THE TECHNOPOLIS PROGRAM IN JAPAN

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Seven years have passed since the construction of Technopolis was on a full scale, and this year is the first objective year of the Technopolis Project in Japan. This Project has been carefully studied from various perspectives not only in Japan but also on abroad. But it is hard to say that the present situation of these discussions is good enough to clarify meanings and realities of this Project. We have a discussion that Japan can get scientific and technological hegemony in the world by means of Technopolis, in one hand. On the other, we have a discussion that Technopolis Project has a strong ideological character of providing illusions to people in less developed areas and integrating them into order. There have been so many discussions which have inadequate theoretical perspectives and failed to find the contexts, realities and meanings of the construction of the Technopolis. This paper is trying to clarify the contexts, realities and meanings of the construction of the Technopolis, based on the critical assessment of previous discussions.

I. The Contexts of Emergence of the Technopolis Project

The concept of the Technopolis firstly appeared in *The Vision of Trade and Industry in 80's* made by MITI (Ministry of International Trade and Industry). This was presented as a report of the Council of the Industrial Structure (one of the most important councils of MITI) which was asked by the Minister of International Trade and Industry to inquire into the image of the Japanese trade and industry in 80's. This report interpreted the present position of the Japanese economy which hung low under continuous influence of the first oil crisis of 70's as the crisis of confidence in the Japanese economy by Japanese people and corporate community. Furthermore this report tried to present a vision to overcome this situation under the consensus of the Japanese people.

This vision grasps the historical meanings of 80's as follows. First, the supply of oil which was the main source of energy becomes unstable, and we are standing at the entrance of the age of pluri-energy which is necessary to develop and use all kinds of energy. Second, it makes clear that the age of America is ending, the world structure becomes pluralistic, and that the Japanese economy which holds 10% of the world economy must take international responsibility. Third, we are inevitably moving toward the aging society. Therefore from industrial side, they must take account seriously the following points in order to adapt to these radical changes. First, industrial community must make clear how to

adapt to the age of high cost and unstable supply of energy. Second, they must think about the way of coping with internationalization of the Japanese economy. It is useful to establish desirable international division of labour between Japan and advanced or developing nations through technological development and development of new commodities. Third, they have to think what should be done in order to face to the difficult situation that Japan reaches to the stage of mature society and that the contents of demand changed from commodity oriented to service oriented such as medicare, education, culture and leisure. It seems to be inevitable to create a kind of social system industry. Fourth, they have to make clear how to adapt the aging society and the coming of the age of regional autonomy. The reform of employment structure and wage system is on the agenda.

Summing up the tasks for the Japanese people in 1980's, this vision suggests three goals of the Japanese society. The first goal is Japan's international contribution as an economic giant. The second goal is to overcome the limit of the scarcity of natural resources, namely the establishment of the economic national security. The third goal is coexistence of 'energetic life' and 'life with fertile minds'. And this vision summarized the leitmotiv of 1980's which runs through these three goals as the establishment of economic national security and the road toward nation-building based on high technology.

The officials of MITI emphasize that the vision is different from forecast and planning. The vision covers 10 years or more, suggests the way of thinking rather than figures, talks to the public for making national consensus and includes attractive catch-phrases of these days. It is no doubt to channelize the people into one direction, and to concentrate the people's effort into the definite direction. Therefore the role of vision is almost the same as 'the method of changing of supply structure ahead of demand which the Japanese economy has, and of technology development.' Officials of MITI call the policies based on the vision as an 'indicative planning economy system.' (Tadao Uchida)

The idea of Technopolis appears in the chapter 8 ('the role of regional economic society and industry') of this vision. But inexplicitly, there are so many ideas which are connected with the idea of Technopolis in this vision. For example, in the chapter 6 ('the road to the nation-building based on high-technology'), the necessity of community technology which is closely related to citizen and society and makes sharp contrast with big and alienated technology, is declared. And the importance of leadership of local self-governments in addition to the state and industry is emphasized. Furthermore, we find in the chapter 7 ('the improvement of quality of life') that urban and regional problems should be under serious consideration.

