Hollowing-out of the Japanese Manufacturing Industry and Regional Employment Development

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1. Findings from statistics

1.1 Large decrease of manufacturing workers

The hollowing-out of the Japanese manufacturing industry, owing to a shift of production sites to other countries, has resulted in a drastic decline in the number of workers in the domestic manufacturing industry. This trend reflects the reality of industrial hollowing-out, namely, that after peaking in 1992 at 15.69 million persons, the number of workers in the Japanese manufacturing industry declined to 12.22 million in 2003, a fall of 3.47 million from the peak. (Labor Force Survey, Ministry of Public Management, Home Affairs, Posts and Telecommunications)

Moreover, according to the sub-classification of industries, the number of employees in the manufacturing industry decreased in all fields from 1996 to 2001. The largest decline was in the textile/textile product manufacturing industry (299,770), followed by the electric appliance and machinery manufacturing industry (216,158), the metal products manufacturing industry (154,036), and the general machines and equipment manufacturing industry (136,375). (Establishment and Enterprise Census, Ministry of Public Management, Home Affairs, Posts and Telecommunications)

In addition to the decrease in the textile industry, which is a mature industry, the number of employees drastically declined in typical export-oriented industries such as electric appliances and machines, machinery, and metal products, fueling fears about the hollowing-out of the domestic manufacturing industry.

1.2 Loss of 600,000 manufacturing workers in Japan due to overseas local production

The effects of overseas local production on the employment of the domestic manufacturing industry can be calculated as follows. Induced exports for intermediate goods caused an increase of 830,000 workers;

the export substitution effect caused a decrease of 1,170,000 workers. Taking into account the effects of other factors, about 600,000 jobs in the country were lost in total (Table 1).

Table 1 Effects of Overseas Local Production on Employment in Japanese Manufacturing Industry (FY2000)

(Unit: 10,000 persons)

Effect	Change in employment
Capital goods export-inducing effect	+1.8
Intermediate goods export-inducing effect	+83.0
Export substitution effect	-117.0
Reimportation effect	-27.3
Total	-59.5

Source: Estimated by Labour Policy Councilor Office of the Ministry of Health, Labour and Welfare based on FY 2003 White Paper on Labour Economy, Ministry of Health, Labour and Welfare

1.3 Low unemployment rate in districts with high manufacturing ratio

An analysis of the relationship between the ratio of the manufacturing industry and unemployment rate by prefecture shows that the unemployment rate is low in districts where the ratio of the manufacturing industry is high. Also, there is a correlation between the extent of decrease in the manufacturing industry ratio and the extent of increase in the unemployment rate. Moreover, reviewing changes in the manufacturing workers between 1992 and 2002 by region, the decline was largest in the Tohoku region, followed by Kinki region. These two regions recorded a considerably higher unemployment rate than the national average. (FY 2003 White Paper on Labour Economy, Ministry of Health, Labour and Welfare)

In terms of employment, the manufacturing industry has remained an important sector.

1.4 Large regional differences concerning changing employment among manufacturing agglomeration districts

A comparison of changes in employment in different manufacturing agglomeration districts between 1995 and 2000 reveals large differences in the rate of decline in the number of employees. Among the districts designated as basic industrial agglomeration districts by the law on regional industrial agglomeration and activation, the top three districts with smallest rate of decline rate were: Kitakamigawa district

in Iwate, West district in Shizuoka, and Otsu/South district in Shiga. On the other hand, the top three districts with largest rate of decline were: Greater Keihin district in Tokyo and Kanagawa, Amagasaki/Itami district in Osaka, and Central district in Osaka.

