A Geographical Study of Continuance and Development of Traditional Industry: The Regional Base of the Shikki Industry in Wajima, Ishikawa Prefecture, Japan

Shuichi SUZUKI

January, 1995

A Geographical Study of Continuance and Development of Traditional Industry: The Regional Bases of the *Shikki* Industry in Wajima, Ishikawa Prefecture, Japan

Satoshi SUYAMA

A dissertation submitted to the Doctral Program
in Geoscience, the University of Tsukuba
in partial fulfillment of the requirements for the
degree of Doctor of Philosophy (Science)

January, 1995

ACKNOWLEDGEMENTS

The author owes endless gratitude to many persons who gladly supported him to complete this dissertation.

Special appreciation is presented to Professor Nobuo Takahashi for his kind advice and help in writing this dissertation. The author also would like to thank Professors Takashi Okuno, Hiroshi Sasaki, Isao Saito, and Akira Tabayashi for their useful comments and encouragement. Moreover, he wishes to express his gratitude to Dr. Tadashi Nakagawa for his invaluable critical comments. Final appreciations are given to Mr. Susumu Somata, Kosaku Kitahama, Tsuyoshi Kumano, and the other artisans in Wajima, who helped him in one way or the other by providing the support, materials and information without which this dissertation would not have been possible.

Satoshi SUYAMA
Research Assistant
Institute of Geoscience
University of Tsukuba
January, 1995

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

INTRODUCTION

1. The purpose of this study and previous studies

The study of traditional industry has been part of the study of indigenous industry since the rapid economic growth period. An interest in the studies of traditional and indigenous industry has been to clarify structure and its changes in a particular industry, in a particular region. Such studies have discussed social division in the production area. Ueno (1973, 1977, 1978, 1984) described changes and restructuring of productive structure in weaving industry regions in Kanto district. Kusakabe (1984) showed that establishments of the Ashikaga weaving industry spread from a center to the periphery, in order of the categories. Tsujimoto (1959) and Saito (1967) explained the regional division of produced items in ceramic and porcelain industry regions in Tokai district and in weaving industry regions in northern Kanto district.

These studies, with their emphasis on productive structure, have analyzed mainly the management of industrial enterprises. The definition of the term "indigenous industry" reflects this trend. Lee (1991) defined indigenous industry as follows: "Indigenous industry is a system of production and distribution, which includes social division, and which consists of areal agglomeration of middle and small scale establishments, based on local capital." This definition is economic in conception, emphasizing the impact of capital and social division on production and distribution. It does not include regional elements except for the idea that middle- and small-scale establishments form areal agglomerations.

Against the trend of these studies, Miyakawa (1974) proposed that industrial geography should include elements other than industry, within industrial areas, as its object. He suggested a new concept, the "structure of the industrial region", which

combined industrial and other regional elements. Ota (1975) and Matsui (1979) also criticized the tendency for industrial geographers to be interested in analyses of industrial facilities since the rapid economic growth period. Studies of the productive structure have remained, focused on the management of industrial enterprises, and have not considered the relations between region and industry. The criticisms originated from the situation. Oguchi (1980) is representative of this criticism: "Previous industrial geography has used the idea of region, but studied only industry."

Early studies before the rapid economic growth period, in discussing the relationship between industry and region, considered physical environments only in their role as locational factors for industry (Oyama, 1934; Misawa, 1952). They mainly concluded that climate and landform conditions defined the location of a particular industry. During the rapid economic growth period, the studies of traditional industry assumed the human and social environment. They included new trend studies, which analyzed not only productive structure, but also regional conditions that formed and maintained the traditional industry region. The regional conditions are called the existence bases of industry. Yamaguchi (1967, 1969, 1970) adopted the conception of areal agglomeration, and in a series of studies tried to clarify regional allocation of related establishments, analyzing their agglomeration. Goda (1971) considered the regional bases of the cotton weaving industry from two aspects; the declining role of local capital and labor force as bases of existence, and the shift in the production system from a putting-out system to a factory system. Takatsu (1969) discussed two factors that played an important role as regional bases in the Hizen ceramic and porcelain industry. One was development of the national economy, which increased demand along with the rapid economic growth. The other was changes in the regional economy, for example expansion of subcontractor use and reemployment of idled coal field workers.

Common features in the productive structure analysis and the study of the regional bases of existence are that both examine the impact of the introduction of modern manufacturing technology, new materials, and new products. They discuss the changes in industrial regions that accompany modernization. For example, Baba (1981,

1986, 1989, 1990) clarified particular changes in productive structure and distribution of establishments in the main Japanese *shikki* (lacquer ware) industry regions. Introduction of new materials and modern manufacturing facilities, such as plastics, chemical paints, plastic injection machines, and so on, brought changes in the main *shikki* industry regions. In the same manner, Goda *et al.* (1985) showed that the Hida *Shunkei shikki* industry an example of the tradition-continuance type that maintained traditional manufacturing techniques, had two parallel productive structures; mass production of cheap items and hand craft of high-quality goods.

These studies showed that traditional and indigenous industry regions continued to function by adopting mass production methods and reducing costs; by saving labor and standardizing production processes, they were able to replace traditional production technology with modern.

Japan has many traditional industry regions, which have increased high grade goods' production and maintained their development using traditional production technique. Geographical studies discussing these regions are rarely found. Rather, they are studied as sociology (Sato and Haneda, 1964) or history of technology (Koyano, 1979).

The purpose of this study is to examine regional bases of traditional industrial regions, where development has continued without achieving modernization, and traditional production technology is maintained. It compensates for the luck of previous studies in traditional and indigenous industry, so as to examine traditional industries which have not experienced conversion of technology by modernization. It is important, for understanding the relation between industry and region, not only to analyze the productive structure, but also to find the regional bases to continue and develop particular industries in a particular region.

2. Methodology

Ueno (1980) suggested six indexes that showed the relationship between industry

and region; labor force, materials supply, market, related industries, finance, and local government policy. Among them, materials supply, market, and related industries are indexes related to organization of production and distribution (abbreviated as Organization in the following), of materials and finished goods. The analysis of productive structure is generally confined within an industrial region. However, Organization is a concept, that includes all processes of production and distribution, and as such connects production within the region to supply sources and sales outlets outside it. It is difficult to identify the relationship between region and industry within the framework of an analysis of productive structure. However, it is indispensable to understand the actual conditions of the industry as Organization. Moreover, it is important to analyze the Organization from a number of viewpoints.

Labor force is an element that characterizes a region, and an index shows the relationship between region and industry (Miyakawa, 1977). In industrial geography, analysis of the labor force is an operation that connects region and industry (Aoki, 1970). Previous studies concerned with the labor force have been of two types. One is a study of the structure of regional labor markets (Okahashi, 1978) and labor market areas (Tomozawa, 1989a, b). The other focuses on demand and supply of labor (Aoki, 1987) and labor force as a regional base (Akahane, 1975, 1980a, b). Because of his focus on regional bases of traditional industry, the author has selected the latter viewpoint. Thus this study examines traditional industry in its relationship to the region, by analyzing demand and supply of labor or reproduction of the labor force.

As the third viewpoint of analysis, this study looks at socio-economic land conditions in a traditional industrial region. Socio-economic land conditions are factors concerned with land that influence new establishment and removal of factories and firms. Concretely, these are land use, land ownership, and land price. Analyses of land in terms of location and distribution of industries are not common, in the study of traditional industry. Studies of urban industry have examined socio-economic land conditions in particular, studies of the industrial community (Takeuchi, 1973, 1974; Ide, 1973). The discussion of industrial community has been trying to clarify the structure of

mixed industrial and residential land use in a large cities. As result of these studies, combined use of buildings for example for residence and industry, or residence and commerce is dominant, in a region where an industrial community is formed. Also, rate of leasehold is high. Repletion of external economies such as agglomeration of related establishments and communication, rather than economies of scale, contributes to maintaining industry in integrated industrial-residential areas. These elements characterize an industrial community. In addition, Takeuchi (1976) and Matsui (1986) showed that an industrial community also exists in an indigenous industry region.

The incubator hypothesis is used for analyzing relationship between industry and land. An incubator is a region that plays a role in promoting growth of newly established factories (Kato, 1985). The incubator hypothesis was born in inner city studies (Hoover and Vernon, 1959), and was developed to explain the new establishment of many factories in a large city (Nicholson *et al.*, 1981). While an incubator located in an inner city, it is possible to establish a business with a small investment, thanks to external economies, such as accessibility to information, caused by agglomeration of related establishments. Thus, as an establishment grows it decreased its dependence on external economies. It seeks a larger lot and often moves from a large city (Narita, 1987). Using this hypothesis, Leone and Struyk (1976), Cameron (1980), and Fagg (1980) discussed new establishments in the inner city, but there has no comparable study in Japan. Oguchi *et al.* (1973) investigated rental factories in Higashi Osaka City, and suggested the existence of an area where new establishments can become to be independent, by small capital.

Two common features of the industrial community and incubator hypotheses are that, they analyze the industrial agglomerated region and emphasize the existence of external economics. At the same time, it is possible that an industrial community regards as the structure of an inner city including an incubator. The present study adopts both the industrial community and incubator hypothesis, to analyze socio-economic land conditions and removal of factories in a traditional industry region.

First, the author classifies traditional industry regions by traditional production

technique, to select a study area. Chapter II explains the development of the study area and its industry, by analyzing number of establishments, value of shipments, and expansion of establishments. Chapter III describes changes in the Organization in a traditional industry region after the rapid economic growth period, and analyzes how the Organization has changed. Then, the author observes organizer and subcontractors that achieved social division in the traditional industry, and analyzes the change of the Organization, based on management. The analysis of the Organization means an approach from inside traditional industry. Chapters IV and V analyze the labor force. Chapter IV clarifies changes in an apprenticeship that serves as a reproduction system for skilled workers often found in a traditional industry region, by analysis of questionnaire data. Chapter V suggests regional migration patterns caused by an apprenticeship system that secures labor force and trains them as artisans. In this consideration, the author derives lifepaths of artisans from questionnaire data, and analyzes them time-spatially. The analyses in both chapters consider of relationships between region and industry through the labor supply and reproduction of skilled artisans. Chapter VI explains how an establishment selects land when it starts up or expands its business, by analyses of cases. In this chapter, the author analyzes with two ideas, as the industrial community and incubator hypotheses. The analyses in the chapter consider of industry and region from the aspect of land. Finally, integrating results of above analyses, the author suggests regional bases for a traditional industry that continues without modernization.

3. Selection of study area

An appropriate study area to achieve the above purpose, had to fulfilled the following conditions: 1. A traditional industry region that continues production using traditional techniques. 2. A traditional industry region that has a larger production scale than is standard. This section classifies traditional industry regions in Japan, to select the study area that is suitable for the conditions.

Traditional industry regions that originated before the Edo era have different

characteristics, depending on the conversion of demands in the Meiji era and changes on lifestyle or introduction of modernized production methods. One region declines with reduction of demand, while another has continued by introduction of modern production techniques or conversion of product items. Some regions also continue and succeed using the former production processes and product items.

One of the elements characterizing the traditional industry is continuance of handicraft production technique that was established before the Meiji era. The term 'traditional industry' includes historical background (Ueno, 1986), and is the opposite of modernized industry. The existence of technique and skill before modernization is an index to distinguish traditional industry from indigenous industry that originated after modernization, and from modernized industry transferred from overseas. The Minister of International Trade and Industry designates traditional craft industries based on the Law Concerning the Promotion of Traditional Craft Industries. One of the requisites for the designation is "producing by traditional technique and/or skill[1)]". Classifying the traditional industry regions by dependence on traditional technique and skill, it is possible to understand the degree of maintaining traditional production or moving to modernized production in each traditional industry region.

Table 1 shows the dependence on traditional technique and skill in traditional industry regions. This table presents 90 regions that produce more than one billion yen a year, among 169 regions designated as traditional craft industry regions. The traditional craft industries are designated by the above requisites. Because the requisites are almost synonymous with a definition of traditional industry, the author identifies traditional craft industries as traditional industries, and the designated regions as traditional industry regions. Adopted data on "Conspectus of the traditional crafts (Zenkoku Debto-teki Kogeihin Soran)" show total amount of production and amount of production of traditional craft items in each region. Rate of traditional crafts means percentage of traditional craft items in total production. It shows dependence on traditional technique and skill.

In 24 regions the rate of traditional crafts is more than 80 percent, and these

Table 1 Production in traditional craft region and rate of traditional craft (1992)

