

Chapter 4 Factors of Success in Regional Industrial Innovation and the Role of Machine Industry, etc.

In this investigation and research, reports were made from questionnaire and hearing investigations while consideration was given to the variety of regional industrial innovations currently undertaken in Japan and their potential. Based on the results of the discussion so far, in this chapter I conclude with the result of these investigations and research by demonstrating the role to be

played by the machine industry, etc. in the competitiveness of the regional economy in the future. I do this while analyzing the factors for success (basic requirement) in regional industrial innovations by reconsidering the cluster theory of Porter, who is influential in Japan's regional industrial innovation activities (the Japanese version cluster).

4-1. The Meaning of Japanese Version Cluster and Issues

The Japanese version cluster (both industrial and intellectual) currently undertaken nationwide is thought to be a take on M.E. Porter's cluster theory ("On Competition"), but in reality, there is a substantial difference in the meaning between the Japanese version cluster and Porter's cluster

theory. To wit, the Japanese version cluster has a strong connotation of industrial policies, focusing mainly on new industries, while Porter clearly states the difference between industrial policies and cluster theory in the "On Competition." I shall quote this at length.

"Industrial policies are based on the idea that certain industries have higher potential to generate wealth than others in international competition (or rather, more generally competition between localities). Desirable industries, or growing industries and industries using hi-tech should be the "target" for support. In industrial policies, superiority in competition is thought to be determined by the increase in profits as opposed to the size... At times the concept of industrial policies appears to be taken as regarding international competition as a zero-some game. In other words, demand in question is constant and the target is to grab as big the share as possible in individual markets. Cluster theory is different to an extreme from this. The concept of cluster regards competition more widely and dynamically and as a competition between localities and between cor-

porations basing the growth in productivity... While industrial policies aim at distorting competition in favor of specific location, the cluster theory concentrates on improving productivity and eliminating restrictions preventing its growth. The cluster theory places priority on achieving dynamic improvement rather than gaining market share.

As a result, productivity improvement and trade leads to market expansion, while aiming at higher productivity and innovation will lead to a view on competition allowing for prosperity at many localities." ("On Competition" by M.E. Porter, translated into Japanese as "Competition Strategy Theories II" by Hirōtaka Takeuchi, Diamond, 1999. pp. 173 – 174. Underline by present writer.)

As seen above, the emphasis in industrial policies and cluster theory is clearly different. However, the Japanese version cluster is rather efforts as "industrial policy" and despite the use

of the word "cluster," the content is the nurturing of industry and local strategy centering on hi-tech industries.

Existing SMEs and traditional local industries

are not conspicuously included in the range of the Japanese version cluster. The fact is that the subject industries for the Japanese version cluster are, whether they are industrial clusters or intellectual clusters, limited to new industry fields promoted by the national government and regions.

In Chapter 2 of the present report, we introduced cases where active efforts are made in regional industrial innovations, but many of them are promoting industrial policies focusing on new industry fields rather than existing industries. This can be assumed to be geared to the formation of industrial clusters that are different from what Porter discusses.

Here, the supporter of industries (administration) should not dwell on the term "cluster." It is all well and fine to state that the Japanese version cluster involves industrial policies and location policies on the axis of the development of hi-tech technologies and products. Just say that it utilizes a different methodology from Porter's. For example, there are cases where results have been obtained through thorough location (invitation) strategy (see the case in Chapter 2, Section 1).

However, one problem that should not be ignored lies in unsatisfactory cases which involve neither thorough location strategy nor Porter-style cluster strategy. It is assumed that the efforts in the Japanese version cluster contain such unsatisfactory cases. For example, there are several issues in the underlying activities of industry-academia-government cooperation, and what is noteworthy is the "time issue." For regions in-

"Some clusters have at their core university research programs, and some clusters hardly depend on resources from official technological research organizations. Clusters can be born in hi-tech industries as well as traditional indus-

What is amiss in the Japanese version cluster lies in its ambiguity. If Porter-style cluster strategy is to be pushed to the forefront, rather than

involved in the Japanese version cluster and specific industry-academia-government cooperative activities, this time issue is extremely crucial in relation to when the results of such industry-academia-government cooperation, will bear fruit in concrete terms and when the effects will appear for the industry and employment in the region involved.