Now, the problem of region is considered in the context of 'duality of space' in this vision. 'Duality of space' means that the direction of internationalization and the direction of regionalization are overlapped and that the importance of both directions is increasing. This basic understanding runs through three national goals which I mentioned earlier. International contribution of the economic giant is a matter of course, but the problem is not completed without establishing industrial policy for local industry and regional economy which are influenced greatly by internationalization of the economy. Based on the basic understanding just mentioned above, this vision changes the idea of regional development from former one which considers redistribution of industry from national point of view to the new one which stresses on the importance of redistribution of industry from regional point of view.[1] In sum, responding to the tendency of increasing autonomy of

regional society, increasing rate of settlement and rise of potentiality of regional economy,
The concept of Technopolis was introduced as one of the trumps to promote industry.[2]

It is said that the concept of Technopolis is made in Japan and does not exist in foreign
countries. It is true in one sense, but strictly speaking it is not true. This concept was
already used abroad as a concept which means technological city without man that is a
result of autonomous movement of big technology.[3] The advocates of this concept in Japan
probably did not know this situation, and tried to consider Technopolis as a regional city
in which high-technology is rooted deep in society and technology becomes a good sup-
porter of people's life and culture.

II. *What is Technopolis?*

Technopolis is defined as a "strategy to achieve two goals—knowledge intensification
and heightening of value added of industrial structure (creative nation-building based on
high technology), and regional development headed for 21st century—by introducing high
technology industry into culture, tradition and nature of regional society, by acomplishing
'town building' which is harmonious with 'industry' (complex of high technology industry),
'academic center' (research institutes and experimental institutes) and 'community facil-
ities' (fertile and pleasant living environment).[4] It has three meanings. Firstly, it has
a national economic meaning to create an economic basis for stable growth of national
economy. Secondly, it has a meaning of industrial policy contributing to change industrial
structure by creating industrial space suitable for development of advanced high technology
industry. And thirdly it has a meaning of regional development to develop region by
introducing and using advanced high technology. The point which was stressed most at
the stage of explaining the idea of Technopolis, is that this requires a participatory, local
leadership and decentralized type of method of regional development. It is called as par-
ticipatory type of development, because it expects participation of local industry, academic
center, local government, and participation of residents in local community as well as private
enterprises outside region. Local leadership type of development means that the subject
of development is local governments themselves. It is totally different from the previous
planning of development whose subject is the state. Decentralized type of development
means that this is not a big centralized project, but it tries to decentralize industries from
center to various regions taking account of difficulty of getting land, harmony with environ-
ment and wide range of effects of social development.

But, as the tendency of settlement of advanced high technology industry and R&D
in big cities becomes quite strong, and as the resource, human and industrial potentiality
of regions is limited, the idea of Technopolis is hard to be realized. Therefore, we must
recognize that a strong support from the state is indispensable. In reality, the Technopolis

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[1] Ikinuku Tameno Bijon—Wakate Tsusan Kanryo ga Kataru 80 Nendai (*A Vision for Survival—80's from Young MITI Officials' Point of View*), Seisaku-jiho-sha, 1980, pp. 229-231.

[2] Seikei Sase, "Technopolis Oitachi no Ki," (The Birth of Technopolis), *Kogyo-ricchi*, September, 1982.

[3] Nigel Calper, *Technopolis: Social Control of the Uses of Science*, MacGibbon & Kee, 1966.

[4] Nihon Ricchi Center Technopolis 90's Project Committee, *Report on Basic Research for Construction of Technopolis*, March, 1982.

Law was established in order to give national priority to Technopolis construction. Ac-
cording to an advocate of Technopolis, the Technopolis Law must support "the policy
based on the new idea different from ideas of former settlement policies, namely the policy
to combine organically the Japanese society and the Japanese archipelago through the medium
of high technology, which is presented against the background of the radical change of the
relationship between technology and economic society."[5]