Rate of traditional craft / Total production	More than 80 %	From 20 to 80 %	Less than 20 %
More than 10 billion yens	Mtl Kanazawa *Haku* <Ishikawa> Tex Honba Oshima *tsumugi* <Kagoshima, Miyazaki> Dye Kaga *yuzen* <Ishikawa> Lac Wajima *nuri* <Ishikawa> Pot Kyo & Kiyomizu *yaki* <Kyoto> Dye Kyo *yuzen & komon* <Kyoto>	Sta Kumano *fude* <Hiroshima> Dye Kyo *kanoko shibori* <Kyoto> Tex Nishijin *ori* <Kyoto> Pot Kutani *yaki* <Ishikawa> Pot Shigaraki *yaki* <shiga> Pot Imari & Arita *yaki* <Saga> Lac Echizen *shikki* <Fukui>	Lac Kagawa *shikki* <Kagawa> Lac Aidzu *nuri* <Fukushima> Lac Yamanaka *shikki* <Ishikawa> Lac Kisyu *shikki* <Wakayama> Lac Takaoka *doki* <Toyama> Dol Edo *Kimekomi ningyo* <Saitama,Tokyo> Pot Hasami *yaki* <Nagasaki> Pot Yokkaichi *banko yaki* <Mie> Tex Tokamachi *tsumugi & chidjimi* <Nigata> Pot Mino *yaki* <Gifu> Bam Edo *wakan* <Tokyo>
From 5 to 10 billion yens	Pot Bizen *yaki* <Okayama> Dye Arimatsu & Narumi *shibori* <Aichi> Tex Hakata *ori* <Fukuoka> Lac Kiso *shikki* <Nagano>	Dye Kyo *kuro montsuki zome* <Kyoto> Bud Osaka *butsudan* <Osaka> Oth Kyo *sensu & uchiwa* <Kyoto> Mtl Sakai *uchihamono* <Osaka> Stn Okazaki *sekikohin* <Aichi> Pot Tokoname *yaki* <Aichi>	Tex Kiryu *ori* <Gunme> Pap Echizen *washi* <Fukui> Bud Nagoya *butsudan* <Aichi> Mtl Nanbu *tekki* <Iwate> Bud Hikone *butsudan* <Shiga> Mtl Tokyo *ginki* <Tokyo> Tex Tama *ori* <Tokyo> Oth Banshu *kebari* <Hyogo> Bud Kawabe *butsudan* <Kanoshima>
From 2 to 5 billion yens	Dye Tokyo *tegaki yuzen* <Tokyo> Tex Yuki *tsumugi* <Ibaraki, Tochigi> Dol Hakata *ningyo* <Fukuoka> Sta Toyohashi *fude* <Aichi> Lac Tsugaru *nuri* <Aomori> Wod Kamo *kiri tansu* <Nigata> Wod Inami *chokoku* <Toyama>	Brd Iga *kumihimo* <Mie> Wod Nagoya *kiri tansu* <Aichi> Pot Tobe *yaki* <Ehime> Pot Mashiko *yaki* <Tochigi>	Bam Beppu *take zaiku* <Oita> Stn Kyo *ishi kogeihin* <Kyoto> Lac Takaoka *shikki* <Toyama> Tex Omi *jofu* <Shiga> Brd Kyo *kumihimo* <Kyoto> Bud Hiroshima *butsudan* <Hiroshima>
From 1 to 2 billion yens	Wod Osaka *karaki sashimono* <Osaka> Mtl Yamagata *imono* <Yamagata> Pot Karatsu *yaki* <Saga> Wod Kishu *tansu* <Wakayama> Tex Oitama *tsumugi* <Yamagata> Dye Tokyo *komon* <Tokyo> Lac Hida *shunkei* <Gifu>	Pot Tanba *tachikui yaki* <Hyogo> Lac Kamakura *bori* <Kanagawa> Lac Kyo *shikki* <Kyoto> Stn Koshu *suisyo kiseki saiku* <Yamanashi> Lac Kawatsura *shikki* <Akita> Wod Kasukabe *kiri tansu* <Saitama> Pot Akatsu *yaki* <Aichi> Oth Koshu *inden* <Yamanashi> Wod Kyo *sashimono* <Kyoto> Oth Kyo *nui* <Kyoto> Bud Nigata & Shirone *butsudan* <Nigata> Pot Mikawachi *yaki* <Nagasaki> Wod *Kaba zaiku* <Akita> Mtl Echizen *uchihamono* <Fukui> Wod Banshu *soroban* <Hyogo> Tex Shiozawa *chidjimi* <Nigata> Bud Kanazawa *butsudan* <Ishikawa> Oth Fukuyama *koto* <Hiroshima> Bud Iyama *butsudan* <Nagano>	Tex Kurume *kasuri* <Fukuoka> Bud Nagaoka *butsudan* <Nigata> Tex Odjiya *chidjimi & kasuri* <Nigata> Pap Inshi *washi* <Tottori>

Bmb Bambooware Brd Braid Bud Buddhist altar Dol Dolls Dye Dyed goods
Lac Lacquer ware Mtl Metal Ware Mtr Craft materials pap Japanese paper Pot Pottery
Sta Stationary Stn Stone ware Tex Textile products Wod Wood working Oth Others

<Ishikawa> Name of Prefecture

Data source: Association for the Promotion of Traditional Japanese Crafts (1993)

highly depend on traditional technique and skill. They continue production using traditional technique, and can be named traditional technique-succeeding regions. In this category, the six regions of Kanazawa *haku* (industrial material, Ishikawa), *Honba* Oshima *tsumugi* (textile, Kagoshima and Miyazaki), Kaga *yuzen* (dyed goods, Ishikawa), Wajima *nuri* (lacquer ware, Ishikawa), Kiyomizu *yaki* (pottery, Kyoto), and Kyo *komon* (dyed goods, Kyoto) produce more than 10 billion yen a year. They distribute in Ishikawa and Kyoto Prefecture, except the *Honba* Oshima *tsumugi*. Because only 24 regions produce more than 10 billion yen a year, they are large traditional industry regions. Though the production in the category includes various items, Buddhist altar production regions are eliminated, because of the introduction of wood process machines and mass production.

Thirty-six regions in which the rate is from 20 to 80 percent have both traditional and modern techniques. Nineteen regions in this category produce only one to two billion yen. In contrast, the largest region, which produces more than 300 billion yen, has only 44.9 percent of the rate. It is named Nishijin *ori* (textile, Kyoto), and it belongs to the category.

Modern technique has almost replaces traditional ones, in regions having less than 20 percent of the rate. These regions can be named modern technique-replaced regions. Large scale traditional industry regions often belong to this category. Regions belonging to this category occupy 45.8 percent of regions producing more than 100 billion yen a year. In contrast, this category holds only 13.3 percent of regions producing from one to two billion yen a year. The large-scale regions include regions adopting mass production by conversion to modern technique.

Overall, the large-scale regions tend to convert to modern technique. On the other hand, Nishijin *ori* has both techniques, and Wajima *nuri* and Kaga *yuzen* hold traditional ones. They also belong to the large-scale regions. The regions that have more than 80 percent of the rate occupy 26.7 percent of all regions. Summing up the regions that have more than 80 percent of the rate, approximately 70 percent of the regions depend on traditional technique and skill. Though the introduction of modern production

technique was particular phenomenon in the rapid economic growth period, regions that adopted it completely were few.

The object of this study is a traditional industry region that continues and develops without modernization. For the study, it is appropriate to select a study area among the regions that have more than 80 percent of the rate. From the result of the analysis, the author selected Wajima *shikki* industry in Wajima City, Ishikawa Prefecture. Wajima City has the fifth grade of *shikki* production, coming after Kainan (Wakayama Prefecture), Takamatsu (Kagawa Prefecture), Yamanaka (Ishikawa Prefecture), and Aidzu-Wakamatsu (Fukushima Prefecture). However, Wajima *shikki* industry specializes in traditional high grade *shikki* production, and has the largest *shikki* production by traditional technique. For these reasons, Wajima City is appropriate as the study area.

CHAPTER II

DEVELOPMENT OF WAJIMA *SHIKKI* INDUSTRY

1. Study area

1) Wajima City, Ishikawa Prefecture

Wajima City occupies the northern edge of the Noto Peninsula facing the Sea of Japan (Figure 1). It is situated at the distance from the Kaga district including Kanazawa City, the political and economical center of Ishikawa Prefecture. Approximately 70 percent of the Wajima City area, hills ranging from 200 to 400 meters above the sea level.

Wajima City was formed by uniting Wajima Town with surrounding one town and six villages, in 1954. Although the population of Wajima City was decreased from 40,493 in 1955 to 30,164 in 1990, the rate of decline was the least in the Oku-Noto district[3]. Approximately 40 percent of population of Wajima City, which are 12,815 people live in such built up areas as Kawai-machi, Fugeshi-machi, Wajimazaki-machi, Ama-machi, and Hori-machi. Among 4,172 employees of manufacturing industry in Wajima City, 2,869 were engaged in *shikki* industry, in 1990[4]. The other main industry of Wajima City is tourism. According to the Wajima City Sightseeing Promoting Association, 2.3 million people came to Wajima City in 1990, mainly for marine leisure in summer.

2) Overview of Wajima *shikki* industry

Though the origin of Wajima *shikki* is unknown, the *shikki* manufacturers organized a guild called *Daikoku-ko*, in the *Tenmei* period (1781-1788), and 66 *nushiyas* existed in the former Wajima town area in 1797 (Committee of Compilation of the History of Wajima, 1973, 1976). The *shikki* industry was already an established business in Wajima in the eighteenth century.

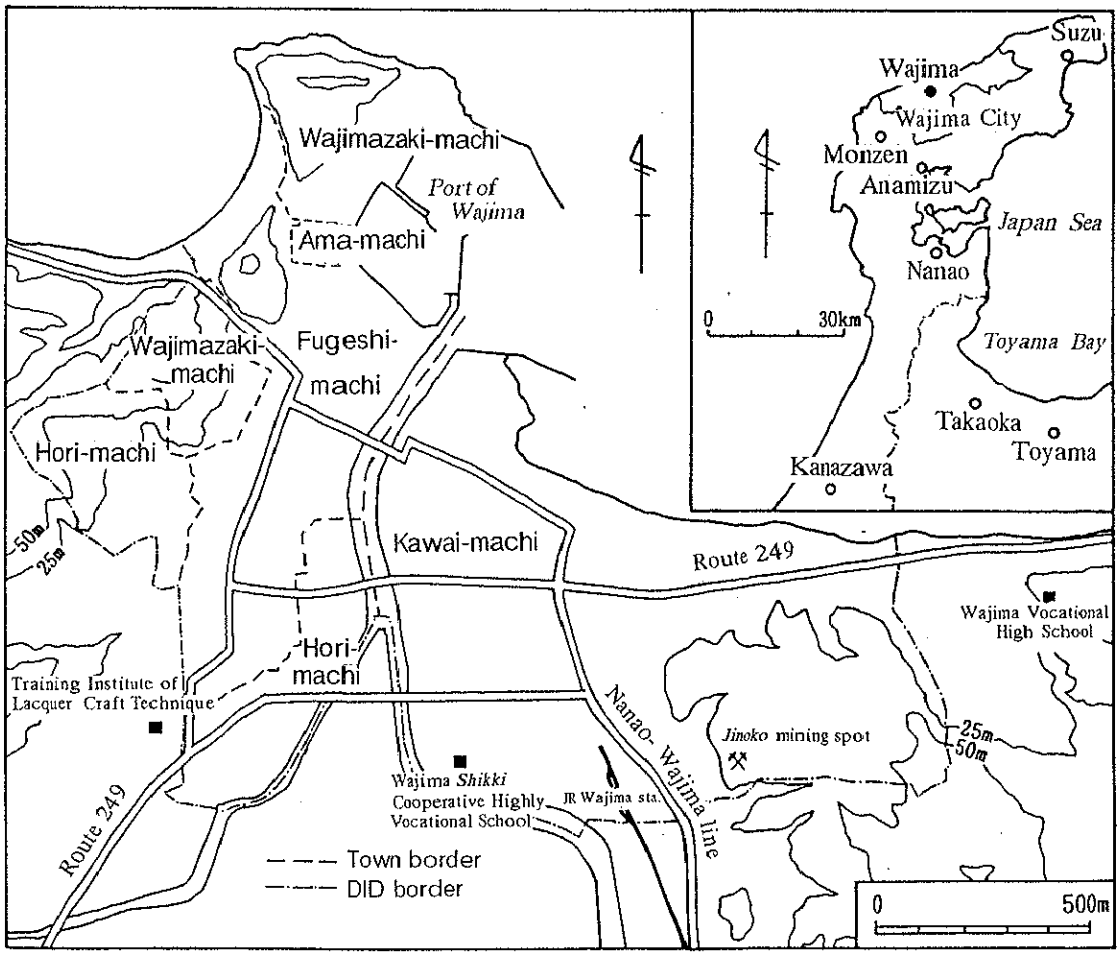


Fig. 1 Study area

The production of Wajima *shikki* almost depends on handicraft. It includes about 60 processes (Wajima City Office, 1980). Because of the materials of *shikki,* including raw lacquer and woods, change easily in quality by temperature, humidity, and sunshine, mechanization is difficult. Most of the production processes depend on artisans' skill and experience. The Wajima *shikki* industry which adopts hard priming method named *honkataji*, has more processes than in the other *shikki* production regions. Wajima *shikki* is thus regarded as high grade and expensive.

The production processes of the Wajima *shikki* consist of *kiji* (wood body making), *kyushitsu* (varnishing), and *kashoku* (surface decorating) (Figure 2). Even today, each process uses traditional methods. The *kiji* makes woods in ordered shapes. By the kinds of woods and processing methods, it is called *sashimono kiji* (joinery), *ho kiji* (hollowing), *wan kiji* (turnery), or *magemono kiji* (board rounding)[5]. The *kyushitsu* process has three steps: *shitaji* (priming), *nakanuri* (middle coating), and *uwanuri* (final coating). The *shitaji* is method that coats *shitaji* lacquer, a mixture of lacquer, rice paste, and *jinoko* (ground diatomate powder)[6], from three to six times by spatula. After drying the varnished material from one to three days, it is ground by togimono process[7]. *Nakanuri* and *uwanuri* are methods to paint refined lacquer by brush. In order to avoid dusts and changes of air conditions, the *uwanuri* is processed in a closed room. The drying period of lacquer requires at least five to six months kyushitsu process. The *kashoku* is a final process to decorate the surface. The *kashoku* consists of *makie* (sprinkled lacquer), *chinkin* (inlaid work with gold), and *roiro* (polishing) methods[8]. Usually, a Wajima *shikki* has different *kashoku* methods on its surface.