The questionnaire statistically revealed, as shown below, the timing of new industry fields such as the "biotechnology field," the "nanotechnology field," and the "IT and semiconductor field" tackled by the universities and national colleges of technology, who are bearers of the Japanese version cluster, in cooperation with industry, academia, and government, becoming the main industry. For the "biotechnology field" it is 7.82 years, for the "nanotechnology field" it is 7.75 years, and for the "IT and semiconductor field" it is 6.31 years.

Considering that it is an effort to deal with new industrial fields, this number of years may appear "shorter" than expected (On the other hand, if those in charge are doing "wishful" forecasting, then the actual timing will be even later). In any event, a length of six or seven years is crucial. What will happen to the existing industries in the region? What will happen to the existing enterprises and industrial agglomerations until such new industries become the main industries of the regions concerned? Such simple questions still remain. Here again, the importance of Porter's cluster theory arises. In a different section of the same book Porter writes the following:

tries, manufacturing and servicing. In reality, there are often mixture of hi-tech and lo-tech, manufacturing and service in clusters..." (Ibid. p. 169. Underline by present writer.)

thorough location strategy, traditional industries as well as so-called lo-tech industries should be placed in the range of the cluster strategy as

stated above. In this context, as in the case report presented on the basis of the hearing investigation in Chapter 2 as well as in the investigation of actual conditions by the questionnaire in Chapter 3, the importance of existing industries and the revitalization of existing mainstay and SMEs is mentioned. This demonstrates that many regions are growing aware of the importance of structuring the Japanese version cluster by making full use of “regional resources.”

Consequently, in order to bring about suc-

cessfully the Japanese version cluster strategy, or regional industrial innovation, all persons involved in regional industries are faced with a choice between a thorough local strategy rather than ambiguous industry nurturing support and a strategy promoting the growth in productivity in existing industries based on Porter-style clusters, and a new industry creation strategy that is fully aware of the results that will appear only in the mid- to long term.

4-2. Success Factors of Japan’s Regional Industrial Innovations

Given the aforementioned strategic issues and based on the findings obtained from present investigation and research, the factors of success

(basic requirements) in Japan’s regional industrial innovations can be categorized as below.

(1) Application of Innovativeness and Heterogeneity of Regional Peripheral Enterprises

It is important that the administrative organizations recognize competitiveness as a result of innovation-oriented behavior and heterogeneity of the enterprises, especially the peripheral enterprises present in the region (industrial agglomeration). In order to realize innovation, the function of nurturing industry, building partnership and

conducting excavations of “network leaders” will be indispensable. Additionally, it is desirable that universities, public institutions, and supporting organizations provide support for enterprises with the awareness that innovation is not simply a novel theme but a novel business system.

(2) Development from the Base Point of Needs and the Application of “Outside Intellect”

When the bearers of regional industrial innovations are SMEs in machinery-related industries, it is more important to conduct product development arising from actual needs instead from the seeds assumed by the demand-pulled model. However, for the application of “outside intellect” for regional SMEs, the universities, public institutions, and supporting organizations are indis-

pendable. In order to make a successful application of “outside intellect,” the three conditions of

- i) motivation at enterprises
- ii) ability to learn and
- iii) exchanges among industry, academia, and government

will become necessary.

(3) Evaluation Index of Regional Industrial Innovation and “Regional Climate”

It is important to securely set “evaluation indices” in the development of regional industrial innovations. The important indices among the “evaluation indices” to be set in particular are the following three items:

i) Technology (regional resources)

ii) Coordinator (human resources) and

iii) Finances (funds).

Additionally, in order to realize regional industrial innovations, a fifth resource in the “regional climate” becomes important in addition to the conventional resources of humans, material,

money, and information. The formation of “high-density human networking” based on this “regional climate” will play a potential role in the creation of innovations.

(4) Regional Industrial Innovation Applying the Advantages of Industrial Agglomeration

Japan’s industrial agglomeration is being reduced but advantages in the agglomeration still exist such as accessibility to resources, market, and internal manufacturing networks. Therefore, conducting innovation activities taking regional particularities into account while skillfully applying the advantages of existing industrial agglomeration becomes important.