As we have several articles[6] which discussed about the process of starting Technopolis
project in each region, we do not deal with this process here. But I would like to add my
keen feeling that it is essential to understand this process by paying attention to the follow-
ing points. Firstly, the process of presentation of the idea of Technopolis and realization
of this idea was under strong leadership of MITI, although its idea expresses that the subject
of Technopolis is the local government itself. The plannings of each Technopolis with
few exception were made by think-tanks in Tokyo. Local governments which are pro-
moting Technopolis have strong discontents with MITI, because it does not trasfer revenue
sources and authorities to local governments.[7] Secondly, there is no local citizen's par-
ticipation in Technopolis constructions, although it is said that the idea of Technopolis is
participatory. While this plan expresses the importance of local people's participation
in Technopolis, it restricts local people's participation to the problem of "cost sharing and
distribution of developmental effects."[8] It is symbolic of this project. Thirdly, this plan
was quite attractive to many local governments, in spite of shortcomings of this plan, so
that "Technopolis fever" has happened in Japan. Why do we have Technopolis fever?
We can point out the following four reasons. The first is that everybody clearly understood
the contradictions and faults of post-war policies of regional development. The second
is that we had no clearcut policies of regional development in 80's. The third is that national
financial conditions were in deep crisis, therefore, to expand public works depending on
national finance was difficult under the strong political trend of making government smaller.
The fourth is that people were impressed by dynamic development of advanced high tech-
nology industry. When the plan of Technopolis was disclosed, many local governments
were vigorously competing for the recruit of Technopolis to their communities. While
MITI intended to construct a few Technopolis, it changed its mind and authorized 14 places.
Furthermore, as MITI established the Technopolis Law in order to give national priority
to Technopolis, Technopolis was considered as if it were the main card of industrial policies
of MITI in 1980's. So, fourthly we have to point out that Technopolis is only a part of
complex of policies of MITI in 1980's. It is one of various industrial policies of MITI,
no more and no less. Namely Technopolis is one of various industrial policies of MITI,
in addition to the electric machine industrial policy, the Law on Temporary Measures for
the Promotion of Specific Machinery and Information Industries and the Law on Temporary

    [5] Masaru Kaneko, "Technopolis Koso no Konnichiteki Igi, *Kogyo-ricchi*," July, 1982, p. 31.
    [6] Amy K. Glasmeier, "The Japanese Technopolis Program: High-tech Development Strategy or Industrial
Policy in Deisguise " *International Journal of Urban and Regional Research*, 12(2), 1988.
Jeffrey Broadbent, "The Technopolis Strategy vs. Deindustrialization: High-tech Development Sites in Japan,"
Journal of Social Issues, Vol. 24, No. 2. Tatsuno Sheridan, *The Technopolis Strategy*, Prentice Hall, 1986.
    [7] From my observations and interviews.
    [8] Shigeru Suzuki, "Technopolis to Gyo-zaisei Mondai," (Technopolis and Administrative-financial Pro-
blems) Nihon-Kagakusha-Kaigi ed., *Technopolis to Chiiki Kaihatsu* (Technopolis and Regional Development),
Ootsuki-shoten, 1985, p. 145.

Measures for Stabilization of Specified Depressed Industries.[9]

III. *The Basic Perspectives for the Evaluation of Technopolis*

Since the first authorization of Technopolis, the number of Technopolis has been gradually increasing and we have 25 Technopolises today. If we would like to evaluate Technopolises, we have to study each Technopolis precisely, or we have to evaluate each type of Technopolis by classifying Technopolises into typology. But as it is no room to do so in this paper, I would like to discuss about the basic perspectives which are indispensable to evaluate all Technopolises.

It is said that Technopolis in Japan is modeled after Silicon Valley in the United States. If it is the case, the regions which are matched to Silicon Valley are Tokyo area (Tokyo, Yokohama, Kawasaki, Atsugi) or Tsukuba Science City only. If we call Silicon Valley in the United States, Sophia-Antipolis in France, Birth-Swindon in England, Tokyo area, Tsukuba Science City and so on as national Technopolis, it is good to call 25 Technopolises which are under construction in Japan as local Technopolis. A scholar in Japan calls the former as Technopolis in narrow sense, the latter as Technopolis in wider sense.[10]

Kawasaki-city is not only a leading base of material supply in Japan, but also a leading base of electric products. But mass production factories of big enterprises have been recently transferred and run out one after another. Research institutes and experimental production centers are settled down these sites. As a result, 151 institutes are accumulated in 1983. Reflecting this process, it is said that a characteristic of Technopolis of Kawasaki-city is to make research development connected closely with production. Yokohama-city is carrying on "Port Future 21" (Minato-Mirai 21) project to accumulate core-administrative function and international information-communication function. And at the same time, the city government is trying to promote attraction of high technology industries in "Kohoku New Town" and "Hakusan High-tech Park." Furthermore, Atsugi-city which already has accumulation of research institutes and factories of high-tech industry such as IBM research institute and NEC, made "Atsugi-new city Morinosato science city plan" and trying to recruit research institutes of high-tech enterprises and several universities by building 2100 houses. Tsukuba science city began as the project of reducing overcrowd in Tokyo by transfering national research institutes to Tsukuba. It was given the character of a national project by Tsukuba Science City Construction Law in 1983. The settlement of Tsukuba University and 46 national research institutes has completed today. This complex is 32% of national research institutes and 45% of the budget and number of researchers. Basic research institutes of almost all fields of high technology were built, and research institutes of private enterprises are continuing to settle down, because they are