2. Component of the Wajima *shikki* industry and change of production

In 1988, 801 establishments related to Wajima *shikki*, (abbreviated as *shikki* establishments in the following) exist in Wajima City (Table 2). The *shikki* establishments consist of eleven categories: as *nushiyas*, *kaiuketori* subcontractors,

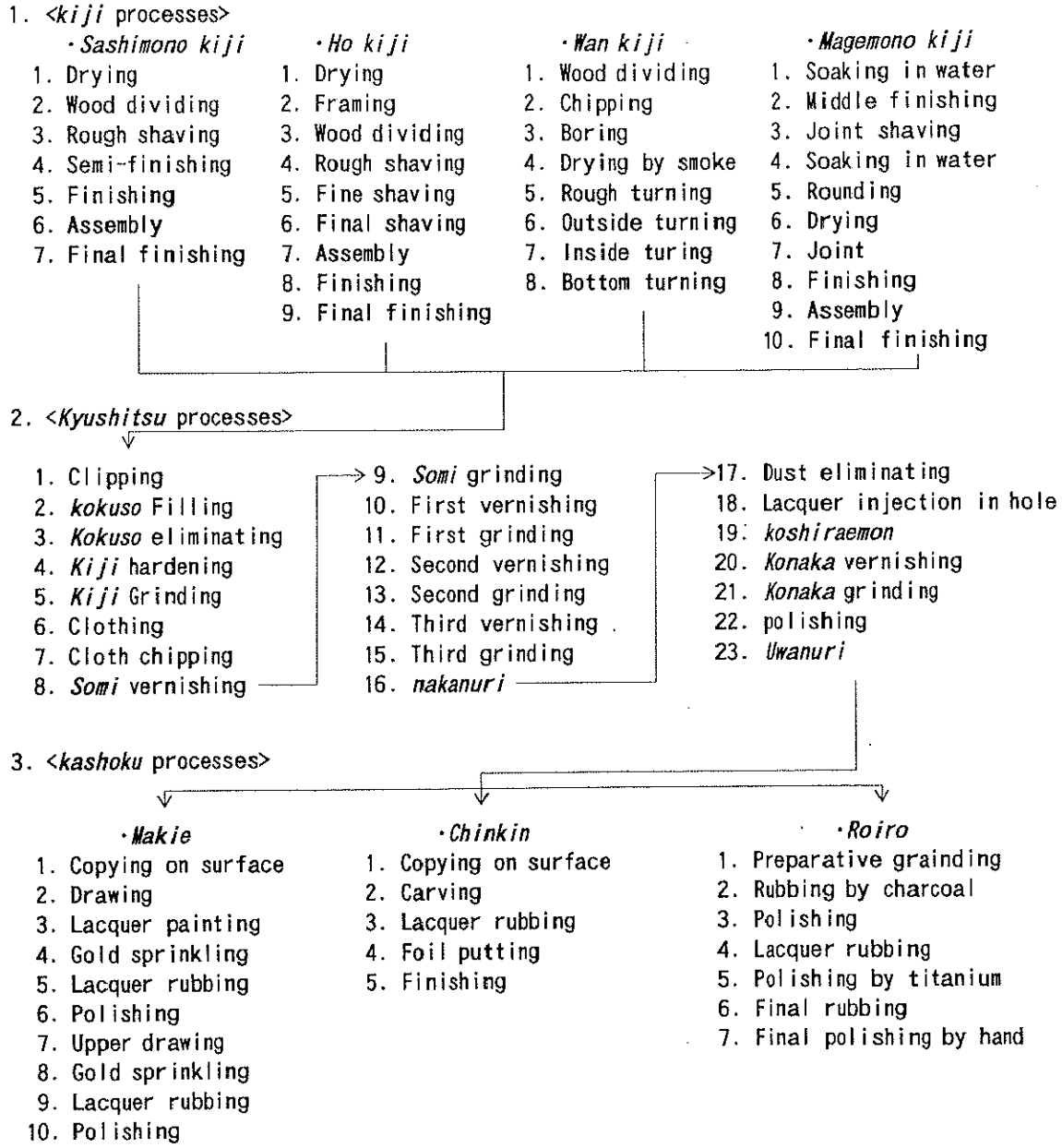


Fig. 2 Production processes of Wajima *shikki*

Arrow neans flow of processes.

Data source: Wajima City Office (1980)

Table 2 Number of *shikki* establishiment by scale of employment, in Wajima (1988)

Categories	Scale of employment				Total
	Less than 5	From 6 to 10	From 11 to 50	More than 51	
Nushiya	181	24	22	3	230
Kaiuketori	130	0	0	0	130
Makie	169	3	0	0	172
Chinkin	69	0	0	0	69
Roiro	41	1	0	0	42
Sashimono Kiji	34	0	1	0	35
Ho kiji	8	1	0	0	9
Wan kiji	15	0	0	0	15
Magemono kiji	10	0	0	0	10
Hashi	54	6	2	0	62
Hako	27	0	0	0	27
Total	738	35	25	3	801

Data source: Author's field survey and list in the Wajima Chamber of Commerce and Industry

makie makers, *chinkin* makers, *roiro* makers, *sashimono kijiyas*, *ho kijiyas*, *wan kijiyas*, *magemono kijiyas*, *nuribashi* (chopsticks) makers, and *hako* (box) makers. The *nushiya* is an organizer of the Wajima *shikki* industry. It not only processes on the *kyushitsu* part, but also sells *shikki*. The *kaiuketori* subcontractor is a maker that processes a part of the *kyushitsu*, by order from *nushiya*. The largest category is that of the *nushiyas* with 230 establishments. Next largest one is that of the *makie* makers. Total number of *kashoku* establishments (including *makie, chinkin*, and *roiro* makers) reaches 283.

Among 801 *shikki* establishments, 738 have less than five workers. All *kaiuketori* subcontractors, *chinkin* makers, *wan kijiyas*, *magemono kijiyas*, and *hako* makers have less than five people. The *nushiya* is the only category which includes relatively large firms, although only three of them have more than 51 persons.

The production of the Wajima *shikki* has rapidly increased since the middle 1960s (Table 3). From 1968 to 1980, it increased from 1.85 to 15.0 billion yen, and reached to 16.1 billion yen in 1989. Particularly from 1968 to 1971, it increased 3.5 times. During the same period, the number of establishments and workers have also increased constantly. The establishments increased from 458 in 1968 to 869 in 1989, and workers increased from 1,384 to 2,869.

The expansion of the industry was induced by the stoppage of lacquer import from China between 1959 and 1960[9]. It became difficult to produce traditional *shikki* items in other *shikki* production regions, because of their dependence on the Chinese lacquer. They converted to produce cheap items using plastics and chemical paint. Introduction of new materials developed in regions with simple techniques of *shikki* production. In contrast, the introduction of new materials did not take place in regions with complex techniques (Baba, 1977). Because Wajima has established high level *shitaji* technique and complex processes, it did not introduce new production techniques. As the result, the demands for high grade *shikki* concentrated into a few regions that produced high grade items.

Table 3 Changes in production and establishments in the Wajima *shikki* industry

Item \ Year	1962	1965	1968	1971	1974	1977	1980	1983	1986	1989
Amount of products (0.1 billion yens)	13.4	18.2	18.5	65.5	91	110	150	140	140	161
Number of establishments	—	—	458	392	591	603	769	800	800	869
Number of employments	—	—	1,384	1,447	1,825	2,020	2,550	2,745	2,801	2,869

Number of establishments and employments in 1962 and 1965 are unkown.

Data source: The Cooperative of Traders and Manufacturers in Wajima *shikki*

3. Expansion of the distribution of establishments related to *shikki*

In the former Wajima Town[10], the *shikki* establishments were clustered in Kawai and Fugeshi-machi in 1967 (Figure 3). The *shikki* establishments were highly concentrated on the mouth of the Wajima River and areas along the Route 249 in Kawai-machi. Many *shikki* establishments were also distributed around the shopping mall named *Asaichi* street along seaside, which had the heaviest traffic flow in the Wajima built up area. The *shikki* establishments also occurred in the entire Fugeshi-machi, except northern forestry part. In contrast, no establishment were distributed in Ama-machi as fishery region, and only one firms was located in Wajimazaki-machi. Similarly, out of the former Wajima Town, only 18 establishments lay in Hori-machi, adjacent to Fugeshi-machi. Each category did not cluster. They distributed with mixture.

Figure 4 shows the distribution of the *shikki* establishments in 1988. Even then, the establishments were accumulated Kawai and Fugeshi-machi. At the same time, a few establishments began to appear in the areas adjacent to the former Wajima Town in 1967.

The two agglomerated areas of the establishments existed in Kawai-machi in 1967. The increase in the establishments made the cores of agglomeration vague, and the western part of Kawai-machi formed a larger agglomeration in 1988. The distribution expanded toward the eastern and southern parts of Kawai-machi, where a few establishments were located in 1967. The establishments showed a remarkable increase in Fugeshi-machi, mainly in the southern part. In contrast, Ama-machi still had no firm. On other hand, the establishments were distributed in Wajimazaki-machi along main roads. Each category of the establishments were located with mixture, and made a regional agglomeration in built up area.

In adjacent areas of the former Wajima Town, the *shikki* establishments were distributed widely in 1988. Mainly, they were located along the two main roads toward south. The distribution of each category showed different patterns in the areas adjacent to the former Wajima Town. For example, *nushiya*s were distributed along the Nanao-

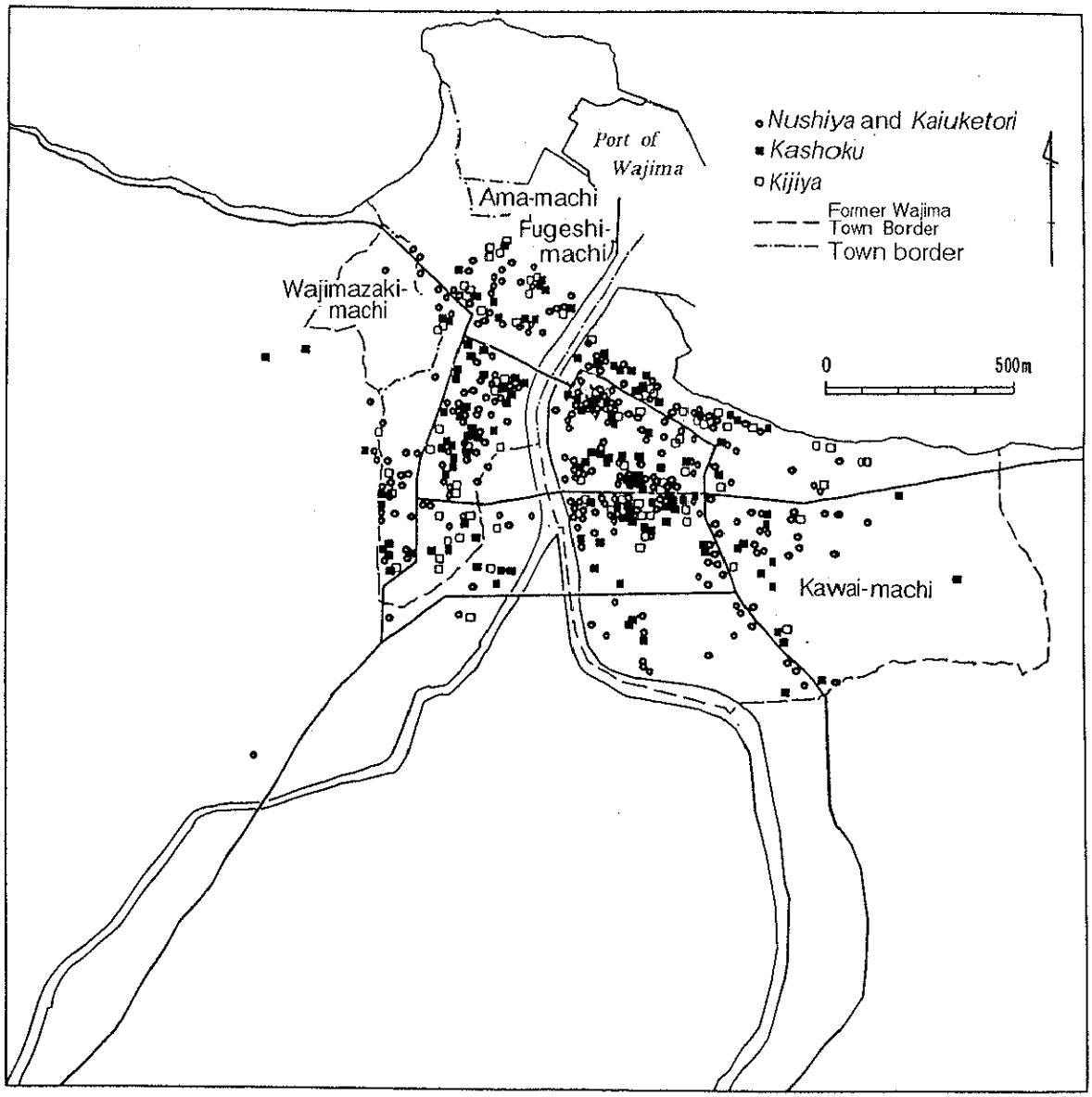


Fig. 3 Distribution of the *shikki* establishments, 1967

Nushiya and kaiuketori are shown in same symbol, because of limited data.

Data source: List in the Wajima Chamber of Commerce and Industry

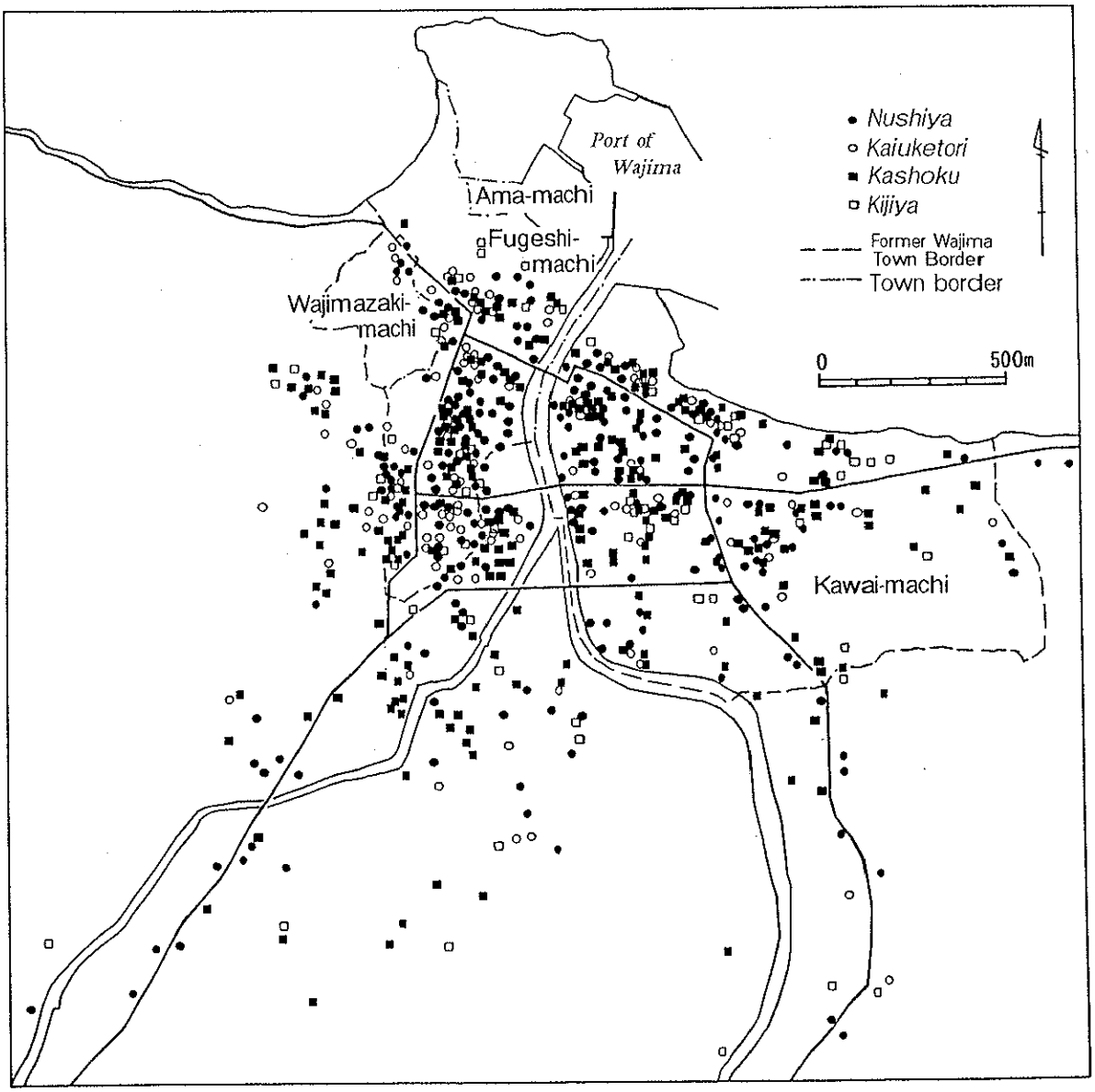


Fig. 4 Distribution of the *shikki* establishments, 1988

Data source: List in the Wajima Chamber of Commerce and Industry

Wajima line and the Route 249 in the adjacent rural areas, and *kashoku* establishments were distributed in rural areas next to the built up area.

