## Chapter 2 Innovation of Local Industries – Case study

### 2-1. Cases of Mie Prefecture and Aomori Prefecture: Mie Prefecture's Crystal Valley Initiative and Aomori Prefecture's Crystal Valley Initiative

#### 2-1-1. Objectives of Two Different Initiatives

In this section we will compare two cases of local area innovation initiatives focused on the FPD[1] industry – one is a case of Mie Prefecture and the other of Aomori Prefecture. Before taking up the main subject, it must be noted that it is not our intention to measure one initiative against the other.

The cases we shall discuss herein are Mie Prefecture's Crystal Valley initiative and Aomori Prefecture's Crystal Valley initiative, both of which aim to address the FPD industry. Let us begin by examining why both prefectures took notice of the FPD industry. Both prefectures argue that they focused attention on the FPD industry instead of the liquid-crystal industry, whose market has been expanding with thin-type TV sets and other new products, because the former is an "industry with a wider skirt." As shown in Diagram 2-1-1, the FPD industry comprises a wide variety of fields including liquid-crystal displays (LCDs)[2], plasma display panels (PDPs)[3], organic electroluminescence (EL) displays[4], and field- emission displays (FEDs)[5]. Canon announced the creation of a joint venture to manufacture SED[6]-based TV sets.[7]

1 FPD: Stands for Flat Panel Display. This generically means a flat-type display device. There are several kinds of FPDs. Typical ones include liquid-crystal-based displays (e.g., notebooks, cellular phones, liquid-crystal TV sets) and plasma-based displays (large-size TV sets).

2 LCD: Stands for Liquid-Crystal Display. A display device using liquid crystal.

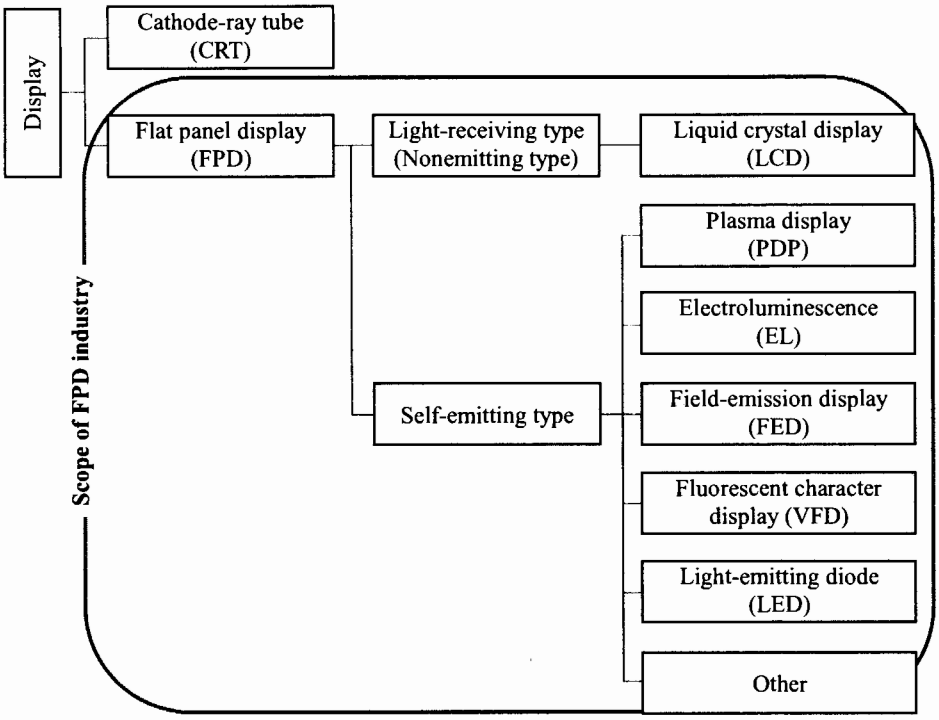
3 PDP: Stands for Plasma Display Panel. Made of a pair of glass sheets with high-pressure gas, e.g., helium or neon, contained between them. The device emits light when a voltage is applied.

4 Organic electroluminescence display: A display using material that emits light when voltage is applied. The organic EL display can produce a high level of luminance with low electric power. It is advantageous in terms of visibility, response, life, and power consumption. This device can be made to have a thin-type display like LCDs.

5 FED: Stands for Field-Emission Display. A display device used to emit light by releasing electrons from a flat-type source of electrons (emitter) into a vacuum against a fluorescent screen. Simply put, it is a variation of the cathode-ray tube that has the electron gun replaced with a flat electron source. It can realize a large-size flat-screen TV that can display images as bright and sharp as conventional CRTs do.

6 SED: Stands for Surface-conduction Electron-emitter Display. A display unit using a device called a surface-conduction electron emitter. A variation of the FED. It can realize a large-size flat-screen TV that can display images as bright and sharp as conventional CRTs do.

7 In October 2004 Canon and Toshiba reached an agreement to make a joint venture to develop, manufacture, and sell SED panels. (Their press releases were sent on September 14, 2004)




Source: Mie Prefecture

**Diagram 2-1-1 Classification of displays by technology**

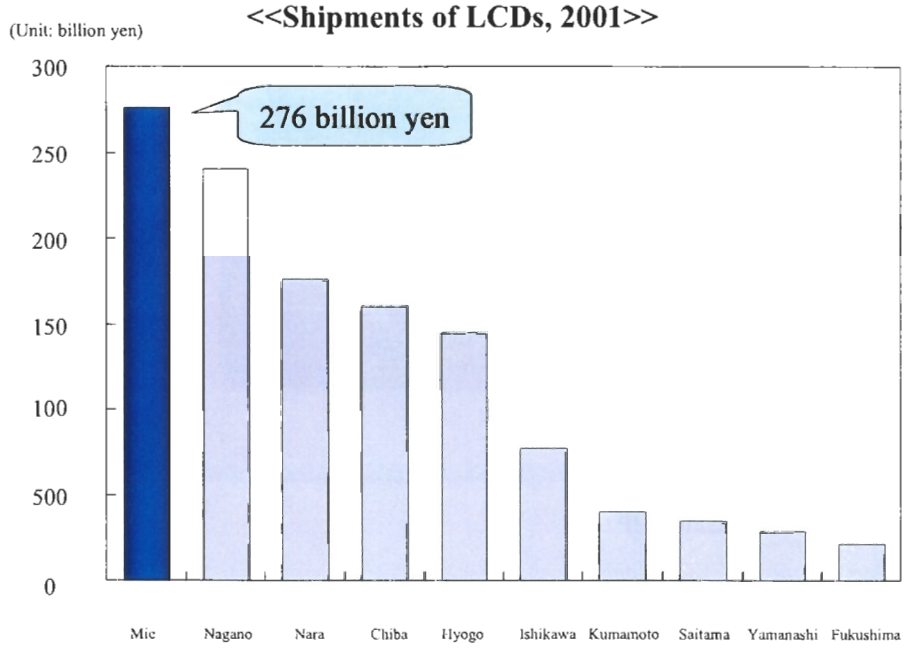
Both prefectures are planning to expand the scope of their local industrial innovation initiatives to the organic EL display industry in the future. Another reason why Mie and Aomori have an eye on the FPD industry is because it is a growth industry with potential market expansion. According to data of the Ministry of Economy, Trade, and Industry[8], the annual market for display devices will increase to about ¥12,000 billion in 2010 from about ¥5,100 billion in 2000.

### 2-1-2. Objectives of Mie Prefecture's and Aomori Prefecture's Initiatives

First, I would like to examine the objectives and overall concept of Mie Prefecture's Crystal Valley initiative. The initiative is a strategic effort intended to help accelerate the integration of a special industry by leveraging on the existing industry accumulation. In the case of the Crystal Valley initiative, the special industry is the FPD industry. In other words, the initiative is intended to cause the existing industry integration to grow like a snowball through the synergistic effect of existing industry integration. Specifically, with the Crystal Valley initiative, the prefecture wants to touch off externally motivated growth (that is, introducing companies from outside the prefecture, or more specifically, moving Sharp's Kameyama factory, Kameyama City, and its related companies) by capitalizing on the existing industry accumulation built around Sharp's Mie factory in Taki Town, Taki County, and thereby allowing the externally enhanced industry accumulation to pave the way for internally motivated economic growth (that is, allowing autonomous industry development within the prefecture). According to industrial statistics published by Mie Prefecture, it is the largest prefecture in terms of shipment volume of LCDs (Diagram 2-1-2). The

8 Technology Survey Report: Technology Trends Part I – Outlook for the Display Market, edited by the Technology Survey Office, Technology Environment Bureau, Ministry of Economy, Trade, and Industry, February 2002

prefecture aims to expand the existing LCD-related industry accumulation. Its Crystal Valley initiative, projected for the period up to 2010, successfully introduced 63 FPD-related companies and 71 FPD-related business offices as of October 2004, surpassing the originally planned level of 55 companies and 64 business offices.




Source: Industry statistics tables, Ministry of Economy, Trade, and Industry

**Diagram 2-1-2 Mie ranks first in shipment volume of LCDs**

Next, let us take a look at Aomori Prefecture's Crystal Valley initiative. The basic concept of the initiative is "initiating a new deployment of industry policies for the twenty-first century." Specifically, it introduces four new ways of thinking: (1) Calling forth local autonomy; (2) Developing and reusing local resources; (3) Having a global perspective (aimed at helping grow the Japanese manufacturing industry as a whole by having the FPD industry take root in Aomori and develop from there rather than focusing narrowly on the FPD industry within Aomori Prefecture); and (4) Building a new city that enables the harmonious coexistence of industry, nature, and humanity. As is evident from the abovementioned fourth policy. Aomori Prefecture's Crystal Valley initiative differs from that of Mie Prefecture in that the former is intended as an area development (city-building) project around Mutsu-Ogawara rather than a local industry revitalization project (Diagram 2-1-3). The initiative covers a ten-year period started in January 2001. This is the fourth year of the initiative. It is aimed to help build 10 to 15 business offices, bringing about 5,000 to 6,000 new jobs with projected annual shipments of ¥240 billion.


Source: Aomori Prefecture HP

**Diagram 2-1-3 Rendering of Aomori Prefecture's Crystal Valley initiative**

### 2-1-3. Comparison between Mie and Aomori in Terms of their FPD Industry Accumulation Plans

Diagram 2-1-4 summarizes both prefectures' initiatives, local resources, and community industry relationships. We will examine in detail each item in this section.

