

論 説

The effort of sixth-industrialization of Chinese mushroom production by using refrigerated containers

—A case study of Sun Mine Co., Ltd.—

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Abstract

After implementing “the law related to creating new business by using regional resources by farmers and fisheries, and to promoting usage of the agricultural, forestry and fisheries products (the sixth-industrialization law),” the activities that called “sixth-industrialization” such as combining primary industry with secondary and tertiary industries to create new businesses to promote domestic agriculture have been spreading across the country. Also Ministry of Agriculture, Forestry and Fisheries of Japan set “business plan certification based on the law of sixth-industrialization and local production for local consumption” and encourages sixth-industrialization activities. Because of this situation, sixth-industrialization has gathering attention nowadays.

However, when a farmer, who is the specialist of agriculture, combines other industries, it means that combining not only advantages, but also disadvantages of them. There is also a comment that such combination is inconsistent with the rationality of the social division of labor. Therefore the purpose of this paper is to try to examine the business model of a non-agricultural company named Sun Mine Co., Ltd. which takes part in sixth-industrialization to diversify its business rather than agricultural company.

Sun Mine has been started as a part of a business division of Sanei Co., Ltd. and conducts produce and distribution of Chinese mushroom by refrigerated containers. The refrigerated containers are suitable for plant factory because of the efficiency of temperature regulation, and can produce the mushroom year-round stably. The company also has two types of distribution channels, and one of them is a recycle system from raw mushroom to processed food. This type of business model is suitable for some other agricultural products therefore it is one of the good examples for sixth-industrialization when non-agricultural companies diversify their business.

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1. Introduction

After implementing “the law related to creating new business by using regional resources by farmers and fisheries, and to promoting usage of the agricultural, forestry and fisheries products (the sixth-industrialization law),” the activities that called “sixth-industrialization” such as combining primary industry with secondary and tertiary industries to create new businesses to promote domestic agriculture have been spreading across the country. Also Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF) set “business plan certification based on the law of sixth-industrialization and local production for local consumption” and encourages sixth-industrialization activities. Because of this situation, sixth-industrialization has gathering attention nowadays.

However, when a farmer, who is the specialist of agriculture, combines other industries, it means that combining not only advantages, but also disadvantages of them. There is also comment that this is inconsistent with the rationality of the social division of labor. Therefore the purpose of this paper is to try to examine the business model of a non-agricultural company named Sun Mine Co., Ltd. which enters into agricultural production by sixth-industrialization to diversify its business rather than agricultural company. From this company’s case study, this paper defines the advantages and disadvantages of the company and point out the development of this business model.

2. The problems of sixth-industrialization

The word “sixth-industrialization” is a coined term meaning combination of primary, secondary, and tertiary industries to promote domestic agriculture to increase consumption of agricultural products by creating new businesses (MAFF 2010). This term was formulated by Imamura (1998¹⁾, but farmers process and sell their products over a period of years.

Hidaka (2011) pointed out that the problems of a farmer’s ownership of processing, distribution, and retail sectors for sixth-industrialization because each the sector specializes specific business to avoid risks and costs of owning an all manufacturing. If a farmer combines other sectors, the farmer also combines the risks and costs of the sectors.²⁾ This argument focuses on the problem of internalization of relations of production.

Chitose (2011) pointed out that the concept of sixth-industrialization has been increasing its range recently. In the past, the concept gradually means a farmer’s diversification to produce processed food by using his own agricultural output, but the concept now involved agriculture-commerce-industry cooperation.³⁾ In short, the concept in the past means a farm-

er's internalization of relations of production, but now it includes externalization of relations of production. These arguments emphasize the importance of focusing internalization and externalization of farmers' relations of production when study sixth-industrialization.

