specialized manufacturing companies by way of "social division of labor"; even major corporations have benefited from their support. Regional industries have grown due to the agglomeration of numerous SMEs in industries in which they can operate with relatively little capital and other resources. Social division of labor in regional industries helped specialized SMEs to operate their business with limited financial resources and knowhow and to form an agglomeration. By producing distinct, high-quality offerings at low cost, many were able to generate demand and acquire competitive strength. However, many of these products are now being manufactured in overseas plants, and Japanese companies must now create new businesses at home. To do so, many believe that knowledge chain rather than product chain is needed.

Gathering information from a broad range of sources is crucial to innovation. Moreover, it is necessary to shed light on new and hidden knowledge and arrange it with new concepts. It is usually a case to add universities and research institutes when a varied perspective are required. In reference to knowledge chain, unfortunately, however, most attention is being given to research organizations.

It is important to make effective use of the knowledge and intellectual prowess of research organizations and universities, which are a source of regional knowledge. At the same time, it is also important to give weight to the perspective of the customer. Generally speaking, when a customer purchases a product, it is not the product per se that he wants – it is the functionality that the product offers; at the same time, the customer also gives consideration to price, sales method,

brand, and other aspects.

In other words, competitive businesses try to appeal to customers not only with their product's "innovativeness," but also with a variety of other elements. Again, customer needs are constantly changing and diversifying, and SMEs must be able to accommodate those needs. Regional industrial innovation relies on the creation of a diverse array of products and business mechanisms that can meet customer needs.

The various efforts and experiments of regional companies should be publicized in order to advertise the business potential that each region offers. The spotlight should be directed toward regional companies working to discover customer needs that have been ignored in order to develop new business systems based on new business concepts. Furthermore, the government should develop policies that support these innovators and encourage them to develop innovative businesses.

1-2. Industrial Agglomerations & Regional Industrial Innovation

1-2-1. The Current Status of Industrial Agglomerations in Japan

Industrial agglomerations are formed when mutually related companies and organizations associated with them gather in a specific geographical area. A large percentage of companies in an industrial agglomeration are SMEs. In Japan, the term is used to refer to a variety of industrial agglomerations, the following being the most typical examples.

The first type of industrial agglomeration is the "production center," a region in which a large number of SMEs in industries that produce traditional Japanese commodities, such as ceramics and fabrics, gather. Some examples of these production centers are Tsubame City (metal Western tableware), Seto and Tajimi (ceramics), and the Bishu area of Aichi Prefecture (fabrics).

The second type of agglomeration is the "company town," where groups of major manufacturer subcontractors are gathered. Some examples of company towns are Hitachi City (home to electronics manufacturer Hitachi), Suwa City (IT device manufacturers), and Toyota and Hiroshima (automakers).

The third type of agglomeration is "the industrial complex," a concentration of a diverse range of SMEs that specialize in machine processing, metal plating, and other basic processing technologies. Some examples are the well-known machinery and metal industry agglomerations in the metropolitan areas of Jonan (Tokyo) and Higashi-Osaka (Osaka), which are also referred to as "urban industrial agglomerations."

These three different types of industrial agglomerations have developed throughout Japan to the extent that the nation could be called "one large clump of industrial agglomerations."

The existence of industrial agglomerations is vital to the Japanese economy from two perspectives. First, from a macro-perspective, they serve as a foundation upon which Japanese industries are built. Major finished product manufacturers in the auto and electronics industries helped to rebuild the nation's economy after World War II and enabled Japan to compete well in the global market; the crucial role that these industrial agglomerations have played in positioning Japan as a global industrial power cannot be denied. Second, because industry agglomerations are geographical in nature, it is logical to conclude that the rise and fall of industrial agglomerations can be linked directly to regional economic development. As the concentration of businesses in the Tokyo area becomes increasingly excessive, much attention is being given to the development of regional economies as a means of improving the nation's overall economy. Many believe that industrial agglomerations are crucial to achieving sustained growth on a national – not just regional – level.

As a result, the Japanese government is placing a higher priority on the creation of government policies aimed at stimulating the development of existing industrial agglomerations and creating new ones. In 1997, the government enacted the "Law on Temporary Measures for the Stimulation of Specific Regional Industrial Agglomerations." This foundational law, which provides for the support of industrial stimulation and development, divides the nation's industrial agglomerations into two broad groups: Group A and Group B. Group A includes agglomerations of fundamental technology industries – ones that manufacture parts, dies, prototypes, and other products that serve as the building blocks of other industries. Group B includes agglomerations of specific types of SMEs (i.e. "production centers"). In addition to matters concerning geographical parameters, the law also specifies matters concerning the value of shipments and the number of companies within an agglomeration, and based on industrial stimulation plans submitted by each region, designated areas are screened.

However, as globalization progresses at an increasingly rapid rate, the current state of Japan's industrial agglomerations does not necessarily look that promising. Based on the industry statistics shown in Diagram 1-2-1, which shows how the total number of business locations, total number of employees, total value of shipments, and total GVA (Gross Value Added) changed between 1985 and 2000. As the Diagram shows, the values of both Group A and B agglomerations fall below national Diagrams. From a quantitative perspective, we may conclude that industrial agglomerations are experiencing a serious downsizing trend at a rate higher than the national average. As the "2001 White Paper on Small and Medium Enterprises" points out:

"Industrial agglomerations have not on a macro-level been able to overcome the current state of stagnation that exists. However, a closer look shows that some industrial agglomerations are doing better than their counterparts in other regions, and that some companies are doing better than others within the same region.

On a regional level, even in agglomerations where growth in shipment values and jobs is sluggish, some companies that have been able to effectively accommodate the changes occurring in business and economic environments are achieving growth while others still struggle." (Page 122)

In light of the these observations, and in light of the importance of industrial agglomerations, we should probably discuss what kind of significance agglomerations hold for, and what possibilities they offer to, today's SMEs – the primary components of industrial agglomerations. This section discusses issues concerning industrial agglomerations and the roles that they have played in the past while taking a look at current conditions. It also discusses the significance of today's agglomerations as "bearers of innovation."

Diagram 1-2-1 Growth Trends in Industrial Agglomerations

		1985	2000	Growth Rate
Total Business Locations	National	438,518	341,421	-22.1 ·
	Group A	131,751	99,493	-24.5 ·
	Group B	148,983	110,635	-25.7 ·
Total Employees (Unit: 1,000)	National	10,889	9,183	-15.7 ·
	Group A	3,315	2,611	-21.2 ·
	Group B	3,198	2,596	-18.8 ·
Total Value of Shipments · Unit: 1 billion yen ·	National	265,320	300,477	13.3 ·
	Group A	86,636	86,862	0.3 ·
	Group B	74,471	77,925	4.6 ·
Total GVA · Unit: 1 billion yen ·	National	97,826	121,183	23.9 ·
	Group A	31,964	34,804	8.9 ·
	Group B	27,362	32,119	17.4 ·

Source: Information compiled from the industry statistics table shown on page 20 of the Japan Small Business Research Institute publication entitled "New Trends in Industrial Agglomerations" (Doyukan, 2003).

1-2-2. Why Companies Form Industrial Agglomerations

(1) History of Diverse Agglomerations

As mentioned earlier, Japan is home to a diverse variety of industrial agglomerations. The given natural conditions and historical backgrounds involved in the formation of these agglomerations differ case by case.