**Diagram 2-1-4 Comparison between Mie and Aomori Prefectures' Crystal Valley Initiatives**

■ **Mie initiative: An extension of the existing industry strategy**

■ **Aomori initiative: A project aimed at developing a new industry from scratch**

| | | Mie Prefecture Crystal Valley Initiative | Aomori Prefecture Crystal Valley Initiative |
|---|---|---|---|
| Type of innovation | | To attract firms (leveraging on the existing industry complex) | To attract firms (building a new type of industry accumulation) |
| Current status of progress | | 18 companies | One company (one more announcing its move to Aomori) |
| Economic ripple effect (estimated by the prefecture) | | 555.3 billion yen, 12,238 jobs | No estimate available (The prefecture has a target.) |
| Subsidies | Government | – | ◎(max. 4 billion yen) (shared equally between government and prefecture) |
| | Prefecture | ◎(max. 9 billion yen) | ◎(max. 3 billion yen) |
| | Local municipalities | ◎(max. 4.5 billion yen) | △ |
| Local Resources | Existing industry integration | ◎(built around Sharp's Mie factory) | –(to develop a new industry) |
| | Core industry | ◎(Sharp's Mie factory and Kameyama factory) | – |
| | Coordination with other Valley initiatives | ◎(Silicon Valley initiative) | –(Aomori's only prefectural Valley initiative) |
| | Coordination with existing industry integrations | ◎ | ◎ |
| | R&D setup | △ | ◎(Prof. H. Seki, Hachinohe Institute of Technology) |
| | Transport infrastructure | ◎(For Sharp Corporation.) | – |
| | Brand value | ◎("Kameyama" brand) | – |
| | Supply of labor (bluecollar) | △(Japan's highest in terms of the ratio of available jobs) | ◎(Japan's lowest in terms of the ratio of available jobs) |
| | Natural environment | △ | ◎(Less frequent lightning strikes and typhoons) |
| | Industry infrastructure (industry water supply) | ◎ | ◎ |
| | Prefectural governer's commitment | ◎ | △ |
| Industry-community relationships | | Busuness-focused (Future overseas transfer possible) (Yatsugatake-type business-sustained city envisaged) | Community-based (Taking root in the community and merging into the local economy) |

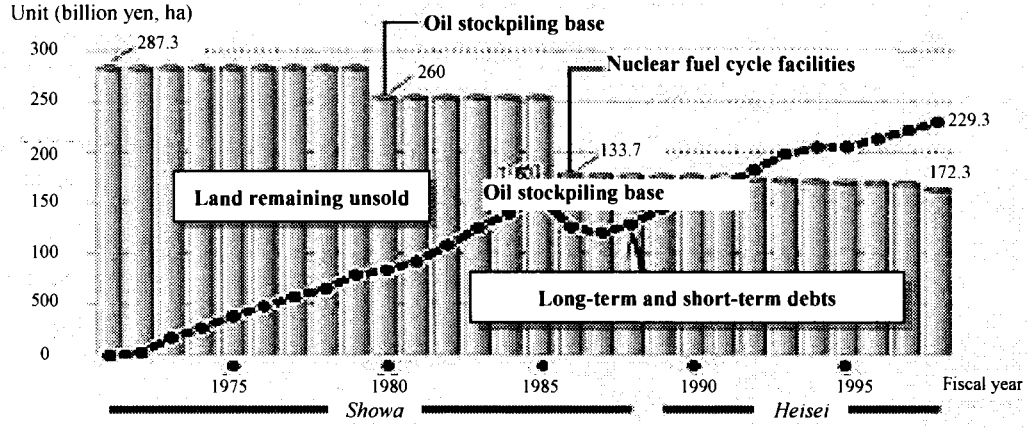
Note: ◎: Applicable △: Cannot be determined –: Not applicable

Source: The author's evaluation based on surveys including interviews, etc.

### (1) Types of Innovation

Now I would like to examine the types of the two prefectural initiatives (innovations). Both initiatives are much the same in that they depend on attracting plants and firms; however, their contents are quite different.

Mie Prefecture intends to add to and expand the existing industry accumulation built around Sharp's Mie factory. On the other hand, Aomori Prefecture wants to introduce and develop the FPD industry from scratch because it has had no accumulation of that industry. Aomori Prefecture experienced the abortion of its Mutsu-Ogawara Industrial Development project. Diagram 2-1-5 shows Mutsu-Ogawara Development Corporation's debts and lots not yet sold since late 1975. (Mutsu-Ogawara Development Corporation was renamed Shin Mutsu-Ogawara Inc.) In the Diagram, the bar graph shows changes in the area of land remaining unsold and the line graph shows the balance of debts. The corporation has been making efforts to sell land by attracting a national oil stockpiling base and nuclear fuel cycle facilities. Nevertheless, it still has about 1,700 ha of land remaining unsold. Moreover, the amount of borrowings has been on the rise, reaching as much as about ¥23 billion. The parties participating in the Crystal Valley initiative have a strong desire to get this area up and running. They are considering revitalizing the area by developing the FPD industry as the area's driving engine.



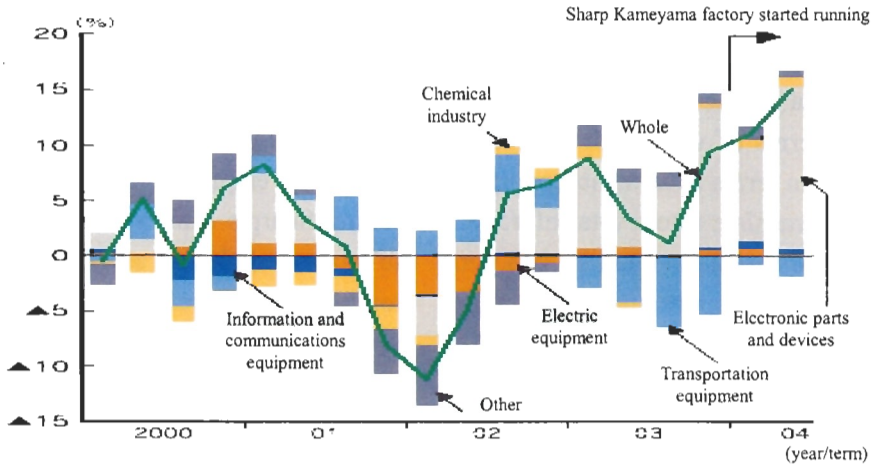

Source: Web Toou Nippo: The accounting of 30 years of the mammoth development project

**Diagram 2-1-5 Mutsu-Ogawara Development Corporation's debts and land remaining unsold**

It seems obvious that Mie Prefecture has a well-defined strategy of adding to the existing accumulation of the FPD industry by drawing on the traditional tactics of attracting plants and firms with huge subsidies as incentives[9]. Diagram 2-1-6 gives the breakdown of Mie Prefecture's mining and manufacturing production. It can be seen from the Diagram that the prefecture's mining and manufacturing production owes much to Sharp's Kameyama factory. The prefecture intends to accelerate this trend by leveraging on the factory.

In the case of Aomori Prefecture, after conducting some interviews I became doubtful about the prefecture's focus on the FPD industry. The prefecture has implemented various tactics including large subsidies and support programs. Since, however, its strategy is not well defined (the prefecture points to its focus on the natural environment), it has to push its initiative solely by deploying tactics. It can be said that Aomori Prefecture needs to formulate a more definite strategy aimed at developing the FPD industry as the prefecture's new area of economic activity.

9 According to the Office of Industrial Location, Mie Prefecture, the Crystal Valley initiative is the strategy and inviting companies is the tactic. Tactics count when it comes to attracting companies. Subsidies are part of the prefecture's tactics to provide support for incoming companies. (Lecture material at the Display Industry Forum 2005, February 7, 2005)




Source: Mie Prefecture Mining and Manufacturing Production and Index of producers' inventory by Mie Prefecture Statistics Survey Department (from Mie Bank Ltd. HP)

**Diagram 2-1-6 Changes in Mie Prefecture's mining and manufacturing production (Percentage of contribution, year-to-year comparison)**

### (2) Progress of Mie and Aomori Initiatives

How are the two initiatives going now? Mie Prefecture experienced an increase in the number of FPD-related companies from 33 at the start of the project to 63 as of October 2004[10]. Sharp Corporation's Kameyama factory started its operation in January 2004, followed by Toppan Printing and U-tec, both of which built their factories in the vicinity of the Sharp Kameyama factory. U-tec's Kameyama factory (U-pack's main plant) manufactures cardboard used for the shipment of Sharp's LCD TV sets. In addition, two taxi businesses opened their offices and supermarket and convenience store chains made new store openings in the area. Businesses finding their way into this area are almost all based outside Mie Prefecture.

Aomori Prefecture estimates that 10 to 15 companies will set up shop in the Mutsu-Ogawara area. To date, however, no companies have entered the area, with the exception of AIS, a manufacturer of LCD filters for cellular phones, which started its operation in July 2001. The second company to come to the area will be AMS, a manufacturer of liquid-crystal backlight displays and interior lighting equipment using white organic EL devices. It started building its factory in March 2005. Given the fact that the projected number of incoming companies is ten to fifteen and that the initiative has already been in place for four years, it cannot be denied that Aomori Prefecture has been lagging behind its Crystal Valley project schedule. The two companies referred to above are based in Aomori Prefecture, which is very unlike the case of Mie Prefecture – this may have significant implications.

### (3) Economic Ripple Effects

Let us now examine what kinds of economic impact the two initiatives will have. Economic ripple effects can be divided broadly into two types. One is the impact on manufacturing and the other relates to the impact on employment leading to the revitalization of the local economy. In the case of Mie Prefecture, the original estimate was as follows: Sharp's Kameyama factory would produce output worth about ¥400 billion when operated at full capacity. Some 1,500 people would be employed, including those working for the affiliated plants located at the Kameyama

10 The number of new companies that set up shop was one in 2002, nine in 2003, and sixteen in 2004. (Lecture material at the Display Industry Forum 2005, February 7, 2005)

factory site. The economic ripple effects expected to be brought about in the prefecture would be ¥155.3 billion in terms of volume of production and 10,738 people in terms of new job opportunities. These would translate into a total of ¥555.3 billion in volume of production and 12,238 people in terms of new job opportunities. In October 2004 it is estimated that 2,552 people (vs. the originally planned 1,500) would be employed at the Kameyama factory and its affiliated plants. It can be said that the initiative has been more successful than was originally planned.

On the other hand, Aomori Prefecture originally set its production and employment objectives at ¥240 billion in terms of volume of product shipments and about 5,000 to 6,000 people in terms of new job opportunities, respectively. However, the prefecture has not estimated the ripple effects of the initiative even after it was implemented. In reality, AIS, the first to open shop under the prefecture's Crystal Valley initiative, had 259 employees as of the end of July 2004, 170 of whom were from within the prefecture. AMS, another company planning to open shop in Mutsu-Ogawara, is expected to provide jobs for about 120 people at the start of its operation.

The two prefectures differ significantly when it comes to employment. In the case of Mie Prefecture, Sharp's Kameyama factory and its affiliate plants employed as many as 2,967 people from within the prefecture, but the percentage of residents of Kameyama City is low and almost no graduates were hired. It can therefore be said that Mie Prefecture's Crystal Valley initiative has contributed to increasing employment in the prefecture but remains less than satisfactory for employment within Kameyama City. A think-tank run by a local bank explained that in Kameyama City, accommodation for single persons, e.g., rental apartments, are lacking and that jobseekers tend to go to Suzuka City and other municipalities around Kameyama. To cope with the situation, Kameyama City is now having a boom in building rental condominiums. In contrast, in Aomori Prefecture, of AIS's 259 employees, 170 are from within the prefecture, including 25 residents of Rokkasho Village. The percentage of new graduates is high. The company plays a major role in promoting employment in the village.

**(4) Subsidies**

What kinds of subsidies are available for these initiatives? In the case of Mie Prefecture's Crystal Valley initiative, no national subsidies are available. Instead, the prefecture subsidizes 15% of the amount invested in fixed assets within the limit of ¥9 billion. Sharp invested ¥100 billion in its Kameyama factory, so the company can receive the maximum subsidy of ¥9 billion[11]. When it comes to subsidies of cities, towns, and villages, Kameyama City refunds 90% of the amount that is equivalent to fixed asset tax in installments of 15 years within the limit of ¥4.5 billion. In effect, a total of ¥13.5 billion in prefecture and city subsidies was used to enable Sharp build its Kameyama factory.

In the case of Aomori Prefecture, the government and the prefecture share the subsidy of ¥5,000 per square meter when a company purchases a factory site. For example, if a company purchases a lot of 80 ha, it can receive a subsidy of ¥4 billion. The prefecture has another subsidy program, offering 10% of the investment made with a limit of ¥3 billion per company. When it comes to subsidies of cities, towns, and villages, Rokkasho Village makes some contribution to working capital financing funds, but doesn't offer any significant subsidies.