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[9] Yoshiji Kitada, "1990 Nendai no Sangyo Seisaku," (Industrial Policies in 1990's), Zen Shoko Rodo Kumiai ed., *Towareru Tsusansho* (Questionable MITI), Otsuki Shoten, 1983, p. 34. Ryutaro Komiya, Masahiro Okuno and Kotaro Suzumura, *Industrial Policy of Japan*, Academic Press Inc., 1988, esp., Chapter 4.

[10] Masayuki Sasaki, "Sekai Toshi Jidai no Chiiki Senryaku," (Regional Strategy in the Age of World City) Institute for Regional Development with Kenichi Miyamoto, *Kokusaika Jidai no Toshi to Noson* (The Urban and Rural in the Age of Internationalization), Jichitai Kenkyu Sha, 1988, pp. 69–70.

interested in a large accumulation of research and development functions.[11]

If a big national Technopolis is going to be constructed in Tokyo area and smaller national Technopolises are going to be built in Osaka or Nagoya area, local Technopolises are obliged to develop industrial regions based on relatively lower level of technology, while local Technopolises leave brain sector to national Technopolises. Today, all officials of local Technopolises think that pull power of Tokyo is increasing rapidly, and development of local regions based on Technopolises is minimized.

The regional development by high technology has been emphasized in Japan's Technopolis Project, but concretely, regional development by IC industry is expected. It seems to be reasonable, when we consider that assembly line of IC industry began to be dispersly settled down Kyushu since 1970's, and it moved to Tohoku, Hokkaido and Shikoku later. But there is one thing to be noted. It is that IC industry in Japan was established as a side-trade of already established major electric makers. "It is completely different from America in which IC industry was established as venture businesses spun out from big enterprises and produced completely new industrial centers."[12] As a result, parts of brain-labour like head quarter function, research and developmental function and photomask production line, do not move from the old industrial centers, instead only parts of mannual labour moved to countryside. Namely, in Japan, the system of vertical type of space division of labour in big enterprises blocked full development of regional economy. It is impossible to promote regional development further by depending on IC industry which is exclusively seeking for cheap labour forces.

Figure 1 shows that the production system of NEC as the top maker of IC in Japan. This figure verifies well the points which we made above, and further it shows one more characteristic of IC production. It is that IC industry in Japan keeps the sector of research and development, and factories for experiments in Japan and endeavors to improve quality of products and value added. This seems to be a matter of course. But we realize how important it is, when we compare it with American case. In case of America, even factory facilities which should keep productive technology were transfered abroad, so that America was forced to fall into difficult situation unable to keep research and development sector.[13] IC industry in Japan seems to have learned much from American experience.

Whether advanced high-tech industries which went into various regions can develop the regions or not remains to be seen, and if it could, how it can do? Various points for discussion were raised already. And so many points still remains to be considered. First of all, advanced high-tech industry, as we have examined already, has probability to move all over the world. If several conditions—for example, in the case of IC industry, gurantee of water, stable supply of high tension electricity, accessbility of airport and highway, availability of labour and accessbility to local cities—are secured, it can go into anywhere. Therefore it is unthinkable to commit to specific regions deeply. In short, the capitalist enterprises march into the regions in order to use them as means of production or means

    [11] Masayuki Sasaki, *Ibid.*, pp. 90–103. Takayoshi Kitagawa ed., *Haiteku-ka to Tokyo-ken, Henbo Suru Gendai Toshi* (High-tech and Tokyo area, The Changing Modern City), Aoki-shoten, 1989.

    [12] Masamichi Sasaki, *Ibid.*, p. 110. Yoshio Inoue and Koretoshi Ito eds., *Sentan Sangyo to Chiiki Keizai* (High-Tech Industry and Regional Economy), Mineruba-shobo, 1989, esp., Chapter 9.