For example, Hitachi City – a classic example of a company town – became the home of an industrial agglomeration led by electronics giant Hitachi. The formation of the agglomeration in Hitachi City was due in part to certain geographical conditions that made it difficult for Hitachi, Ltd., which began full-scale operations in the Taisho Period (1912 – 1926), to establish a network with suppliers in the Tokyo-Yokohama area. To get around this problem, Hitachi spun off business and made other efforts to create and nurture affiliate companies for the purpose of developing a tight network of suppliers; these efforts led directly to the formation of an industrial agglomeration.

In the Kumamoto area, which is home to developing semiconductor and auto-related industry agglomerations, aggressive government-led efforts that include plans for "technopolis" and urban industrial development are being made to lure outside businesses. Business that have been lured to the area have given momentum to the formation of industrial agglomerations.

In the Yamagata-Yonezawa area, which is home to developing electric machinery (including semiconductor-related businesses) and machine industry agglomerations, the area's traditional metal casting industry has been a driving force in the formation of industrial agglomerations. In addition to possessing fundamental technology that supports other manufacturers, the area's metal casting industry also contributes to the development of machine industry and has help to create numerous sewing machine-related companies in the area. This group of companies has joined forces with major electric appliance manufacturers that moved into the area during Japan's period of rapid economic development and are forming an industrial agglomeration. It is not rare for traditional regional industries to drive the formation of industrial agglomerations as the metal casting industry has done in this case.

(2) Debate over the Advantages of Industrial Agglomerations

There are many debates concerning the advantages (results) that Japanese industrial agglomerations offer. It was the research of Alfred Marshall and Alfred Weber that originally ignited these debates. Marshall in 1890 pointed out that industry-specific concentrations of companies in geographical proximity offered these advantages: 1) effective transmission of technology, 2) more technological innovation possibilities, 3) development of complementary industries, 4) economic use of expensive machinery, and 5) development of external economies that involves the creation of highly skilled labor markets and other factors. In 1923, he also discusses the unique "industrial atmospheres" that develop within each agglomeration, and how they, too, are advantageous because they are impossible to emulate in other agglomerations.

Marshall also pointed out several disadvantages that can be associated with industrial agglomerations: 1) excessive, lopsided demand for a specific type of labor, 2) higher rents, 3) reduced product demand, and 4) weakened defenses due to reduced availability of raw materials.

Weber in 1986 stated his belief that the driving force behind the formation of industrial agglomerations is "lowered production and sales costs," which are made possible by the integrated efforts of specific clusters of companies in specific areas. Specifically, industrial agglomerations make it easier to divide operations between multiple companies, reduce costs through joint pro-

curement and sales, and reduce general overhead costs by sharing water service, roads, and other infrastructure.

Weber also identified two development steps of agglomeration: expanded business scale of one company as the "low-level" stage and several businesses getting closer to each other as the "high-level" stage. He also made a discrimination of "genuine (technological) agglomeration" caused naturally by agglomeration factors and "contingent agglomeration" induced by other location factors such as transportation and labor costs.

In addition to these traditional industrial agglomeration theories, newer theories began emerging in the U.S. and Europe starting in the late 1980s. A representative example of the industrial location theory[1] is the new type of production system characterized as "flexible specialization" (Piore & Sabel). Another example is Michael E. Porter's industrial cluster theory, which focuses not only on cost reduction but also on boosted productivity, the potentialities of innovation and new business creation.

Matsubara in 1999 conducted a study of U.S. and European industrial agglomeration theories. He saw that Weber's theories focus on cost reduction by expanding manufacturing operations and locating plants in close proximity to one another, while Marshall's focus on the stimulating effect that regional industrial agglomerations have on external economies. Matsubara also points out that most industrial location theories developed in recent years are aligned with Marshall's theories and concentrate primarily on non-economic factors such as production system attributes, personal relationships, and regional climates (i.e. social conditions, cultures, etc.). Furthermore, he characterizes Porter's industrial cluster theory as one that addresses inter-company relationships, rather than ones between plants and areas, and fails to adequately address how to compare the productivity and competitive superiority of one cluster to another.[2]

(3) Accessibility to Resources, Markets and Manufacturing

As we have observed, there is a variety of different arguments on the advantages arising from the formation of industrial agglomerations. If we take a look at the actual companies that comprise them, however, we see that they tend to concentrate in certain areas because of the economic rationales associated with them.

In 1999, Nishioka identified these rationales as 1) accessibility to resources, 2) accessibility to markets, and 3) accessibility to manufacturing networks within agglomerations (see Diagram 1-2-2).

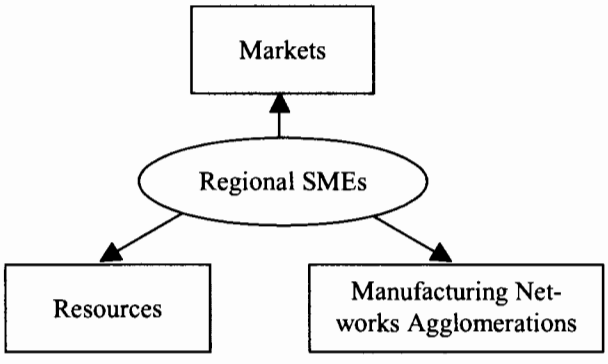

Diagram 1-2-2 Advantages of Industrial Agglomeration

Source: Tadashi Nishioka, a member of working group for Economic Research Institute (ERI)

1 This should include innovative milieus and Florida's learning area.

2 As for trends in discussions regarding industrial agglomeration in Japan, please refer to a report complied in 2000 by Hirofumi Ueda.

In many cases, accessibility to resources contributes to agglomeration in the initial stages, but all three types of accessibility are necessary to achieve organic and sustained growth and creative economic incentives for agglomeration.

① Resource Accessibility

Accessibility to resources refers to the quality of access and the volume of resources that are accessible. Once raw materials are procured, manufacturers utilize human (labor) and capital (equipment) resources to produce output and generate profits. Needless to say, the amount of profit that a company generates is largely affected by the cost of the resources that are utilized; consequently, the cost of acquiring these resources is a main factor behind companies' decisions to set up shop in certain areas.

② Market Accessibility

The word market as used in the term "market accessibility" refers to the market that is created by industrial agglomeration and functions indepently.[3] Internal markets are created by the vertical or horizontal division of labor within industrial agglomerations, and certain companies or groups thereof are responsible for linking internal markets to external (end user) markets. These companies/groups are called "terminals," and they handle and transmit not only products but also information on internal resources (including qualitative information concerning the technical levels and business conditions of companies within an agglomeration) and external sources (the demand side).[4]

Terminals are highly familiar with conditions within their respective agglomerations, and one of their roles is to determine, based on demand, which internal company is the most suitable supplier for the client. By doing business with a terminal, external companies can take advantage of all the functions that the terminal's agglomeration offers and, at the same time, regional SMEs that comprise the agglomeration can benefit from external demand without having to shoulder the cost of trying to win new customers. In this sense, companies in industrial agglomerations are able to reduce transaction costs by relying on terminals to handle the product and information transactions.[5] On the other hand, the role of the terminal could also be detrimental to the ability of other companies to develop their own marketing skills.

③ Internal Manufacturing Network Accessibility

Accessibility to an industrial agglomeration's internal manufacturing network offers major advantages: 1) companies can rely in part on the resources of other internal companies and therefore need to invest less capital, and 2) the division of labor made possible by agglomeration enables companies to specialize in specific fields and, as a result, allocate their limited resources more efficiently. With the exception of some company towns, different type of networks are found in the agglomeration, even though the sizes of their respective networks may differ. Moreover, division of labor and competition between companies in a network has been seen to help raise the com pe-

3 These markets are called "internal markets" in order to distinguish them from the traditional market concept.

4 In this respect, a terminal serves as a "logistics terminal" and "information terminal" for the other companies in its agglomeration.