In the case of Mie Prefecture, it may be safe to say that Kameyama City was persuaded by the prefecture to take part in its Crystal Valley initiative. Actually, the city is to defray ¥4.5 billion in subsidies, notwithstanding the fact that its

11 The prefecture's ¥9-billion subsidies will be defrayed in installments of 15 years. The first installment, ¥3 billion, will be granted in fall 2004.

budget scale is no larger than about ¥16.1 billion (2005 provisional budget). A city with a small annual budget of ¥16.1 billion decided to provide as much as ¥4.5 billion in subsidies although it is to be defrayed in installments of 15 years, whereas the subsidies offered by its umbrella prefecture do not exceed ¥9 billion. Furthermore, as explained in the subsection discussing the economic ripple effects of the initiatives, the expenditure of as much as ¥4.5 billion has not produced a job-creating effect for the city as originally expected. It could be called into question as to whether or not the city's decision to defray subsidies was appropriate. On the other hand, Mie Prefecture's initiative has resulted in an increase in employment that was beyond expectations for its subsidies of ¥9 billion. The prefecture is confident that the defrayment will be collected in about ten years through prefectural and other taxes payable by the employees.

When it comes to Aomori Prefecture's Crystal Valley initiative, Rokkasho Village offers almost no subsidies. What counts is the relationship between the national government and the prefecture. From this point of view, it can be said that the prefecture has taken advantage of the government's subsidies in pushing with its project. Originally, the government had a giant project for the development of the Mutsu-Ogawara area. The prefecture is encouraging corporations to move to the area by using the national subsidies for the development of that area.

Both prefectures place emphasis on their efforts to attract businesses to their respective development areas by leveraging on huge subsidies (a total of ¥13.5 billion in the case of Mie Prefecture and ¥7 billion in the case of Aomori Prefecture). The difference lies in the composition of these subsidies: "the prefecture + the city" for Mie and "the national government + the prefecture" for Aomori.

**(5) Local Resources**

Local resources can be compared from various aspects.

**① Existence of core companies**

In Mie Prefecture Sharp's Mie factory already exists in addition to the Kameyama factory, which commenced operation on January 8, 2004. Diagram 2-1-7 presents an overall profile of Sharp's Kameyama factory. The factory manufactures liquid-crystal panels and assembles them into TV sets in a continuous process. Diagram 2-1-8 shows Sharp's forecast of its liquid-crystal business growth. Diagram 2-1-9 gives a list of the company's liquid-crystal-related investments. Sharp has plans to make a huge capital expenditure of more than ¥400 billion in Mie Prefecture. In addition, the company announced on January 12, 2005 that it would build a second factory in the Kameyama factory site. Its total expenditure including buildings and production equipment would amount to about ¥150 billion. The factory is scheduled to start its operation in October 2006. Mie Prefecture has successfully synchronized its Crystal Valley initiative with Sharp's growing liquid-crystal business, adding to the effect of industry integration

## ■ Operation started on January 8, 2004

≪Profile of Kameyama factory≫

| | |
|---|---|
| Location: | 464 Kougawa, Shiraki-cho, Kameyama City, Mie Prefecture |
| Area of site: | About 330,000m² |
| Total floor area: | About 243,800m² |
| Type of structure: | Steel-reinforced concrete 5-story (about 280m in width, about 320m in length) |
| Buildings: | Large liquid crystal display plant, large liquid crystal TV set plant, administration building, etc. |
| Amount invested: | About 100 billion yen (including the lot, buildings and 1st and 2nd production lines) |
| Workforce: | About 1,000 people (as of January 2004 when the factory started its operation) |

≪Large LCD plant≫

| | |
|---|---|
| Total floor area: | About 117,700 m² |
| Mother glass size: | 1,500×1,800 square millimeters (12 sheets of a wide 26-inch display) |
| No. of sheet input: | 15,000 sheets a month<br>(Equivalent to 180,000 sheets of a wide 26-inch liquid crystal module every month)<br>With the start of the second production line the capacity has increased to 27,000 sheets a month since August 2004.<br>(Equivalent to 334,000 sheets of a wide 26-inch liquid crystal module every month) |

≪Large liquid-crystal TV set plant≫

| | |
|---|---|
| Total floor area: | About 77,200 m² |
| Products: | Large liquid-crystal TV sets (25 inches and larger) |
| Production capacity: | 100,000 sets a month |

Source: Prepared by the author based on Sharp's HP

**Diagram 2-1-7 Profile of Sharp Kameyama Factory**

■ **Increase in the production capacity of large-size liquid-crystal displays for TV sets: Kameyama Factory**

| | Production line 1 | Production line 2 | Production line 3 |
|---|---|---|---|
| Start of operation | January 2004 | August 2004 | 2005 |
| Total number of input glass sheets | 15,000 sheets/month → | 27,000 sheets/month → | 45,000 sheets/month |
| Investment amount | 100 billion yen | | 50 billion yen |
| Mother glass size | 1,500 x 1,800 mm | | |

■ **Increase in the production capacity of liquid-crystal displays for medium/small systems: Tenri Factory & Mie Factory**

| | Tenri Factory | Mie Factory No. 3 | |
|---|---|---|---|
| | | Production line 1 | Production line 2 |
| Start of operation | October 2002 | June 2003 | March 2004 |
| Total production capacity (as converted to type 2) | 2,500,000 sheets/month → | 6,500,000 sheets/month → | 12,200,000 sheets/month |
| Investment amount | 46 billion yen | 50 billion yen | 42 billion yen |
| Mother glass size | 620 x 750 mm | 730 x 920 mm | |


Source: Prepared by the author based on Sharp's HP

**Diagram 2-1-8 Sharp's growing liquid-crystal business**

■ **Sharp plans to invest about ¥400 billion in Mie Prefecture**

| Start of operation (Month/Year) | Factory | | Amount of investment (100 million yen) | Mother glass size (mm) | Products |
|---|---|---|---|---|---|
| 08/00 | Mie No.2 | Stage 1 | 600 | 680×880 | 20-inch sheet x 4 LCD TV |
| 04/01 | Mie No.2 | Stage 2 | 700 | 680×880 | 20-inch sheet x 4 LCD TV |
| 10/02 | Tenri | NF1 | 460 | 620×750 | 2 to 8 inch LCD for systems |
| 06/03 | Mie No.3 | Stage 1 | 500 | 730×920 | LCD for systems |
| 03/04 | Mie No.3 | Stage 2 | 420 | 730×920 | LCD for systems |
| 03/05 | Mie No.3 | Stage 3 | 300 | 730×920 | LCD for systems |
| 01/04 | Kameyama | Stage 1 | * | 1500×1800 | LCD TV sets (25-inch and larger size, integrated production) |
| 08/04 | Kameyama | Stage 2 | * | 1500×1800 | LCD TV sets (25-inch and larger size, integrated production) |
| — | Kameyama | Stage 3 | 500 | 1500×1800 | LCD TV sets (25-inch and larger size, integrated production) |

Note 1: Sharp invested a total of ¥100 billion in Kameyama Factory. The investment was made in two installments: January and August in 2004.

Note 2: The start of Kameyama Factory's line No.2 can be moved up to May 2004.

Note 3: Kameyama Factory's line No. 3 is scheduled to be started during the period between the end of 2004 and the beginning of 2005.

Note 4: DIR forecast for March 2004 and after.

Source: Prepared by the Office of Investment Information, Daiwa Securities, based on material supplied by the Daiwa Institute of Research, etc.

**Diagram 2-1-9 Sharp's liquid-crystal-related investments**

### ② Coordination with other "Valley" initiatives

Originally, Mie Prefecture formulated four "Valley" initiatives including the Crystal Valley initiative. They included the "Medical Valley" initiative[12], "Silicon Valley" initiative[13], and "Pearl Valley" initiative[14]. The prefecture now places emphasis on the Silicon Valley initiative because it is related to the Crystal Valley initiative. In the northern area of Mie Prefecture, Toshiba and Fujitsu run semiconductor plants. Mie Prefecture wants to help reinforce relations between the semiconductor industry and the liquid-crystal industry in the prefecture.

In the case of Aomori Prefecture, the Crystal Valley initiative is the only industrial initiative of its own. However, the prefecture has a special environment and energy industry creation zone in the Mutsu-Ogawara area to push its energy-related policies. There you can see an interesting landscape dotted with a national oil stockpiling base[15], a nuclear fuel cycle base and 44 huge windmills for power generation[16].

12 An initiative intended to promote medical care, health and welfare.

13 An initiative aimed at adding to the semiconductor-related industry accumulation.

14 The Shima Area of Mie Prefecture serves as a place of landing for several international undersea optical cables. The project is intended to capitalize on this regional characteristic to promote low-cost high-speed information communication networks and thereby help accumulate IT-related industries including call centers, data centers and software businesses. In September, 2004, however, Governor Akihiko Noro decided to make an overall review of the project, which virtually translates into abandoning the project.

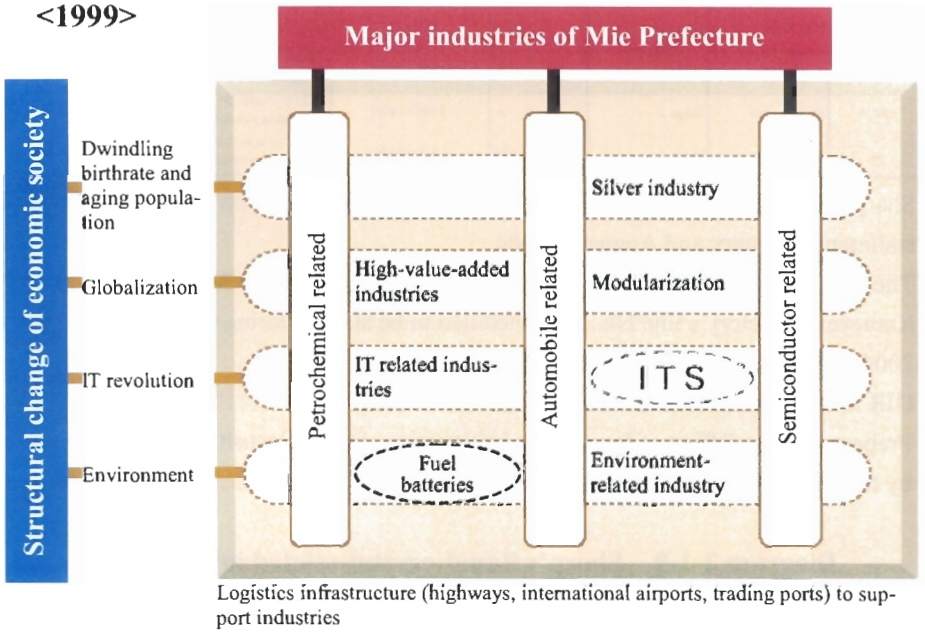
15 The breakdown: 22 units run by Rokkasho Village Wind Power Generation Corporation and another 22 units run by Eco Power Corporation.

16 "I saw a little bit strange landscape in Rokkasho Village of Aomori Prefecture. Beyond the facilities to process fuel spent by nuclear power plants, there was a row of colorful tanks of the national oil stockpiling base, and on the backward hillside the huge blades of more than twenty wind generators were turning, representing nuclear power, fossil fuel and natural energy, respectively." Quoted from Shunju, Nihon Keizai Shimbun, December 3, 2004.

### ③ Coordination with other industries

Mie Prefecture has three existing industry accumulations. These are the petrochemical industry typified by the Yokkaichi industrial complex, the automobile and related industries built around Honda's Suzuka factory, and the electronic parts and device–related industries centering on the liquid-crystal business of Sharp and the semiconductor business of Fujitsu and Toshiba.

Diagram 2-1-10 illustrates how the three industrial accumulations were related in the 1990s. It can be seen from the Diagram that in the past these three industries did not have strong relations.