On the one hand, Hotta (2012) pointed out that mismatches inter economic agents cause a difficulty of opening up to a new market. The first mismatch is between farmers and final consumers that "final consumers tend to choose their consumption avoiding relatively expensive foods, even are interested in the foods (Hotta 2012 p.15)." This mismatch tends to happened not only in sixth-industrialization, but also in other food consumption. The second mismatch is between farmers and processors that "farmers want to sell their irregular products as processing materials, but processors want regular products which are suitable for machine processing (op. pp.14-15)." One of the most important things for sixth-industrialization is reuse irregular products for production to reduce disposal loss and generate profit at the same moment, therefore this second mismatch hampers doing sixth-industrialization activities.

On the other hand, Hotta (op. pp.40-42) also pointed out that the lack of knowledge accumulation for starting and operating sixth-industrialization. Indeed there are many agricultural cooperatives in the country, and they have knowledge, skills, and distribution channels for specific agricultural products. However, the system of agricultural cooperatives is only for raw products, not for processed products.⁴⁾

From these aspects, this paper will determine the advantages and disadvantages of the business model of Sun Mine Co., Ltd. which is a manufacturing company trying sixth-industrialization for diversifying its business by agriculture.

3. History of Sun Mine Co., Ltd.

Sun Mine is a Chinese mushroom producer by using mushroom beds in refrigerated containers. It was established as a business division of Sanei Kogyo Co., Ltd. in 2011. The mother company, Sanei, is a subcontractor of a bearing production company therefore the company does not have any knowledge and skills for agriculture. Because of the collapse of Lehman Brothers in 2008, Sanei's production was decreased dramatically, and the president decided to diversify company business to de-concentrate production fluctuation risk. This was the start of the agricultural business of Sanei.

Since the president is familiar with microbe study by using an incubator, he conceived a new idea for mushroom bed cultivation by using a refrigerated container as an incubator, and tried to test growing by 15,000 mushroom beds in a container. In the result, it was realized that gross weight of 150 kilograms of Chinese mushroom could be harvested, and the gross sales were 1.5 million yen. Therefore Sanei started mushroom production as a

new business division.

Since Sanei is a subcontractor and specialize to produce intermediate goods (lower additional value product), the president aimed to produce consumer goods (higher additional value product) by this new project. Hence the president got “sixth-industrialization approval” from MAFF at the same time with commercialization in 2012, and began to try to produce processed food by using irregular mushroom to reduce disposal loss. After that, the company expands mushroom production division, and then separates the division as an independent company in January 2015.

4. Characteristics of mushroom bed cultivation

There are two ways of Chinese mushroom cultivation method; the first is raw wood cultivation, and the second is mushroom bed cultivation. Mushroom bed method produces mushroom 120 days although raw wood method takes two years, hence former is more suitable for commercialization. Moreover, Chinese mushroom grows slower than other mushroom species, thus there are less large competitors in the market.

Mushroom bed method is composed 5 production processes; bed adjustment, inoculation, mushroom generation, harvesting, and shipping (Hokken 2015). In the mushroom generation process, mushroom bed will generate mushroom reacting outside stimulations. This reaction makes it possible to control mushroom generation artificially.

On the other hand, since Japanese people have Chinese mushroom eating habit for a long time, the demand is more stable than other kinds of mushroom from outside country. Dried Chinese mushroom having a longer shelf life also used for various traditional Japanese foods hence its demand stable. For these reasons, Sanei decided to enter into Chinese mushroom production.

5. Advantages of container cultivation

Mushroom bed cultivation needs a greenhouse to stabilize temperature, but a refrigerator container can keep temperature more efficiently than a greenhouse, and it can reduce cost and increase productivity.

Since the container encapsulates itself perfectly, it is easier to control inside temperature, and adjust mushroom generation and harvesting period. Moreover, it can be able to wash inside the container and keep clean environment for cultivation. If disease outbreak occurs inside a container, the damage is possibly prevented only inside of the container.