The distribution of the firms expanded, from the former Wajima Town, including Kawai and Fugeshi-machi, to the surrounding areas during the two decades.

CHAPTER III

CHANGES OF ORGANIZATION OF PRODUCTION AND DISTRIBUTION

This chapter identifies the restructuring of the Organization of production and distribution, as a condition of continuance and development of the Wajima *shikki* industry in the rapid economic growth period. Nushiyas and *kaiuketori* subcontractors who process the *kyushitsu* part are analyzed. *Nushiyas*, being organizer of the Wajima *shikki* industry, occupy the position that can change of the Organization. The *kyushitsu* part experienced the most remarkable change in its division of production.

1. Traditional organization of production and distribution in Wajima *shikki* industry

1) Traditional division of production

Kijiyas, *nushiyas*, and *kashoku* makers divided production processes of Wajima *shikki*. *Nushiyas* were the only processors of *kyushitsu* until about 1960. In addition to processing *kyushitsu*, *nushiyas* sold *shikki* productions and organized the industry. Unlike other *shikki* production regions, the wholesalers are not specialized in sales in Wajima. Wajima *shikki* industry is controlled not by commercial enterprises, but by *nushiyas*, whose main business is manufacturing[11].

Nushiyas ordered *kiji* to *kijiyas*, in compliance with customers. They varnished lacquer on *kijis* delivered by *kijiyas*. They processed all steps from *shitaji* to *uwanuri* and such additional processes as *togimono* and *fukiage* (final grinding) by themselves. The *kyushitsu* processes was the final processes for *shikki* production. The *nushiya sometimes* ordered *kashoku* on surface in compliance with customers. *Nushiya* delivered the final products to customers.

Kijiyas and *kashoku* makers purchased the materials by themselves; *nushiyas* did

not offered the materials. Because most *kijiya*s and *kashoku* makers were small, they depended the financing from rich merchants or landowners named *ginshikata*s. Because *nushiya*s did not become *ginshikata*s[12], they did not fettered *kijiya*s and *kashoku* makers by funds. From the *nushiya*s side, *kijiya*s and *kashoku* makers were material suppliers and consignment processors. They were independent of *nushiya*s.

Some characteristics distinguished the Wajima *shikki* industry from other traditional ones. The traditional production of the Wajima *shikki* industry was continued, though a simple division of labor organized by *nushiya*s. Because *nushiya*s had production and sales functions,*kijiya*s and *kashoku* makers were independent of *nushiya*s in terms of material and funds supply. The relationship among *nushiya*s, *kijiya*s, and *kashoku* makers has been continuing.

2) Sales method

Traditional sales method of the Wajima *shikki* depended on *nushiya*s. They sold *shikki* by peddling to customers, called bashoyuki or *tabi* (journey). *Nushiya* called a sales area as a *bashosaki* or a *basho* (place). One *bashosaki* includes one to five counties. To prevent invading *bashosaki* of each other, the Trade Association of Wajima *Shikki* assigned the sales area (Committee of Compilation of the History of Wajima, 1976). The association was predecessor of the present Cooperative of Traders and Manufacturers in Wajima *Shikki* (abbreviated as *Shikki* Cooperative in the following).

Until the mid 1950s, *nushiya*s visited customers in July, August, November, and December. After humid June, when lacquer dried easily, and after September and October, when *nushiya*s produced items for new year, *nushiya*s carried out sales. *Nushiya*s conducted 30 to 40 days of sales journey. After sending goods to a *basho* by ship or railway, a *nushiya* left for the destination. In a *bashosaki*, the *nushiya* visited three to four customers with samples a day to take orders. In the next visit, he delivered goods and received the charge. Main customers with large demand included rich individuals, inns, and restaurants.

*Nushiya*s organized their customers into groups called *wanko*s. A *wanko* was a mutual financing association for purchasing same goods. It consisted of 10 to 20

customers. A caretaker was selected for managing installments. A person of a high social status usually, took this honorable post. The members regularly reserved agreed installments in three to five years. When a *nushiya* visited, they took part in a tender. The *nushiya* invited them to a restaurant to open the tender. The members tendered rate of interest on loan. A member who tendered the highest rate could borrow installments, and could buy goods. In the next tender, he could not join it. Finally, all members could buy the *shikki* products. Although a *wanko* reached a maturity in three to five years, it continued when demands of customers existed. For *nushiyas*, *wankos* have advantageous to hold many good customers. The wanko continued to exist as an important sales method until the mid 1950s.

Nushiya secured good customers, by the peddling and the *wanko*. By the peddling, *nushiya* could take customers' demand directly. By the *wanko*, he could buy goods constantly. *Nushiyas* got the trust of customers through those methods. Demands for high grade goods of rich customers supported the Wajima *shikki* industry.

2. Restructuring of organization of production and distribution in the Wajima *shikki* industry

1) Division of *nushiyas* and diversification of sales

There are many types of the present *nushiyas* by presence or absence of production or by sales methods (Figure 5). Procedure of the classification is as follows. First, *nushiyas* are classified according to whether or not they process *kyushitsu*. *Nushiyas* with *kyushitsu* process are further categorized into these with or without *kyushitsu* to *kaiuketori* subcontractors. *Nushiyas* with subcontractors are subdivided by sales methods.

Although the *nushiyas* are categorized into five types, all *nushiyas* order *kyushitsu* to the *kaiuketori* subcontractors. Thus no *nushiya* falls into those without subcontractors. *Nushiyas* with a *kyushitsu* process are thus classified as Type A, who sell only by retail to consumers; Type B, who sell to consumers and wholesale dealers;

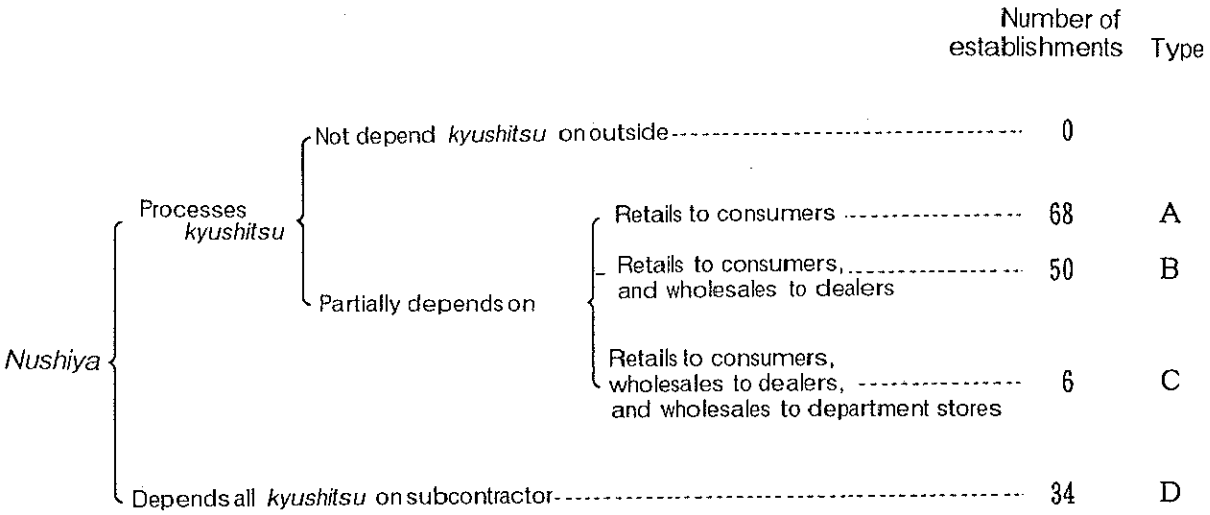


Fig. 5 Classification of the *nushiya*, 1988

158 samples are available among 230 *nushiya*s.

Data source: The author's field survey in November, 1988

Type C, who sell to consumers, wholesale dealers, and department stores[13]. In addition, type D is the *nushiyas* without the *kyushitsu* process[14]. In 1988, 158 *nushiyas*, whose management conditions were surveyed among 230 *nushiyas*, consisted of 68 type A, 50 type B, 6 type C, and 34 type D establishments.

The management of *nushiyas* of each type is elucidated by representative cases (Table 4). The alphabets added to *nushiyas* are corresponded to the types in the following descriptions.

The comparison of the *nushiya* type indicates that the *nushiya* with many types of customers tend to have a larger number of employees. The *nushiya* A and D with only one sales method hold only family workers. On the other hand, the *nushiya* B employs 13, and the *nushiya* C has more than 150 workers. Though the *nushiya* A processes only *uwanuri* and *nakanuri*, the *nushiya* B conducts all *kyushitsu* processes except *togimono*, and *makie*. The *nushiya* C carries out all *kyushitsu, makie*, and *roiro* processes. Therefore, *nushiyas* with many employees can widely cover production processes.

The examination of relation between the number of employees and that of subcontractors indicates that the *nushiyas* with the *kyushitsu* process are the *nushiya* A, B, and C. Among them, the *nushiya* C ordered all of *shitaji* and 40 percent of *nakanuri* and *uwanuri* to *kaiuketori* subcontractors. To the contrary, the *nushiya* C orders only 30 percent of *shitaji* and *nakanuri*. Because *nushiya* with many employees includes more workers for *kyushitsu*, the large sale *nushiya* decreases the dependence on *kaiuketori* subcontractors in *kyushitsu* processes. According to the number of subcontractors except *kyushitsu*, the *nushiya* A orders to nine subcontractors, while the *nushiya* B has 18. The *nushiya* C reaches 36. Because the large *nushiya* can process *kyushitsu* more than smaller ones, it must depend *kiji* and *kashoku* processes on many subcontractors. The *nushiya* D without the *kyushitsu* process orders *kyushitsu* to 13 *kaiuketori* subcontractors. Comparing with the *nushiya* A in the same scale, it has more orders, i.e., it orders to 29 subcontractors. The numbers even suppresses that of the *nushiya* B, which has 27 orders.

Table 4 Types of *nushiya* managements

Items \ *Nushiya*	*Nushiya* A	*Nushiya* B	*Nushiya* C	*Nushiya* D
Year of establishment	1917	1940	1948	1955
Number of employments	2 (Male 2, Female 0) (Production1, No-production 1)	15 (Male 8, Female 7) (Production 13, No-production 2)	173 (Male 87, Female 86) (Production 99, No-production 74) (in branch 35)	3 (Male 1, Female 2) (Production 0, No-production 3)
Business contents	*Uwanuri, nakanuri*, and sales	All of *kyushitsu* except *togimono*. *makie*, and sales	All of *kyushitsu, makie roiro*, and sales	Sales only
Number of outside orders	*Shitaji* 2, *uwanuri* 1, *togimono* 2, *makie* 3, *chinkin* 1, *roiro* 1 *sashimono kiji* 1, *ho kiji* 1 *wan kiji* 1, *magemono kiji* 1	*Shitaji* 4, *uwanuri* 2, *togimono* 2. *makie* 7, *chinkin* 2, *roiro* 4 *sashimono kiji* 2, *ho kiji* 1 *wan kiji* 1, *magemono kiji* 1	*Shitaji* 3, *uwanuri* 1, *togimono* 0, *makie* 18, *chinkin* 7, *roiro* 2 *sashimono kiji* 6, *ho kiji* 1 *wan kiji* 1, *magemono kiji* 1	*Shitaji* 5, *uwanuri* 3, *togimono* 5, *makie* 5, *chinkin* 2, *roiro* 3 *sashimono kiji* 3, *ho kiji* 1 *wan kiji* 1, *magemono kiji* 1
Rate of dependence on *kaiuketori*	*Shitaji* 100% *Nakanuri* and *uwanuri* 40%	*Shitaji* and *nakanuri* 30% *Uwanuri* 15%	*Shitaji* and *nakanuri* 30%	*Shitaji, nakanuri*, and *uwanuri* 100%
Customers	Ordinary consumer 100% (250 persons)	Wholesale dealer 80% (4 dealers) Ordinary consumer 20% (10 shops) (*Sushi* bar and restaurant)	Ordinary consumer 60% Department store 30% Wholesale dealer 10% (3 dealers)	Retail store 100% (8 dealers)
Sales method	Peddling only	Wholesale to dealers, peddling,and exhibition (promoted by wholesaler)	Peddling, wholesale to dealers and department store, and exhibition (promoted by itself)	Wholesale to retail stores
Sales areas	Nigata, Fukushima, Ibaraki, Saitama, and Tokyo	Osaka, Kyoto, and Hyogo	All of Japan (Kanto 27.2%, Kansai & Chugoku 26.9%, Hokuriku 29.3%)	Fukuoka, kumamoto, and Miyazaki
Number of days in sales activities	4 times a year, 80 days totally	20 times a year, 150 days totally	Everyday. Branches in Tokyo, Osaka Kanazawa, Nagoya, and Fukuoka	4 times a year, 50 days totally

Data source: The author's field survey in August, 1988 and April, 1991

On sales function, the *nushiya* C, holding the most numbers of sales methods, has more employees in sales division than in production division when the employees in blanches are combined. In contrast, the *nushiya* A continuing only traditional method depends sales activity on the son of the manager. The nushiyas with more sales methods spend more days on sales activities. The *nushiya* B and C take part in exhibitions. The *nushiya* B supplies goods to the exhibitions planned by wholesaler. In other words, the *nushiya* B depends on the ability of the wholesalers. The *nushiya* C conducts its own exhibitions in different parts of Japan.