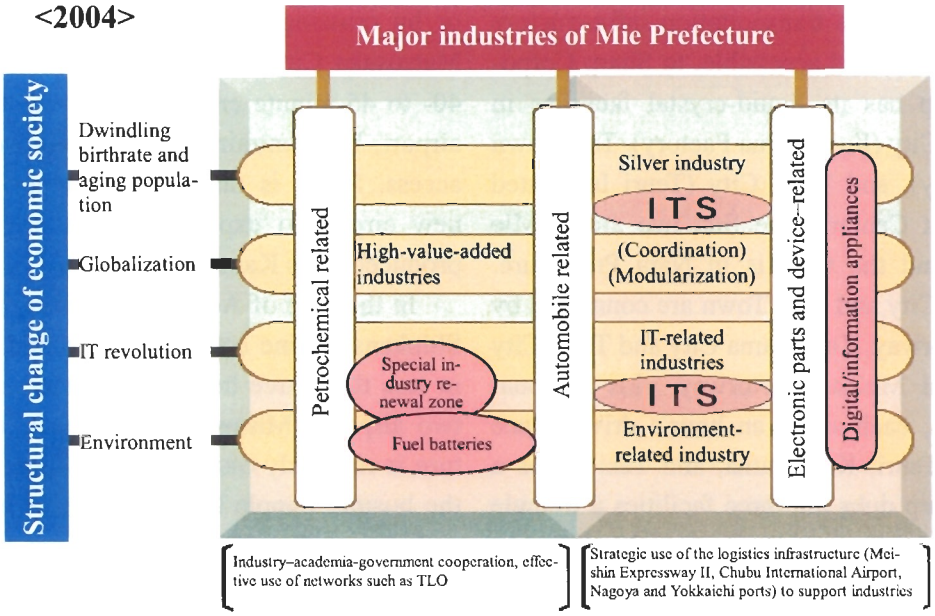



Source: Prepared by Miegin of Institute of Research on the basis of the prefecture's survey report of March 2000

**Diagram 2-1-10 New trends of major industries in Mie Prefecture ①**

However, Diagram 2-1-11 reveals that in recent years these three major industries have been strengthening their mutual ties in areas such as fuel batteries, ITS[17], and environmental issues. In the liquid-crystal industry, JSR (formerly Japan Synthetic Rubber) built a new optical film plant within its Yokkaichi factory to manufacture film products for liquid-crystal displays. The Yokkaichi factory started early, in 1960. The new plant is intended to manufacture optical films for delivery to Sharp's Kameyama factory.

17 ITS: Stands for Intelligent Transport Systems. A new transport system designed to solve road-traffic-related problems such as traffic accidents and traffic jams by effectively linking people, vehicles, and roads using information technology.




Source: Prepared by Miegin Institute of Research on the basis of the prefecture's survey report of March 2000

**Diagram 2-1-11 New trends of major industries in Mie Prefecture ②**

In Aomori Prefecture, AIS, which was the first to take part in the Crystal Valley initiative, uses Hachinohe Refinery to process waste glass. As this case suggests, a major challenge for Aomori Prefecture is how the Hachinohe industrial district can be used effectively.

**④ R&D setup**

In Mie Prefecture, the role of universities remains minimal in the Crystal Valley initiative primarily because: i) The number of liquid-crystal-related researchers available in the prefecture is small; and ii) large corporations like Sharp have R&D facilities of their own[18]. In June 2002 the prefecture established a display industry study meeting. However, the meeting conducted its activities not as a study meeting of the Crystal Valley initiative but as a part of the government's industry cluster project dubbed "Tokai Manufacturing Industry Creation Council." The prefecture believes that internally motivated economic development cannot take place without accelerated technology transfer to local businesses. To this end, the prefecture intends to make good use of Mie University and other institutions.

Unlike Mie Prefecture, Aomori Prefecture places great importance on the role of universities. The initiative aims at improving the prefecture's R&D setups by giving priority to enhancing its R&D functions. The prefecture intends to win high repute in the field of FPD by promoting world-class R&D projects and thereby making Aomori attractive to researchers. Specifically, under the leadership of Professor Tatsuo Uchida of Tohoku University and Professor Hidehiro Seki of Hachinohe Institute of Technology, six universities, ten companies, and two public research labs have teamed up to carry out a joint Aomori Prefecture R&D consortium. Also, the prefecture created a clean room in March 2004 in a prefectural lab and built a new FPD research institute, inviting research workers from outside the prefecture. In addition, the prefecture opened a course at the Hachinohe Institute of Technology to help develop human resources useful in the FPD industry.

18 Sharp Corporation has a technology center building in its Mie factory where its liquid-crystal engineers gather.

### ⑤ Transportation infrastructure

Mie Prefecture's transportation infrastructure seems attractive, and accessible, to Sharp Corporation. Sharp has its liquid-crystal facilities in Kameyama City (Kameyama Factory), Taki Town (Mie Factory), and Tenri City (Tenri Integrated Development Center). The first two are in Mie Prefecture and the third is in Nara Prefecture. Kameyama City and Taki Town are connected by the Ise Motorway, Kameyama City and Tenri City by the Nishi Meihan Motorway, plus National Highway 25, each about an hour's drive. Since connecting Tenri, Kameyama, and Taki forms a triangle, Sharp dubs the three facilities a triangle scheme[19]. National Highway 25 linking Kameyama City and Tenri City was once a toll road but it is now free to use. Another important transportation facility is the new international airport, Centrair, which opened on February 17, 2005. There are three options to access the airport from within Mie Prefecture: by land via Nagoya or by crossing Ise Bay from Tsu City or from Matsusaka City on a high-speed vessel (about a 40- to 45-minute cruise). Mie Prefecture has no airport, but Centrair Airport is relatively easy to access. Sharp is discussing whether to use the new airport to export the liquid-crystal panels produced at its Kameyama factory[20].

In the case of Aomori Prefecture, the Tohoku Shinkansen Line connects Tokyo and Hachinohe in less than three hours. The prefecture also has two airports (Misawa and Aomori). The prefecture is relatively easy to access when it comes to the businesspeople traffic. But there is some uncertainty with respect to lead time for entering companies when it comes to physical distribution, that is, procuring raw materials and shipping and selling finished goods. Aomori Prefecture has plans to build an international cargo airport, but the possibility is slim.

### ⑥ Brand values

On its homepage, Sharp advertises the first series of liquid-crystal TV sets manufactured by its Kameyama factory. Also, media reports said that in January 2004, when the Kameyama factory started its operation, some appliance stores had consumers who asked for TVs manufactured at the factory. Oftentimes, vegetables and other perishables bear place-of-origin indications. But it is unusual to sell TV sets by specifically advertising their place of origin. The place-of-origin indication of "Manufactured by Kameyama Factory" reflects i) Sharp's strategy to capitalize on the recognition of Kameyama factory as the world's most advanced factory, ii) Sharp's corporate brand recognition spread through the media, and iii) the acknowledged reliability of Japanese industrial products. Anyway, the media has made "Kameyama" a huge brand image. Kameyama was traditionally identified with its local candle-making industry but it has undergone an image change: it is now dubbed the "city of liquid crystal" or even the "city of Sharp[21]." Mie Prefecture feels somewhat uneasy about this phenomenon. According to the prefecture, it's OK to be the city of Sharp at the municipal level, but the prefecture itself should not be identified with Sharp or liquid crystal.

In the case of Aomori Prefecture, the Mutsu-Ogawara area and Rokkasho Village, which are central to the prefecture's Crystal Valley initiative, have a rather negative image due to the nuclear fuel cycle facilities.

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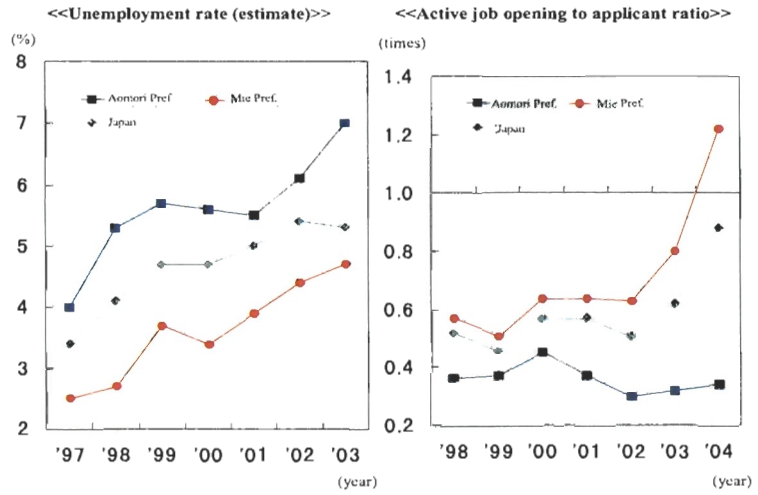
19 Z. Tani, Director, Liquid-Crystal Business, Sharp: Sharp's liquid-crystal business strategy and its contribution and expectation to Mie Prefecture, lecture at Project "C" kickoff conference, Leading industries seminar, June 3, 2002

20 *Nihon Keizai Shimbun*, December 1, 2004

21 Kameyama Co., Ltd., the manufacturer of Kameyama brand candles, has its head office factory in Kameyama City. The company accounts for about 75% of the domestic market for candles for use at Shinto and Buddhist ceremonies.

### ⑦ Labor supply

Diagram 2-1-12 shows the unemployment rate and the ratio of active job opening to applicant in Mie Prefecture and Aomori Prefecture.




Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications, and Ministry of Health and Welfare

Source: Prepared by the author based on "Minryoku" published by Asahi Shimbun

**Diagram 2-1-12 Employment situation in Mie and Aomori**

Mie Prefecture's unemployment rate has been below the national average. The ratio of available jobs has been above 100%. According to a local bank-run think tank, the employment situation has been improving rapidly since around September 2003, causing companies to suffer from a manpower shortage. While they advertise for temporary workers, part-timers, and contract workers for their new plants and others, applicants want full-time jobs because of the strong labor market, making it difficult to recruit adequate people for unfavorable conditions. They are forced to offer better conditions for employment and hire full-time employees. But hiring full-time employees involves higher costs including benefit expenses, which in turn translate into profit erosion. In Mie Prefecture, since the labor market is tight and favorable to workers, companies are forced to offer attractive employment conditions to secure the necessary manpower, resulting in increased costs and reduced profitability.

In contrast, Aomori Prefecture's unemployment rate has been above the national average. The ratio of available jobs remains flat although the national average has been picking up. The employment situation is very severe. It can be said that the labor market is a buyers market. According to the prefecture, the inactive employment situation in terms of the ratio of available jobs partly reflects the fact that job applicants tend to seek jobs in their hometowns. We previously noted that local employment has been on the increase in Aomori Prefecture by referring to AIS's employment of 25 people straight out of school. Ironically, this may confirm young people's hometown-oriented job preference.

### ⑧ Natural environment

Now, let us turn to the natural environment. To help attract FPD companies, Aomori Prefecture points to its natural environment, whereas Mie Prefecture does not refer much to the natural environment in its Crystal Valley initiative. In Kameyama City, "symbiosis with nature" is taken up as a challenge. The site of Sharp's Kameyama factory was originally a forest in which groups of monkeys lived. The city is racking its brain to come up with measures to cope with the crop damage caused by these monkeys that were forced to leave their habitat.[22]

Aomori Prefecture emphasizes the characteristics of its natural environment, that is, i) a solid bedrock (especially suitable for oil stockpiling base and nuclear fuel cycle facilities), ii) cool weather, and iii) infrequent lightning. The manufacture of liquid-crystal displays requires a clean room that is kept at a constant temperature year-round. In Aomori, the weather is cool in summertime. This helps FPD companies save about 10% of air-conditioning costs. The infrequent lightning is also favorable to liquid-crystal and other microtechnology industries.