    [13] Koichi Shimokawa, "Kokusai Bungyo no Shinten to Sangyo Kudoka," (The Development of International Division of Labour and Deindustrialization), *Chiiki Kaihatsu*, March, 1988, p. 21.

Fig. 1.   IC Production System of NEC
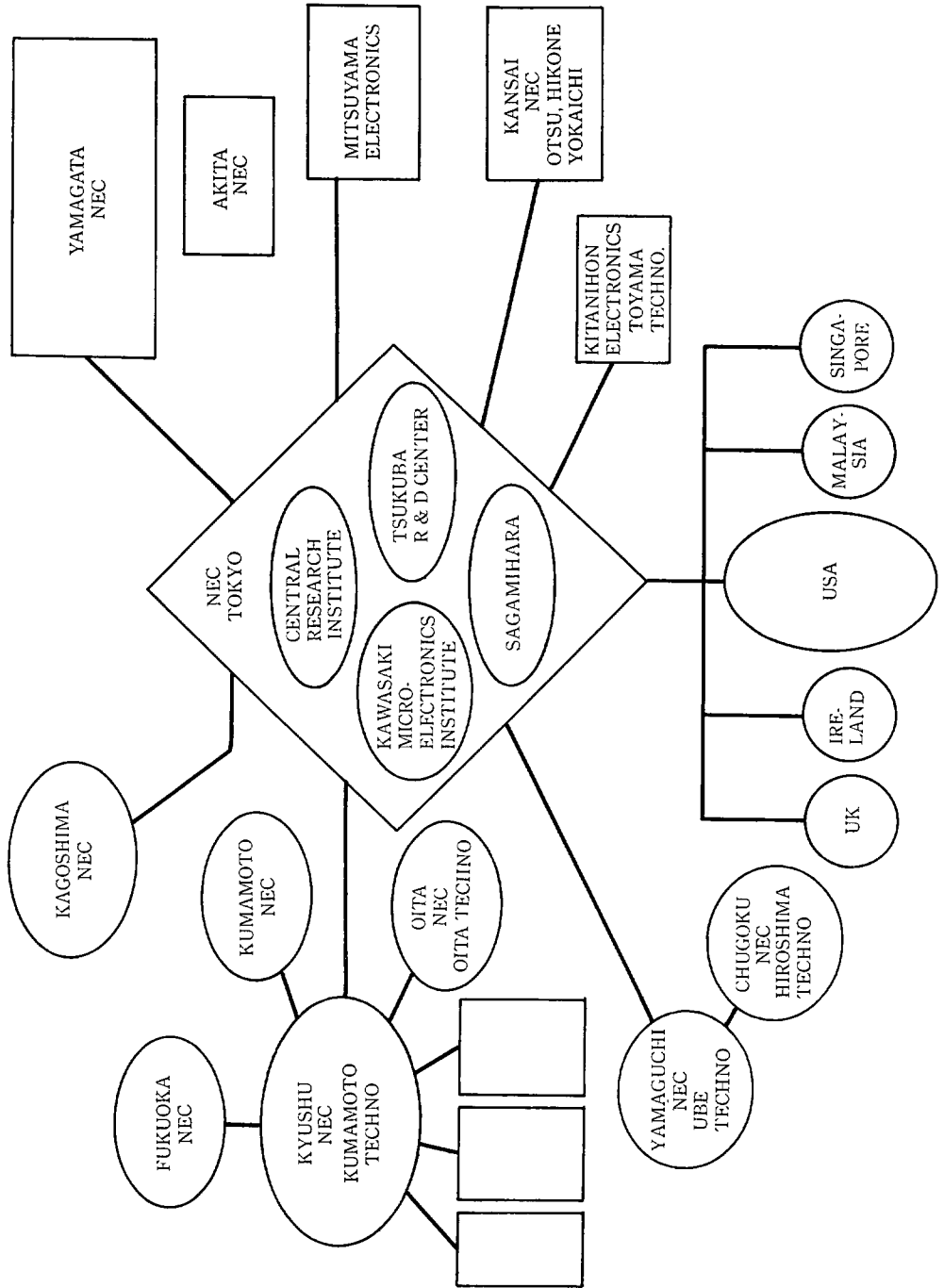
of life. Technopolis program explains the same reality as regional development by advanced technology, and it does not examine how to develop the regions by advanced technology. The enterprises usually march into the regions by obtaining most preferable conditions from the local governments. The local governments expect marverous economic effects from enterprises to their regions. But it results in little merit for majority of local enterprises, although a few good local enterprises can get some merits from invited enterprises. The enterprises which march into the region have little interest in the technological transfers to the regions and the technological level up in the regions. We have few successful examples of the technological exchanges between the local enterprises and the advanced enterprises. In most cases, the employment effects of advanced enterprises fall short of our expectations. On the contrary, we have many demerits of advanced enterprises, such as decreasing flexibility of local government's finance as a result of local government's dependence on the boom and bust of the advanced enterprises, and public pollutions produced by them.