Figure 6 shows the changes in the management of *nushiyas*. *Nushiya* maintained the traditional management with the *kyushitsu* process and selling by peddling till about the mid1950s. The *nushiya* C started trades with wholesale dealers in 1956, and began to have business with *kyushitsu* to *kaiuketori* subcontractors in 1961. As a result, it shifted to the Type B. When it started the trade with department stores, it again shifted to the Type C in 1965. Though the *nushiya* A depends on only traditional sales methods, it began to order *shitaji* to subcontractors, and shifted to the Type C in 1965. The *nushiya* D stayed in the Type B in the first five years, because it employed an *uwanuri* artisan and sold to wholesalers. In 1960 when the artisan retired, it shifted to the Type D that depended all *kyushitsu* on upon subcontractors.

The division of *nushiyas* began with start of trades with wholesalers by a few *nushiyas* in the latter half of the 1950s. From the late 1950s to the early 1960s, other *shikki* industry regions shifted to cheap goods' production. The demands to produce high grade *shikki* products began to expand in Wajima. Because the Type B and C gained new customers through wholesalers and department stores, they could strengthen their sales abilities. The Type D, specializing in sales was added as a new type. The sales methods of Wajima *shikki* industry were diversified. The industry could obtain more customers in addition to the traditional ones.

2) Independence of *kaiuketori* subcontractors

Kaiuketori subcontractors conduct a part of *kyushitsu* process after receiving orders from *nushiyas*. Although such subcontractors did not exist originally in Wajima

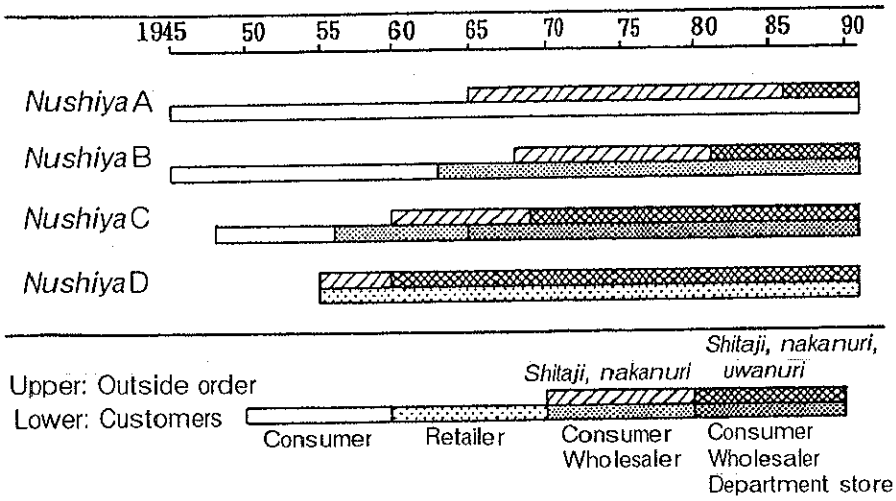


Fig. 6 Changes in the *nushiya* management

Data source: The author's field survey

shikki industry, they began to increase around 1960 to be parts of the Organization. While most *kaiuketori* subcontractors purchase materials for their use, a few subcontractors depend supplement of lacquer on *nushiya*. *Kaiuketori* subcontractors are categorized into four types by processes: as *shitaji, nakanuri, uwanuri*, and *togimono.*

Table 5 shows the management and attributes of 24 artisans of *uwanuri* processors for detail cases analyses. Among the 24 of the *uwanuri* processors, 13 were established in the 1970s, and eight in the 1960s. The period of their proliferation corresponded to the production increase of Wajima *shikki* (Table 3). An average *uwanuri* processor, which depends upon family labor, has one to three *uwanuri* artisans. The process rooms range from 20 to 70 square meters. Traditionally a *nushiya* used storehouse as a processing room in order to avoid dust and to control the air. They did not offered to own specialized rooms for *uwanuri* process. They remodeled ordinary Japanese style rooms into *uwanuri* processing rooms. They floored the improved rooms with linoleum to keep the dust away, and introduced air conditioning facilities to stabilize temperature and humidity.

The *uwanuri* subcontractor does not take only one, but several *nushiyas*' orders. Table 5 indicates that only one processor take more than 10 orders; the most orders are five or six. At the same time, because *uwanuri* artisans are disciples of the *nushiya* managers who trained them to master the skill, they usually cannot be equal to *nushiyas*; it is difficult for the artisans to demand adequate price to the *nushiyas*. Therefore, an *uwanuri* processor tends to avoid taking orders from the *nushiyas* who once was his master.

The parents of many *uwanuri* processors were employed in the *shikki* industry. In cases that a father was a *nushiya*, the son acquired *kyushitsu* skill under the father or a relative. The parents of some *kaiuketori* processors that were established after 1970, are not employed in the *shikki* industry. The emergence of independent *kaiuketori* subcontractors in the 1960s stimulated those who never had any relation to the *shikki* industry.

Kaiuketori subcontractors were once employed in *nushiyas* as temporary or full-

Table 5 Career and management of the *kaiuketori* subcontractors, 1990

No.	Age	Year of establish-ment	Number of employments			Master in training	Finally graduated school	Father's profession	Area of room for *uwanuri*	Number of clients
			Total	*Uwanuri* artisans	Family laborers					
1	60	1953	3	2	3	Father	Elementary	*Nushiya*	About 40㎡	4 nushiyas
2	32	1960	6	3	3	Father	High	*Nushiya*	52.8	10
3	59	1961	3	2	3	Father	High	*Nushiya*	46.2	6
4	50	1963	3	1	2	*Nushiya*	Junior	*Makie*	26.4	3
5	39	1963	3	1	3	Father	High	*Kaiuketori*	21.5	5
6	54	1965	2	1	2	*Nushiya*	Junior	*Kyushitsu* artisan	23.1	3
7	53	1965	2	1	2	*Nushiya*	Junior	*Kijiya*	39.6	5
8	57	1968	4	1	2	*Nushiya*	Junior	*Kijiya*	19.8	4
9	53	1969	2	1	2	*Nushiya*	Junior	*Kyushitsu* artisan	39.6	5
10	60	1970	2	1	2	Grand father	Elementary	*Nushiya*	26.4	10
11	52	1970	3	2	3	*Nushiya*	Junior	*Kyushitsu* artisan	33.0	4
12	49	1970	2	2	1	*Nushiya*	Junior	*Kyushitsu* artisan	66.0	6
13	44	1970	5	2	3	Father	High	*Nushiya*	33.0	10
14	54	1971	2	1	2	*Nushiya*	Junior	*Kyushitsu* artisan	19.8	5
15	49	1971	2	1	2	*Nushiya*	Junior	*Kyushitsu* artisan	29.7	6
16	44	1971	1	1	1	*Nushiya*	Junior	Clothier	23.1	4
17	46	1972	1	1	1	*Nushiya*	High	Office worker	33.0	3
18	50	1973	3	2	3	*Nushiya*	Junior	*Kyushitsu* artisan	23.1	5
19	49	1973	3	1	3	*Nushiya*	Junior	Office worker	26.4	10
20	48	1973	2	1	2	*Nushiya*	Junior	*Kyushitsu* artisan	26.4	5
21	49	1975	2	1	2	*Nushiya*	Junior	Farmer	23.1	4
22	47	1975	3	1	2	*Nushiya*	Junior	*Nushiya*	66.0	7
23	36	1982	2	1	2	*Nushiya*	Junior	*Kyushitsu* artisan	33.0	3
24	34	1986	6	3	1	*Nushiya*	Junior	Farmer	About 50	About 40

Data source: The author's field survey in August, 1990

time artisans before independence. Temporary workers were hired from a few days to several months by the *nushiyas* that lacked artisans. The *nushiya* paid their daily or monthly wages. When such artisans achieved independent as *kaiuketori* subcontractors, they can expect an increase of income and freedom of working hours. Artisans with had adequate skill thus closed to be independent as the *kaiuketori* subcontractors.

Nushiyas who maintain all *kyushitsu* processes cannot shift from one step to another until the lacquer is dried. By contrast, *kaiuketori* subcontractors are in charge of only one step. They can process *uwanuri*, while other items are being dried after *uwanuri*. The subcontractors have a high efficiency. As a whole, the *kyushitsu* processes of the Wajima *shikki* industry has gained a high efficiency. The industry could increase the production because of the dependency on the *kaiuketori* subcontractors. *Nushiyas* could decrease its artisans to stabilize their management.

3) Existence of materials supply functions

Before the Second World War, the Wajima *shikki* industry could get such main materials as lacquer and woods within the Noto Peninsula and Ishikawa Prefecture.

Fugeshi and Suzu counties in Oku Noto district used to produce lacquer. Table 6 shows the production of the lacquer in Fugeshi county, including the present Wajima City's territory. The gathering lacquer reached its peak at on the end of the nineteenth centuries (Ishikawa Prefecture, 1963). Even during the 1910s, 40 to 70 farmers gathered 40 to 60 tons of lacquer. Farmers grew lacquer tree around upland fields and in abandoned paddy fields. Gathering lacquer was the farmers' side business in summer. Lacquer dealers in Wajima bought it to sell to *shikki* establishments. Development of sericulture lead to the conversion of lacquer tree fields into mulberry. The producers of lacquer decreased in the 1920s. On the other hand, The import of cheap Chinese lacquer began. The production of lacquer rapidly decreased and stayed only 117 kg in 1946. Now, lacquer is hardly produced in the Noto Peninsula[15].

In present, the *Shikki* Cooperative and the *shikki* material merchants supply lacquer. The Japan Association of *Shikki* Cooperatives imports the Chinese lacquer through trading companies. It supplies lacquer to *shikki* material merchants and the

Table 6 Production of raw lacquer in Fugeshi county (1912 - 1917)

Year	Number of lacquer gathering farms	Amount of gathered lacquer
1912	45 farms	37,946kg
1913	58	39,540
1914	69	40,890
1915	39	31,770
1916	34	59,614
1917	45	56,771

Data source: Institute of Wajima *shikki*

Shikki Cooperative. Japanese lacquer is mainly produced by the gatherers in Joboji and Ashiro, in Iwate Prefecture. They gather lacquer in Iwate and Ibaraki Prefecture. Lacquer wholesalers in Nagoya, Sabae (Fukui Prefecture), and Kanazawa buy gathered lacquer. They supply it to *shikki* material merchants and *shikki* firms. The *Shikki* Cooperative makes collaboration sales business of lacquer to supply it to cooperators cheaper than the market price.

The other main material is wood. Even now, Ishikawa Prefecture can supply about half of the materials (Table 7). Wajima *shikki* industry used only three kinds of woods as its *kiji*: *ate*, *keyaki*, and *honoki*. They are provided from the Noto Peninsula. Lumbers were carried by ship or land road from all over the peninsula[16].

However, *keyaki* and *honoki* decreased their production by reckless deforestation. While 90 percent of *keyaki* are produced in Ishikawa, half of *ate* are carried from Hokkaido. The cost of *ate* rose suddenly into 1.9 times in 1960, despite growing all over Oku Noto district (Saito, 1972). The exhaustion of local resources and price rise developed the introduction of new kinds of woods produced out of Ishikawa Prefecture. The use of *kusamaki* (Hiba Abror Vitae, *Thujopsis dolabrata*) instead of *ate*, *shinanoki* (Shinanoki, *Tilia japonica*) instead of *honoki*, and *hansa* (Japanese cherry birch, *Betulia grossa*) instead of *keyaki* has been increased. They all come from out of Ishikawa Prefecture. Aomori Prefecture produces *kusamaki*, while Hokkaido produces *shinanoki* Gifu Prefecture produces *hansa*.

*Kijiya*s purchase these woods from wood merchants and the market. In case of *shinanoki*, a factory in Takaoka (Toyama Prefecture) produces special plywood for *shikki* and furnitures. Sashimono and ho *kijiya*s buy the plywood from it via wood merchants in Wajima. Though all of *ate* is the production in Ishikawa Prefecture, the amount of *kusamaki* used as substitution of *ate* is 1.5 times of that of *ate*. *Honoki* produced in Ishikawa Prefecture can meet only 50 percent of the demand. Most *shinanoki* used for *shikki* production comes from Hokkaido. The production of the *honoki* in Ishikawa Prefecture fills only 50 percent of the demand. *Nushiya*s sometimes purchase parts of *kiji*s from other regions, such as Yamanaka (Ishikawa Prefecture),

Table 7 Quantity of different kinds of wood used in the Wajima *shikki* industry, 1980

Unit: m^3, ( ): %

Kind of wood / Prefecture	*Keyaki*	*Ate*	*Honoki*	*Kusamaki*	*Shinanoki*	*Hansa*	*Katsura*	Total
Ishikawa	722.5	457.8	101.4					1,281.7
Gifu	80.3					200.5		280.8
Aomori				715.4				715.4
Hokkaido			101.4		205.4			306.8
Yamagata							36.4	36.4
Total	802.8 (30.6)	457.8 (17.5)	202.8 (7.7)	715.4 (27.3)	205.4 (7.8)	200.5 (7.7)	36.4 (1.4)	2,621.1 (100.0)

Data source: Institute of Wajima *shikki*

Shogawa (Toyama Prefecture), and Furukawa (Gifu Prefecture). The Yamanaka and Shogawa designated as the traditional crafts' regions. In Wajima, material bases of wood also disappeared.

The *jinoko* mined in Komineyama in Wajima is indispensable to the *kyushitsu* processes of the Wajima *shikki.* The *Shikki* Cooperative has mined and it since 1907. In the year, the former Wajima Town donated the mining patent to the Trade Association of Wajima *Shikki* by free (Kumano, 1984). Because the *Shikki* Cooperative monopolizes the mining of *jinoko,* only the *jinoko* becomes a stable material basis in the Wajima *shikki* industry.

It is impossible for the Wajima *shikki* industry to supply those materials in the Noto Peninsula, except the *jinoko.* Instead of the local bases, the *Shikki* Cooperative, the *shikki* material merchants, and the wood merchants are located in Wajima. They function as materials suppliers, connecting to materials markets in Japan. They gather traditional materials and supply them to the Wajima *shikki* industry. The function replaces the local material bases.

3. Cases of management in establishments related to *shikki*

The previous sections elucidated the restructuring of the Organization. In this section, typical cases of the *nushiya* and the *kaiuketori* subcontractor are examined.