When changes in employment, in terms of the number of employees, in ten manufacturing agglomeration districts are compared, Toyota, Hamamatsu and Suwa recorded a small rate of decline; while Hitachi city and Tokyo Jonan experienced a large rate of decline. (FY 2003 White Paper on Labour Economy, Ministry of Health, Labour and Welfare)

These figures show that there are some districts such as the Kitakamigawa district in Iwate prefecture which could minimize the declining rate of employees even in the Tohoku region which generally experienced the highest rate of decline of manufacturing workers in the country. Hence, in terms of the national average or the prefectural average, a comparison of wide areas is not so relevant. Incidentally, while many districts in the Tohoku region attracted assembly plants of leading electric appliance and machinery manufacturers after creating industrial sites, the Kitakamigawa district in Iwate attracted small and medium-size enterprises with strong technical skills from the Keihin district, in addition to major manufacturers, and has succeeded in forming an industrial agglomeration based on the mechatronics sector.

Moreover, in Nagano prefecture, there are considerable differences among districts even in the same prefecture. The Hokushin district suffered a severe employment situation affected by the closure or scaling-down of the Fujitsu factory, while the Nanshin district including Suwa, Okaya and Ina, where the electronic component industry is concentrated, enjoyed a job openings-to-applications ratio exceeding 1.0. Accordingly, the regional economy centering around employment should be examined when considering the location of a company within the range of commuting distance as well as a promising industrial structure (Table 2).

Table 2 Number of Employees in Industrial Agglomeration Districts

(1) Basic industrial agglomeration (Changes between 1995 and 2001)

(Unit: %)

District	Number of establishments	Number of employees	Shipment amount
Nationwide average	-11.9	-11.0	-1.8

Average of 25 districts	-13.1	-13.2	-5.8
Hachinohe (Aomori)	-8.7	-13.1	-7.3
Kitakamigawa basin (Iwate)	-9.5	-1.8	17.0
Kenhoku Rinkai (Ibaraki)	-10.2	-9.0	-10.1
Kennan (Tochigi)	-13.8	-15.5	-4.1
Gunma	-12.6	-5.7	0.0
Tokatsu/Kawaguchi (Chiba/Saitama)	-14.1	-14.2	-11.3
Greater Keihin (Tokyo/Kanagawa)	-9.9	-21.0	-13.2
Chuetsu (Niigata)	-15.7	-12.1	-10.5
Toyama/Takaoka	-6.0	-9.6	-10.1
Kanazawa/Komatsu (Ishikawa)	-16.2	-8.5	5.3
Kofu (Yamanashi)	-12.5	-5.8	8.2
Suwa (Nagano)	-9.1	-7.1	3.5
West part (Shizuoka)	-9.4	-2.8	13.7
Kitase (Mie)	-12.1	-11.9	12.8
Shiga Otsu/South part	-6.1	-3.4	-4.4
Central Osaka	-15.6	-17.6	-13.7
Amagasaki/Itami (Hyogo)	-17.5	-20.4	-11.2
Tottori	-12.2	-11.4	6.5
South part (Okayama)	-13.2	-16.2	-12.4
Hiroshima	-14.2	-13.0	-10.3
Tokushima	-12.0	-7.2	5.1
Kagawa	-18.4	-15.8	-9.4
Central Kochi	-10.1	-11.0	-7.8
Kita-Kyushu	-9.4	-11.1	-4.1
Kumamoto	-14.1	-6.2	17.6

Source: Calculated by Labour Policy Councilor Office of the Ministry of Health, Labour and Welfare based on the FY2003 White Paper on Labour Economy by the Ministry of Health, Labour and Welfare

(2) Ten Agglomeration Districts (Changes between 1995 and 2000)

(Unit: %)

District	Number of establishments	Number of employees	Shipment amount
Nationwide average	-11.9	-11.0	-1.8
Average of 10 districts	-11.1	-11.5	-0.2
Yamagata prefecture	-12.6	-10.0	13.1
Hitachi city (Ibaraki)	-11.1	-22.3	-21.5