(5) Regional Industrial Innovation through Networking of SMEs and Application of Regional Resources

In order to realize regional innovations under the leadership of regional mainstay and SMEs, three conditions need to be satisfied:

- i) cooperation between industry and academia to match the realities of regional resources
- ii) arranging of systems to apply the resources of the regional enterprises (arrangement of humans, material, money, and information)
- iii) wide-range networking of enterprises such as the fortification of marketing functions and networking with the distribution industry, not just in terms of the manufacturing technology

(6) Presence of a Key Person to Promote Regional Industrial Innovation

In order to realize regional industrial innovations, indispensable is the presence of “human resources (organizations) who will act patiently while being rooted in the region” regardless of the background of either industry, academia, or government. This would involve the presence of, or developing or acquiring, a coordinator-type key person, promoting regional industrial innovations, as well as innovator-type and producer-type key persons.

(7) System to Enhance the Awareness of Regional Enterprises toward Entry and Effective Application of Funds

In order for inviting regional industries, including major manufacturers, to participate in various enterprises in regional industrial innovations, inventiveness, in particular from the side of the administrative organizations, is necessary. On the other hand, venture corporations started by universities are becoming active in university-related research organizations. Nevertheless, it is necessary for them to further polish the “business sense” in order to effectively use subsidies and grants. As has been made clear through the investigation of the actual conditions (by questionnaire), a period of at least six years or more is necessary before the results of research and development in “new industrial fields” become commercialized and grow into enterprises to become leading industries of the region concerned. It is desirable, therefore, to make industry-academia-government cooperation with a firm eye on commercialization and growth into business.

4.3 Roles Played by the Machine Industry, etc. in Competitiveness Fortification of the Regional Economy

As discussed above, some issues remain for regional industrial innovations to be realized and various types of adoptions of Japanese version clusters will still have problems. The fact re

mains, however, that in recent years various challenges to the revitalization of regional industries are becoming very active, including the revitalization policies of industrial agglomerations. It can be stated that a golden opportunity has arrived for persons in universities, national colleges of technology, public institutions, and various support organizations to regard regional resources in a new light.

The machine industry is a field that will play an important role. Of course, there are many regions where the machine industry (manufacturing in machinery and metal) has not accumulated as a result of the characteristics of regional resources. However, given the potential competitiveness of Japan's manufacturing and its market-forming ability, the role to be played by Japan's machine industry in regional industrial innovations and, furthermore, in the enhancement of competitiveness of the regional economy, remains important.

As mentioned in the factors for success in the regional industrial innovations, efforts to raise regional enterprises, especially mainstay and SMEs, onto the main axis of regional industry seem to be more in demand, since it is no overstatement that the source of competitiveness in Japan's manufacturing and machine industry lies in the mainstay and SMEs accumulated nationwide. I would like to conclude with a rough sketch of regional industrial innovations if they were to be redefined as a cluster formation focusing on the machine industry, particularly on mainstay and SMEs.

Diagram 4-1 presents regional industrial innovations as cluster strategy (Porter-style) with mainstay and SMEs as the main players. Thus far, many regional enterprises (especially subcontractor-type enterprises) have appeared to have defined themselves within a specific industrial field such as the automotive industry or the household appliances industry. Many have a long history of supplying parts (semi-finished products) to makers in a related industrial field or to major suppliers. However, when it's boiled down to the capability (ability, skill, property) of an en-

terprise, it is not on the parts level but is buried on a deeper level. In other words, it is the core technology or core skills owned by the enterprise. This core technology or skills have hidden potential to create parts and products that can be applied in a totally different industrial field. Therefore, it is the role of the universities, public institutions, and official support organizations, which are outside resources for the enterprises, to let them know how to complement the necessary resources and how to remove the hindrances and barriers in the entry. Naturally, the method of "industry to industry networking" (networking with major corporations with market accessing ability) will also realize this. What matters most is how to draw the potential from the mainstay and SMEs, which comprise an important element in the regional resources.