1) Management of a *nushiya*

The changes of management of *nushiya*s and the relationship between *nushiya*s and other *shikki* establishments are identified through a case of the *nushiya* B. The *nushiya* B was established in 1940. Because the founder was once employed as artisan in Osaka, the *nushiya* B made Kansai district as its *bashosaki.* Customers were about 30 restaurants and sushi bars, to which utensils for business were sold.

Because the customers began to use cheap goods produced in the other regions, however its proceeds became to be stagnant after about the latter half of 1950s. In the period, the *nushiya* B tried to convert into the cheap goods' production using chemical

paints. Because high transportation cost made it impossible to compete with Yamanaka or Kainan, the *nushiya* B continued the traditional *shikki* production. In 1963, it began business with a wholesale dealer in Osaka. As the opportunity, it increased proceeds to the wholesale dealer. At present, the sale for the wholesale dealer occupies about 80 percent of all sales.

In 1991, the *nushiya* B ordered to 27 *shikki* establishments (Figure 7). Except four establishments, all subcontractors were distributed in the built up area and its suburb of Wajima. Because most of the establishments were located within 1 km from the *nushiya* B, the *nushiya* B did not have to concern with distance in the selection of ordering establishments.

The establishments receiving orders from the *nushiya* B increased after 1970 (Figure 8). The *nushiya* B has increased outside orders to *kaiuketori* subcontractors, since it began the order of *shitaji* in 1968. Also it began to place *uwanuri* on outside orders from 1892. It classifies goods by shapes, such as round, square, and large; The *nushiya* B assigns *shitaji* and *nakanuri* processors according to such shapes for efficiency. By partially depending *kyushitsu* processes on *kaiuketori* subcontractors, the *nushiya* B could decrease its own *kyushitsu* artisans. The *kyushitsu* processes caused a large difference in working quantity by seasons. Particularly in such leisure season for *kyushitsu* as winter, artisans sometimes had no works all a day. Because the *nushiya* B used to pay the artisans the wages during such seasons, it often ran short of the reserved funds. By ordering to *kaiuketori* subcontractors, the *nushiya* B could solve to be unstable on management, and could achieve the rationalization of management.

The most increased categories, ordered by the nushiya B, are *kashoku* makers. After about 1960, *nushiya* has planned to raise price by using *kashoku*. Particularly, *makie* is gorgeous and includes many special methods[17]. The *nushiya* B places order to seven *makie* makers, selected by using method and levels of their artisans' skill. *Chinkin* finishes in shorter time than the *makie* does. The *nushiya* B, therefore, does not need to hold more establishments than *makie*. It holds only two *chinkin* makers including rarely orders.

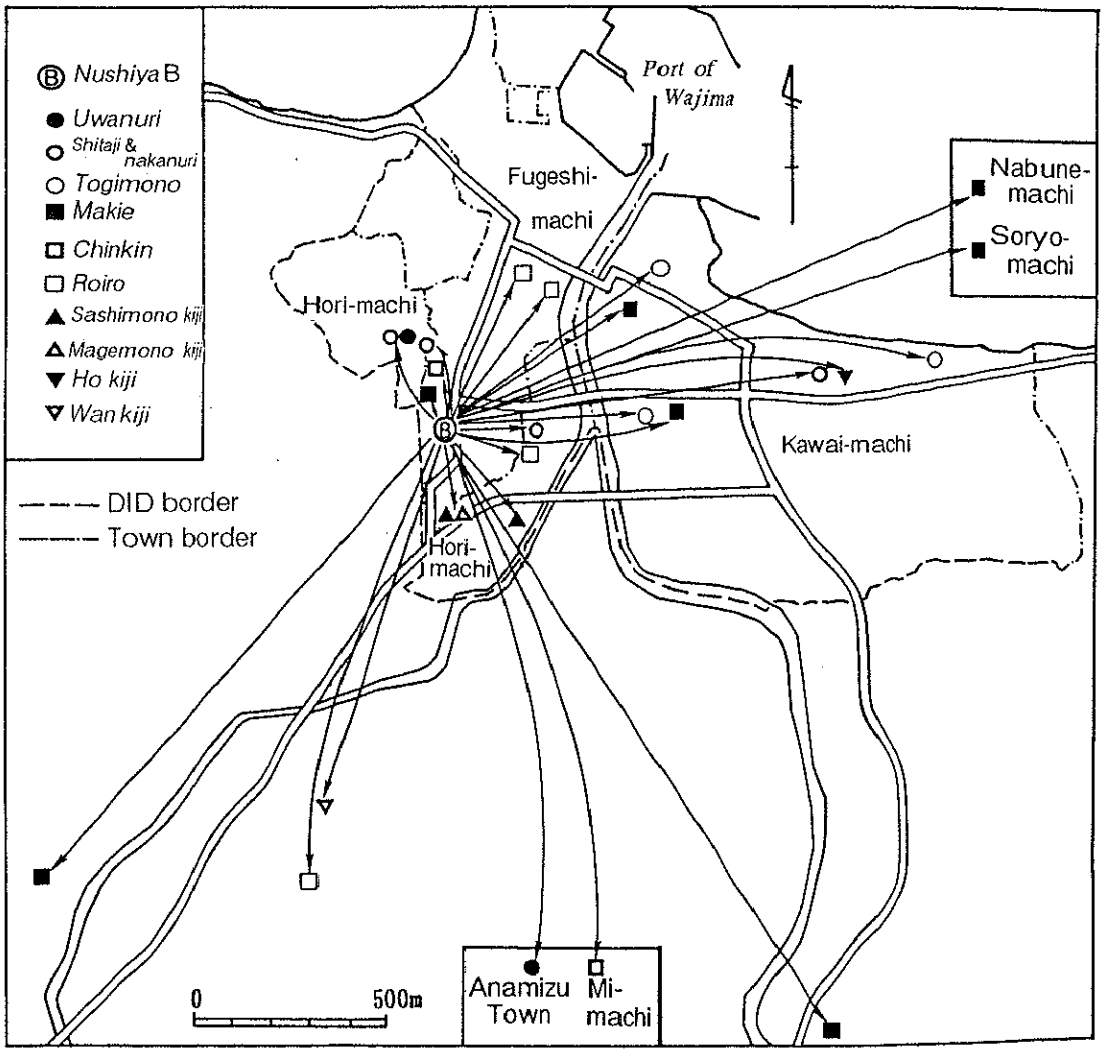


Fig. 7 Subcontractors of *nushiya* B, 1991

Combined symbols mean one establishment.

Data source: The author's field survey in August, 1988 and April, 1991

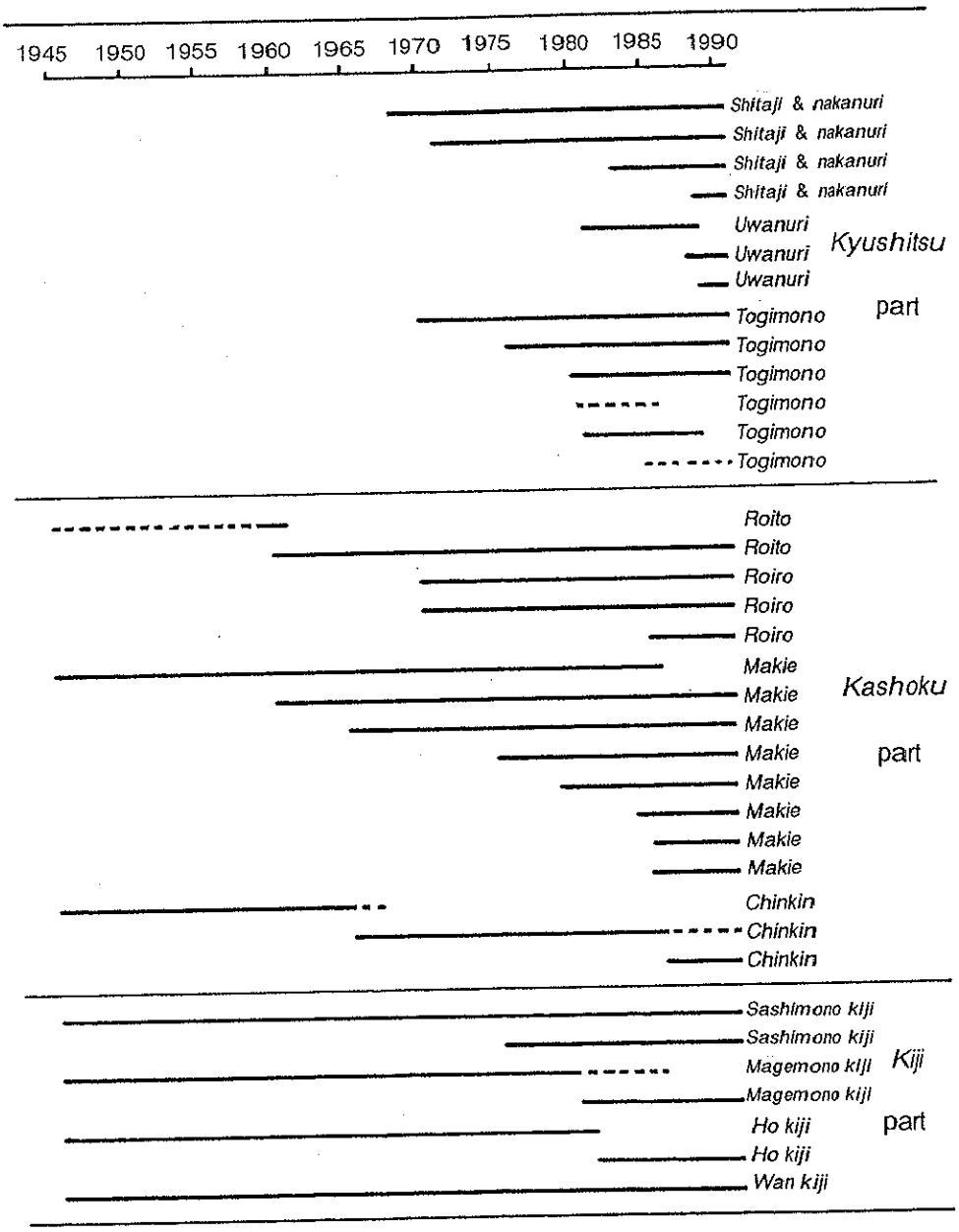


Fig. 8 Changes on the subcontractors of *nushiya* B

Dotted line means a few orders.

Data source: The author's field survey in August, 1988 and April, 1991

Figure 9 shows the production-distribution network of the *nushiya* B. In the figure, the distribution part is located right of the *nushiya*, and the production part production is located left.

The *nushiya* B has two courses of distribution. One is wholesaling to dealers, and the other is retail to consumers. They both connect to consumers. On the other hand, there is a path, that *nushiya* loans and borrows goods. The *nushiyas* borrow goods, that cannot produce by itself, in the path. Because the business come into existence upon credits, it needs no fee. At the same time, they often sell and buy incomplete goods before processing *uwanuri* (named *nurijita*). They name such business as *nakama-uri*. The *nushiya* B depends its sales for consumers on wholesale dealer so largely that it has relatively simple relationship in the distribution.

The production network is more complex than the distribution are. Most of the *shikki* establishments are agglomerated in the Wajima built up area. It is the reason why the process of the *shikki* finishes in Wajima City, except for a part of *uwanuri*. In contrast, materials and tools come not only from the city, but also from different part of Japan. The *Shikki* Cooperative and *shikki* material merchants supply lacquer. Wood merchants supply wood. The *shikki* material merchants also supply secondary materials, such as golden powder and foils, and tools, such as brushes for *makie* and *kyushitsu*, from all over Japan. The brushes for *makie* and *kyushitsu* produced in regions designated as traditional craft industry. It also shows the connection among traditional industry regions.

On the other hand, there are some materials that are supplied from other *shikki* establishments or from factories without any relation with the *shikki* industry. The remainder of *ate* board used by *magemono kijiya* is the material for spatula using in *shitaji* process. *Wan kijiya* supplies *kokuso* powder[18]. These *kijiyas* buy steel for cutlery from ironworks mainly repairing ship[19].

2) Management of a *kaiuketori* subcontractor

Kaiuketori subcontractor A is located at the east side of the Wajima-Nanao line in Kawai-machi. The subcontractor specialized in *uwanuri*. The table 5 shows it as No. 9.

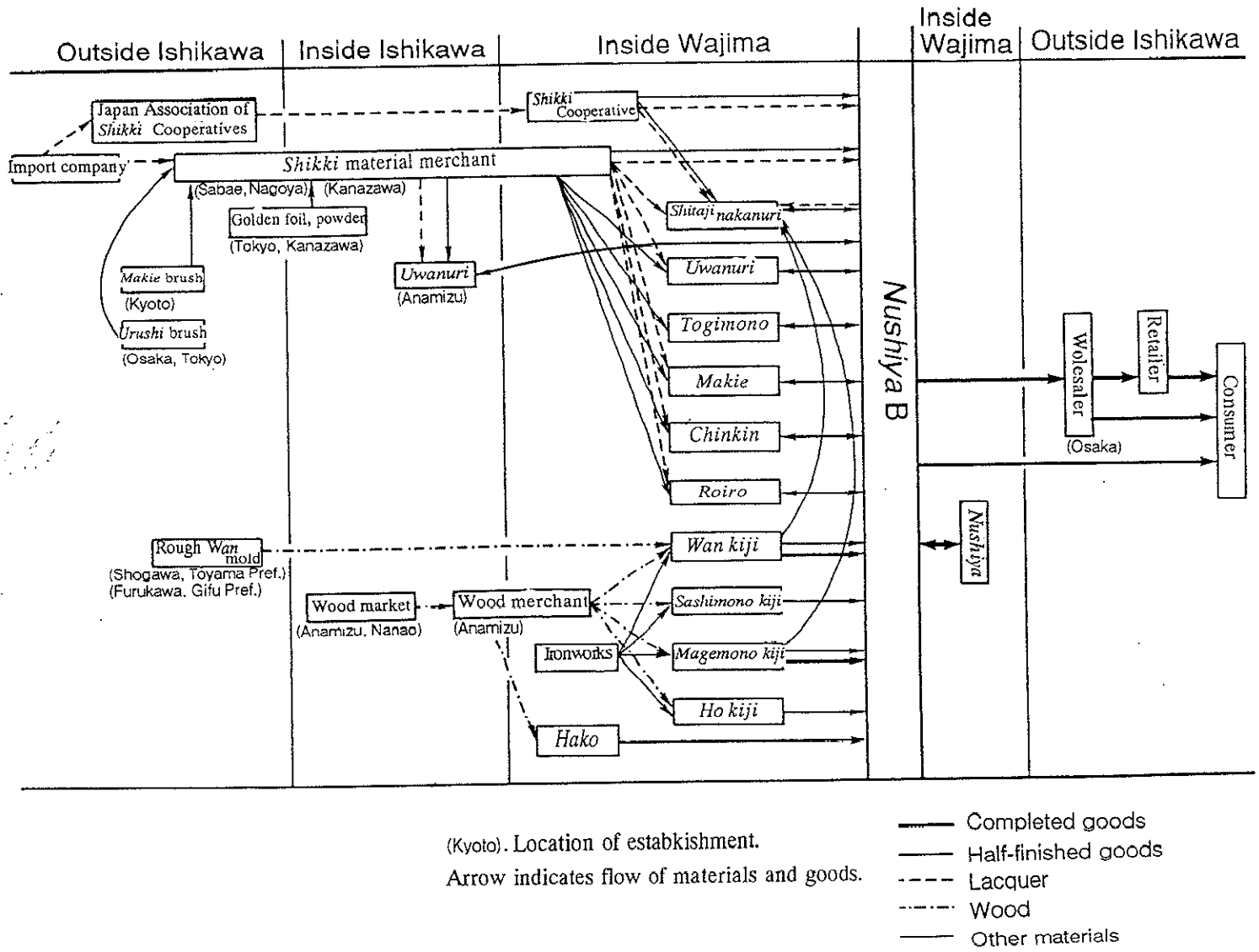


Fig. 9 Linkage of *nushiya* B with other *shikki* estabkishments, 1991

Data source: The author's field survey in August, 1988 and April, 1991

It was established in 1969, when artisan A, who is the manager, became independent of a *nushiya.*