On the other hand, a container is cheaper than a greenhouse, and easier to mover and

Figure 1: The production cycle

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Group 1	cultivation				harvesting					cultivation				harvesting		
Group 2																
Group 3																
Group 4																

Source: Hearing from the president of Sun Mine Co., Ltd. by author

set because of a movable asset. By these characteristics of the container, the container cultivation can increase and decrease production scale by unit, and economize small space.

6. Production system

Sun Mine which is independent from Sanei's mushroom business, cultivates four groups of 24,000 mushroom beds, and one group has 4 containers of 6000 beds (each container has 1500 beds).

The cultivation period is about 120 days and harvesting period is about 150 days from first harvesting. In the start and end of harvesting period, mushroom generation tend to be unstable therefore Sun Mine overwrap cultivation periods some groups for year-round produce (see figure 1). The average production amount is 120 kilograms per day.

7. Marketing strategy

Opening up the new market is necessary not only for sixth-industrialization, but also for launch a new business. Since Sanei is a manufacture and did not have any channels for selling agricultural products when it start mushroom business, the company chose consignment sales contract to research demand for their Chinese mushroom. The result shows that the demand increased in winter and decreased from May to July, and the average unsold is about 30 percent.

On consignment sales contract, some amount of disposal loss is unavoidable because the consigner is due to pick up the unsold. Therefore a farmer wants direct transaction with a retailer but the retailer wants large amount and stable year-round dealing. If a farmer produce small amount of product or unstable delivery, a retailer will not make a contract with him. Hence Sanei chooses consignment sales contract for selling raw mushroom and replaces the unsold to new mushroom every day, also uses the unsold to process for dried mushroom. By this strategy, the company's consumers can access fresh mushroom every day,

the quality of dried mushroom is increased, and disposal loss is reduced.

Sun Mine tries to do new strategy, “tasting and selling,” to open up new selling channels nowadays. This strategy is selling own mushroom inside a retail store in front of the vegetable shelves with tasting and offering recipes for dinner. Since consumers who visit vegetable shelves tend to do cooking by themselves, most of them are interested in the tasting and the recipes, and mushroom sales tend to increase. Because the president has confidence for his mushroom quality and the production management, he created this method.

However, a complex retail store is different from a retail store and increasing number of consumers who taste the mushroom does not link with the sales amount. Consumers at a complex retail store tend to go shopping for clothes or sundries first, and then come to see food just before their leaving. Therefore when consumers taste the mushroom just after their coming to the store, they tend to forget about mushroom when they leave the store.

On the other hand, there are many different tendencies at a suburban big shopping mall. At the big shopping mall, for example, sales amount tend to be lower in the morning hour because of fewer visitors, or when the store is crowd with families, the linkage of tasting numbers and sales amount relation will be unstable and uncertain, and so on.

These are point out the importance that when and where a product should be promote, observing visitors to realize potential consumers, and understanding specific characteristics of the stores. These kinds of importance can learn from selling experiences more than from books or interviewing. From this aspect, tasting and selling strategy is suitable for collect information to open up the new selling channels.

Moreover, Tasting and selling strategy sometimes brings a chance of direct transaction. Gaining repeat customers of own product at a retail store, the retailer considers to conclude a constant direct transaction with the producers to diversify the store shelves. When a producer proposes a direct transaction to a retailer without any sales performance evidences, the retailer probably refuses or haggles because of inventory risk. That is why Sun Maine emphasizes on tasting and selling strategy.

8. Sales channels

Choosing a sales channel is one of the most important things not only for sixth-industrialization but also for early stage of businesses to stabilize the operation.

Sun Mine opened three sales channels such as (1) farmer’s markets by consignment sales contract, (2) retail stores by consignment sales contract, and (3) retail stores by direct transaction, and then the company learned the characteristics of each channel to use them efficiently.

Since the parent company, Sanei, is a subcontractor of one company, and has only one

trading partner, the company has difficulty of adjust to changing demand. Because of Sanei's situation, Sun Mine keeps various sales channels for dispersion of risk.

