

# A Study of Transforming Strategy into a New Business Domain in the Japanese Mature Glass Industrial Cluster

**Ryo Terashima**

Nagoya Institute of Technology  
Gokisocho, Showaku, Nagoya, Japan  
Tel: (+81) 90-7088-4516, Email: [25117054@stn.nitech.ac.jp](mailto:25117054@stn.nitech.ac.jp)

**Nobutaka Odake**

Nagoya Institute of Technology  
Gokisocho, Showaku, Nagoya, Japan  
Tel: (+81)90-6808-5997, Email: [odake.nobutaka@nitech.ac.jp](mailto:odake.nobutaka@nitech.ac.jp)

**Abstract.** The purpose of this study is to clarify some of the issues surrounding the business situation in industrial structure of Japanese mature glass industrial cluster in Sabae area. Recently, for some reasons such as a wide-spread of low-cost Chinese products, the scale of the glass industry in Sabae area has been shrinking. However, the glass manufacturers try to transform their business into the medical device industry with a unique titanium processing technologies dedicated to the glass industrial cluster. The authors focused on the business activities of the glass manufacturers in Sabae area. Survey of the companies was applied. Hearing was conducted to some glass manufacturers related to detail explanation of the business activities. As a result, the authors had three findings. Firstly, the glass manufactures have established networks among the industrial cluster to transform the mature business. Secondly, the business-to-business network has developed new technologies for the medical device industry co-operating mutually. Thirdly, the company group T is trying to promote market expansion and technological development. Therefore, it is important for a mature industrial cluster to formulate a business-to-business network with high level technological companies, when transforming a mature business into a new business.

**Keywords:** Mature Glass Industrial Cluster, Medical Device Industry, Business-to-Business Network

## 1. INTRODUCTION

As for the Sabae area which is a glasses place of production in Japan, it is the beginning that the farmer performed making a glasses frame as a side job in the agricultural off-season of a winter season about 100 years ago. Then, in response to the fair wind of postwar high economic growth, the home demand of glasses also increased and Sabae area grew up favorably as a place of production. Moreover, the production technology of the glasses frame using titanium which is a lightweight and strong metal was established for the first time in the world in the 1980s, and formed temporarily the one large place of production which produces 90% or more of the glasses frames manufactured in Japan. However, manufacture of the glasses in the Sabae area became a severe

situation due to the fall of the demand accompanying the downturn of subsequent economy. Furthermore, in the flow of globalization, when China in which personnel expenses are cheap and mass production at a factory is possible gained power, an international competition intensifies and, value of production is decreasing in domestic and international glass markets. In such situation, the company applied the technology accumulated by manufacture of the glasses which need about 200 process, they got out from the existing glasses business by trying to entry to the medical instruments field, and have established the axis of a new enterprise.

Greiner (1972) has presented five steps of growing models of a company, and in order for a company to overcome a crisis. He described that a fixed change and revolution are required. It can be considering about the activity of this

company is a foothold for new business development.

In this paper, we adopt the activity as one model, using as an example the glasses manufacturing enterprise which has tried entry to the medical equipment field. This model suggests to key factors that companies in other mature industrial cluster develop new business.

## 2. RELATED WORKS

Investigation and research about the glass industries of the Sabae area have been done from many viewpoints in the past.

From the comprehensive viewpoint of the present condition and the management strategy of an overall community, they interview the company in the area and are describing aggravation of the financial condition as the whole. Moreover, they made reference also about the growth of the glasses quantity of production of China which is a competition partner of the Sabae area, and describe that it is necessary to raise the advantage of processing technology, such as product development from a global viewpoint, and material development which is the features in Sabae area (Uede 2001).

From the viewpoint of local formation in Sabae area, they examine the process and existence base of local formation about the glasses locality having formed local distribution how, and clarify (Okuno1977).

From the viewpoint of the formation of compound place in Sabae area, they hold an interview about enterprise compounding and actual condition with the company in Sabae area, and show clearly that they do not have time, financial, and human resource to compound an enterprise. Furthermore, they also show clearly that existence of a center firm which leads enterprise compounding is not able to recognize (Nambo 2008)

From the viewpoint of the comparative analysis between places of production they adopt as an example Sabae in Japan, and two places of production of the Belluno in Italy which almost occurred as a glasses place of production at the same time, make reference about the feature of each place of production. Or the difference in the strategies, are discussing the future directivity of the Sabae area which is declining (Kato 2009).