In these contexts, we have a Kenichi Imai's discussion which gives us a clue of examing contents of the regional development by advanced technology.[14] According to Imai, the first object of Technopolis is to pull up the level of their way of dwelling and learning to a new stage, by creating a new way of life based on advanced technology. Imai devides R&D which Technopolises should develop into the following two categories. (A) R&D which is necessary to transform advanced technology into concrete commodities. (B) Large-scale creative technological developments which necessitate the accumulations of various elemental technologies, like the development of new materials and new energies. He stresses that (A) is more important than (B). Because (A) can be created even at middle or small sized enterprises, or at the prefectural industrial laboratories. It is essential for the activation of industries. Without it industrial declining is unavoidable, as American industries have experienced. The second object of Technopolis is the idea of "technological innovations at grassroot level." It means that science and technology increase their accessibility to the people in the regions, and that they are pulled up to a new stage by absorbing various needs and desires of the people. Furthermore, it is necessary for the policies of Technopolises to stress on the transfer of technologies to the regions. Technological transfers should be between the regions, enterprises and different fields of technologies. Imai especially puts stress on the technological transfers to the social systems, for Technopolises do not accomplish their expected objects until advanced technologies can be applied to solve urban problems. The third object of Technopolises is to produce true creativity which the Japanese society has been seeking for years. This creativity has been produced from science parks in the three metropolitan areas until now. But the advance of science and technology will make it possible to produce creativity in various regions other than those metropolitan areas. It is now necessary to build up the firm infrastructure in order to prepare for regional diversification of this function.

Imai's argument clarifies the adequate relationship between science & technology and the regions, which other arguments on Technopolis have not. But it seems to me that even his argument has left insolvable gaps between Technopolises and residents who live in the

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[12] Kenichi Imai, "Technopolis no Imisuru Mono" (The Meaning of Technopolis), *Ekonomisto*, May 25, 1988, pp. 44–51.

regions. We can clearly understand these gaps, when we think what are residents in the regions. As Kokichi Shoji clarifies it,[15] firstly the residents are the people who think their regions as use-value. This is contradictory to modern capitalism or late capitalism which sees particular regions as means of production and tries to commodify the regions as a whole. Secondly, the residents are people who appear as subjects living their lives based on morphology and ecology in the regions. Their life is contradictory to modern capitalism which tends to destroy morphology and ecology in the regions. The regional development of modern capitalism tries to use the region as exchange value. Thirdly, the residents are people who are the subjects forming the regional society as their community. Namely, the regions for the residents are the combination of use-value, morphology, ecology and community. Therefore, there exist insolvable gap between regions and capitalism which sees the regions as exchange-value, and has a tendency to destroy morphology and ecology, and is exterior to community. It seems to me that one of the most important standard of evaluation of the projects of Technopolises is how to bridge this gap.

IV. *The Present Conditions of Technopolises*

Now, I would like to analyze the present conditions of Technopolises. It is very hard to choose one representative Technopolis among 25 Technopolises. But I would like to choose the Technopolis which is evaluated as a good Technopolis in Japan and is paid much attention to by foreign scholars. It is the Technopolis in Oita Prefecture.