5 In company towns, internal markets are created by vertical divisions of labor that are overseen by major corporations, which function as terminals. In a fabric industry agglomeration (an example of a production center), each separate production process (such as twisting, dying, finishing, and weaving) is handled by a specialist company. In this case, a wholesaler that is highly familiar with the agglomeration acts as the terminal. The same is true for other types of production centers, such as ceramics and daily commodity production centers.

tency level of the players involved – and even the competency level of the entire region in question.[6] Additionally, internal manufacturing networks are also considered to function as a type of public infrastructure and, as such, make it easier to establish new businesses in their areas.

1-2-3. The Downsizing of Industrial Agglomerations and the Significance Thereof

(1) Downsizing and Attributable Factors

Even though companies decide to set up shop in industrial agglomerations because of the economic incentives they offer, as Diagram 1-2-1 indicates, many of the nation's agglomerations are shrinking based on quantitative statistics. In addition to economic globalization, this slump can also be attributed to the development and improvement of transportation networks, information technology, and logistics infrastructures, because having a geographical advantage is no longer as important to procuring business resources as it used to be. Furthermore, the terminals upon which other companies relied to bring business to the area have in many cases been unable to keep up with the changes occurring in business and economic environments. During Japan's period of remarkable economic growth, it was acceptable for terminals to focus on the quantitative adjustment of supply and demand between internal and external markets. Now, however, as Japan's economy continues to mature, it is more important for terminals to create demand. Unfortunately, many terminals have been unable to effectively assume this new role, and that in part has led to the downsizing of industrial agglomerations.

Industry watchers have also pointed out that the increasing rigidity of manufacturing networks within industrial agglomerations is another factor that has contributed to the downsizing trend. An observation of industrial agglomerations that are currently being forced to downsize reveals that they share some common traits. For example, many companies operating in company towns and production centers, which rely on a few terminals to bring business to their areas, are engaged in mass-production operations and do not manufacture their own brand-name products or conduct independent marketing activities.

Furthermore, in many cases inter-company exchange does not go beyond the sphere of the agglomeration's internal manufacturing network, which means that individual networks rarely have opportunities to engage in the exchange of information.[7] As a result, companies within agglomerations are becoming more indistinguishable from their counterparts, and inter-company relationships are growing more rigid; their activities start losing momentum as the leading company goes into slump. Naturally, however, there are more than a few companies that are creating new businesses within agglomerations. The quantitative expansion of industrial agglomerations in the years following the nation's period of rapid economic development encouraged companies in agglomerations to establish manufacturing networks (division of labor) primarily for the purpose of achieving greater production efficiency; failure to pursue additional objectives has prevented networks from accommodating today's changes more flexibly.

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6 An example of this is the rivalry between Kyoto-area electronics giants Kyocera and Nidec Corporation that has helped to strengthen each player. Such cases are not rare.

7 For example, it is surprising to learn that a considerable number of company leaders with plants located in the same industrial complexes are unfamiliar with each other's operations simply because they belong to different industries and cater to different customers.

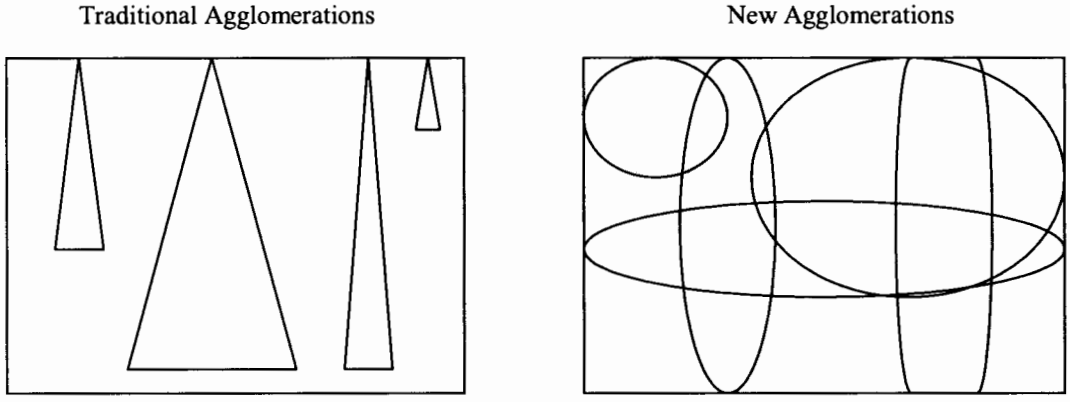
(2) The Significance that Innovation Holds for Today's Industrial Agglomerations

Has economic globalization made industrial agglomerations obsolete? Here is where the opinions of industry watchers are likely to differ. Still, Japan is not the only nation where industrial agglomerations exist; well-known, globally competitive agglomerations are found not only in the U.S. (Silicon Valley) and Italy (Como), but in other nations as well. Furthermore, although physical proximity is expected to become less and less of an advantage for same-industry companies, manufacturing networks within industrial agglomerations will likely continue to offer advantages for SMEs with limited resources because these networks offer accessibility to business resources and enable them to reduce transaction costs.

Based on these observations, we believe that even today industrial agglomerations have importance for Japanese industry. Still, globalization-oriented industry agglomerations (hereinafter collectively referred to as "new industrial agglomerations") must not only strive to become high-efficiency manufacturing centers, they must also be able to cope with changes in business and economic environments in a flexible manner. To remain relevant, new industrial agglomerations must strive to achieve regional industrial innovation. In this case, the concept of regional industrial innovation refers to a situation in which connections between companies in an industrial agglomeration create new business domains and drive technological innovation – a trend that eventually spreads throughout the entire region.

Many of Japan's traditional industrial agglomerations are, as mentioned above, engaged primarily in mass-production operations, and terminals have focused primarily on adjusting supply and demand. Consequently, it is difficult to find cases where innovation has been achieved on a sustained basis.

As we discussed earlier, it is a fact that inter-company exchange has in the past been limited to the confines of closed manufacturing networks. New industrial agglomerations must strive to meet market needs by manufacturing a large selection of products in smaller volumes and single units. Doing so will be realized by forming flexible, multilayered manufacturing networks comprised of a broad range of companies (see Diagram 1-2-3).



Notes:

1) The rectangles represent geographical parameters.

2) Triangles and circles represent inter-network relationships within the region.

Source: Tadashi Nishioka, a member of working group for Economic Research Institute (ERI)

Diagram 1-2-3 New Industrial Agglomerations Comprised of Diverse Networks

Inter-company exchange between diverse manufacturing networks will enable them to share a broad range of information over a large area; it will also help companies within an agglomeration to better distinguish themselves (technologies) from their colleagues, and this in turn will enable them to develop new networks. Moreover, since companies would no longer need to rely on a few terminals to bring business to the agglomeration – instead, demand would be generated by a larger number of companies with strong focus on marketing – companies in new agglomerations will be much better equipped to accommodate changes in business and economic environments. And, as mentioned above, the information exchanged through multidimensional transactions and other means will enable innovation on an individual company level to expand throughout regions in which industrial agglomerations are located. Diagram 1-2-4 compares the direction of new industrial agglomerations to the current state of traditional agglomerations.