After graduation of a junior high school in 1952, the artisan A got a job in a major *nushiya,* and started the training of *kyushitsu* as an apprentice. Two reasons made him to be an apprentice in the *nushiya*: first, his father was also an artisan employed by *nushiya,* and secondly, *shikki* industry was the most ordinary selection for graduates in Wajima. He finished the training during four years in the *nushiya.* Though he mainly learned a *shitaji* technique, he engaged in *uwanuri* as an assistant in the fourth year. His father was hospitalized, when he finished the training. He then moved to another *nushiya* that paid higher wage. In the *nushiya,* he mastered *uwanuri* and was employed as *uwanuri* artisan for three years. After that, he again changed to another *nushiya* with higher wage. He continued to work there as *uwanuri* artisan till 1969.

It has been enough for *nushiya* to employ one *uwanuri* artisan. Because the *uwanuri* process has greatly influenced on the finished products, however, *nushiya* has tried to hire a highly skilled *uwanuri* artisan from another *nushiya* by good wages. *Uwanuri* artisans changed to other *nushiyas* without hesitation, when treatment for the artisans became worse even a little. Many artisans existed in every category who did not stay in one *nushiya*; they preferred rolling around from one *nushiya* to another.

The first reasons when the artisan A established his own factory was that he could not expect the rise in wages as an employed artisan. The second reason was that other *nushiyas* ordered *uwanuri* to him. Artisans worked by the daily wages, in Wajima, when the artisan A was employed in *nushiya.* The artisan A judged that working by himself at home would increase his income. Even today, highly skilled employed artisans take up orders from *nushiyas,* to work at home. They call this work *yonabe.* He remodeled the second floor of his home for *yonabe.* Therefore, he has already equipped all facilities that were necessary for independence, such as *uwanuri* room and *denki buro* (electric drying box for *shikki*)[20].

In 1990, mainly five *nushiyas* ordered uwanuri to the *uwanuri* processor A. Orders from them occupied about 90 percent of its all proceeds. With the business with

these five *nushiyas*, the artisan A never suffered a lack of orders through a year. Figure 10 shows the changes of main clients. Two *nushiyas* of five began to have business the artisan A after the independence. They had ordered him with *yonabe*, before independence. Among the five, four *nushiyas* did not employ *uwanuri* artisans except No. 1. They depended *uwanuri* on the *kaiuketori* subcontractors. Even the No. 1, employing *uwanuri* artisan, ordered *uwanuri* on high grade items named *ginmimono* to the artisan A. The *nushiya* that the artisan A finished training also required once or twice a year, when the *nushiya* was externally busy. The artisan A considered the orders from the *nushiya* as temporary. The *uwanuri* processor A sometimes received orders from lacquer craft artists in Wajima when the quantity is little.

The *uwanuri* processor A supplies lacquer by himself; he does not depend it on *nushiyas*. Though the processor A buys all lacquer from the *Shikki* Cooperative today, it used to buy lacquer from lacquer merchants in Kanazawa and Nagoya till about 1985[21]. It uses lacquer about 7.5 kg a month, and 80 percent of it is from China[22]. The combination of lacquer differs from one goods to another. The processor A combines lacquer by his own decision, without requesting from *nushiyas* except high grade goods.

The *uwanuri* processor A is a case of the *kaiuketori* subcontractors. They once worked as journeymen or *yonabe*, but achieved independence as a good opportunity when the demand for Wajima *shikki* increased. Although the *uwanuri* processor A remains small, it maintains a stable management by continuous orders from a few *nushiyas*. Two factors enabled the production increased of the Wajima *shikki* industry without altering traditional production processes. The first factor was that highly skilled artisans such as the *uwanuri* processor A could achieve independence. The second factor was that such artisans could specialized in a particular process.

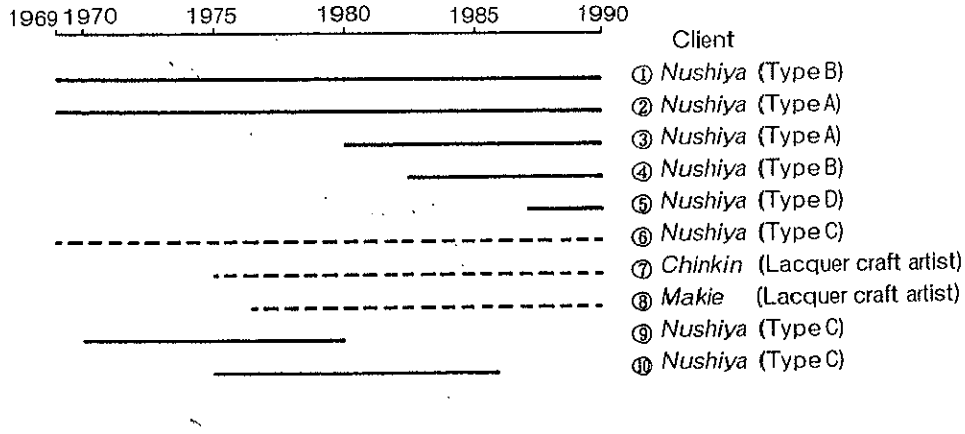


Fig. 10 Changes of clients in *Kaiuketori* subcontractor A

Dotted line means a few orders.
Types of *nushiya* are based on Fig. 5.

Data source: The author's field survey in September, 1990

CHAPTER IV

APPRENTICESHIP AND ITS CHANGES IN THE WAJIMA *SHIKKI* INDUSTRY

The previous chapter examined the restructuring of the Organization of the Wajima *shikki* industry. Because most production of Wajima *shikki* depends on handicrafts even today, maintaining and training as skilled artisans is crucial for the continuance and development of the region. The restructuring could not have been achieved without a sufficient supply of skilled artisans. How did the system of holding and training the artisans cope with the production increase of the Wajima *shikki* industry? From where were the artisans for *shikki* production supplied? How were they trained?

Chapter IV and V examines the reproduction process of the skilled artisans in the Wajima *shikki* industry. Some characteristics in the training of the artisans are identified. Regional migration patterns of the artisans are also elucidated in the reproduction processes. This chapter clarifies some attributes of the apprenticeship and the artisans as bases of understanding the regional migration patterns of the artisans. The author expects, that the apprenticeship has contributing to the development of the Wajima *shikki* industry.

1. Reproduction of artisans by apprenticeship

The production of the Wajima *shikki* consists of a sequence of handicrafts, except for a part of the *kiji* process. Therefore, the production is largely depended on highly skilled artisans. It is indispensable for the Wajima *shikki* industry to train skilled artisans.

According to Kiyokawa (1987), "technique" means "a systematic aggregation of knowledge and information, organized for the particular production." Techniques thus

can be taught through manuals or texts. On the contrary, "a skill" means "an ability to perform a duty." The skill is not only a knowledge, but also the total ability that can respond to every situation. The only method to acquire such an ability is to experience in practice (Saito, 1990).

Repeating is the most efficient method to gain the skills involved in Wajima *shikki* production. The Wajima *shikki* industry reproduces the skilled artisans. Every category of Wajima *shikki* production requires skilled and complex operations, which cannot be acquired without a long learning period. Because small *shikki* establishments cannot pay enough wages to unskilled labors, the labor must work as *deshi* (apprentice) with low wages.

Kyochokai (1936) and Sato *et al.* (1962) examined apprenticeship in Japan. Their studies were based upon the preconception that apprenticeship is a form of a low wage labor force victimized by capitalistic modernization processes. They claimed that apprenticeship had to disappear in the future to liberate unskilled labor with low wages. By contrast, however, some recent studies of economic history appreciate the apprenticeship. They suggest that the apprenticeship is continuing in another form through industrialization (More, 1980). The main academic interest have been shifted to the efficiency of apprenticeship as a skill education[23]. The apprenticeship continues and functions as a skill training system, through which highly skilled artisans are reproduced in every category of the Wajima *shikki* industry.

All artisans of the Wajima *shikki* industry were trained to learn skills as apprentices for four years[24]. The apprentice learns higher level skills gradually, by observing his master and elder artisans' works, and by repeating of practices, on actual production. The process of training is common to all categories related to the *shikki* production.

An apprentice trains to be an artisan under the apprenticeship. After the training and the sequential employment as an artisan, he becomes independent or succeeds his father's profession. The independence or succession is the major purpose for the artisans. A path can be expected that they will become independent artisans after being

trained in four years and being employed in the following years.

An apprentice learns skills step by step, from easy operation to difficult process. In case of the *kyushitsu* part, an apprentice begins from an easy *shitaji* process on a flat board. The *shitaji* process on a flat surface differs from that on a curved surface on the method of coating and in the form of spatula. A large difference also exists by season on way of combination of lacquer and in time of drying. It is necessary to learn their knowledge and skills totally. The apprentice gets higher skills from *shitaji* to *nakanuri* during four years. Because *uwanuri* is a delicate skill, a master of artisans permits only to talented artisans.

In case of *makie* of the *kashoku* part, a new apprentice starts a training by copying figures on a glass sheet by vermilion lacquer as a basic technique to draw fine line. The apprentice also engages in polishing which demands a physical strength and patience. After half a year, he is allowed to trace figures on products. A talented apprentice becomes able to draw easy lines and to involve in other easy but actual *makie* processes. After such things, he moves to learn main techniques in the use of his period. Because he has many opportunities to observe techniques and designs of his master and thus tend to receive a strong influence from the master.

Either in *kyushitsu* or *kashoku* section, a monthly wage of an apprentice as a greenhorn is only 70 thousand yen. (Section of Leading in Small and Medium-Sized Enterprises, Department of Commercial Industry and Labor, Ishikawa Prefecture, 1984). Artisans can receive a respectable treatment after finishing the four years of training.

The relationship between an apprentice and his master is not limited to the employer-employee bond, but is extended to different aspects of life like parent-child relationship. When the training is finished, they celebrate the completion with a ceremony. In the ceremony, they pledge to be a parent and a child over cups, and the master presents the artisan a suit or kimono. Similarly, the artisans who trained under the same master become brothers called *deshi-kyodai* (brothers in apprenticeship). When an artisan attends such ceremony as wedding or funeral of another *deshi-kyodai*, his seating

position is among those of the *deshi-kyodai*'s family. The connection between master and the apprentice and among *deshi-kyodai*s is so strong that they carry out annual events and ceremonies strictly. *Deshi-kyodai*s organized many get-togethers in Wajima. The members often go on a trip and open a party, in which the master is always invited[25]. The apprenticeship thus includes the aspects of social community as well as the system for skill succession.

Although the apprenticeship maintains the functions for skill succession of *shikki* production, partial changes are observed under the restructuring of the Organization. Mainly in the type A *nushiyas*, the number of days for sales activities has been increased. Thus a master cannot spend a long time for training his apprentices. By independence of the *kaiuketori* subcontractors, *nushiyas* without employed artisans for *uwanuri* have been increased. An apprentice training in such a *nushiya* cannot learn the *uwanuri* skills. Moreover, an apprentice employed in a large *nushiya* learns only one process for an efficient production. Therefore it becomes difficult to succeed the entire skill. To solve the difficulty of succession, the Ishikawa Prefecture and the *Shikki* Cooperative established schools to teach skills for the *shikki* production in the middle of the 1960s. They are Wajima *Shikki* Cooperative Highly Vocational School[26], Training Institute of Lacquer Craft Technique[27], and Course of Interior in Wajima Vocational High School[28] in Wajima City. They function as educational facilities (Harima and Kokon, 1976).

Establishments of the schools mean that the Wajima *shikki* industry begins to depend reproduction of artisans on education in other institutions. As a result of the reduction in the ability to reproduce the artisans through the restructuring of the Organization.

The apprenticeship continues as the system for the reproduction of artisans. The apprenticeship is a labor base on Wajima *shikki* industry. It gathers labors to be artisans, and reproduces skilled artisans.

2. Attributes of artisans

1) Components by sex and age

Patterns in regional migration of artisans can be identified by examining their origins, the place to learn skills, and the location of their firms after independence. To clarify the patterns, the authors carried out questionnaire to *kashoku* artisans, who belong to the cooperatives or work in two major *nushiya*s in August 1991[29]. In this section, The *makie*, *chinkin*, and *roiro* are categorized as *kashoku* makers.

Kashoku makers are examined because the numbers of establishments and employees have been increased nearly two decades. They also have many young artisans. Therefore, this most developed section is expected to reflect the development of the Wajima *shikki* industry. *Kyushitsu* and *kiji* parts are assumed to show similar results, because they carry out the same training by apprenticeship.

The questions include sex, age, the least school graduated, father's profession, business experiences, and residential removing. Out of the survey distributed to 412 artisans, 252 responses occurred (62.1%).