Jonan (Tokyo)	-11.3	-22.0	-24.0
Suwa (Nagano)	-7.5	-5.2	-1.3
Hamamatsu (Shizuoka)	-10.0	-4.8	7.4
Toyota (Nagoya)	-1.4	-4.6	10.8
Higashi-Osaka (Osaka)	-11.2	-15.2	-18.3
Kadoma (Osaka)	-15.9	-15.6	-7.4
Hiroshima city	-16.7	-14.6	-10.7
Kita-Kyushu	-11.8	-14.3	-13.5

Source: Calculated by Labour Policy Councilor Office of the Ministry of Health, Labour and Welfare based on the FY2003 White Paper on Labour Economy by the Ministry of Health, Labour and Welfare

2. State of regional employment development

2.1 Limit of stereotype regional development

According to the law on resort development enforced during the bubble economy, many regional resort facilities were constructed nationwide, which resulted in huge cumulative deficits, and many of them were forced to shut down or were sold. They mostly adopted a semi-governmental (the so-called “third-sector”) style in which a local government participated in the construction as well as management, and are now involved in clearing the financial debt. Many of the failed regional resort facilities were a combination of different types of resorts such as a large hotel, golf course, ski ground, tennis courts, or hot spring; the concepts were very similar.

The reason why the development concepts were uniform was the reliance on a consultant or development company in Tokyo or Osaka for planning, including the basic design, to ensure that the resort satisfied the law. In other words, the outcome resulted from the binding nature of the resort law as well as a lack of planning and development ability by the local regions.

This centrally-led standardized industrial promotion was not limited to resort development. The situation was also true with the regional industrial promotion program which attempted to attract factories from large city areas by creating new industrial parks. Most of the factories that were set up in such districts were manufacturers’ assembly plants for finished products, but these assembly plants were directly affected by the accelerated relocation of plants to China in the 1990s and these

industries are now suffering hollowing-out.

In the 21st century with the rapid progress of globalization and technology innovation, this stereotyped form of industrial promotion does not work. Instead, various industrial promotion programs utilizing regional features are required. Therefore, local governments must formulate their own industrial promotion and agglomeration plans based on a regional development strategy which focuses on regional characteristics. They also need to develop their ability to efficiently carry out these projects.

2.2 Necessity of decentralized industrial policies (Regional industrial policies in Italy)

In view of unemployment of young people and long-term unemployment in EU countries, the EU presented an employment strategy in the late 1990s and urged member governments to change their employment policies. To create jobs, decentralized regional development was proposed, many measures for which provide a useful reference for Japan.

The case of Italy is particularly helpful as a model of diversified regional industrial promotion. Italy as a whole has not enjoyed a flourishing national economy, though some regional economies, including the underground economy, cannot be underestimated. Unlike Silicon Valley in the US which has received an inflow of excellent overseas human resources, Italian regional communities are very closed societies and many small companies form industrial networks based on close human relations, a feature which Japanese local communities share to some extent.

As a successful model of regional industrial promotion in Italy, the packing machine industry in Bologna is well known. The regional industry consists of about 400 companies located in the countryside surrounding Bologna. In its post-war history, craftsmen of two old companies, which have existed since before the war, spun off and established new companies one after another, to form an industrial agglomeration. There are only three companies that employ more than 500 employees, while 60% are craftsman-based companies with fewer than 10 workers.

Packing machine manufacturing is a niche market in which production typically starts when an order is received, and so product differentiation makes it easy for small manufacturers to participate. To adapt to production on demand, or upon receiving an order,

manufacturers must be able to handle the designing, manufacture, and even sales. The region's manufacturers, despite being small in size, employ many *projetista* (skilled engineers) who have knowledge of research and development as well as production and can act as sales engineers.

To successfully support the packing machine industry, which is a regional cluster, *projetista* must be carefully nurtured. In Italy, the industrial policies drawn up by the central government rarely function. In contrast, local industrialists take the initiative in providing industrial support systems involving the relevant local government. Most *projetista* in this district are graduates of a local school, Aldini Valleriagni High School. The school is a counterpart of Japan's technical schools, but is a municipal school whereas Italian high schools are usually state schools. Also, nearby Bologna University supplies technology and human resources to the district.