From the point of the realization process of the technical innovation, they examined how companies in Sabae area has innovated in the processing technology side of the new materials, supporting the global competitiveness in Sabae area from the standpoint of a planned type wholesaler and a glasses frame manufacturing enterprise(Aihara 2008).

As mentioned above, although very many researches in Sabae area have been done before. But there is little research which has focused on cross-industrial entry in Sabae area. Therefore, they were limited to give light on the prevention factor of cross-industrial entry by investigating the

consciousness and the actual condition of entering and forming a compound place of production to cross-industrial to the company in a place of production. It can be said that this is a limit of related works. This paper focused on the company in a place of production which achieved fixed success by cross-industrial entry in Sabae area, and we investigated the present condition.

## 3. PURPOSE AND METHOD

The purpose of this research is to clarify the element which becomes important, in order that the manufacturing enterprise in the mature place-of-production type dump may establish a new business unit system. We collected data by the participation in the show held in Sabae area, and literature documentation. Moreover, we interviewed Company Group T which adopted in this paper.

## 4. THE OUTLINE OF SABAE AREA

The position of Sabae area is shown in Fig. 1. The Sabae area is located in the northern part in Fukui Prefecture, and the population of area is about 68,400 in 84.59km<sup>2</sup>. A glasses frame, lacquer ware, and fiber are developed as a specific local industry, and many households in the Sabae area are engaged in such industries.

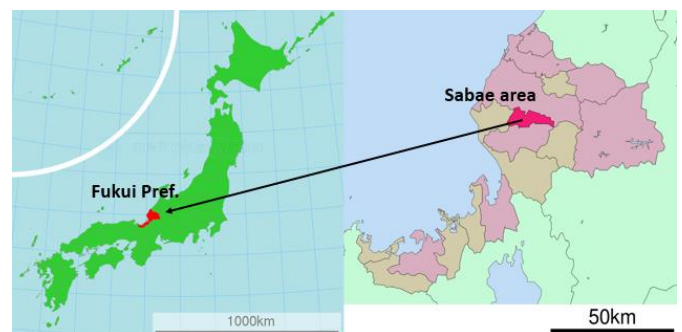


Figure 1. The position of Sabae area

Gozaemon Masunaga invited the glasses craftsman from Osaka in 1905, and the glasses industry of the Sabae area began from having acquired the technology of glasses frame manufacture made from brass. A glasses frame can be indoors manufactured in the Sabae area of the very large winter of snowfall. Moreover, since there was little initial investment, they were comparatively easy to begin newly. After World War II, although the production base of the glasses of urban areas suffered damage and lost the base of production by war devastation. Since the Sabae area also had little damage of war devastation, they succeeded in revival comparatively promptly. Although glasses frame manufacturer was most until then, the contractor and middle processor treating several kinds of parts,

such as a lens, the wholesaler of glasses, etc. increased rapidly as well as the development in the manufacturers of a glasses frame. As a result, they formed one of the most place of glasses production in response to the influence of prosperity, such as postwar high economic growth. Furthermore, when it succeeded in development of the glasses frame made from titanium for the first time in the world in 1980s and it spread to the overall community, the Sabae area established the status as a global glasses place of production.

The graph of the glasses product shipment volume of total amount in the Sabae place of production is shown in Fig. 2. As mentioned above, although it was the Sabae area which established the global glasses place of production, the shipment volume of a glasses product is decreasing from 1992. With a peak of 120 billion yen of the shipment volume in 1992, it has decline to about 60 billion yen which is the half in 2013.

Shipment volume decreased because the following reason.

- Downturn of demand and the influence of a strong yen by collapse of the bubble economy.
- Intensified international competition by the company which can manufacture glasses in large quantities since personnel expenses.
- Sabae area was not able to satisfy well the needs for fashionability, like glasses become a part of fashion from medical implements.