The Oita Technopolis (The Toyo-no-Kuni Technopolis) is one of the eight Technopolis Projects which were granted the first approval of the MITI in March of 1984 as the first national Project. It is not only due to very good conditions for location of advanced technology industry such as ample electric power, water, land, airport and labour forces, but also due to strong leadership of the Governor of the Prefecture, Mr. Hiramatsu. He was an influential high-ranking official of MITI. He was one of the brains of Technopolis Project set by MITI.[16] He has a strong connection with the central government and the economic community at national level. By using this effective political pipe, he was quite successful in inviting high technology enterprises into this region. When he was a high-ranking official of MITI, he recommended the idea of "Tsurusaki sea port based industrial area." Therefore, he is called as a father of Oita "new industrial city" project. What were the effects of the construction of new industrial city since 1964? The amount of manufacturing shipment of Oita Prefecture increased from 54,800,000$ to 14,036,000,000$ in 20 years from 1960 to 1980. This increase came mainly from industries based on basic resources in combinat (industrial complex). Their manufacturing shipment increased from 2,510,000,000$ to 8,723,000,000$ in the same peiord. Their national share increased from 0.79% to 2.07%. It may be said that the construction of this new industrial city was successful in a certain degree. But if we examine precisely the effects of the construction

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[15] Koichi Shoji ed., *Jumin Ishiki no Kanosei: Kokusaika-Jidai no Machi Zukuri to Nihonjin no Shakai Ishiki* (Social Planning and Social Consciousness of the Japanese in the Age of Internationalization), Azusa-shuppan, 1986, Introduction.

[16] But it is erroneous to stress on his personal power to build Technopolis in Oita. The movement of the capital is much more important.

of Oita new industrial city, we can find unsuccessful aspects of the construction.   Firstly, it drove out agriculture in the Prefecture into stagnation.   The number of agricultural household diminished.   Their income decreased from 82% of national average to 72% of it.   Secondly, the economic effect of the new industrial city to middle and small sized enterprises which are 95% of the number of enterprises and 85% of the employed, did not match with what to be expected.   Especially good economic effects of enterprises in com- binat (industrial complex) were very weak.   Thirdly, employment effects of the new indus- trial city were very low.   It was due to the weakness of employment effects of enterprises in combinat (industrial complex).   Namely, the construction of the new industrial city deepened the regional contradiction between sea port based area and inland area, between industry and agriculture, between big enterprises and middle or small sized enterprises.[17]

Looking at the Technopolis Project closely, we can find that the idea of Technopolis Project is taking account of weakpoints of the new industrial city projects.   According to *The Basic Idea of Oita Technopolis*, in order to create the pluralistic industrial complex and promote organic associations between different areas in the Prefecture, "The Techno- polis is then built on the three basic principles: the integration of agriculture, forestry and fisheries with industry; the fostering of human resources to produce highly skilled and motivated work forces; and decentralization to allow technopolis to develop in harmony with the natural environment and with special local characteristics and traditions and to anticipate the ripple effects of the project."   Furthermore, this Project encourages local leadership by which industrial development and community formation can be carried out in hand with the particular characteristics of each local area.   Table 1 shows the goal of industrial development of Oita Technopolis.   This goal is to be accomplished by the fol- lowing incentive and support.   The first one is (a) Technology Transfer Promotion Project, (b) Research and Development Assistance Project, (c) Loan Guarantee Project, to upgrade the technical standards of small and medium-sized firms.   The second one is for strength- ening of research & development functions of this Technopolis.   It consists of the estab- lishment of Oita Prefecture Advanced Technology Development Research Institute, ex-

TABLE 1.   THE OBJECT OF INDUSTRIAL DEVELOPMENT OF OITA TECHNOPOLIS
(OITA PREFECTURE)

	1980	1990	2000	Annual average increase rate (%)	
				1980–1990	1980–2000
Population (1,000)	282	296	310	0.5	0.5
Amount of manufacturing shipment (100 millions)	134	431	960	12.4	10.3
Amount of vaue added (100 millions)	48.5	185.9	403.2	14.4	11.2
Number of job holders (100)	1405	1477	1628	0.5	0.7
Number of working people in manufacturing (100)	182	257	337	3.5	3.1

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[17] Tadao Kigazawa, "Oita-Toyonokuni Technopolis," *Nihon no Kagakusha*, October, 1984, p. 26.

pansion of Oita Prefectural Experimental Laboratory and establishment of exchange network among academic, industrial complex and local government. The third incentive and support is human resource cultivation. The fourth one is to offer prefectural tax incentives and loans to companies who wish to set up plants and research facilities in Technopolis. The fifth one is Technopolis Imformation Network Improvement Project and Research & Development Project, to develop high information functions. The sixth one is to create the core organization to promote Technopolis project.