## (6) Relationship between Communities and Companies

Both Aomori and Mie depend on companies moving in from the outside for their Crystal Valley initiatives. For this reason, the relationship between the affected communities and incoming companies counts. Mie's initiative can be regarded as an effort to make a so-called corporate town built around Sharp's Mie factory and Kameyama factory. But the prefecture does not intend to just make corporate-town-type industry accumulation areas.[23] From the viewpoint of business management, Sharp moved to Mie prefecture partly because of the prefecture's strong persuasion. But this was not the largest factor.[24] Sharp must have made the decision to enter the prefecture based on its own judgment. The company will no doubt remain in Kameyama City until it recovers its invested money. But it is unknown whether or not it will continue operating in the city for another 20 or 30 years thereafter. Also, supposing that Sharp withdraws its Mie factory and Kameyama factory, it is unknown whether or not other companies that moved to the prefecture with the aim of doing business with Sharp will remain. The prefecture has similar misgivings. In light of this, it can be said that the community–company relationship in Mie Prefecture's industrial innovation initiative is focused on business. The prefecture has to take into consideration the possibility of Sharp's withdrawal. If such a situation occurs, the initiative will become stuck for as long as it depends on the existence of Sharp for area innovation. Many corporate towns depend on a single core company. Yet depending on a single company may eventually lead to a stalemate. In view of this, it is necessary to build a corporate city centering on more than one company, in order to form a wide industrial structure. The prefecture wants to avoid being represented solely by Sharp Corporation.

Aomori Prefecture's Crystal Valley initiative is positioned as an effort to promote regional development. Naturally, companies willing to provide support for this scheme have been entering the prefecture. AIS, the name of the first company to set up shop under the initiative, can be interpreted twofold: i) Advanced Innovation Speed

22 As the mountain was opened up for the project, about 140 monkeys were forced to evacuate their habitat and move down to villages, where they did troublesome things. (K. Nishioka: Industry Overview, Sharp Kameyama factory and the liquid-crystal industry. Quoted from Nikkei Microdevice HP.)

23 Company town-type agglomeration refers to an area where single company or plural companies become(s) the core and attract(s) a number of subcontractors of parts and components in the same community or neighboring areas.

24 According to lectures given by Sharp's executives, the reasons why the company intends to remain in Japan can be summarized as follows: i) Liquid-crystal technology is still undergoing progress and the liquid-crystal business involving state-of-the-art technology requires the competent Japanese engineers who helped launch the liquid-crystal industry. ii) It is necessary to integrate important management resources in the Tenri-Kameyama-Taki triangle framework.

and ii) Aomori Information technology Supporter. The latter reflects the company's desire to become a company capable of supporting Aomori Prefecture's information technology industry. AIS intends to help develop the FPD industry in the Mutsu-Ogawara area by putting down roots in the regional economy. It can therefore be said that Aomori Prefecture's Crystal Valley initiative is characterized as a community-oriented project.

### 2-1-4. Some Hints suggested by the Two Prefectures' Initiatives

We have compared Mie Prefecture and Aomori Prefecture in terms of their Crystal Valley initiatives. The two initiatives are the same with respect to their aim to promote regional innovation by leveraging on the FPD industry but are different when it comes to the approach taken.

It can be said that Mie Prefecture's initiative is a model for innovating an existing industry. Specifically, this could be done by attracting companies by leveraging on the existing industry accumulation. On the positive side, this model allows the project to produce results certainly and massively in a relatively short period of time: the larger the scale of existing industry accumulation, the larger the size of results. On the negative side, it becomes increasingly difficult to attract regionally rooted businesses in proportion to the size of existing industry accumulation. In the case of Mie Prefecture's Crystal Valley initiative, since companies tend to enter the prefecture counting on Sharp's two factories for orders, it is unlikely that they take root in the regional economy.

Aomori Prefecture positions its Crystal Valley initiative as a regional development project intended to create a new industry. It can therefore be called a new industry building model. On the positive side, it helps attract companies willing to take part in the prefecture's vision of growing the FPD industry as a local industry of the Mutsu-Ogawara area. These companies are expected to put down roots in the regional economy and contribute to growing the FPD industry. On the negative side, since the initiative has to be started from scratch, it is very difficult to attract companies.

The two initiatives employ two different approaches to innovate regional economies by leveraging on the FPD industry. This gives us a number of suggestions. In the case of Mie Prefecture, since its initiative aims at adding to the existing industry accumulation, it is expected to achieve success in the short term. The challenge is how it can be sustained in the long term. This model would be of help for municipalities desirous of expanding their existing local industry accumulations. In the case of Aomori Prefecture's initiative, there would be considerable difficulty in producing satisfactory results in the short term. In the long term, however, it would help bring sustained growth if a new FPD-based local industry can be established. This model would help municipalities that wish to cultivate new industries and thereby achieve their local industrial structure innovation.

In the case of Aomori Prefecture's Crystal Valley initiative, it seems difficult to realize an achievement in the short term. Moreover, the odds are not high for getting up and running even in the long term. Through interviews with the people concerned, the author was strongly impressed by their earnest desire and determination to make it with the Mutsu-Ogawara area by growing a new FPD-based local industry. I do not mean to say that Mie Prefecture is not carrying out its initiative in earnest. What I want to emphasize is that Aomori Prefecture's earnestness is backed by its keen sense of crisis. Earnest desire is critical for any project to be successful. The project in question will stretch as long as ten years. However, it would take much longer to

grow the FPD industry as a full-fledged industry. With this long-term perspective, the most important thing is to sustain the earnest desire of the people concerned. An executive of AIS emphatically said, "What we are thinking now is of little use. It is absolutely necessary to convey what we think to our successors." If a municipal body plans to carry out a new industry development project like that of Aomori Prefecture is to succeed in the project, it is essential to be determined in earnest to commit to developing the local industry on a sustained basis. Earnest commitment does not necessarily ensure the success of a project. But lack of it translates into a much higher possibility of failure.

**Acknowledgment**

In preparing this report, I used information obtained through my interviews with the people concerned as well as published articles and other documents. I'd like to express my thanks to each individual person who kindly spared time during his or her pressing work hours for my interviews.

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## 2-2. Efforts Made by Kobe City, Hyogo Prefecture ("Participation of Local SMEs in New Fields Such As the Medical Industry City")

### 2-2-1. Damages Caused by the Great Earthquake of Hanshin-Awaji and "Creative Recovery"

The Great Earthquake of Hanshin-Awaji (hereinafter referred to as the Great Earthquake) occurred in the middle of the 1990s when the Kobe economy was endeavoring to bring about structural change in order to end the stagnation where some major corporations and their local subcontracting SMEs had accumulated, acquiring a heavy, thick, long, and large type industrial structure. Kobe's economy and industry suffered severe losses. The shock was particularly great for local SMEs and manufacturing industries. Recovery from the Great Earthquake was needed, of course, but in the face of the necessity for a new reconstruction of the economy and industry, various attempts were made toward a "creative recovery."

On January 17, 1998, three years after the disaster, the ordinance relative to the promotion of safety for the citizens of Kobe City toward the building of a safe city where everyone can live securely was enacted in Kobe City. This ordinance newly proclaimed the building of a society where everyone could live securely and safely based on the experiences and lessons learned from the Great Earthquake.

It is said that the building of a new Kobe in terms of the economy and industry after the Great Earthquake can be classified into three categories: i) Efforts mentioned in the national recovery committee as specific recovery undertakings in conjunction with the Great Earthquake; for example, the promotion of a project for trade with the Shanghai and Yangtze Trade Promotion Project; the promotion of a health-care park project; a new industry-structuring project, and the Great Earthquake of Hanshin-Awaji commemorative project. ii) Unique attempts by the City or industries and citizens based on the experiences of the Great Earthquake such as:

<1> the concept of a state-of-the-art medical industry city that promotes overall health through the production and provision of secure and safe food as well as the recommendation of sports in addition to research bases for state-of-the-art medicine through "informal meetings for the building of a city to enjoy health," etc.

<2> the rebuilding and regeneration of the chemical shoes industry, participation in and changeover into fields such as medical care and robotics rather than conventional subcontracting activities such as steel and shipbuilding and iii) new attempts for activities by the City, industries, and citizens not necessarily connected directly with the Great Earthquake, such as "Prop Station" and "Abuabua Orchestra" activities.[1]

As per the City-wide vision ("Kobe 2010 Vision"), solutions to mid- to long-term issues are to be clarified as they were left over after the planned period of the recovery plan in response to "proposals from the informal meeting to promote the recovery and revitalization of Kobe City" on January 13, 2004, at the same time as the orientation for the "building of future Kobe" in this proposal is to be concretized, and strategic planning is aimed at through "selection and concentration" in order to make use of efforts put forth in the course of the recovery.

On the other hand, while various policies and strategies are being undertaken at the level of local governments on the premise of building a secure and safe society, which is a concept arising from experiencing the unexpected events of the Great Earthquake, local groups of SMEs have been searching for paths for their own recovery. They all have the common goal (including ideals) of participating in new fields (fields of new industries and new enterprises) and becoming independent through the development of unique

1 "Reflections 10 Years After the Earthquake and the Making of a New Kobe" by Kojiro Niino (Japan Center for Area Development Research 'Local Development' Vol. 483, December 2004, pp. 4-5), "White Paper on Disaster Management," etc.

products or new development in the framework of a secondary foundation; if possible, through the creation of a "Kobe brand name" toward regional revitalization. For this purpose, it should be mentioned that networking is of greater importance than activities by SMEs alone.

Consequently, we shall discuss, from a networking perspective, examples from product development promotions conducted through the participation of many SMEs in the medical apparatus field through substantial involvement in the concept of the medical industry city by Kobe City; examples from product development promotions through the setting of a process through networking toward new product developments and pioneering in new enterprises; and finally, examples from product development promotions through the taking up of new concepts.

### 2-2-2. The Concept of a Medical Industry City for Kobe and the Participation of Local SMEs

#### (1) The Kobe Medical Industry City Concept

A concept arose in Kobe City, Hyogo Prefecture, around the autumn of 1997 to accumulate medical industries that are expected to grow – following this, investigations began. An informal meeting regarding the concept was then organized and a research association on the concept was inaugurated by members of industry, academia, and government.

This concept is a project that makes use of the Kobe Airport, which is scheduled to be opened in 2005 and will improve bases for the research and development of advanced medical technology centering around the Port Island Second Term Development. It also attempts to accumulate medical industries domestically and overseas and to generate new industries in order to enhance the welfare of citizens through the offering of advanced medical services as well as to contribute to international society through things such as improvements in medical technology in Asian nations.

As a background for the promotion of this concept, the following can be mentioned:

i) high-level potential in the Kansai Region (accumulation of universities, pharmaceutical corporations, and new industries as top-notch sites accumulating life science research in Japan)

ii) high-level potential as a property of Kobe (robust infrastructure of traffic and information, healthcare-related high-level technological resources, collection of industries with varied technological seeds such as mechanical metallurgy, electronic, chemical, new material, active networking and exchanges with Asia)

iii) networking and role sharing was feasible with related projects and organizations and

iv) invitation of national organizations, etc. and the application of related policies, systems, etc. was feasible.[2]

The concrete start of the said concept began with the creation of the "Kobe Informal Conference on the Concept of the Medical Industry City" in October 1998, as mentioned before. A report was presented in March 1999 after the participation of the honorary director of the Kobe City General Hospital and persons in the medical field at the Conference. In this report, proposals were made to improve the following three installations at an early date:

i) an "up-to-date medical center" with research and development functions and support functions for clinical research

ii) a "medical business support center" consisting of various businesses support functions, etc. and

iii) a "training center" offering an education sup port function for personal resources.

Among them, the three themes to be taken up by the up-to-date medical center and which should form the core are:

i) clinical research support (clinical trial)

2 Kobe, Foundation for Biomedical Research and Innovation brochure, the Kobe Medical Industry City Concept, September 2002

ii) cellular and gene therapies and
iii) research and development of medical equipment including welfare and nursing devices.