One of the advantages of a farmer's market is suitable for selling irregular products. A farmer's market users tend to care more about quality, uniqueness, and scarcity of products than uniformity. Therefore if the irregular products have these characteristics, the users tend to come and buy the products wherever the market located. However, when the weather is bad, the users tend to not come to a farmer's market and increasing unsold irregular products, even if they have higher quality than ordinal regular products because they are not for daily use.

On the one hand, one of the advantages of a retail store is suitable for selling regular products. A retail store users come to buy products for daily use therefore bad weather is less damage for customer traffic than a farmer's market. A retail store users also tend to care more about price and uniformity of quality, size, shape, and color of products than uniqueness or scarcity, hence a retail store is not suitable for selling irregular products.

There are some differences between a consignment sales contract and a direct transaction. In a consignment sales contract, a retailer accepts the contract easier than a direct transaction because the producer takes the risk of unsold. There is also time difference between delivery of products and payment in a consignment contract because after sold the products, the retailer deducts commission and pay the remains to the producer.

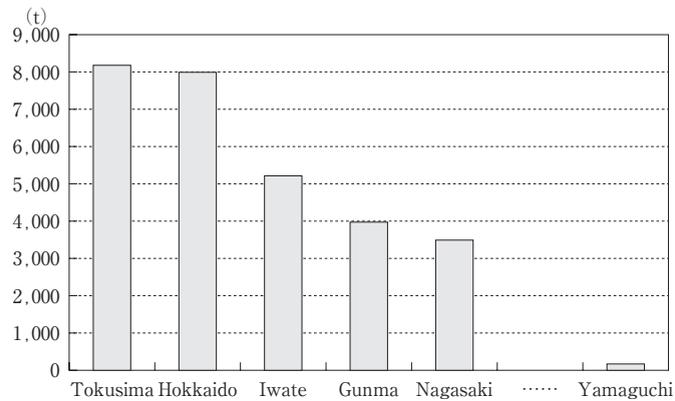
In a direct transaction, on the other hand, a transaction complete when a producer sells own product to a retailer and the retailer pays to the producer, therefore the time difference is less than a consignment sales contract also the retailer takes the risk of unsold.

For these reasons, a producer wants to transact directly but a retailer wants to avoid the risk of unsold, and this makes a difficulty of a direct transaction especially for a small producer. To overcome this problem, it can be affective way that a producer start to transact with a retailer by a consignment sales contract to get repeat customers of own product, and wait the retailer ask to conclude a direct transaction. This strategy is a same with Sun Mine's tasting and selling strategy.

The other characteristic of a farmer's market, in terms of a consignment sales contract, is that a producer can make a transaction easier than with a retail store. In general, a farmer's market is smaller than a retail store both in floor space and product variety, thus the market willing to accept a small lot of product, on-and-off transactions, and even irregular products to avoid empty shelves (lack of stock) as long as the transaction brings profit. On the other hand, a retail store generally does not deal an irregular product even in a consignment sales contract therefore a farmer's market is one of the suitable selling channels for early stage of new businesses or irregular products.

However, when a producer increases his production scale, he needs more transaction partners to sell the products. More than certain production scales of producers use an ag-

Figure 2 Production amount of Chinese mushroom



Source: Ministry of Internal Affairs and Communications, 2015

gricultural cooperative to sell their products, but as Nakano (2014 pp. 354-355) reported, the charge for the use of an agricultural cooperative is not cheap.⁵⁾

On the other hand, Since Yamaguchi's Chinese mushroom production amount is 44th place of whole 47 prefectures in Japan (see figure 2), Sun Mine aims to distribute own product wider in Yamaguchi through a wholesale market to enhance the visibility of its "local" products.

So far, Sun Mine is in situation of excess of demand over supply, and continues to increase production scale, but the company prepare for shipment to a wholesale market because of risk de-concentration, avoiding the charge for the use of an agricultural cooperative, and enhance the visibility of own products. By these marketing strategies, Sun Mine produces raw Chinese mushroom, dried mushroom, and process mushroom products, also try to develop new processed products to reduce disposal loss at the same time.

