

Basic Study on Promotion of Science and Technology in Regions (1)

– Study on the Cases of Local Area Development Based on Science and Technology –

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4th Policy-Oriented Research Group

1. Purpose of the Basic Study

As may be noted in the 4th Comprehensive National Development Plan and other relevant policies, it is considered one of important policy objectives of Japan through the 21st century to correct the present state of major activities concentrated in the Tokyo Metropolitan Area and to endeavor to rebuild a nation with a number of regional centers distributed across the nation.

The local autonomous bodies are actively studying policy measures to promote their areas, sharing the same understanding with the central government on this policy objective. Effective utilization of science and technology is drawing attention of their policy makers as a tool for promoting their areas. Some local autonomous bodies have already initiated such policies.

Against such a background, this study set its objectives. The objectives are first to clarify the relationship between the regional development and science and technology from the viewpoint of regional development by science and technology, and to identify the elements necessary for achieving the development and solving the associated problems, and second to find out something that could serve as leverage for regional development on science and technology. To facilitate the work toward these objectives, data and materials on science and technology on regional areas were collected and compiled. These data were analyzed and summarized.

2. Framework of the Basic Study and the Method of Study

Figure I-1 presents the overall flow of the entire study. This chapter outlines the structure of the entire study, leaving the details of the study results and methods to their respective parts of the report.

In fiscal 1988, the study set the objective for preparation of basic materials for regional scientific and technological activities on commencement of the study. As a result, an understanding of the macroscopic picture of research and development activities by region was obtained.

More specifically, the information and data were collected from literature, statistics and by means of questionnaires to private enterprises on such subjects as distribution of higher education facilities and human resources, research and development investments by private enterprises, distribution of researchers and research organizations by region, distribution of research achievements by region. The information and data thus obtained were compiled and analyzed. The results of these works have already be reported on the "Preliminary Study on Regional Promotion of Science and Technology" (March 1989), Chapter 2 of which presents outline of the study.

In fiscal 1989, more specific studies were done with a view to identifying problems associated with regional development and measures to cope with the identified problems. As indicated in the flow of the study, it was decided to make two approaches of different viewpoints.

One approach consisted in studying actual cases. Interviews were conducted mainly in the regions where science and technology are considered to have prompted or to be pushing regional development. The purpose of this approach was first to identify the causes and elements for success and second to find useful suggestions from them for formulating clues

to the future measures.

The other approach singled out a certain region, (the Tohoku District, Northeastern Area of main island of Japan was selected) specifically, and focussed on the richly endowed human resources there. This approach considered regional development in this area through effective utilization of the human resources.

These two approaches were concurrently executed. The results of the first approach are summarized in Chapter 3 of this report. The second approach is summarized in a separated report entitled "Basic Study on Promotion of Science and Technology in Regional Area (II) – Study on Policy Measures for Regional Development from the Viewpoint of Human Resources."

Of the entire scope of this study, the portion of fiscal 1988 was executed by the 2nd Theory-Oriented Research Group of NISTEP; the study on the actual cases of the first approach, which represents this report, was executed by the 4th Policy-Oriented Research Group and the latter half, or finding useful suggestions from the actual cases and formulating clues to the future measures were carried out by the Research and Development Cooperation Division of the Science and Technology Promotion Bureau, Science and Technology Agency.

3. Discussions

(1) The cases of the City of Tsubame which converted the traditional industry into a different one, industrial development of Sakaki-Cho and quality improvement of the Yamanaka lacquerware all generated macroscopic activation effects on regional industries. In these cases the industrial and technical bases accumulated by their own efforts of the Small and Medium Enterprises (SMEs) there made the changes possible. In these cases, the existing industries, the existing technical base and the existence of the networks developed in these frameworks putting the local industries together are considered to be the greatest factors leading to the success. Besides these factors, support by the administration as those by the autonomous bodies helped them grow and reach a stable stage of growth. The Sapporo Techno-Park, which also had a macroscopic activation effect, is another noticeable example in which active administrative guidance and support were provided in a period when the software industry was beginning to grow. It may be noted that the administrative guidance and support helped stabilize the new industries in a very short period of time.