The "Kobe Medical Industrial Development Project Study Group" was inaugurated in August 1999 and in the interest of its promotion, as close networking among industry, academia, and government is indispensable, persons from the medical field inside and outside Japan, industries including those from local areas (approx. 200 firms then), universities and research institutions in Kyoto, Osaka, and Kobe as well as related governments were present. This Research Association consisted of the following:
i) a visual medicine center (research and development of medical apparatus)
ii) clinical research support center (clinical trial system, etc., networking with medical organizations in the region)
iii) urban infrastructure improvement (invitation of industries and urban development) and
iv) regeneration medicine (clinical application of regeneration medicine, etc.)

Thus far, in terms of the core research institutions, including the "Institute of Biomedical Research and Innovation," which conducts research that bridges the gap between basic and clinical applications, the "Translational Research Informatics Center," the "The Biomedical Accelerator (BMA)," and the "Center for Developmental Biology" have been completed. Also, the "Kobe Biomedical Development Center" (temporary name) is scheduled to be completed in the autumn of 2005 and the Municipal Central Hospital is scheduled to move around 2010 (see Diagram 2-2-1). There are more and more medical-related enterprises that participate in the Concept each year seeking up-to-date research – thus far, 73 enterprises (as of January 20, 2005) are involved. At first there were many venture SMEs that came forward, but recently major corporations both domestic and overseas have begun to make their mark, taking note of the up-to-date medical research. The ripple effects for local industries are beginning and, as a result, the efforts are becoming conspicuous in the development of medical apparatus centering around the Kobe Machinery and Metal Industry Association, which will be discussed later.

As early as April 2002, the Kobe region aimed at the formation of a supercluster in life sciences throughout the entire Kansai region as the "Wide Kansai Cluster" (intellectual cluster generation enterprise by the Ministry of Education, Culture, Sports, Science, and Technology) in conjunction with the northern Osaka (Saito) region.

**Diagram 2-2-1 Activities surrounding the Kobe Medical Industry City Concept**

| Time | Content |
|---|---|
| Autumn 1997 | Concept was born. Kobe City started to investigate it. |
| 09/1998 | Mayor Yukitoshi Sasayama of Kobe (then) announced study of concept. |
| 10/1998 | Foundation of the "Informal Meeting on Kobe Medical Industry City Concept" was established. |
| 03/1999 | The "Informal Meeting on the Kobe Medical Industry City Concept" submitted a report. |
| 08/1999 | "The Research Association on the Kobe Medical Industry City Concept" was inaugurated. |
| 10/1999 | Kobe City set up "Medical Industry City Concept Promotion Headquarters" |
| 02/2000 | Setting of the "Physics and Chemistry Research Institute, Generation and Regeneration Sciences Comprehensive Research Center" in Kobe was decided on. |
| 03/2000 | Establishment of the Up-to-Date Medicine Promotion Foundation |
| 08/2001 | Nationally selected for the "City Regeneration Project" |
| 08/2001 | Establishment of the "Kansai Bio-Science Promotion Congress" |
| 04/2002 | Opening of the "Generation and Regeneration Sciences Comprehensive Research Center" |
| 04/2002 | Nationally selected for the "Intellectual Cluster Generation Enterprise" as the Kobe Region of the Kansai Wide Area Cluster |
| 11/2002 | Completion of the "Kobe Incubation Office" |
| 04/2003 | Full opening of the "Up-to-Date Medical Center" |
| 04/2003 | Approved for the "Up-to-Date Industrial Special Area" as the Structural Reform Special District |
| 07/2003 | Commenced full operation of the "Kobe Clinical Research Information Center" |
| 04/2004 | Opening of the "Kobe Biotechnology Research and Human Resources Development Center"/"Kobe University Incubation Center" |
| 07/2004 | Opening of the "Kobe Biomedical Creation Center" |
| Autumn 2005 | Planned completion of the "Kobe Biomedical Development Center" (provisional name) |
| 02/2006 | Planned opening of the "Kobe Airport" |
| Circa 2010 | Planned move of Kobe Municipal Central Citizen's Hospital |

Source: Prepared from *Kobe Shimbun* (April 11, 2004) (http://www.kobe-np.co.jp/news_now/20040411.html) "Toward the generation of new up-to-date industry" by Takashi Miki ("Local Development" Vol. 483, December 2004), etc.

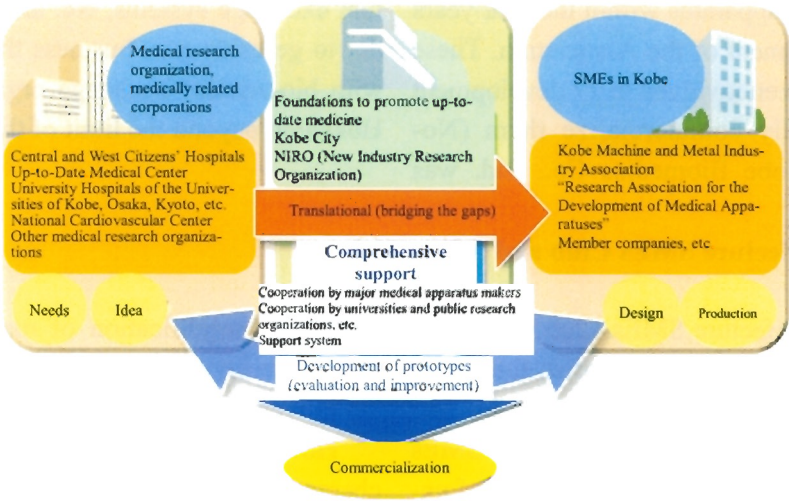
### (2) Participation of Local SMEs and the Kobe City Machinery and Metal Industry Association

The Kobe City Machinery and Metal Industry Association Corp. was founded in February 1960 as a collective of SMEs in Kobe City (Kobe City Association of Machinery Industry). In 1963, its foundation as a corporate juridical person was authorized to take the current organization. The Industry Association consists of cooperation firms and subcontractors of shipbuilders and heavy-machinery makers, the so-called heavy, thick, long, and large type industry such as Kawasaki Heavy Industries, Mitsubishi Heavy Industries, Mitsubishi Electric, and Kobe Steel, which can be said to have formed a uniquely Kobe-type manufacturing industry.

However, in recent years, this heavy industry went into a structural recession and the deterioration in the economic and managerial environment surrounding the SMEs worsened the depressed condition for the Industry Association and its members, calling for drastic countermeasures. In particular, the Great Earthquake had a substantial effect, affecting 95% of the Industry Association. The need was felt for a type of manufacturing that could meet the demands of the times in reconstruction efforts, and the structuring of a system (including a secondary foundation) to permit any

degree of independence from parent corporations was striven for. As part of such efforts, medical apparatus was noted as a future hopeful field, and coincidentally, Kobe City was promoting the concept of a medical industry city. This concept was taken as a business opportunity and the "Medical Apparatus Development Research Association" was inaugurated with 32 member enterprises (the association allows non-members of the Industry Association to join) in November 1999 under the leadership of the Industry Association (since the risk was too large for just one corporation to take) to study the system of the joint receiving of orders at the same time as the development and prototyping and research of related products toward the development of new types of medical apparatuses.

The Research Association started with study meetings on medical apparatuses and conducted investigation on the needs at medical sites through visits. They have considered various themes for development, large and small, so far and partial commercialization has begun step by step. Since 2000, the Research Association has been exchanging information on production technology at the "Japan Commerce Association of Medical Apparatus" and has been setting up "Executive Committee of Kobe Medical Apparatus and Technology Exchanges" along with Kobe City and NIRO (New Industry Research Organization). It has also been solidifying networks with other organizations within the framework of the concept of the medical industry city (see Diagram 2-2-2). At the same time, the Industry Association received subsidies for the research and development of networking generation technology as a local body from METI Kansai. The Industry Association distributed the subsidies in order to actively support business development by members of the Industry Association and the Research Association. Additionally, the Industry Association endeavors to understand the status of the medical apparatus field through overseas inspection visits of up-to-date medical apparatus and lecture activities in 2002.




Source: Up-to-Date Medicine Promotion Foundation homepage:
(http://www.ibri-kobe.org/02san/01_01_4.htm)

**Diagram 2-2-2 Networking system among organizations in the development of medical apparatus**

Non-porcelain scalpels and forceps, called small steel items, developed in conjunction with Kobe University, were the first concrete product development.

These are tools used in conjunction with MRIs, and until then almost all were imports from Europe. Among the European-made small steel items, a pair of tweezers costs approximately 80,000 yen while a surgery set can be as much as approximately 25 million yen. Given the low cost of domestic products once they are introduced, customer needs would be met swiftly. Their introduction was decided on at the Up-to-Date Medical Center to be opened in February 2001. Further growth in demand could be expected along with the sophistication of medicine. Of particular importance, conventional processing technology could be utilized at local enterprises and short-term development was feasible, taking into consideration the early achievement, thus contributing to the decision to participate in this field.[3]

According to the Industry Association, a total of 44 enterprises have participated in the manufacture of medical apparatus within the four years since the establishment of the Association. These enterprises have been involved in 27 development themes to virtually commercialize them (November 2004). Kobe Biomedics Co., Ltd. was established in June 2003 as a liaison for product marketing and development needs because sales expansion (sales activities) was still an issue due to a lack of experience in sales by members. It was necessary to pioneer sales routes to hospitals and medical research organizations, given that the development field was medically oriented and that there were limited volunteer-based activities due to the absence of full-time personnel at the Association. The Company was incorporated through the joint contribution from 35 member enterprises of the Research Association with capital of 18.4 million yen and with one permanent employee, while the seat of President was taken by the president of a local enterprise, also a director of the Research Association.[4]

"Med-Collabo Kobe," an independent exchange organization made up of 70 enterprises in the medical and biotechnology fields who had advanced in the Port Island Second Term Development, was established as the secretariat of the Kobe Chamber of Commerce in November 2004. The Industry Association also participates in this organization in which regular meetings and virtual exchange systems, etc. are established in order to generate new business through association with bio-venture exchange organizations, etc. in Hokkaido beyond the limit of this organization.[5]

### 2-2-3. Hyogo Prefecture SMEs Club and Adhoc Kobe

The Hyogo Prefecture SMEs Club was established in 1970 by 40 managers after the Japan SMEs Club (currently Tokyo Club) came into being in 1957. Their aim was to "protect SMEs through independent efforts and the power of unions among SMEs and to strive for the independent and peaceful development of Japan's economy." Currently, approximately 1,100 managers participate in seven branches inside the Prefecture, forming a body that conducts activities toward the "solidification of managerial constitution," "ability enhancement for managers," and "improvement in the management environment."

However, members of this Club also have the characteristics of heavy, thick, long, and large type industry, most of whom were cooperating firms and subcontractors of major corporations seeking future developments in the midst of structural stagnation and transfers of parent corporations when they were struck by the Great

3 From "*Nikkan Kogyo Shimbun*" November 28, 2000, "*Nihon Keizai Shimbun*" December 8, 2000, etc.
4 From "*Nihon Kogyo Shimbun*" June 3, 2003
5 From "*Kobe Shimbun*" November 12, 2004, February 24, 2005, etc.

Earthquake and suffered enormously. Despite all this, the recovery of Club members was relatively swift and they reconstructed the plants and restarted operations through mutual help. It is said within the Club that "networking power was rediscovered through the spirit of mutual aid" and that "they came to believe that the Club itself seemed like management resources.[6]"

Although recovery from the Great Earthquake was tough, the Club established a Production Section Meeting in March 1996 consisting of 30 enterprises in machinery design, dies, press, welding, sheet metal, machinery assembly, etc. in order to activate the power of networking discovered in the aftermath of the Great Earthquake. Firstly, study meetings were held, then exchanges with other integration areas were initiated, visits to science labs at universities were also undertaken; afterwards, aggressive activities were undertaken such as plant visits to all participating enterprises in the Production Section Meeting and additionally an inspection tour to central and northern Italy (Third Italy, successful area cooperation of traditional local industry) was conducted.