In addition, the DEMO Center (a center for diffusion and service for automated packing machines) was established under ERVET (a regional development corporation in Emilia-Romagna), which was established to assist local industries. ASTER (Emilia-Romagna technology development corporation) has been established as well, to provide technical assistance to small and medium-size companies. Furthermore, an industrial federation, a craftsmen federation, a chamber of commerce and industry and a small business union are providing various assistance services in the fields of human resource development, technology development and transfer, provision of market information, and consultancy.

The background underlying the formation and operation of this business-government-academia cooperative system is district-oriented spirit termed as *campanilismo*. People place strong trust in human relations centered on a territorial society and blood relations. (Kiyonari and Hashimoto, 1997, Chapter 4)

2.3 Success and limitations of venture-type job creation (the case of Sapporo Valley)

There are several types of regional employment development programs, among which the software industry in Sapporo is a successful case of regional agglomeration in a specific district, and has enjoyed the spontaneous formation of venture businesses with little commitment from

the central or local government. IT-related industries in Hokkaido agglomerate mostly in Sapporo city, the core location. In particular, application development firms with advanced technology are clustered to the north of Sapporo station, such that the area is now called Sapporo Valley.

Sapporo Valley consists of several core firms and several firm groups with personnel who spun off from the former. Regarding the histories of the core firms, their executives originated in the Micro-computer Study Group organized by Professor Aoki of the Engineering Department of Hokkaido University. Many of the executives now running the core firms in Sapporo Valley are former students of this study group. The former study group students founded venture businesses, and are now building Sapporo Valley today, together with the spun-off firms.

The industrial agglomeration of Sapporo Valley consists of venture businesses originated in the Micro-computer Study Group at the core, together with several groups that were started later. In 1982, Hokkaido System House Association and Hokkaido Software Association were set up, and Sapporo city created an industrial park, Sapporo Techno Park, in 1986 for the information industry. BUG and Tecnova, established in 1977 by former students of the Micro-computer Study Group, are based in the Park.

In the Sapporo Techno Park, Sapporo Electronics Center was constructed as a central facility, where IT venture executives, engineers, university teachers, and local government personnel have opportunities for exchange through various projects and study meetings held here. The development of mutual exchanges around the Center led to the formation of a local organization NCF (Network Community Forum) in 1996. NCF has launched various businesses exclusively based on the district.

The human resources of the IT-related industry of Sapporo Valley are closely connected with Hokkaido University. Executives of core companies were trained at the Micro-computer Study Group, and engineers, recruited later as businesses grew, include many graduates of Hokkaido University. Some graduates from the university are hired immediately after graduation, while others have returned to Sapporo at the age of around 30 after working for a leading company in Tokyo or elsewhere, the so-called “U-turn” group. Very recently, those from Tokyo, with no previous connections with Hokkaido, are increasingly joining these

companies, induced by the technological power of the core companies and good living environment in Sapporo.

The agglomeration of the IT-related industry at Sapporo Valley is a successful case. In FY1999, there were 25 establishments, with sales of 7.37 billion yen (up 21.4% from the previous year), with 644 employees (up 24.3%), exceeding the average in Hokkaido by 12.7 percentage points in sales amount and 17.5 percentage points in number of employees. However, the sales of many core firms are less than one billion yen and very few have sales of more than 2 billion yen, suggesting a lack of driving power for regional employment development. Although the growth in business has been sluggish partly because of the recent IT-related recession, new venture businesses are expected to emerge in line with the growth of the core firms.

The IT software industry is expected as a major source of job creation, with the industry concentrated in large cities. In the information-telecommunications sector with 60,000 establishments and 1.47 million employees, Tokyo accounts for 31.3% and 42.0%, respectively. (The 2001 Establishment and Enterprise Census, Ministry of Public Management, Home Affairs, Posts and Telecommunications)

In view of the trend toward concentration in Tokyo, the network scale of firms in the Sapporo Valley agglomeration is limited, with Hokkaido University as their center. Their close network, which has so far supported the growth, is now having an adverse effect. Therefore, a key to the future development is whether the firms can extend their network.