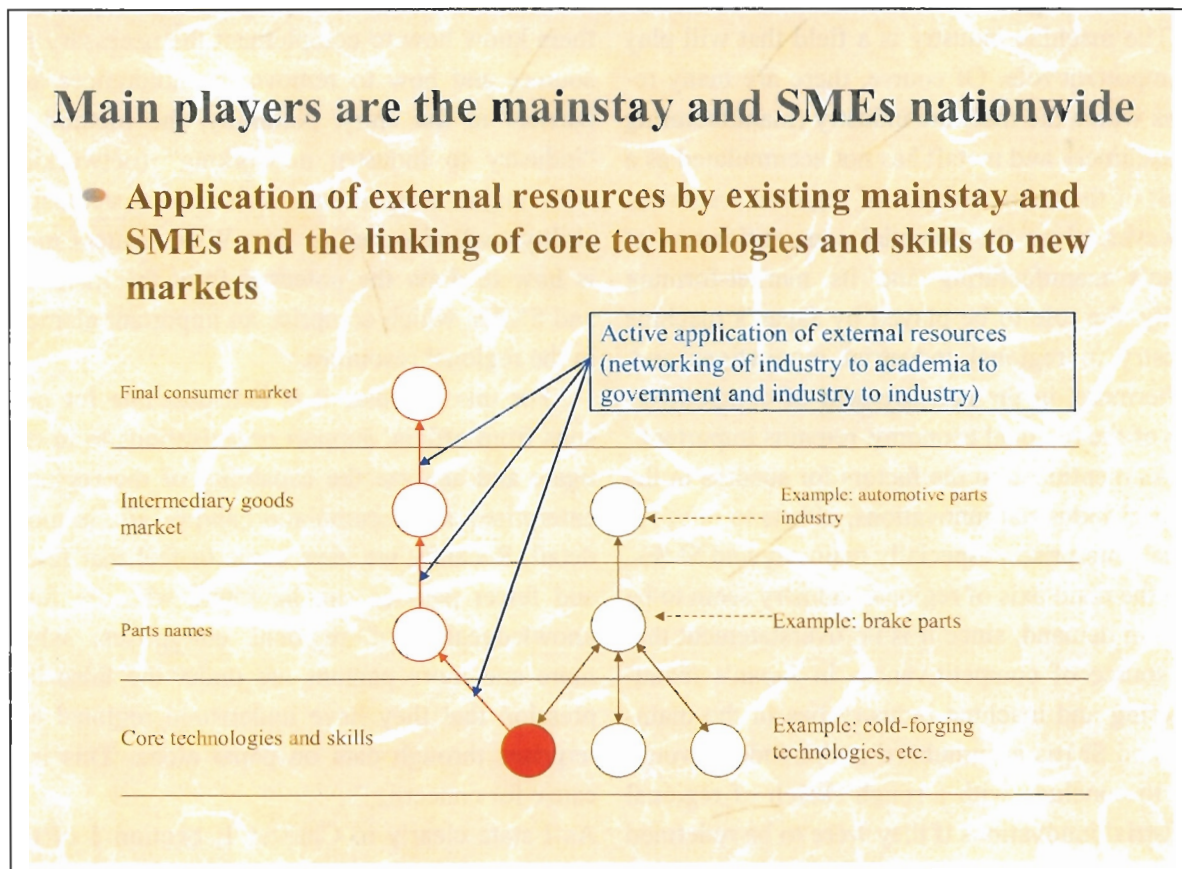
For this purpose, it is indispensable for persons from official support organizations to investigate and analyze the capability of the regional enterprises and accumulation ability, etc. in more detail. Recently we have come to feel that fewer and fewer persons can be found who are fully knowledgeable of regional enterprises, while more and more persons are under the false impression that they have understood regional enterprises through data on paper alone. This is a cause for concern.

As I state clearly in Chapter 1, Section 1 of the present report, there may be decreasing abilities to identify enterprises that have launched or are willing to launch novel businesses, not just novel themes. As shown in the investigation in Chapter 3, Higashi-Osaka City and Ota-ku are listed as model regions. Their background is that persons in charge of these regions have done the legwork to observe the actualities of these regional enterprises in detail. Their efforts enabled the visual understanding of what is available and what is missing in these regions, leading to developing and implementing necessary policies. The efforts in Iwate Prefecture (INS, etc.) are attracting attention and it is assumed that there are

similar reasons behind this. Additionally, it is also possible to identify the characteristics of bottom-up-type networking activities by SMEs in the Tama region in the efforts of the TAMA Industrial Revitalization Council, which is considered a model for the formation of the Japanese version clusters or Silicon Valley.

I believe, as stated repeatedly in this report,

that cluster formation applying regional resources, especially the potential power of existing mainstay and SMEs as well as the advantages of industrial agglomerations, instead of the notion that “in the beginning there was new industry” is necessary for the further revitalization and success of the Japanese version clusters currently being developed.



Source: Economic Research Institute (ERI)

Diagram 4-1 Cluster formation with the mainstay and SMEs at the main axis