Moreover, although the glasses from Sabae area were sold for tens of thousands of yen till then, a major company glasses volume retailer Company Z began to sell the Chinese low prices glasses which are about 5000 yen in 2001. For this reason, the glasses company of the Sabae area is dealt a big blow, and the domestic market share which was 90% or more also temporarily fell to about 25% in 2015. Since Chinese companies are superior in respect of a price and the Italy companies which holds the license of a fashion brand also in the field of a brand name is superior, the Sabae area is faced with a very severe situation. In order to attain differentiation with other places of production by advertising the height of the quality in response to such situation, they have devised the measures of developing exhibition to an international trade fair, and a brand original with a place of production. By such method, a temporary effect does not come to regain vigor like the heyday of what is obtained, and has not still solved the problem of a decline.

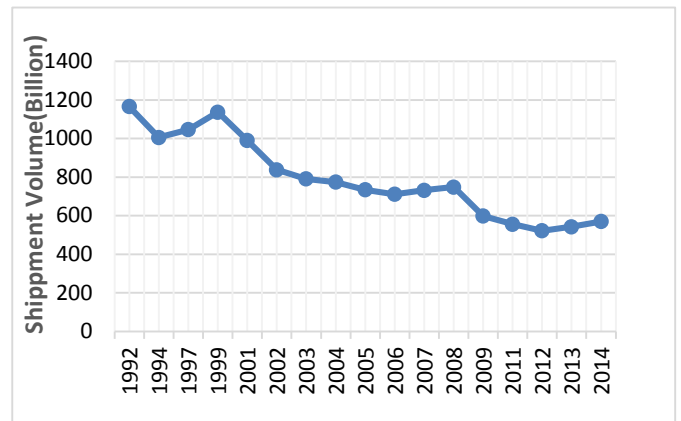


Figure 2. The glasses product shipment volume (Source: Data from Home page of Fukui Pref. [http://www.pref.fukui.lg.jp/doc/chisangi/megane/meganesangyo\\_d/fil/gankyogaiyo.pdf](http://www.pref.fukui.lg.jp/doc/chisangi/megane/meganesangyo_d/fil/gankyogaiyo.pdf))

## 5. THE FEATURE OF SABAE AREA

The following three points are mentioned as a feature about glasses production in the Sabae area.

They are OEM production, Manufacturing Processes of Glass, and Titanium Processing Technology.

### 5.1 OEM PRODUCTION

The Sabae area has a high dependence to OEM production. OEM is production system of trustee's brand. A general merit is shown below.

- It is not necessary to have stock.
- A price is paid certainly.
- In the growth phase of a market, the quantity of production increases.
- In the mature phase of a market, constant quantity-of-production maintenance is securable.

The general demerits are also shown below.

- A producer cannot be engaged in a product at a plan.
- A possibility of becoming price competition with rival companies is high.

Actually, orders from customers declined because production base shifted to China. This fact has led to put down the glass production in Sabae area. Therefore, some companies in Sabae are trying to break away from the OEM and develop its own products.

### 5.2 PRODUCTION SYSTEM OF SABAE AREA

The manufacturing process of glasses exceeded 200 processes in many cases, and the process became complicated by the tendency to heighten the added value among others.

Therefore, the Sabae area has the production system of division of work between companies. Moreover, since the glasses manufactured in the Sabae area have feature of limited production with a wide variety, they perform labor intensive type of production.

The production structure of the Sabae area is shown in Fig.3. A middle processing maker exists for every process focusing on the finished-goods maker. Also, the maker who provides a middle processing maker with parts, the materials, and equipment. Finished goods are supplied to the wholesale company, the retail stores, the trading companies, and the overseas makers, etc. Thus, many subcontractors exist in one maker's basis.

To start with, the finished-goods makers are classified a major company glasses finished-goods maker and a minor one. The major one has many production bases not only domestic but overseas. They are trading by the original sales channel and there is also a company which has its own brand. Moreover, there is also a case which establishes not only a processing division but a sales division in the company, and sells by the company. The minor one is mainly performing production by OEM. Especially an important process is performed at its company, and others are from an outside order.