2.4 Revival of manufacturing agglomeration (Suwa/Okaya)

Even in the Suwa/Okaya region in Nagano prefecture where small and medium-size machine manufacturers have long been concentrated, the number of establishments as well as employees have been decreasing due to the overseas transfer of production bases of their user companies and their own companies, though the extent of the decline in the region is smaller than the nationwide average as mentioned previously. Since before the war, there has been a cluster of subcontractors for Suwa Seikosha, and many manufacturers strived to increase customers as quartz watches became popular. The strongest supporting feature in their development has been precision process technology accumulated through the manufacturing of watch parts.

A survey on machinery and metal manufacturers in the Suwa/Okaya region revealed that there was a large difference in competitiveness between two groups of manufacturers: those whose shipments increased and those whose shipments decreased in value in the 1990s. According to a later analysis, the strengths which determine the shipment value of a manufacturer are: stable quality, adaptability to the production of various items, product development ability, marketing ability, and information-based management for order-receiving, production and delivery time, in order of importance. On the other hand, low price, quick delivery and precision processes are prerequisites and do not lead to higher shipment amounts. Reflecting these changes in competitiveness, requirements for additional personnel have been changing from conventional skilled workers to production engineers, product development and design engineers, and sales and marketing staff. (The Japan Institute of Labour, 1999)

Local governments are assisting individual companies with their managerial innovation. For small companies which lack IT and English language skills, the Okaya city government is creating a system which will publish information on regional companies on the Internet to attract new orders from companies within and outside the country.

Moreover, companies linked via the Internet are trying to jointly capture all orders to the region, even when a single company cannot satisfy a particular order due to workload or technology: if a certain order cannot be satisfied due to volume, the order is shared with another company in the same industry, while if a lack of technology hinders order-receiving, the help of a company having the required technology may be sought.

This progress in inter-company relationships is creating a network-based industrial structure with a horizontal scope, a shift from the conventional vertical or pyramid-type affiliations in the industry. A network-based industrial structure will help subcontractors affiliated to a particular leading manufacturer win orders from new customers other than its parent company, thus forging a new business model. However, the network-based industrial structure creates opportunities to attract new customers on the basis of spot transactions, unlike the conventional long-term dealings, and there is a risk that if they cannot satisfy the requirements of new customers, the transaction will be suspended immediately. Accordingly, firms must

maintain technology for differentiation, because low price and quick delivery alone cannot sustain the business. The elements which support such differentiation strength with the ability to cope with changing transactions are, as mentioned above, the ability to fulfill orders for a variety of items, development of new products, and the use of IT.

Examples in which sales increased despite recession include small precision press companies. Newly developed technology enabled precision presses to be used for components which previously were manufactured by cutting, and thus costs were slashed. The new technology was successfully developed by young employees, technical high school graduates, assisted by the prefectural industrial laboratory and the laboratory of the engineering department of Shinshu University. Moreover, orders were taken via the Internet, and they even received an inquiry from IBM in the US, which led to a bulk order for PC components. Also, the company is building an inter-company network in the district and attempting the joint development of technology and products, beyond joint order-receiving, and is carrying out joint local production in Southeast Asia.

In this way, small manufacturers have little IT knowledge even though they may have sophisticated processing technologies. To create a network-based business model in the region, the prefectural or city government must prepare the necessary environment including minimum-level software education and assistance in creating websites.

2.5 Regional employment development by strategically attracting companies (Kameyama city, Mie prefecture)

The basic conditions for developing regional employment already exist in large cities and their surrounding areas, and manufacturing agglomeration districts. However, local areas far from a large city are not prepared for developing the regional economy and employment. In these districts, small-scale job creation is possible through community businesses or others, but to create jobs on a large scale the local government must attract companies to the area. However, the conventional passive method of creating an industrial park and waiting for advancing companies will attract assembly plants only, with the concomitant risk of hollowing-out due to factory closure or a shift of production to overseas. The key is to strategically attract promising

companies which can support growing industries.