Diagram 1-2-4 The Future Direction of New Industrial Agglomerations

	Future Direction of New Industrial Agglomerations	Current State of Traditional Agglomerations
Product (Order) Characteristics	Large selection of products in smaller volumes and single units	Mass-production
Business-winning Companies	Large number (type unspecified)	Small number (terminals)
Component Companies	Heterogeneous	Homogeneous
Division of Labor	Flexible (multilayered network)	Rigid (vertical network)
Market Consciousness	Strong	Weak
Ratio of House-brand Products	High	Low
Business Activity	Vibrant	Sluggish
New Business Creation	Frequent	Rare
Exchange within Home Region (Includes Informal Exchange)	Active	Rare
Regional Climate/ Milieu	Aggressive	Conservative
Technological Complexes	Large	Small

Source: Economic Research Institute (ERI)

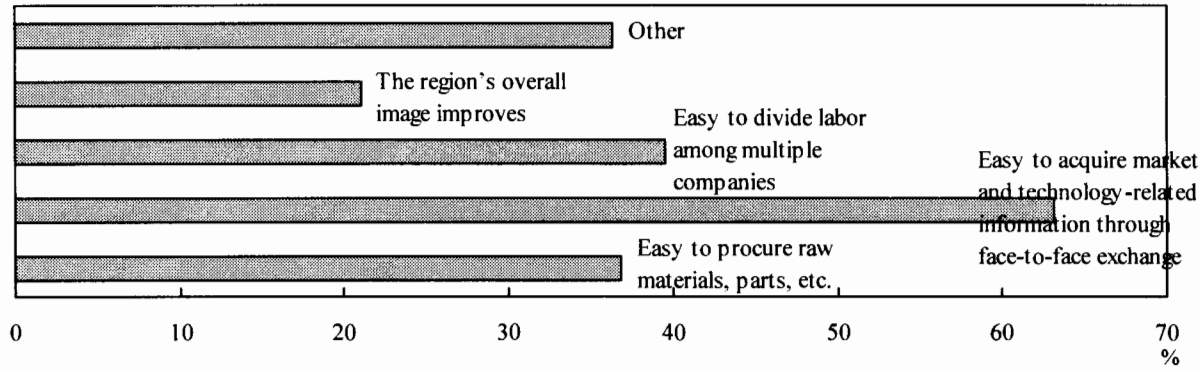


Diagram 1-2-5 Advantages of Industrial Agglomeration

Source: Taken from page 209 of the "2003 White Paper on Small and Medium Enterprises." Data is based on responses to the Value Management Institute's survey entitled "The Current State of Industrial Agglomerations in New Growth Areas & Issues Concerning the Development Thereof." Because these are responses to a multiple-choice question, the total response rate exceeds 100%.

Based on the responses shown in Chart 1-2-5, we see that the perceived advantages of industrial agglomeration for SMEs are changing. According to the Value Management Institute survey results, the most common response (60% of the total) was easy to acquire market and technology-related information through face-to-face exchange, a much larger ratio than easy to procure raw materials, parts, etc. or easy to divide labor among multiple companies. The results seem to indicate that, from the perspective of regional SMEs, physical proximity per se is no longer nearly as important as finding ways to leverage physical proximity for facilitating the exchange of information between diverse companies within an industrial agglomeration.

Indeed, it will not be easy for traditional industrial agglomerations to transform themselves into the new, globalization-oriented agglomerations of tomorrow. Nevertheless, diverse networks are beginning to emerge even in traditionally conservative regions throughout Japan.

For example, in Okayama Prefecture's Tsuyama area, which is home to an industrial agglomeration that specializes in stainless steel processing technology, SMEs joined forces in 1997 to establish Tsuyama Stainless Net, a joint order-receiving organization; this arrangement has made it possible for companies to share equipment and technology-related information. Only seven companies (with 70 affiliates) have joined the network so far; still, this network deserves attention because its members represent different fields of expertise (i.e. machine processing, steel plating, instrument manufacturing) within the stainless steel processing industry.

In Kumamoto Prefecture, the Prefectural Industry Federation in 2001 established GAMADAS, a joint order-receiving organization comprised of 20 local companies from a broad range of fields, including design, electric controlling systems, machine processing, surface treatment, metalworking, and software development. The aim of this network, which is also better equipped to handle customer orders that are becoming more advanced and complex, is to promote the development of new products based on interaction between these companies from diverse technological backgrounds.

Similar efforts are being made in the nation's metropolitan areas as well. In Kyoto, for example, ten companies belonging to the Kyoto Youth Association of Small and Medium-size Companies in Machine and Metal Industries (also known as Kiseiren; approx. 80 member companies) in 2001 formed Kyoto Shisaku Net, an industrial network aimed at providing specialized prototype solutions; each member company is conducting various network-building experiments.

These types of activities illustrate the innovative possibilities that cooperation between companies from different fields create. Industry watchers expect this trend to spread to other regions as well.

At any rate, as economic globalization advances, regional industrial agglomerations · which are traditionally regional in nature · are now being forced to compete with other regions on a global basis. In order to compete successfully, industrial agglomerations must strive to promote regional industrial innovation that leverages the special characteristics of the regions in which they operate in order to build competitive strength.

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1-3. Regional Industrial Innovation & SMEs

In this section, we will discuss the various ways in which SMEs can get involved in, and the ideal roles that SMEs should play in, regional industrial innovation.

1-3-1. Innovation in SMEs & Regional Industrial Agglomerations

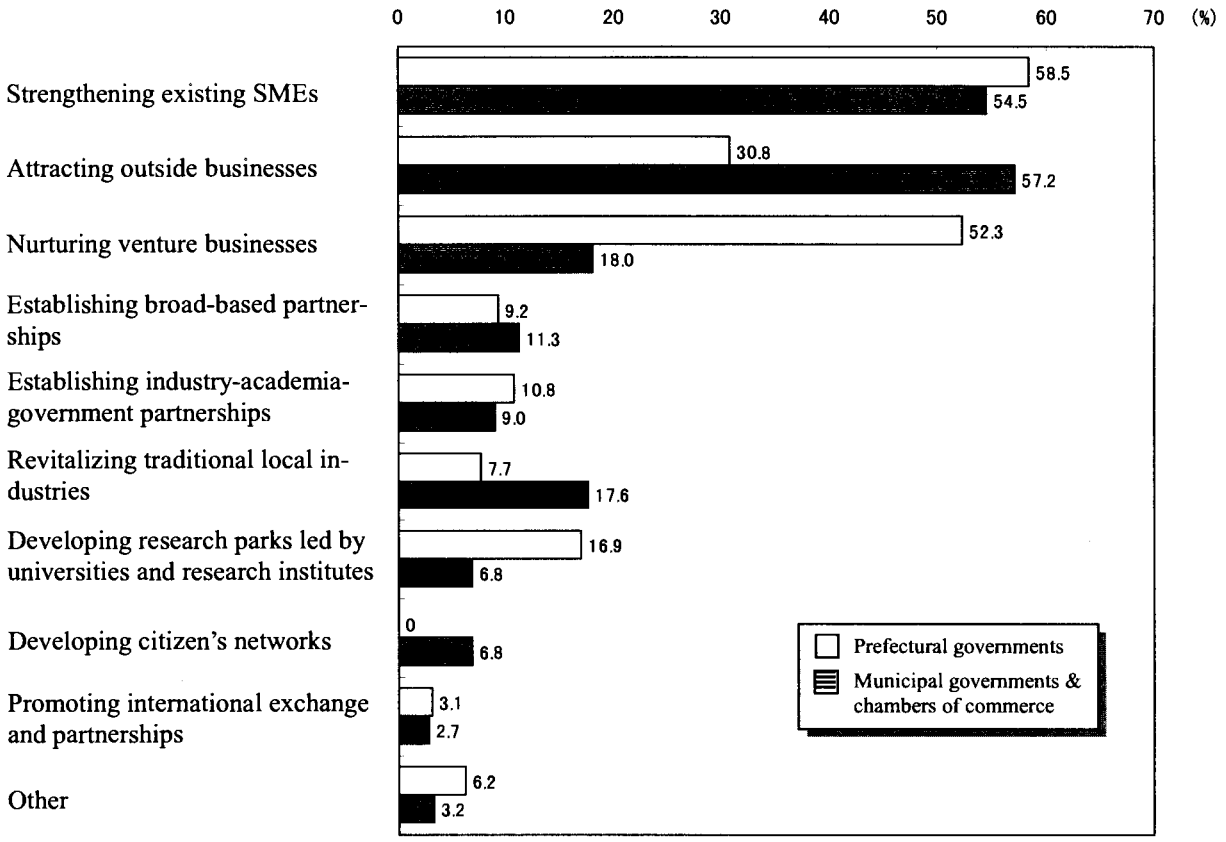
First, let us discuss the relationship between regional industrial agglomerations and innovation in SMEs. In the past, innovation in SMEs operating in agglomerations has traditionally been driven by the development or introduction of new technology for the purpose of meeting the new needs of their respective parent companies and other customers. This type of innovation was based on technical guidance and new technology information provided by parent companies in hierarchical industrial organizations; this trend was particularly evident in company towns. As industrial structures characterized by a vertical division of labor begin to collapse, however, regional industrial innovation driven by parent-subsidiary agglomerations is rapidly becoming a thing of the past.