The visit to Italy, in particular, was rich in providing new ideas. Among them, the major differences among Japanese management of SMEs were:

i) maintenance of strong technologies
ii) creation of modes
iii) introduction of new technology and
iv) pursuit of small-volume production.

In terms of agglomeration, the major differences were:

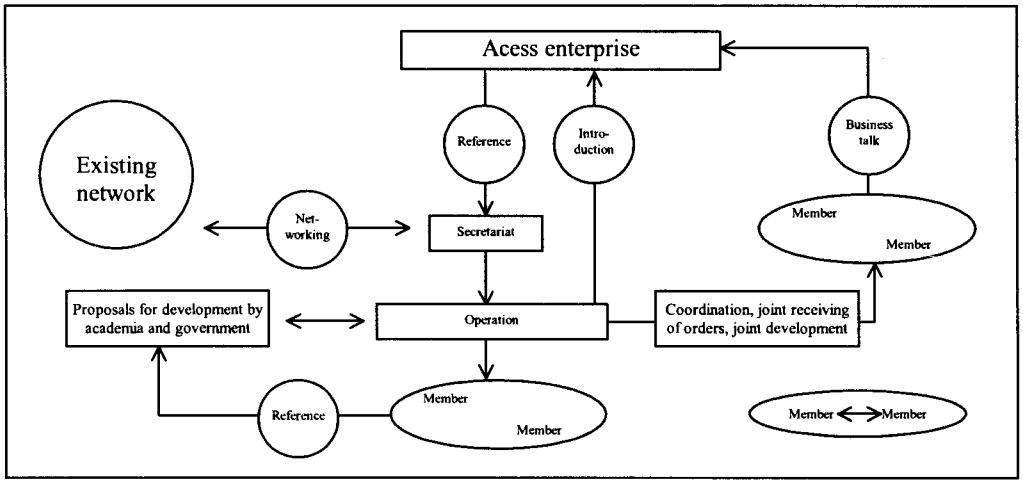
i) speed of expansion in advanced technology and excellence in abilities
ii) ability to conduct effective and swift information exchanges and iii) presence of persons with the special abilities necessary to create techno logical innovation as well as the existence of specialists who support market pioneering if it is required.[7]

From then on, it was felt that the "target or benchmark" of the Meeting "should be Italy (pride in being SMEs, and the elevated status of manufacturing technicians) and not a agglomeration of SMEs in Tokyo or Osaka."[8]

In 1998, the Production Section Meeting moved to the practical stage of joint development and joint receiving of orders. A cooking oil recovery unit was requested from the NIRO (New Industry Research Organization) at a cost of 5 million yen. Although five enterprises received the order jointly, there was a deficit of 3 million yen due to errors of the No. 1 unit production in this business; the No. 2 unit, which received an order at 2 million yen, also resulted in a deficit of one million yen because the basic design was redone from scratch. The system of volunteer enterprises for the joint receiving of orders and joint development was thus re-examined. It was then decided that the new approach would be to select a chair-enterprise at the steering committee for development and commercialization and that they would have full responsibility as the organizer enterprise.[9] Based on this experience, the development group with joint order-receiving capability, "Adhoc Kobe," was established in December 1999 to strengthen lateral connections (networks) by enhancing the technological power of member enterprises from the mold of the Production Department Meeting while promoting networking through research and development, and realizing pioneering in the new sales routes through sales by the complex of enterprises (see Diagram 2-4-3 for the reference process). Afterwards, the group developed new products such as a medicine sorter-packer due to rapid increases in orders. In order to respond to a customers' request for busi-

6 According to the hearing of the Hyogo Prefecture SMEs Club
7 "Why are SMEs in Italy vigorous? Third Italy seen by the SMEs, visit in April 1997" by the Hyogo Prefecture SMEs Club, International Exchanges Meeting, August 1997
8 According to the hearing of the Hyogo Prefecture SMEs Club
9 After "Blazing through Networking" "Hyogo Economic Strategy" November 2003; "Effects of networking among SMEs and ventures – a case of Adhoc Kobe" ("Industrial integration in the age of 'downsizing'" edited by Hiroshi Ueda, Sohusha, 2004), etc.

ness with a corporate organization, the group was incorporated (limited liability company) in March2001 through the process of joint contribution. The new company is the liaison for ordering corporations and jointly developed products are to be sold under the brand of "Adhoc Kobe"[10] Graphiner, an automatic welder of stud bolts, and ion counters are examples of some of their solid achievements.




Source: After pamphlet of Adhoc Kobe

**Diagram 2-2-3 Reference process at Adhoc Kobe**

### 2-2-4. Formation of the Universal Design Industry Cluster and the Participation of Local SMEs

Kobe City is attempting citywide activities to be the world's most universal city in order to create a safe, pleasant, and comfortable city for everyone. The background of this is:

i) Kobe City enacted the "ordinance to protect the welfare of Kobe citizens" in 1977 as a welfare city ahead of other cities and, as already mentioned,

ii) citizens felt the importance of human to human relationships as a result of the Great Hanshin-Awaji Earthquake and

iii) residents of Kobe were proud of their city, which was rich in nature, fashionable, and attractive and they wanted to have visitors to enjoy it. Through such endeavors, the residents envisioned a Kobe where

i) human rights would be respected mutually and all individuals had stakes

ii) a comfortable life could be had by everyone and

iii) the industry was revitalized to create a lively city.

The residents aimed at such realization from the side of realizing awareness, systems, city building, and manufacturing. As for concrete activities, the Nagata-ku Universal Design Research Group, which was first established in Kobe, Prop Station Social Welfare Nonprofit Organization, Kobe Women's College, etc. were engaged in the Universal Design from their standpoints, while the "Kobe UD Square (Kobe Universal Design Promotion Congress)" was established in 2003 to rally such movements.[11]

The Nagata-ku Universal Design Research Group, established in July 2001, is engaged in research and educational activities jointly with

10 "*Nikkan Kogyo Simbin*" February 26, 2001

11 "Toward Kobe, the most universal City in the world" Kobe UD Square, March 2004

local enterprises, NPOs, communities, and elementary and secondary schools, etc. In addition to regular research activities, they undertake various endeavors such as the holding of a "Kobe Universal Design Fair from Nagata-ku," they award the "Kobe Universal Design Grand Prize," and implement Universal Design classes at elementary and secondary schools (dispatching lecturers).[12]

Amid such activities, the undertakings of the "Hyogo New Welfare Industry Research Association" are active.[13] This Research Association was established in February 1997 through the active participation of persons of different fields with varying backgrounds, specialties, and logic in cooperation across different fields around the core of technologies at local industries, centering around Kobe City and Miki City. Current membership consists of 26 enterprises, 3 juridical persons (medical, social welfare, etc.), 1 union, 4 organizations, and 2 universities – all members have become representatives. The main activities are wide-ranging, including those in conjunction with the Kansai Network System (KNS), the generation of new industries through lecture meetings and visits, the development of original products through the networking of different fields, various exhibitions, lectures, and attendance and presentation at scientific meetings, to support the generation of industrial clusters in the region.

The secretariat is based at the Hyogo Prefectural Industrial Technology Center Machine & Metal Industry Technology Support Center. As such, the chief researcher at the Center fills the position of caretaker.[14] When first established, only welfare tools were developed but later, from the viewpoint of universal design, which targets products that are easy for both handicapped and non-handicapped people to use, product development began. Also, the Research Association allows many Universal Design products that are unique to the region by adding such keywords as "industrial cluster" and "local technology" to such "Universal Design." The Association recognizes that such additions "will result in the creation of local brand names (new regional UD brands which are not started from scratch), which will bring about efficient local competitiveness."[15] In other words, Universal Design has the ability to generate new markets and "industrial cluster" has the ability to swiftly generate products with added high values. Additionally, it can be said that local manufacturing has been activated through the application of the strengths (distinguished traditional technology and original in-house technology) of existing "local technology," which is the source of innovation in terms of what should be manufactured for local SMEs.[16] The idea to activate regions from such a Universal Design standpoint has been witnessed in many other regions in recent years, but there have been few cases to realize concrete product development and sales as the Research Association has.

As for concrete product development, the Research Association first started, on a trial basis, the manufacture of crutches after the Association was first established. However, the attempt failed miserably, according to them, because operability was unknown and the work was done only by the maker and the research members. What made the orientation of the Research Association final was the encounter with Coop Kobe when the know-how of to manufacture "sellable products" began to become visible through collaboration with the coop, which knew everything about consumer

12 "Kobe Universal Design" Homepage (http://www.city.kobe.jp/cityoffice/18/menu03/t/keikaku/ud/ud_top/)
"Nagata-ku Universal Design Research Group" Homepage (http://www.nagata-ud.jp/kentky/) etc.

13 Discussed in Chapter 1-1-5 "Stimulate Business, Not Product Innovation."

14 Hyogo Welfare New Industry Research Association homepage (http://www.tokokizai.co.jp/hyogo-fsk/)

15 "Manufacture by Universal Design – Three keywords of "UD" "Industry cluster" "Regional technology" invigorate regional industry! From activities of the Hyogo Welfare New Industry Research Association" ("Urban policies" No. 117, October 2004), p. 33.

16 Ibid. p. 33

needs.[17]

As part of the process, the first item developed was a "bath stool that was easy to stand up from," a product for the bathroom developed and geared for the aged. Conventional bathroom stools are 20 to 30 cm in height, while this one was 40 cm high with legs made out of aluminum and a soft resin seat, making the product lightweight and sturdy. Thanks to the support of the Industry Technology Center, the legs were manufactured by Toko Machine Material Co., Ltd. (Miki City) and the seat by Taisei Co., Ltd., permitting the product to be in storefronts in as little as eight months.

Due to the price setting to match the market needs, this product grew to become a merchandise hit and approximately 5,000 units are said to have been sold since the start of sales in 1998.[18]

"Kobe Miniyard" is a game invented by President Kiyomi Suzuki of the Nova Laboratory Co., Ltd. within the framework of the Research Association. He has had a unique career as a captain on overseas routes with many years of sailor life under his belt. He was always fascinated by the joy of playing billiards at every port town worldwide. He repeated many trials and error attempts in search of something that made "play feasible in narrow cabins during voyages." He finally came ashore to attempt commercialization.[19] This is a universal "born in Kobe" game which can be enjoyed by the handicapped, the aged, and children. It is a simple game that involves the dropping of flat wooden balls into four pockets cut open on a disk with an 85 cm diameter using a cue that can be held by one hand, just as in the nine balls in billiards. The set table can rotate and the game can be played by everyone without having to contort oneself. The Japan Miniyard Association was founded in Nagata-ku to introduce the game worldwide as a new cultural leisure activity born in Kobe. This product has been registered for industrial property and patented for design and the rules of the game have been copyrighted.

Product after product has been developed in the cooking, food, bath, rehabilitation, toy, helper tool, gardening tool, and fashion-related areas, including kitchen knives with adjustable shafts, safe duckboards for falling, various rehabilitation products applying the abacus technology of Ono City, etc. There are said to be 150 items on the market at present.

### 2-2-5. Innovation Promotion Factors Obtained from Actual Cases

Thus far, we have outlined cases of product development through networking from the Kobe City Machine Metal Industrial Association, which has practiced development through entry in a new field called the medical industry city concept of Kobe City; Adhoc Kobe (Hyogo Prefectural SMEs Club), which has practiced development by creating a new system involving the joint receiving of orders and joint development; and the Hyogo Welfare New Industry Research Association, which has practiced development by introducing a new concept called universal design.

Though it is impossible to say that all went well in terms of successes, it is highly plausible that networking permitted these local SMEs to conduct the development of new products. In addition, chances have arose for innovation, such as becoming independent and making renewed starts or promoting such actions. We will investigate the factors promoting such innovations by reviewing the three items below.

17 J-NET 21 homepage (http://j-net21.smrj.go.jp/info/igyoshu/company/043.html)
18 "*Chugoku Shimbun*" January 13, 2005
19 "Top 100 barrier-free selected daily consumer goods that are easy for everyone to use" by Tateo Takashima. Nihon Keizai Shimbunsha, 2002.