Kameyama city in Mie prefecture is a successful example of the development of the regional economy and employment by attracting companies with strategic means. In Mie prefecture, following the election of Governor Kitayama, who aimed to change the administration from centralized and bureaucratic governance to decentralized autonomy, the reform of the local government administration advanced swiftly. As reforms progressed, the Crystal Initiative was adopted to strategically attract companies and hence encourage the development of the regional economy and employment.

The Crystal Initiative aims to build an agglomeration in one of the 21st-century growth industries, flat panel displays (FPD) including liquid crystals. The core is Sharp, a leading company in the liquid crystal field. Sharp, which has already set up in Taki-cho in the prefecture, declared that the company would concentrate its managerial resources on the liquid crystal business as a result of their selection and concentration of business fields. Upon hearing Sharp's plan to build a new high-tech factory, the governor and the Prefectural Attraction Promotion Team repeatedly negotiated with Sharp, both formally and informally, and as a result, Sharp decided to set up in Mie prefecture.

The Prefectural Attraction Promotion Team selected Sharp as its target because the company runs a promising business with growth potential, it already has another factory in the prefecture, and Tenri city in Nara prefecture where its development division is located is linked with the northern region of Mie prefecture by a motorway. Also, it was fortunate that there was a private site in Kameyama city which could satisfy the requirements of Sharp: 330,000 square meters of flatland, 10,000 ton/day water for industrial use, and land preparation to be completed within one year. For the 15-year period from FY2004, 9 billion yen will be provided by the prefecture, and 4.5 billion yen by Kameyama city as subsidies.

Sharp's Kameyama factory started full-fledged operation as an integrated plant, ranging from manufacture of the world's largest liquid crystal panels to assembly of liquid crystal TVs. Sharp's managerial strategy is to maintain a world-leading status while gathering everything from development to production of high-tech products at one location, thus promoting its "black box" technology.

In addition to the production of liquid crystal panels, the assembly process was transferred from its Yaita factory in Tochigi prefecture to be expanded further. Employment by Sharp has rapidly increased, with the transfer of employees from the Yaita factory and recruitment of new graduates. Also, related industries are joining in, thus accelerating the growth of regional employment.

When Sharp started its local operation in January 2004, the number of regular employees was about 500 persons, a figure which is scheduled to increase to about 650 in April including new graduates. Moreover, in April 2004, 12 cooperating companies within the site will be employing 1,680 workers, and eight related companies outside the site employing 1,040 workers, thus expanding the regional employment by 2,720. Accordingly, Mie's plan to strategically attract a company will generate employment of almost 3,500 persons at Sharp as well as its cooperating and related companies.

3. Reduction and trend toward high efficiency among manufacturers

From 1990 when the bubble economy burst, Japanese manufacturers have entered a retrenchment phase. In terms of employment, hollowing-out has progressed rapidly. However, looking at regions and companies microscopically rather than macroscopically, many regions have been building new business models or revitalizing their competitive power. While it is true that the manufacturing industry as a whole cannot avoid the trend toward scaling down, surviving companies have acquired new competitiveness and are becoming more efficient.

The basic strategy for developing the regional economy and employment in a mature society is to use not a stereotyped socioeconomic development model, but to use diverse, unique network-type models that suit the regional features and environment. This type of network will involve various organizations and individuals such as local governments (prefecture, city, town and village), national agencies, private enterprises, and NPOs. Local governments must develop their ability to implement and lead a regional development project to success starting from the planning stage. In particular, regions other than large cities and their surrounding areas and regions lacking agglomerations of manufacturers must develop excellent human resources who possess the

ability to strategically attract companies.

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