As economic globalization progresses and competition grows more fierce, large-scale corporations (agglomeration core company candidates) are increasingly allocating their business resources to areas in which they possess technological (competitive) superiority, such as the field of next-generation environmental technology, while outsourcing parts manufacturing and processing operations to specialized manufacturers. More and more, major manufacturers are losing their ability to provide technical guidance to their subcontractors and guarantee future orders. Furthermore, restructuring efforts and layoffs are creating an absence of skilled human resources that can provide the technical guidance with extensive knowledge that subcontractors require.

SMEs can no longer rely on their parent companies to provide them with enough orders to guarantee their survival. They must now strive to develop their own technological prowess and new technologies. Because their resources are limited, SMEs must work to forge industrial and academic partnerships to replace their traditional reliance on parent companies. Many believe that joining together with area universities and research organizations to develop new technologies and products is an effective strategy for meeting new market needs.

1-3-2. The Roles of Regional SMEs in Government Policies Aimed at Promoting Regional Industries

"What areas are you focusing on in order to promote the development of industrial agglomerations in your particular region?" is one question posed by an Economic Research Institute survey of Japanese universities, national colleges of technology, prefectural governments, municipal governments, and chambers of commerce. Strengthening existing SMEs represented high interest (over 50% of the total) among all respondents. The most common response (57.2% of the total) from municipal governments and chambers of commerce was attracting outside businesses. On the other hand, the most common response (52.3% of the total) from prefectural governments was nurturing venture businesses. And, as Diagram 1-3-1 indicates, prefectural governments disagree with municipal governments and chambers of commerce on the importance of revitalizing traditional local industries and developing research parks led by universities and research institutes.



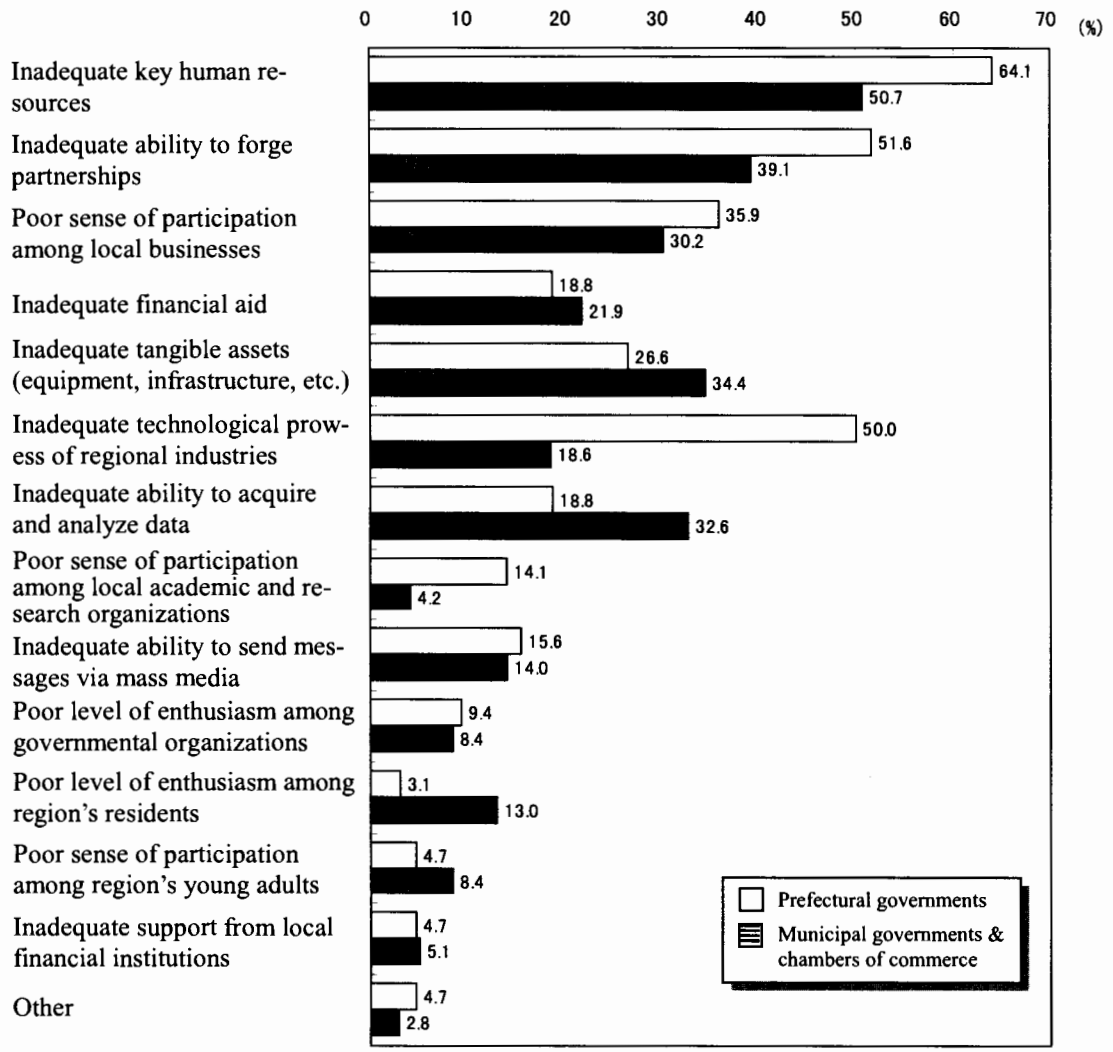
Note: Non-responses have been omitted.

Source: Graph is based on responses to the Economic Research Institute's "Survey on the Current Status of Regional Industrial Innovation & Success Factors" by Economic Research Institute (ERI).