Secondary, the middle processing maker is a specialty of specific process in the glasses manufacturing. About production, since the order received from a finished-goods maker is mainly required, it is subject to business fluctuation. By performing division of work between companies, they grow up to be the company which specialized in each process and a field. Moreover, we consider that they can increase the efficiency of work by technical accumulation. On the other hand, although specialized in a specific process, the flexible correspondence to the irregular request from a customer is difficult. Furthermore, the demerit that are hard to carry out smoothing of product production, or idle time occurs depending on the case is also considered.

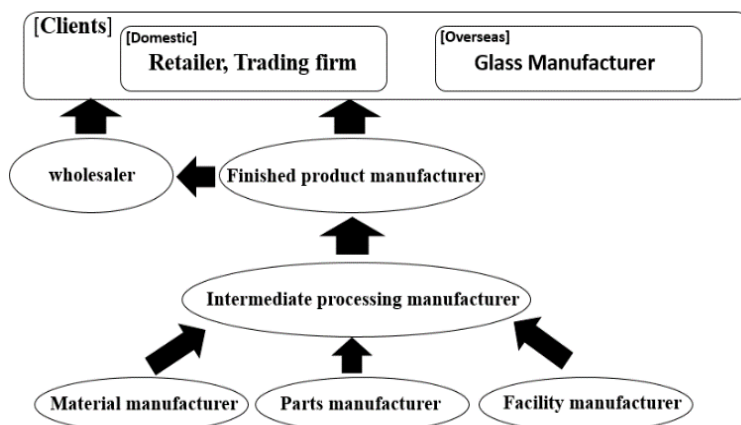


Figure 3. The production structure of the Sabae area (Source: Authors)

### 5.3 TITANIUM PROCESSING TECHNOLOGY

Companies in Sabae area are superior to processing titanium that is said to difficult-to-process materials. In 1980s, Material manufacturer provided companies in Sabae area titanium. Thereafter, Companies in Sabae area developed titanium process technology and succeeded in world's first commercialization of the titanium glass frame.

There are five of the benefits of titanium and titanium alloy, such as light-weight, high strength, corrosion resistance, excellent biocompatibility, high stability. Therefore, titanium and titanium alloy are a very good compatibility with the glass frame.

Although there are many benefits of titanium and titanium alloy, there are two demerits, such as high price and difficult-to-process.

The titanium glass frame made in Sabae is nationally and internationally acclaimed and became the main product in Sabae area. This is technological innovation that came up with in Sabae area.

As mentioned above, for reasons that many benefits of titanium and titanium alloy, titanium process technology is one of the key factors to entry into a new business domain.

### 6. MANUFACTURING PROCESSES OF GLASS

Although manufacturing process is approximately 200 steps and include detailed steps, it can be largely divided into 11 steps. Concrete steps are as follows.

(1)Planning

Decide the shape of the glass based on designs tailored to the market needs.

(2)Prototype

Production of prototype. Recently, they have built prototype by the 3D printer.

(3)Design

Production of drawings by CAD. To create the design drawings of small parts by making full use of 2D and 3D. They plot to note whether the problem such as wearing comfort and durability does not occur.

(4)Metal Mold Manufacturing

Since mold prototype affect the finished, an artisan makes a careful check manually.

(5)Parts Producing

Metal parts are produced by pressing and cutting.

(6)Rim Forming

When they enter the design data to the machine, the rim is made automatically.

(7)Brazing

Rough-shaped glasses are made by welding a part in the brazing material.

(8)Polishing

With a polishing cloth which rotates at high speed, they polish glass frames.

Thereafter, put the abrasive and glasses in the box-shaped tool called barrel to polish the whole spectacles.

(9)Surface Treatment

They perform surface treatment with ultrasonic cleaning and plating process.

(10)Assembly

Various parts such as ‘‘Temple’’ and ‘‘The Nose Pad’’ are attached to the glass frame and glass is assembled.

(11)Inspection

They manually confirm that there are no mistakes such as size, scratch and dirt.

If the finished glass frame do not pass the inspection, modification is performed and it is repeated until the pass

**7. THE OUTLINE OF COMPANY GROUP T**

Glasses manufacturing of Sabae area is mainly done through division of labor. Because each of its companies specialize their manufacturing process and accumulate technique through division of labor, they can do high quality work. But it is so hard to handle customer’s request due to division of labor that they have to decline unprofessional requests and lose a chance.