Listed below are points of special importance in planning regional development based on promotion of science and technology, considering the outcomes of the interviews, in addition to the above examples which were extracted from the tables in the preceding section.

1) Aspiration for Regional Development on the Local Sides

In promoting scientific and technological development and regional development, the latter based on the achievements of the former, the positive environment and tradition in which the concerned people join to encourage and support such endeavors are instrumental. Among the cases studied, the City of Tsubame fostered such an environment over the region through the industrial activities. In Anan-Cho an environment to support the enterprise was created throughout the city the moment the subject enterprise was established. In other cases too, such an environment could be a latent factor leading to the success. The posture of the concerned autonomous bodies towards such activities has also a great influence.

2) Existence of Individuals and Groups Equipped with Technology

Science and technology are the "products of intellectual activities of humans." Therefore, individuals and groups equipped with technologies are naturally the base of science and technology. The accumulation of the existing technological bases among the regional SMEs in the mentioned cases is tantamount to the existence of the groups of people equipped with technological skills. In the case of the wood processing industry of the City of Tendo in which unique technology has been developed, and also in other similar cases, the

background is the existence of groups of people equipped with technological skills.

3)Existence of Organization which Could Effectively Utilize Human Resources

Next, people or organizations or institutions that could draw the best of the excellent people, gifted not only with technologies but also with creativity, mentioned in 2) above and could develop them even further are important. Their roles would be that of leaders in a broader sense of the word. They could be managers of enterprises, heads of autonomous bodies (as in the cases of Anan-Cho and others) or even could be an innovative enterprise itself in the region as in the case of Sakaki-Cho. These leaders should have managerial ability including development of human resources, strong will and passion. The ability to rightly evaluate technologies and products and their future prospects is also important.

4)Existence of Regional Networks

Existence of networks in a given region is an important factor effectively developing and utilizing the human resources existing in that region. A network connecting business enterprises of similar trades, universities and colleges nearby and public facilities helps them utilize their abilities and supplement each other in the field of technological development through exchanges among them. The network connecting the enterprises in the same business line promotes the sentiment of sharing the same fortune and competition among them, a sort of psychological effect.

Although not found in the cases of this study, existence of a community, or a salon, in which organizations in different fields not limited to industrial areas participate would have a profound effect on the region in giving incentives to do something.

5)Network Open to Outside of the Region

The networks mentioned above should not be limited to the given region. The importance of network open to outsides concerns technological exchanges and communication among people, the latter being the base of the former. In the cases studied, development of "Marine Ceramics in Sendai" and establishment of "Hoks, Ltd." are initiated through such networks of people. It is important to develop small networks that are casually generated with people or organizations outside the region irrespective of their professions or fields.

An important aspect of the network with the outsides concerns collection of information. In the regions studied, though none of the successful incidents originated from information from outside, information is the key factor to technological development in today's world which progresses and changes very rapidly, as is rightly pointed out by various critics. The gap in availability of information between Tokyo, where information gathers automatically, and regional areas could constitute a major problem in regional development.

Prompted by the development of SPG, local regions could be able to become transmitters of information rather than remain as receiver. This could be a milestone achievement from the viewpoint of developing networks with outsides.

6)Effective Supports by Local Autonomous Bodies

Among the cases studied, the autonomous bodies are members of the promoters in the case of the Sapporo Techno-Park. Besides this, there are cases in which autonomous bodies provided financial supports like subsidy or technical supports like technical guidance, technical exchange or formation building.

It would be very important for autonomous bodies to have a foresight in the regional development and to provide timely assistance for realization of smooth technological development and regional promotion based on technology thus developed.

Although not elaborated specifically, in all the cases which have made some achievement, great or small, the efforts made by the promoters, enterprises and others, themselves are outstanding.

(2)As is discussed above, human resources are a very important factor in regional development based on science and technology. During the interviews conducted as part of this study, anticipated shortage of human resources was mentioned in many places. Solution of this problem would constitute a key determining the future development.

Specifically, the following aspects were pointed out.

1)Graduates from Science and Technology Courses not Staying in Regional Areas

Most graduates from the science and technology courses find jobs in metropolitan areas or with large enterprises. This was pointed out by Nagaoka University of Technology and the Miyazaki Prefecture Office and at other places. The Sapporo City Office expressed a similar concern.