Diagram 1-3-1 Question: "What areas are you focusing on in order to promote the development of industrial agglomerations in your particular region?" (multiple answers allowed)

These differences of opinion are based on differences in perceptions of the scope of region. Prefectural governments are focusing primarily on policies centered around the Ministry of Education, Culture, Sports, Science and Technology's intellectual cluster program and the Ministry of Economy, Trade and Industry's industrial cluster program. Municipal governments and chambers of commerce, on the other hand, are focusing on policies aimed at attracting new businesses and revitalizing traditional local industries.

Let us look at the next question: "What factors do you think prevent adequate contribution to and promotion of regional industries by governmental organizations?" Prefectural governments, municipal governments, and chambers of commerce all seem to agree on the three most common responses: 1) inadequate key human resources, 2) inadequate ability to forge partnerships, and 3) poor sense of participation among local industries. Moreover, 50% of the responses from prefectural governments indicated that inadequate technological prowess of regional industries was a factor (see Diagram 1-3-2).



Note: Non-responses have been omitted.

Source: Graph is based on responses to the Economic Research Institute's "Survey on the Current Status of Regional Industrial Innovation & Success Factors" by Economic Research Institute (ERI).

Diagram 1-3-2 Question: "What factors do you think prevent adequate contribution to and promotion of regional industries by governmental organizations?"

Responses to this question indicate that a strong need exists to develop human resources that are able to effectively facilitate the promotion of industry-academia-government partnerships. Additionally, we must take a closer look at why so many people indicated that there is a poor sense of participation among local businesses. We believe that the high response rate of inadequate technological prowess of regional industries among prefecture governments may be attributed to the low rate of participation in intellectual cluster programs by companies located in technologically advanced regions (which are the beneficiaries of university-led research programs).

In other words, from the perspective of regional government policies, developing human resources that can effectively forge networks is a

top priority, even though the importance of strengthening existing SMEs by promoting regional industries is also commonly recognized. Moreover, we may conclude that inadequate technological prowess and a poor sense of participation among local companies are also priority issues.

1-3-3. Obstacles to Participation of SMEs in Regional Industrial Innovation

The existence of regional SMEs is crucial to regional industrial innovation and development. When numerous SMEs team up with other companies from related industries to develop innovative technology and new products, their efforts have a stimulating effect on the regional economy and industries.

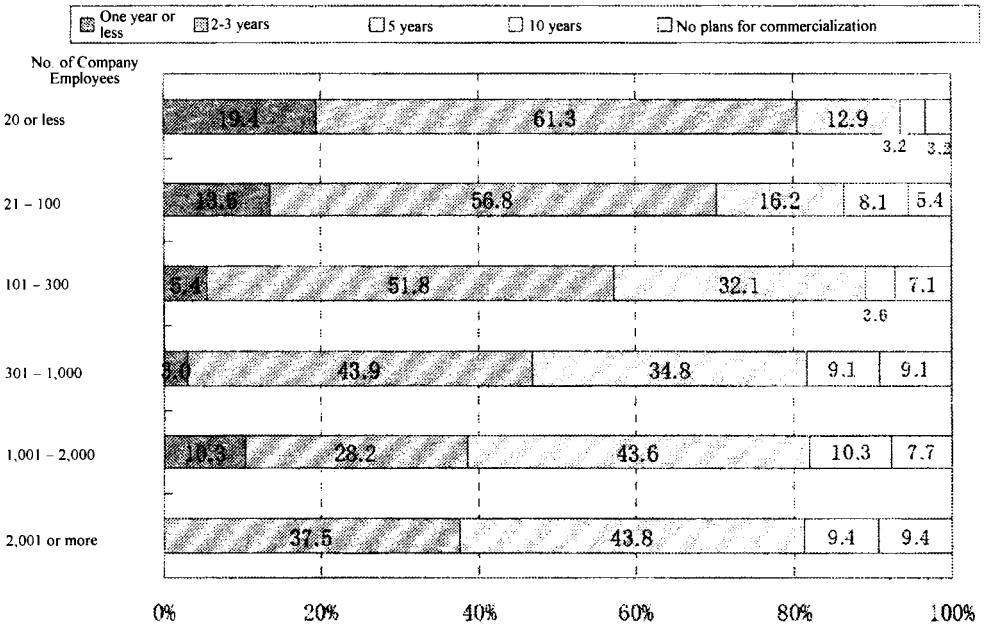
A present, however, the sense of participation in such efforts among regional businesses in not necessary adequate, and there is also a lack of key human resources that are able to promote the level of participation needed to stimulate industrial innovation and development. Industry watchers also point out that the types of partnerships and industrial clusters being promoted by government policies for the purpose of innovation do not adequately take into account the current conditions that exist in regional SMEs.

Many of the cluster programs underway throughout the nation aim to promote regional industrial development through the development of state-of-the-art technology. For example, the intellectual clusters being promoted by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) are centered around the research activities of universities and research organizations; the purpose of creating intellectual clusters is to utilize the results of these activities to develop Japanese versions of Silicon Valley (U.S.). Consequently, government policies in this area are more likely to place a higher priority on developing new and leading technologies instead of developing human resources that can promote the establishment of industry-academia-government partnerships (that are more geared toward current industrial conditions).

Naturally, if government policies are going to focus primarily on the development of practical applications for state-of-the-art technology, then it will be difficult for regional SMEs, which have limited resources to devote to research activities, to participate in intellectual clusters (therefore, the high response rate of inadequate technological prowess of regional industries seen in Diagram 1-3-2). Many more SMEs would be able to participate if government policies instead promoted 1) joint industry-academia-government research projects and 2) industry-academia-government partnerships based on industry needs.

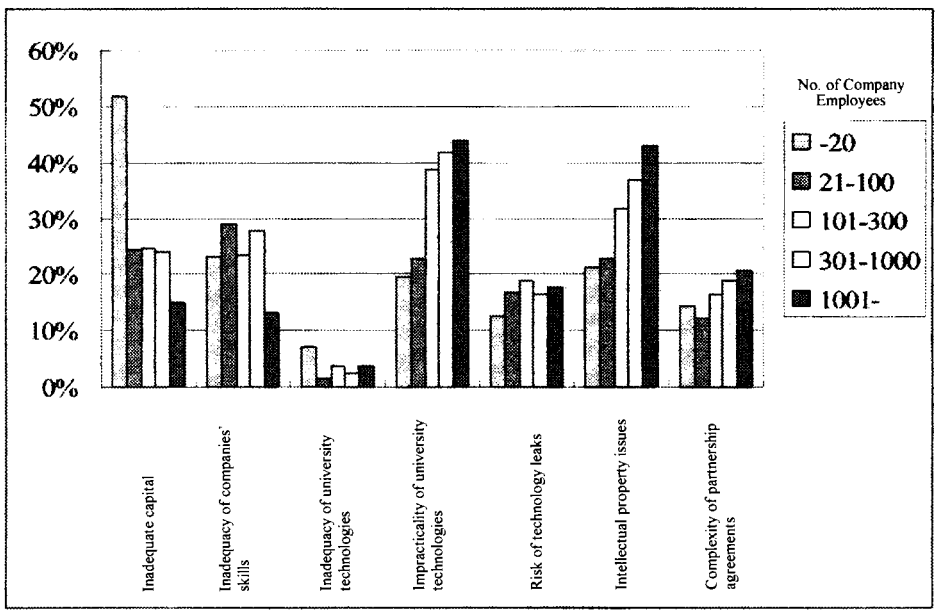
A study by the Japanese government's Research Institute of Economy, Trade and Industry (RIETI) entitled 'The Current State of R&D Partnerships between External Organizations' suggests that SMEs in partnerships with universities to develop new products/technologies visualize shorter product commercialization lead-times than larger companies (see Diagram 1-3-3). Additionally, when asked about obstacles to industry-academia partnerships, a high percentage of large-scale corporations responded that technologies developed by universities are not practical (see Diagram 1-3-4). Based on these observations, R&D-oriented SMEs (as opposed to major corporations) may be able to play a considerable role in industry-academia partnerships that have clear and specific R&D objectives.