In these situations, existing seven companies in production areas were integrated and established corporation groups ‘‘Company Group T’’. It consists of some companies in the same business type and different business types that specialize raw materials, forging, cutting, rolling, bending, soldering and plating.

Those companies can do a series of operations, but main business contents of Company Group T is Titanium processing.

This is due to two reasons.

The first reason is taking advantage of the titanium processing technology developed in manufacturing of titanium glass flame to different business and stabilizes companies through the transactions with a number of industry companies.

The second reason is that their technologies and ideas that acquired through the interaction of different business apply to glass production.

The type of industry Company Group T’s joining are many industries, including medical instruments industry, fishing tackle industry, bicycle industry, home electric appliances industry, decorations industry, aerospace industry, or food industry.

**7.1 THE MANUFACTURING SYSTEM OF COMPANY GROUP T**

As mentioned above, it is performing division of work among companies in Sabae area and existing subcontracted companies.

However, the manufacturing system of Company Group T is not in this case.

The manufacturing system of Company Group T is shown in Fig.4.

The first as a follow of production, it is existing company receiving orders in Company Group T and accepting orders from customers.

The contents of this order account for titanium processing it is impossible for other company.

Then, this order entry department assign those orders to several companies and send those drawing.

Accordingly, it is not necessarily that all seven companies operate only one order.

If former manufacturing system in Sabae area is vertically-network, one of Company Group T is horizontally-network.

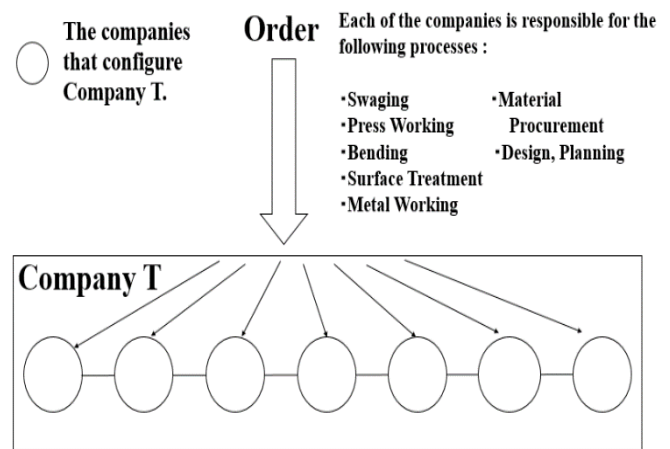


Figure 4. The manufacturing system of Company Group T (Source: Authors)

**7.2 ENTRY INTO THE MEDICAL DEVICE INDUSTRY**

Company Group T develops products in various fields utilizing titanium processing technology and focus on particularly development of medical instruments industry.

As mentioned above, titanium have various characteristics. Titanium material have biocompatibility and this is suitable to the human body.

And, it is increasing demands as medical material of cardiac pacemaker and the MRI apparatus, because this is lightweight, superior in corrosion resistance and non-magnetic material.

In addition, the surgical instruments using light-weight titanium material reduce fatigue of doctors when they perform a long operation, and so the more and more demands will probably increase in the future.

Company Group T started partnerships with medical companies in 2012, developing and mass-producing from 2015. As the flow of receiving orders of medical instruments, in the first place several companies receive the drawing and perform

trial manufacture.

After that, the company receiving orders decide to whether or not use those instruments thinking standards of cost and quality.

### **7.3 CHALLENGES IN THE ENTRY INTO THE MEDICAL DEVICE INDUSTRY**

There are several barriers to the new entrants to the medical device industry. First of all, there is a certification of the problem that is ISO13485 based on Japanese Pharmaceutical Affairs Law. Medical devices are those relating to biological. Therefore, high safety and technical capabilities is needed in order to ensure it. There are many merits with this certification. Specifically, such as gaining the trust of customers and markets, the business efficiency improvement and strengthening of the organizational structure.

Secondly, there is a review of Japan's Pharmaceuticals and Medical Devices Agency (PMDA).