This may be attributable to the regional discrepancy. More specifically, there are significant differences between large enterprises based in metropolitan areas and local enterprises in such working conditions as salary, welfare and working hour. The small capitals accumulated in local area, or the conditions which make capital accumulation difficult in local areas, could be a root cause for such differences. In addition to the difference in working conditions, unlimited options Tokyo could offers are another cause for these graduates going to Tokyo. This represent a problem for which local areas have no solution and makes this issue more difficult to solve.

2)Universities and Colleges not Having Departments Needed There

This was pointed out by the wood processing industry of Tendo City. This issue concerns the issue of 1) and could not necessarily be solved merely by installing such a department in the universities or colleges there.

3)Regional Enterprises not Having Successors

This issue was pointed out by Seika-En, an association of lacqueware manufacturers of Yamanaka, and other organizations. In many Japanese traditional industries this issue is a problem of the region as well as the problem of the industry.

4)Dearth of Skilled Labor and Young Labor

This is pointed out as a serous problem in the City of Tsubame. This could also be a problem shared by all industries, generated as a result of too rapid an economic growth. As in the case of the City of Tsubame, the image of the manufacturing industry not compatible with the value of today's young people may be one of the root causes.

(3)Finally, as discussed above, it would be important to mind the following points when local autonomous bodies and other organizations promote regional development based on science and technology.

1)Roles of Scientific and Technological Development in Regional Developments

The results of this study indicate that scientific and technological activities have often played important roles in increasing the feasibility of regional development.

The local autonomous bodies should, in planning regional development in their areas, consider "science and technology" as one of the elements of regional development and establish a policy for promoting them. Recognizing the roles of science and technology as such, it is essential that organizations and institutions to promote them be established.

2)System of Identifying and Developing Promising "Talents"

As mentioned above science and technology are the "products of intellectual activities of humans." The people gifted with creativity and high technical capabilities, or excellent "talents," are key to the advancement. In formulating policies it will become all the more

important to emphasize "talents" or the software aspects along with the economic infrastructure development.

It means that the autonomous bodies should be keen to get hold of the human resources available not only in their areas but outside their areas. In addition to the ability to identify promising potential talents, it is necessary to positively develop them. Formulation of a social system to adequately appraise these talents and policies to provide them with opportunities for outside exposure and for learning are required, in addition to "identification of potential talents."

3) Involvement of "Kosetsu-shi (Local Government's Research Institutes)" and Regional Universities/Colleges

Regarding technological aspects of the development of human resources discussed in above 2), Kosetsu-shi and universities/colleges in the region have important roles to play. Their activities should be intimately involved and rooted in the region for the purpose of supporting human resources development and promotion of technology in the region.

Their roles in the policy for promotion of scientific and technological development should be more clearly delineated. Reinforcement of these organizations should be thoroughly studied, including effective location of their researchers, so that they may be technologically more advanced and more adaptable to new (innovative) technologies in particular.

4) Establishment of Networks Connecting "Creative Ideas with Talents" and "Talents with Talents"

Regarding Items 2) and 3) the effective utilization of human resources and establishments requires networks that connect "creative ideas, or persons gifted with creativity with technologies, or persons having technologies" and "persons having excellent technologies with other persons having excellent technologies" and "persons having excellent technologies with persons having managerial capability." The autonomous bodies should play the roles of initiating and formulating such networks and also assisting in realization of such connections.

5) Support in Funding and Infrastructure Development

Availability of capital is a major factor in regional difference. Policy measures aimed at supplementing death of local capitals, financial assistance or tax incentives for example, would be important. Those regions which are considered to be sustainable and eager to develop should be well supported.

The economic infrastructure and scientific and technological bases should naturally be provided. In provision of infrastructure the cultural aspects and good living environments within the region should be given due consideration to encourage people to live there and continue to work there.

In addition to the policies recommended to local autonomous bodies, the nation should assist local autonomous bodies by providing supports in the forms of capital and infrastructure development, wide-area networks extending across regional boundaries, or prefectures, strengthening of locally located national research institutes and national universities/colleges, and their positive involvement in their respective regions.