Now, what is the present condition of Oita Tedhnopolis? First of all, the population of the Technopolis area is 279,289 in Oct. of 1988. It is minus 2,224 from the population in 1980. As we will find later, the population in industries is increasing and the decrease of the population in the Technopolis area is due to the decrease of the population in agriculture, forestry and fisheries. Next we will find out the amount of manufacturing shipment. The amount of manufacturing shipment of 1987 is 2,642,700,000$. It is 100.1% increase from 1980. And the percentage of it in total manufacturing shipment of Oita Prefecture is 18.5%. It was 9.5% in 1980. Therefore, we can say that the growth of the amount of manufacturing shipment in the Technopolis area is incredible. But the ratio of manufacturing shipment in 1990 to the goal figure of manufacturing shipment in 1990 is 61.6%, so that the outcome of Technopolis is not so successful. On the population in manufacturing, the figure of it in the Technopolis is 20,432. It increases 2,987 from 1980. But it is 82.5% of the goal figure. The new enterprises located in the Technopolis area are more than 100 cases. It is 43.9% of the total figure of Oita Prefecture.

Judging from the various figures, the Technopolis project comes out pretty well, although it is far behind the first goal. And the Technopolis must tackle with a lot more tasks. Firstly, we can forsee the minus effects; defects of the Technopolis to outside area of Technopolis and other industries except advanced technology industries. Secondly, according to Oita Technopolis Project, "Oita Prefectural government is encouraging the built-up of high technology industry in Technopolis in two ways: by introducing advanced technology companies; and by raising local small and medium-sized firms to the level of high technologies industry."[18] But the latter way is far more behind the former way. Of course, venture companies have already been set up in the Technopolis such as Ishii Tool and Engineering Co. Ltd., Denken Engineering Co. Ltd. and Hoks Electronics Co. Ltd. But so many difficult problems must be solved in order to develop their venture businesses. For example, Hoks Electronics Co. Ltd. is the company which is composed of technical staffs from the Japan System House (the mother company), its own local staffs and women's labour force in the region. It is experimentally developing and making word-processors and personal computers. Its outcomes of operations are increasing year by year. Of course, it has a keen desire to move into the field of the mass production of these machines, because it is very hard to stabilize its operations if it is based on the development and experimental production of these machines only. But it is very hard for the company to move into the field, because the big companies try to cut down the cost of supply of these machines. Therefore the company is trying to get direct transactions with a company in Silicon Valley in

[18] *Oita-ken Technopolis Kihon Koso* (Oita Prefecture Technopolis Basic Plan), Oita Prefecture, 1983.
[19] Masayuki Sasaki, *Ibid.*, p. 128.

the United States.[19] This case is a symbol of the difficult situation of venture businesses
in the Technopolis. Thirdly, industrial development and community formation have been
carried out dominantly by the central giovernment, the prefectural government, big com-
panies and a few excellent companies in the region, although the Oita Technopolis Project
encourages the development of wide local leadership. It is doubtful whether the Techno-
polis can lead to the indegenous development of the region as a whole. Of course we can
understand that local governments are trying to encourage local leadership in various ways.
"One Village and One Product Movement" is a good example. But many residents who
participate in social movements which are seeking for indegenous development of the region
are very critical of the policies of the prefectural government. The local governments are
obliged to encourage indegenous local leadership. Fourthly, the construction of academic
centers and community facilities is far behind to the industrial development. It is far below
the level of those constructions of the national Technopolises in the three metropolitan
areas.

V. *In Conclusion*

There exists few evaluation that the Technopolis projects have been very successful even
at national and prefectural level. Therefore, the new idea—it is necessary to create the
Technopolises which can compete with national Technopolises by concentrating on several
Technopolises and by making effective networks among them—is on the horizon.[20] Any-
how, it is the time of reflexion on the Technopolis Projects now. The goal is to create the
Technopolis which is based on the people's way of life in each different regions and the
resident's self government. Otherwise ongoing process of "relative decay" of the Japanese
manufacturing capacity and "declining" of the quality of life of the Japanese people in the
local regions will never be stopped.

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[20] From my interviews.