They subject to examination of the quality, efficiency and safety to get the certification. It is necessary to research and develop in cooperation with the medical field such as university hospital.

In any case, there are the great merits to get the certification. However, it is difficult to get because it requires a lot of cost and time. In the case of orders production, Company Group T do not have to get their own authentication. However, it is necessary that Company Group T acquires the certification in order to launch the product in the world.

One of the Company Group T is ready for certification. However, not yet acquired because there is no stable orders for medical equipment. Therefore, it is a challenge to develop Company Group T's mainstay products in the medical equipment.

Company Group T produce products on the basis of the passed-in drawings and they do not have the specialized knowledge of medical care.

Therefore, there is a problem that cannot be performed smoothly communicate with each other when the meeting about the product with medical companies

There are two activities in order to get orders.

Firstly, they have participated in various exhibitions not limited to exhibition of glass-related and deepen the relationship between the companies in other industries.

Secondly, Company Group T are focused on enhancement of Social Networking Services and home page. Company Group T does not hold the sales department. One of the Company Group T perform the business activity only SNS and homepage and this company is responsible for the business activity in Company Group T.

When searching for a word associated with the titanium such as titanium processing in the search engine, this company has been devised, such as come to the most top of the search results.

## **8. DISCUSSION**

There are three factors that Company Group T has achieved a certain level of success in different industries entries.

Firstly, it is the titanium processing technology in the glass production with a history of approximately 30 years. Titanium is generally difficult-to-process material. However, Sabae area has a high level of titanium processing technology in the world. Titanium process technology is estimated high demand in various fields because of the advantages of titanium. Therefore, it can be said that it is a major strength that already hold a high potential technology for not only Company Group T but also other companies.

Secondly, it is the manufacturing system. The manufacturing system of Sabae area is business-to-business division of work conventionally. Therefore, the companies in Sabae area cannot respond to the various demands when it came orders request individually. To overcome it, Company Group T is a group company that is composed of companies specialize in a particular process. It can be said that it is possible to increase the width to accommodate the request.

Thirdly, it is a promotion that uses SNS and homepage. They are developing and promoting technical skills and methods, to focus on the strengths of titanium processing technologies for stepping up the international glass markets.

## **9. CONCLUSION AND FUTURE RESEARCH**

In this paper, we focused on the company in Sabae area. The company has attempted entry into different industries with core technology that is cultivated in the glass production.

Company Group T cooperates among companies and promote initiatives of the market cultivation and the technology development in mature industrial cluster.

The activities of Company Group T are considered to raise a certain degree of success in terms of the re-activation and guidelines indicating new direction in Sabae area.

When manufacturing companies in mature industrial cluster enter into the different industries, they should carry out market development and technology development with diversion of core technology that has been cultivated in an existing business.

As future works, to investigate the other cases of glass companies that have entered the different industries and to investigate the position of glass companies that have entered the different industries in Sabae area. The important thing is to accurately grasp the relationship of each of the companies and glasses Association and public institutions in Sabae area.

## REFERENCES

- Aihara, M. and Akiba, F. (2008) A Note on the Innovation Process in an Industrial District-The case of an eyewear district in Japan-. *The economic studies* 58(2), 113-130.
- Glasses related statistics. (2013)  
[http://www.pref.fukui.lg.jp/doc/chisangi/megane/meganesangyo\\_d/fil/gankyogaiyo.pdf](http://www.pref.fukui.lg.jp/doc/chisangi/megane/meganesangyo_d/fil/gankyogaiyo.pdf)
- Greiner, L.E. (1972) Evolution and revolution as organization grows. *Harvard Business Review*.
- Kato, A. (2009) The rise and fall of glasses production area. *JAIST press*.
- Nambo, M. (2008) The availability of the plural production area in the eyewear industry of Sabae. *Fukui regional economies* (6), 43-59,
- Okuno, H., (1977) The Basis of the Development of the Frame of Glasses Manufacturing in Sabae City. *Japanese Journal of Human Geography* 29(2), 115-150.
- Uede, T., Kijima, S., Nisikata, T., Masamoto, J. (2001) Present Situation of Glasses Industry and Its Management Strategy. *Production management* 8(1), 28-33.