Product Commercialization Lead-times



Source: RIETI survey entitled 'The Current State of R&D Partnerships between External Organizations.'

Diagram 1-3-3 Product Commercialization Lead-times Visualized by SMEs in Industry-Academia Partnerships



Source: RIETI survey entitled 'The Current State of R&D Partnerships between External Organizations.'

Diagram 1-3-4 Obstacles to Industry-Academia Partnerships

Partnering with universities to develop commercially-viable technologies and products for seeds found in universities is not the only way for SMEs to participate in regional industrial innovation activities based on industry-academia partnerships. They can also contribute by helping to develop prototypes, manufacturing new products developed at universities, and supplying equipment and parts needed to develop these new products. As mentioned earlier, agglomerations of companies that can provide such services are crucial to regional industrial innovation. To be able to win manufacturing orders from universities and research organizations, however, and contribute to regional innovation, SME manufacturers must possess adequate, specialized skills that can only be acquired through a constant process of skill-building; they must also forge partnerships with other companies in order to develop the collective strength needed to win a broad range of manufacturing orders.

In the two case studies below, we will discuss how industrial partnerships enable SME manufacturers to quickly and effectively process orders for product prototypes.

Case Study 1: Kyoto Shisaku Net

Located in the southern area of Kyoto Prefecture, Kyoto Shisaku Net is an industrial network, comprised of ten machine and metal industry SMEs, that specializes in prototype solutions.

When a customer submits a request for a prototype via the Internet or by fax, the request is forwarded via e-mail to member companies' computers and supervisors' cell phones. Based on the specifics of the request, the Kyoto Shisaku Net office decides which member companies will be the organizer, based on the competencies that each member company has registered. Within two hours, the office submits an estimate to the customer.

Members that possess the skills required by the customer's request are required to respond to the RFQ. If more than one member possesses the required skills, then a discussion is held to determine which member is best suited to the project; however, in urgent cases where time is limited, the Kyoto Shisaku Net office has the right to designate who the project leader will be. Because there are only ten members, each member is familiar with the competencies of the others, and a sense of mutual trust has been established. As a result, members rarely complain about project leader choices.

Kyoto Shisaku Net handles between 200 and 300 requests each year, about 20% of which result in signed contracts. The variety of prototypes is broad, and orders range from a little more than 10,000 yen to 10 million yen. In many cases, customer satisfaction with prototypes leads to mass-production orders or orders for other types of parts, according to inside sources. In addition to prototypes, member companies also frequently handle requests to design and redesign parts.

By accommodating a broad range of customer requests, member companies have been able to improve their technical skills considerably. For example, some members that used to engage only in metalworking operations were able to acquire new skills, such as resin treatment skills, as a result of fulfilling orders that required products to be processed and delivered in 'sets.' And, as the skills of its member companies continue to broaden, Kyoto Shisaku Net has not only been able to win new customers but also expand business relationships with existing customers.

Case Study 2: Rodan21, Inc.

Rodan21, Inc., is a collaborative group of small and medium-sized enterprises located in Higashi-Osaka City, which is home to a large number of manufacturing companies. These SMEs specialize in a broad range of fields, including planning, design, and marketing. Its

is 'We accept any manufacturing challenge!'

The group offers free business consultations and also handles product planning, design, prototypes, manufacturing, sales, patents, marketing studies, and other services aimed at meeting customers' diverse needs. It positions itself as a 'one stop service center' for all manufacturing-related needs.

In addition to the 17 companies that have financial stakes in Rodan21, the group also includes other businesses in the fields of manufacturing, sales, and design. These businesses, which are required to sign non-disclosure agreements, form what is called 'the member cluster.' When a customer submits a prototype/development request via the Internet, a face-to-face interview is held with the customer to gather more details, and then stakeholder companies and member cluster companies hold planning meetings to discuss how to best approach the project. Subsequently, companies are selected to handle the various aspects of the project, from planning and design to prototypes, production, and commercialization.

Each year, Rodan21 processes more than 1,000 customer requests. Of these, roughly 250 have resulted in the actual commercialization of parts and products, including wheelchair lifts and solar-powered exterior lighting fixtures. The company has also sells a specialized, house-brand water pump used to extinguish fires called 'Quick Catcher.'

1-3-4. Utilizing Regional Resources

Also crucial to industrial innovation in a particular region are 1) resources that can be used to distinguish the region from others and 2) the ability to utilize these resources effectively. Examples of regional resources are: weather/climate, milieus, cultures, core companies, the existence of industrial agglomerations, and the existence of university research organizations (i.e. the achievements and world-class authorities associated with university research programs). While a broad range of resources can be identified, priority should be placed on finding ways to utilize the resources that regional SMEs have accumulated.

As we discussed earlier, a survey of municipal governments and chambers of commerce indicated that these organizations are focusing primarily on luring core companies to their regions in order to promote industrial development. What is important here, too, is identifying what resources can be used to distinguish a particular region from others, how to get regional SMEs involved in the process, and how to best utilize the resources that regional SMEs possess.

We have already discussed the fact that regional SMEs can no longer rely on technical guidance from core companies to build their own technical competencies. If they are unable to build their own technical competencies in order to meet customer needs, they will likely have to procure parts and materials from other regions; new developments in logistics and communications have lessened the importance of operating in close proximity to one's suppliers. Regions without industrial agglomerations of highly-skilled companies will find it harder to attract outside businesses.

It is also important for regions to develop systems for winning business by identifying/recognizing regional resources and widely publicizing their distinguishing characteristics. The regions of Ota Ward (Tokyo) and Higashi-Osaka City are well known for this type of system. Many other regions with highly-skilled industrial agglomerations are thought to exist throughout the nation, although they remain somewhat obscure. As a result of the systems put into place by Kyoto Shisaku Net and Rodan21, member companies were able to effectively advertise their skills to a wide range of customers and consequently win orders. In Kyoto Shisaku

Net and Rodan21, member companies were able to effectively advertise their skills to a wide range of customers and consequently win orders. In Kyoto Shisaku Net's case, the system played a role in expanding customer orders and helping member companies to diversify their skills and innovate.

Another example of this type of collaborative system is the Migakiya Syndicate, a group of Tsubame-area (Niigata Prefecture) businesses that specialize in metal polishing (see case study be low).

Although metal polishing companies have operated in the area for a long time, they operated within a vertical corporate structure, and their operations were mainly limited to the processes involved in manufacturing metal Western tableware. Once the Syndicate was formed, however, their skills became widely known in other regions and industries as well, and this helped them to win more business. We can also conclude that this has contributed to the resources and possibilities that the region is able to offer.

Case Study 3: Migakiya Syndicate

The Tsubame area of Niigata Prefecture is home to a production center of companies that manufacture metal goods, including tableware and home furnishings. Here, companies that specialize in the surface treatment (polishing) of metal products have formed an industrial agglomeration. However, because the manufacture of metal products has been transferred to overseas plants, and because of stiff competition with imported products, this agglomeration has seen its volume of business continuously fall. In an effort to boost business, the Tsubame Polishing Industry Association led a drive to establish an online ordering system. Based on consideration of the various issues involved in creating such a system, the association created an online ordering system manual. At the same time, it also created a 'polishing technology standards' manual intended to standardize the quality of polishing services within the industry in preparation of the online system's launch. In January 2003, representatives from the Tsubame Polishing Industry Association and the Japan Association of Certified Metal Polishing Technicians came together, established the Migakiya Syndicate, and launched the online ordering system.