**(1) Strengthening of Intercorporation Network and Clear Target Setting**

It is sometimes possible for one enterprise, which has been in the cooperating and subcontracting relationship, to move forward alone in building a new relationship with a parent company smoothly but more often than not, networking and association will prove to be effective.

In the above cases, despite the premise of the industrial association and group, once clear objectives were set such as enter into a new field or conduct new product development, intercorporate networking and cooperation was accordingly conducted anew. For the Medical Apparatus Research Association of the Kobe City Machine Metal Industrial Association, and Adhoc Kobe of the Hyogo Prefecture SMEs Club, "Adhoc Harima" was established (October 2001) as a result of the above. Additionally, "Watt Kobe" was organized (March 2001) for joint development in environment technology toward the promotion of applications of natural energy such as solar and wind power. This, in turn, expanded and grew into the "Watt Kobe Solar Recharging and Energy Conservation Consortium" and then into "NOP Watt Kobe" (April 2003). Also, "Team IT Pro," which offers IT solution services, was approved in 2002, and then the "NPO Kobe Business Care Net," which attempts to contribute to the revitalization of the entire region by supporting the management of SMEs and community businesses, was approved in June of the same year. The members are managers of SMEs in Kobe City who play a role in building the city in conjunction with a local NPO and the government administration. Originally, this grew out of a parent study meeting by 11 members of the East Kobe Branch of the SMEs Club, who recounted that they had come up with the concept one year prior to the foundation. Promoters consisted of owners of various enterprises such as construction, taxi, software development, and electronics parts manufacture who offered solutions to issues related to the management of SMEs such as the financing and securing of human resources through seminars, etc. while making their management plans and work rules public at these enterprises. "Independence through cooperation" can be striven after through swift networking and cooperation toward a clearly defined goal.

The idea to revitalize regions from the Universal Design standpoint has appeared to grow out of many areas in the last several years, but there are few cases of concrete product development and sales, as in the case of the Hyogo Welfare New Industry Research Association. A trigger for its establishment was the heightened anxiety among those concerned regarding changes in the economic and management environment, which faced an economic slump and flat growth in demand in recent years. The Research Association started from the beginning of the activities by research associates of the Industry Technology Center and hardware makers in the interest of opening up a path for the survival of local industry through the development (later products were developed from a Universal Design standpoint) of merchandise geared toward the aging society. The processes of such networking can be seen everywhere but one factor for the success of the Research Association lies in the promotion of networking by the Research Association in open organizations. There are no membership fees or rules and all members are representatives, thus guaranteeing equality. Their unique mode of cooperation is worth mentioning when products are being developed in cooperation, all members accord thorough support while advancing toward one target.

Nonetheless, it is necessary to clearly define the responsibility area in networking and cooperation. We already discussed the process as an example where Adhoc Kobe changed their conventional approach after their business failure in order to clarify the responsibilities for the joint receiving of orders and joint development. Also, the Hyogo Welfare New Industry Research Association clearly defines the connection between the risk and the return. At the Research Association, the profits gained from one product are to be

earned by the enterprise that developed it first. Consequently, there are few advantages to becoming a member if you do not have motivated participation, which would result in eliminating the atmosphere of friendly teamwork, but would promote positive activities, according to them.

**(2) Excellent Leadership Such As a Key Person and Secretariat**

A key person will be called for who can take leadership within the organization or group in order for it to find newer values in addition to realizing smooth business operation as a matter of course.

This can be done through a secretariat, but sometimes it is necessary to approach set targets from a new standpoint, rather than simply alluring enterprises and persons, and to be able to combine resources more effectively to permit "selection and concentration" and sometimes even to proceed in an unusual fashion in order to obtain concrete results.

For example, the Kobe City Machinery and Metal Industry Association set up the Medical Apparatus Development Research Association in order to join in the medical industry city concept of Kobe City. At first, however, they had to deal with the reactions from participating enterprises that "it would be impossible for mere subcontractors to manufacture medical apparatus." Nevertheless, the secretary general of the Industry Association, who was one of the promoters at the time, boosted self-confidence by saying, "most enterprises balk at medical apparatus, but the subcontractors in Kobe are involved in more sophisticated parts for power plants, submarines, and airplanes." At the same time, he invited doctors and researchers about once a month to hear, in concrete terms, what kind of products are needed, while the members paid visits to medical institutions for opportunities to look at the apparatuses, which eventually gave the participating enterprises confidence that their technology would be sufficient to make parts and peripheral apparatus.[20]

The Hyogo Welfare New Industry Research Association developed a cooperative relationship on an equal basis among members without electing any representatives, but the significance of the Hyogo Industry and Technology Center as well as the chief researcher, who is a caretaker, is profound. There is a thorough involvement in the Research Association as it was said that, ""The reason for failure in merchandise development by associations in various industries is that it takes too much time." In reality, the persons in charge of development tend to be busy with daily work and put off merchandise development. There, the caretaker will be in control of the progress of the development and even assist in the work if there are delays in order to permit rapid development. Also, active attendance at expositions, fairs, etc. will generate a condition from which it will be difficult to recoil."[21] At the same time, it appears that the caretaker himself/herself is proactive about thinking out all of the possibilities before putting things into practice, which results in the trust of the members, enabling the practice of development and manufacture from a new standpoint.

Additionally, the secretariats at the Hyogo Enterprises Club and Adhoc Kobe as well as the leadership of the key persons involved there and the systems and approaches are exquisite. The system after establishing Adhoc Kobe was already discussed, but various methods and approaches have been utilized in order to strengthen networking and cooperation. It is very interesting to observe the ability to maintain powerful human networks for extracting ideas, in addition to offering ideas, and to precisely target the reviews of the collected information and material.

20 "*Yomiuri Shimbun*" (Osaka Edition) July 7, 2001

21 "Development of Universal Design Merchandise by traditional technology – the Hyogo Welfare New Industry Research Association" Homepage (http://www.nextone.jp/no040916/sr/sr03.html)

### (3) Manufacture of Sellable Items and Systems Making

As it is often said, a product needs creation as well as sales and salability, for which sales activities are necessary.

The major target of the Hyogo Welfare New Industry Research Association is the "generation of salable merchandise." Also, in order to concretize the Universal Design and apply it in the products, the participation of Coop Kobe, hospitals, homes for the aged, universities, etc. in addition to manufacturers was utilized so that they could prepare a system where they could work together from product projection, development, monitor tests to sales including users. A major trigger for this was the failure in the development undertaken by the makers and chief researchers at the Industry Technology Center alone at first. They learned the importance of cooperation with users (including intermediaries) for manufacturing after understanding the needs of the aged and disabled, not just the ideas of the manufacturer alone as was the case in the beginning. They also realized that it was essential that they understand the need and the market information, which is directly related to the merchandise development, as well as the wide-ranging connection with different fields such as cooperation with distributors to obtain sales routes. In other words, they always aimed at manufacture while being constantly aware of market needs with the recognition that "success comes only after sales." Active attendance at expositions and fairs contributed to the morale boost among member enterprises and, as a result, social appreciation was increased, as seen in the prizes always won at contests for various welfare tools. At the same time, product developments at such research associations will lead to operational changeovers so that the subcontracting enterprises of major corporations grow to survive with their original merchandise.

At the Kobe City Machines and Metal Industrial Association, the database is structured on the Internet. It is a collection of the signature technologies of member enterprises and enables the details of the technologies of the enterprises to be understood. In addition, a "Guidebook for receiving orders and ordering" is being issued to circulate such data in order to allow the selection of the optimal developer by each candidate material for development. The Industry Association has thus far actually developed 18 medical apparatuses and tools based on this guidebook. Currently, they hold 40 proposals for development and this number is expected to grow in the future. They have decided on a joint development group through a computer search for an enterprise with optimal technology for each proposal from a technology information database structured from the guidebook for receiving orders and ordering. The technologies contained in the database range widely from design (product, parts, dies designs, etc.), material (sale of steel material, sale of aluminum material, etc.), prototyping and small volume processing (machining, sheet metal processing, etc.), dies (press dies, plastic molds, etc.), mass production (metal press, plastic, etc.), surface treatment and finish (plating, painting, etc.) to assembly (welding, repairs, etc.) permitting an understanding of the concrete technologies available at the enterprises.[22] Also, in October 2004 they completed "Enterprises in Kobe – Up-to-Date Technology Data Book 2004," a booklet introducing SMEs with head offices or shops within Kobe City.

The understanding of information and its introduction through IT as well as thorough PR activities by means of paper media is elementary and labor intensive, but it is important and effective in making known the technologies and know-how available at the enterprises concerned.

22 "*Nikkan Kogyo Shimbun*" September 30, 2002

### 2-2-6. Future Prospective and Issues

Thus far we have reviewed the status of entries into new fields and new product developments by the local SMEs in Kobe City based on their networking and cooperative activities; in particular, their innovations in terms of their efforts toward independence and secondary establishment.

We have demonstrated in clear terms the promoting factors such as clear target setting and strengthening of networks for such purposes, the presence of an outstanding leader or secretariat, trust among members and clear agreements among them, system building for salability, and thorough PR activities through IT. Additionally, we can add orientation based on an understanding of changes in the economic environment and the clarification of issues, as well as active involvement in the cooperation among industry, academia, and government or the conscious application of policies. Every one of them is based on the premise of independent business developments (innovations), not on government initiatives or heteronomy. In other words, it is self-reform based on internal development that leads to greater successes. I discussed the case of the medical industry city concept in Kobe City. From the City concept, setting into a so-called wide region cluster category brought about results that were larger than initially expected. Also, habitat segregation with other regions in subject fields has been achieved, so that there will be great growth in the future as the one and only up-to-date (regenerative) medical-industry-related accumulation site in Japan. However, such concepts and cluster plans will bring about true developments through organic connections or effective networking between the administration carrying out target and orientation setting and public organizations capable of according multiaspect supports; universities, research organizations, and medical organizations with intellectual property; and groups of enterprises in charge of manufacturing and system-making with the extensive use of regional and local resources (the accumulation of universities and public testing and research organizations plus manufacturing technology in Kobe).

Nevertheless, there are some environment changes taking place now. For example, the Kobe Biomedical Development Center, which is scheduled to open in the autumn of 2005, is said to be planning a catheter test site for medical workers using miniature pigs, etc. This is part of the plan to have related persons from SMEs in charge, etc. and to set up occasions for exchanges of technological training and sales activities. Since members are from different industries, there is an advantage in that SMEs can participate in equipment improvement and OEM of major corporations. This, however, will lead to business development in conventional-type business practices (cooperation and subcontracting for the parent corporation) and will not lead to the birth of new business morphology including changes in the business practices.

In the Kobe medical industry city concept, the WHO Kobe Center was opened in response to a request from Hyogo Prefecture and Local Business Circles and research activities are being conducted on the theme of "city and health." As the subject field in the medical industry city concept will be expanded to include lifestyle diseases such as diabetes from 2004 onwards, it will become increasingly necessary to further strengthen the adhesion in the region and locality through data collection via IT, citizen's health awareness for prevention, and the promotion of "city building to enjoy health" with an eye on the health-related industry such as food.[23]

There is a saying that "the strength of Kobe subcontractors in manufacturing lies in the technological power and quality control power that is trained at major corporations, while the weakness is in the development power and sales power."[24]

23 "Toward the creation of new up-to-date industries" by Takashi Miki ("Regional Development" Vol. 483, December 2004)

24 From the hearing at the Hyogo Prefecture SMEs Club

Accordingly, there is an urgent need to discover new paths as part of "creative rebuilding" by promoting innovations through self-reform; weaknesses are covered by networking and cooperation.

**Addendum**

I hereby express my appreciation for those who responded to my request for a hearing research.