9. Conclusion

The reason why Sanei established new business is to aid the main business by the regression of the collapse of Lehman Brothers in 2008. This case is one of the sixth-industrialization that a non-agricultural industry entered agricultural production to diversify own business for risk de-concentration.

Because of the regression, Sanei had surplus workforces, and the company could use the workforces to establish and run the new business and create processed food to stabilize the business operation. This way of sixth-industrialization is completely different from farmer's diversified sixth-industrialization. One of the reasons of this success is probably that Sanei created new business division without hiring outside workers and specialists. Since reusing the own surplus workers rather than firing them, the workers think and work

hard, and they use every material and facility that the company has, for creating new business, therefore the business has been established a few additional cost. It would be another reason for the success that the president had microbe cultivation skill and the workers have production management skill. By these reasons, Sanei has created plant factory like mushroom production system and industrialized way of the factory management system, thus this division has demerged from Sanei as Sun Mine in 4 years.

One the other hand, Sun Mine's strategies such as multiple selling channels, everyday delivery, and testing and selling can be model for sixth-industrialization. As discussed in this paper, Sun Mine has three selling channels and combines them to sell own raw mushroom, processed mushroom products, and irregular mushroom according to the respective features of each channel.

Second strategy is delivery fresh raw mushroom and pick up unsold every day. By this method, the customers can access highly fresh mushroom and higher quality dried mushroom.

Last one is tasting and selling strategy. This strategy is for directory watching a retail store visitors and getting ideas to improve products, information from the visitors, learning how to emphasize products to potential customers, and gaining repeat customers. As a result of this strategy, a producer is possibly able to get a direct transaction offer from the retailer. If the producer gets the transaction, he probably can get an initiative for negotiation. From these reasons, Sun Mine's strategies are effective for sixth-industrialization, especially for its early stage.

Since Sun Mine's sixth-industrialization model is based on knowledge and management skills for organizing and controlling an industrialized production system, this model is can be a model case for a non-agricultural industry when the company enters agriculture as diversification. To demonstrate the efficiency of this model for other agricultural products, Sun Mine tries to cultivate elephant garlic as a pilot production by same manner.

On the other hand, because of Sun Mine spins off from Sanei, both companies have a problem for human resource. Sun Mine is originally one of the business divisions of Sanei, and established to absorb surplus workforces generating by demand instability as an accumulator. However, since Sun Mine became independent company, Sanei's accumulating function is disappeared. Actually, because of Sun Mine's expansion of production scale absorbs and accumulates Sanei's surplus workforces right now, but according to the midterm plan, Sun Mine needs more workforces near future. If so, hired workforces for Sun Mine's production cannot share with Sanei because of the difference of the professions that both the companies need.

Finally, this paper cannot demonstrate two aspects of Sun Mine's business. The first is business analysis of mushroom production because Sun Mine's mushroom business just stated 4 month before research, and is now expanding, also Sanei's mushroom division was

not separate clearly from main business in accounting. The second is follow-up research for elephant garlic to demonstrate efficiency of Sun Mine's business model because it is now under pilot production. These two topics will be analyzed in next research.

Notes

- 1) The definition is "sixth-industrialization is projects and actions to get new values and to create employment opportunity for elder people and women by expanding aquiculture beyond the area of primary industry to secondary and tertiary industry (Imamura 1998 p. 1)."
- 2) Hidaka argues that previous studies "do not investigate the risk and cost by bearing other sectors (2011 p.20) "
- 3) The examples are such as a farmer's market, restaurant, and inn.
- 4) Nakano reported an agricultural cooperative's sixth-industrialization, and it does not reach success yet.
- 5) According to Nakano (2014 p.356), in case of a melon shipping cooperative, average earnings per unit of crop land is 2.2 million yen, and about 500,000 yen of the unit earnings (more than 20 percent) is for commission and running cost of the cooperative.

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