The Syndicate is comprised of 29 companies, six of which are administrative members. Order information submitted via the Syndicate's Web site, which is managed by the Tsubame Chamber of Commerce, is first forwarded to the six administrative member companies. After reviewing the details of an order, the six companies decide whether or not to accept the order. The companies in charge of fulfilling the order then form a production team (referred to as a 'syndicate') comprised of other member companies that will contribute to order fulfillment. The administrative members also 1) serve as liaisons between the customer and the production team, 2) manage the customer's account, 3) distribute payments to team members, 4) handle project management, and 5) provide training and guidance to team members. In cases where a product fault is detected, the member company responsible for the fault is held liable for the damages. The Syndicate's online ordering system manual has made it possible to standardize the group's practices and, as a result, respond to customer needs and fulfill orders more rapidly.

Each year, roughly 25 million yen in sales revenue flows through the Migakiya Syndicate office to member companies. In many cases, however, customers contact member companies directly after finding them on the Syndicate's Web site; therefore, the actual Syndicate contribution to members' revenues is thought to be much larger.

In addition to boosting revenues, the Syndicate contributes greatly to members' businesses in

other ways as well. It allows member companies direct access to much broader customer base, whereas in the past, they merely functioned as the subcontractors of larger corporations. They are starting to win b-to-c customers, too – people, for example, who want to have their keepsakes or motorcycle parts polished. Furthermore, member companies are now able to offer polishing services for a broader range of products, including auto parts, appliance parts, and parts used in semiconductor manufacturing instruments. Granted, these orders require a much higher level of precision and shorter lead-times compared to tableware and home furnishings; however, fulfilling these new types of orders has enabled members to gradually improve their technical skills. Even when machine processing companies or research divisions of major corporations submit via the Syndicate's Web site highly complex processing orders that other companies are not equipped to fulfill (which happens frequently), members are always ready to take on the challenges involved.

The sharing of technology and expertise made possible by the Migakiya Syndicate is another factor that contributes to industrial development. For example, there are some polishing orders that must be divided among multiple members. To ensure maximum efficiency and a consistent level of quality, it is crucial for members to share expertise and standardize their technology and processes. Syndicate members share technology and provide each other with advice and guidance. This enabled them in 2002 and 2003 to successfully develop technology for mass-producing polishing magnesium products for the Industrial Research Institute of Niigata Prefecture.

These observations highlight the importance of leveraging resources that industrial agglomerations in traditional production centers have accumulated. Policymakers are too preoccupied with trying to promote regional industries through the development of new, leading-edge technologies; traditional and mature technologies are not receiving the attention they deserve.

Next, let us take a look at the case of Toray, a major Hokuriku-area manufacturer that established an industrial cluster free from the restraints of the traditional vertical corporate structure.

Case Study 4: The Toray Synthetic Textile Cluster

Japanese chemical giant Toray in June 2004 established the Toray Synthetic Textile Cluster, a Hokuriku-area industrial agglomeration comprising 67 small and medium-sized businesses that specialize in woven textiles, dyeing, sewing, and other textile-related fields. By establishing a network that goes beyond the traditional bounds of industry and vertical production operations, the cluster aims to 1) develop and utilize new textile materials, 2) develop new products, 3) expand export channels, and 4) integrate the entire range of technologies and services that member companies offer in order to become the world's leading textile manufacturing network.

(Based on articles from the Nikkei Sangyo Shimbun (12/1/2004) and the Nikkan Kogyo Shimbun (12/28/2004))

The next case study refers to a SME group located in Miki, Hyogo Prefecture. This cluster succeeded in developing universal design products utilizing technologies and knowhow accumulated in a home to hardware.

Case Study 5: The Miki City UD Cluster

Hyogo Prefecture's Miki City is home to a traditional production center characterized primarily by the manufacture of saws, planes, chisels, and other carpenter tools. The area's SME manufacturers have teamed up with the Hyogo Prefectural Institute of Technology to form the Hyogo Institute of New Welfare Industries. They have achieved success by forging partnerships with area co-ops, universities, hospitals, and other organizations to develop rehabilitation/geriatric equipment and universal design (UD) products.

The first product that the Institute developed was a special type of crutch that incorporated various technologies. However, because it was unable to develop adequate sales channels, the project was a failure. Luckily, however, the local co-op joined the Institute, bringing with it valuable information that accurately reflected consumer needs. The co-op was also involved in the rehabilitation/geriatric field and already sold its own house-brand rehabilitation/geriatric equipment, but it had been hoping to team up with local businesses to develop additional house-brand products. Based on information that the co-op provided, the Institute was able to develop an aluminum bath chair that turned out to be a big hit in just eight months.

This major success immediately lent great impetus to the Institute's activities, and other manufacturers from adjacent areas joined the organization, including an abacus maker from neighboring Ono City; the network expanded to include hospitals, nursing homes, and universities. The Institute's next goal was to try to develop hit products for each member company. Some examples of products that members developed are: knives with adjustable handles, therapeutic devices that incorporate abacus beads, bathtub handrails, shower heads that can be adjusted while sitting down, and miniature circular billiard tables with lazy susan bases (brand name: Kobe Miniyard) that enable players to shoot pool from a fixed position.

The Institute leveraged the manufacturing (i.e. woodworking, hand tool production) technology and expertise that member companies had accumulated over the years to develop products that accurately reflected the needs of consumers and caregiving organizations. As a result, these products won various praise and awards, including top prizes in contests sponsored by the Rehabilitation Engineering Society of Japan. Currently, 150 products developed by Institute members are available on the market. In some member companies, sales of these products account for as much as 30% of total revenues, and some companies have evolved into leaders in the niche markets of rehabilitation/geriatric equipment and universal design.

When manufacturers and logistics organizations (i.e. the co-op) combine forces, the potential for developing popular products increases. This kind of arrangement also makes it possible for manufacturers to receive valuable, expert advice concerning how to develop sales channels and advertise products. Moreover, once a sales channel is developed, manufacturers can also begin promoting the products of other member companies. This type of network contributes greatly to the competitiveness of the region.

The Institute's successes also encouraged the pottery industry of Hyogo Prefecture's Tanbatachikuiyaki area to follow its example. Sixteen potters from the area formed an organization called the Universal Design Tableware R&D Council. The purpose of the Council is to develop and manufacture universal design tableware under the brand name "Tanba UD" for use by the elderly and physically disabled.

As we have observed in the above case studies, merely incorporating leading technology, innovative technology, and tried-and-tested technology into the development of a new product is not enough to guarantee that the product will be a hit. Priority must also be given to accurately understanding the needs of the end user and developing new and effective sales channels.

To repeat what we discussed earlier, it is necessary to leverage regional resources in order to promote regional industrial innovation. Innovation through vertical production networks is now a thing of the past. What is important now is to determine the best way of encouraging a broad range of regional SMEs to participate in regional industrial innovation activities, and to determine how regional SMEs can forge strategic partnerships. The solution to these problems lies in 1) establishing industry-academia partnerships that are well suited to the current state of region's resources (and are not overly focused on commercializing university-developed technologies), 2) developing systems for winning business by identifying/recognizing regional resources and widely publicizing their distinguishing characteristics, and 3) developing broad-based networks that excel not only in the field of manufacturing but also in the fields of marketing and logistics.

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