Figure 11 clearly shows that the artisans from 30 to 44 years old occupy a large proportion in the *kashoku* artisans. Female artisans are a few and mainly below 49 years old. In the late 1960s when the artisans of 40 to 44 years of age were young and were under their masters for training, the *shikki* production began to increase. The artisans between 30 and 44 years old occupy a large proportion because many labors took part in the *shikki* industry in this production increase period.

The number of artisans in each category above 45 years old stays about 10 because the number of apprentices was stable and because the Wajima *shikki* industry made simple reproduction of artisans before the 1960s. By contrast, the artisans from 20 to 29 are relatively few. It does not mean a lack of successor; many apprentices have not finished their training on this generation[30].

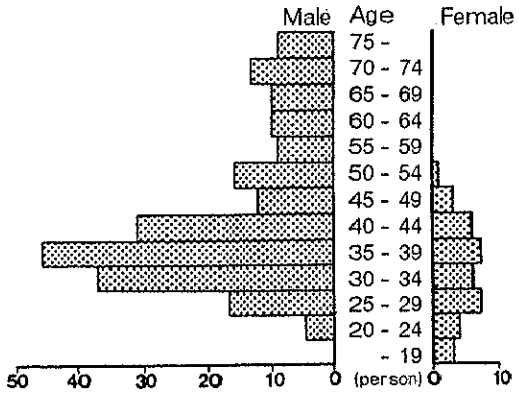


Fig. 11 Population pyramid of *kashoku* artisans, 1991

Data source: Questionnaire in August, 1991

2) Birthplace and residential place

The author examines the origins of the artisans as well as their present residences. Figure 12 shows birth places of the artisans, while Figure 13 demonstrates their present residential places. The former Wajima Town, in which all *shikki* establishments were located till the latter half of the 1960s, is the birthplace for 161 artisans. The former Wajima Town is the present residential place of lesser artisans (129). Outside the former Wajima Town, artisans' birthplaces are distributed all over the city. Particularly, many artisans were born in the southern areas of the former Wajima Town. The Ishikawa Prefecture, except the Wajima City, and out of the Ishikawa Prefecture have some artisans[31]. The birthplaces of about 40 percent of them are distributed all over the city and out of the Wajima City, while the former Wajima Town is the center.

Residential places are distributed within a smaller area than that of the birthplaces. The center of distribution is the former Wajima Town and its suburb. Particularly, the areas with 10 to 20 residents are distributed around the former Wajima Town. In short terms, present residential places of *kashoku* artisans are mainly the former Wajima Town and its suburb.

Tendencies of the two distributions match with the distribution changes of the *shikki* establishments. The former Wajima Town, as the largest birthplace and residential place of artisans, is the traditional agglomeration region of the *shikki* establishments (Figure 3). The next largest number of residents live around the former Wajima town. More than ten artisans live in each area. They are also the areas, that the *shikki* establishments have increased for the latter half of the 1960s (Figure 4). Furthermore, most of areas out of them have fewer locations of the establishments, and less than 5 artisans of natives and residents.

The analyses in Figure 3, 4, 12, and 13 lead to the division of Wajima City into three regions (Figure 14). (1) The central region is the former Wajima Town, that the former agglomerated area of the *shikki* establishments, and the largest birthplace and present residential region. (2) The inner zone is the suburb of the former Wajima Town,

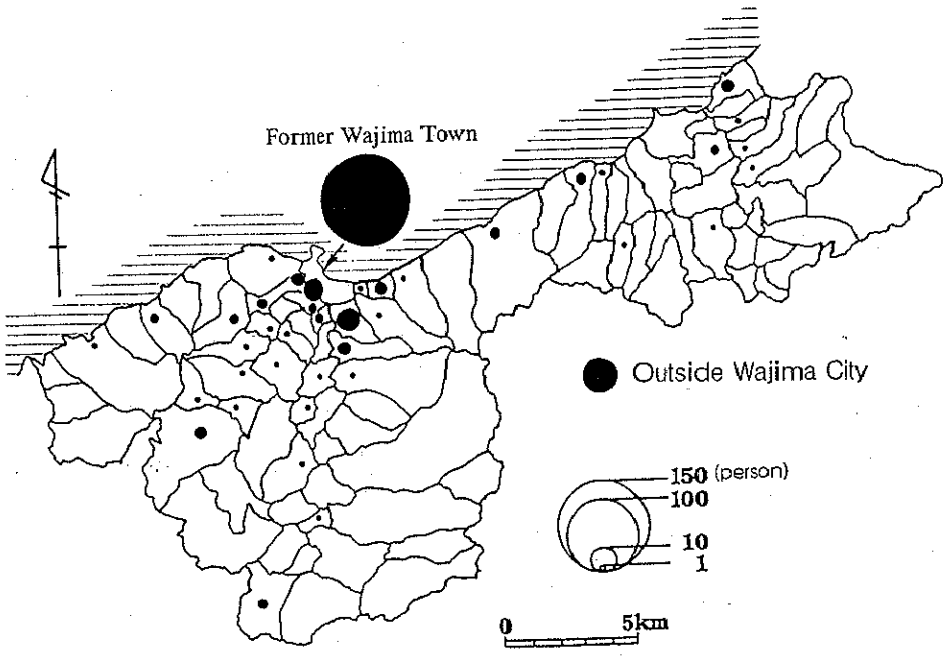


Fig. 12 Birthplace of *kashoku* artisans, 1991

Data source: Questionnaire in August, 1991

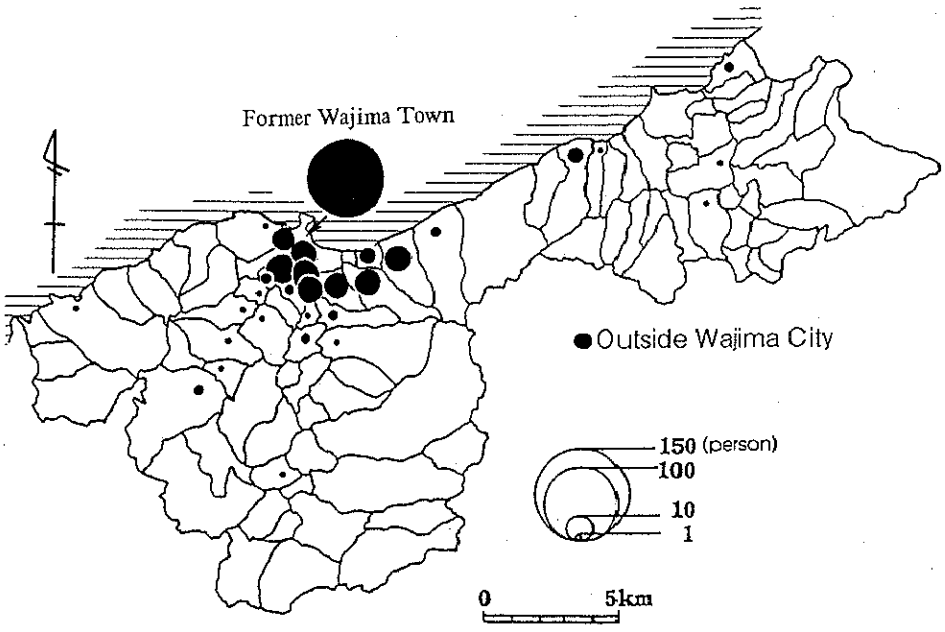


Fig. 13 Place of residence of *kashoku* artisans, 1991

Data source: Questionnaire in August, 1991

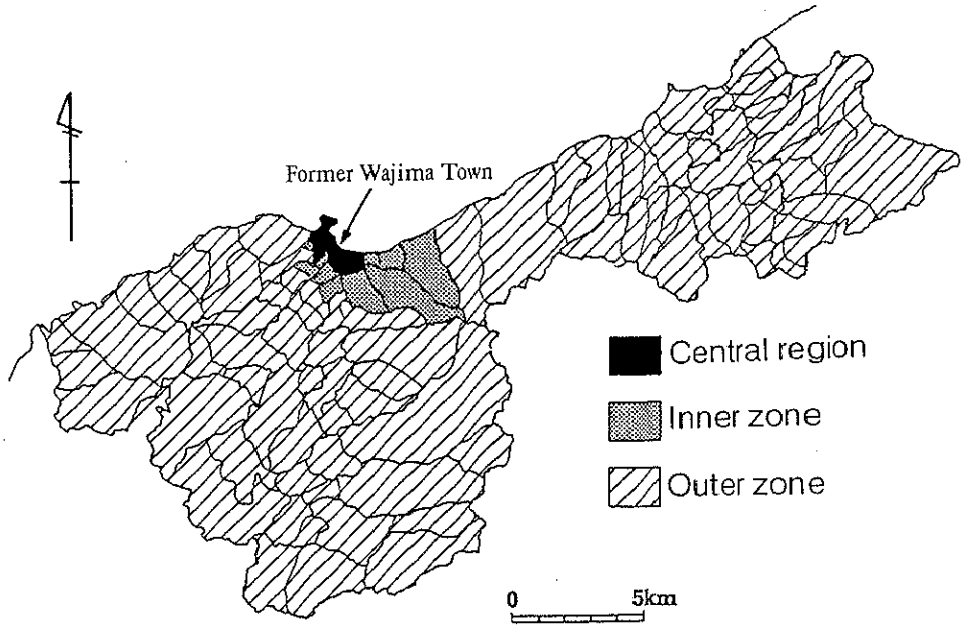


Fig. 14 Regional division of Wajima City, 1991

Data source: Questionnaire in August, 1991

that the establishments have located for the latter half of the 1960s. It now has the second largest number of artisans next to the former Wajima Town. (3) The outer zone has fewer establishments and functions as supplement of the artisans. A distinction between the inner and outer zones exists in the number of residents, to match with the distribution of the establishments in 1988. An area includes more than ten residents belongs to the inner zone. Another area belongs to the outer zone[32]. Additionally, (4) the outside of the Wajima City is essentially homogeneous to the outer zone, but it shows the width of supplement area of the artisans.

3) Social attributes

A general path is extracted from unskilled labor to be skilled artisan to present. According to the questionnaire, the most persons entered the training at the age of 18, when they graduated high school. Although graduates of universities and junior collages are increasing in recent years, the majority of the artisans do not receive a higher education. Average years required to be independent from the beginning of the training are 8.2 years. The average age of independence is 27.4 years old. The artisans were employed by *kashoku* makers for four years after the four years of training. Therefore, it is a typical path of an artisans, to receive the training for four years after the graduation of high school, to be employed as an artisan for four years, and to be independent. An average artisans who succeed the father's profession is trained by their parents after graduation of high school. Other people are trained in other master's atelier and begin to work with their parents soon after finishing the training.

Figure 15 shows the fathers' professions of the artisans. The father's profession is one of motive for child to select profession. The artisans who succeed the fathers' profession are 61, or 24.2 percent of all surveyed artisans. If 58 artisans whose fathers' professions are the other *shikki* industry are added, they are 119 persons, or 47.2 percent of all artisans. More than half of artisans have grown in home that has no relations to *shikki* industry. In the generations below 44 years old, the tendency is obvious. More than 60 percent of the artisans' fathers are not engaged in *shikki* production. Thus the Wajima *shikki* industry took many unskilled labors who have

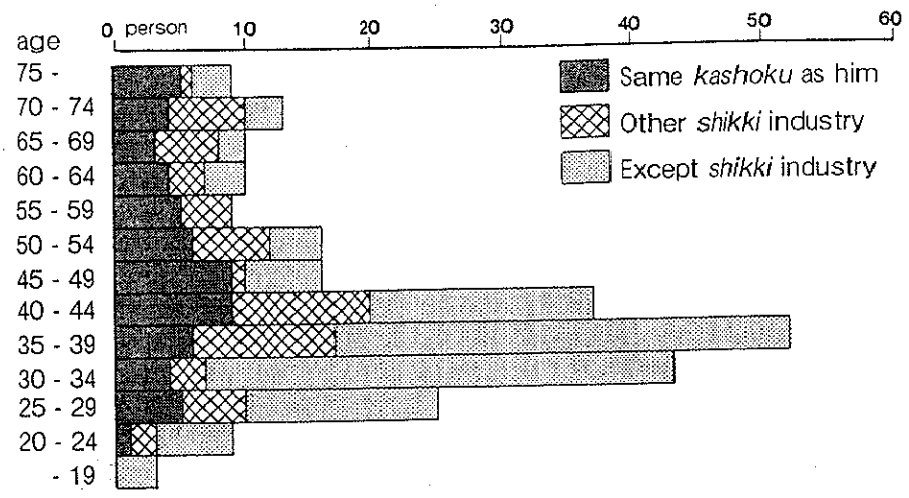


Fig. 15 Relationship between age of *kashoku* artisans and their fathers' professions, 1991

'Other *shikki* industry' includes father who engaged in another *kashoku* that his son engages.

Data source: Questionnaire in August, 1991

grown in home having no relation to *shikki* as apprentices in the 1960s, because of a serious shortage of labor. On the other hand, in generations above 45 years, more than half of artisans, entering before 1960, are successors of their fathers' profession.

Figure 16 shows a relationship between artisans' age and their birthplace, by the region defined in Figure 14. From 80 to 90 percent of artisans above 45 years old were born in the central region. In contrast, the artisans below 44 years old were born in the other zones, mainly the outer zone. In one of the generations, artisans who were born in the zones outside the central region occupy more than half. Furthermore, artisans born outside the Wajima City increase in the categories below 44 years old. There are no artisans born there above more than 45 years old. The artisans who were born in the inner and outer zones grew in the home having no relations to *shikki*, and took part in the industry by the stimuli from the production increase of the *shikki* industry.

3. Qualitative changes of apprenticeship

More than half of artisans above 45 years are successors and born in the central region. The number of male artisans above 55 years is stable by generations. In the generations, there are no female artisans (Figure 11). In contrast, the artisans born in the zones outside the central region and grown in home having no relation to *shikki* are dominant in the categories below 44 years. Most artisans between 40 and 49 years old took part in the *shikki* industry in the 1960s. It was the period of increasing production, and expanding distribution of the *shikki* establishments.

These facts elucidate a qualitative change of the apprenticeship changed during the 1960s. The original purpose of the apprenticeship in Wajima used to be the succession of home profession by the oldest son. In other words, it was an "inheritance" of the skills from the father to the son. Skill training for apprentice who have grown in home having no relation to *shikki* used to be the secondary function. After 1960s while newcomer from home having no relation to *shikki* increased, their number surpasses that of the successors. As a result, the purpose of apprenticeship changed. The inheritance of

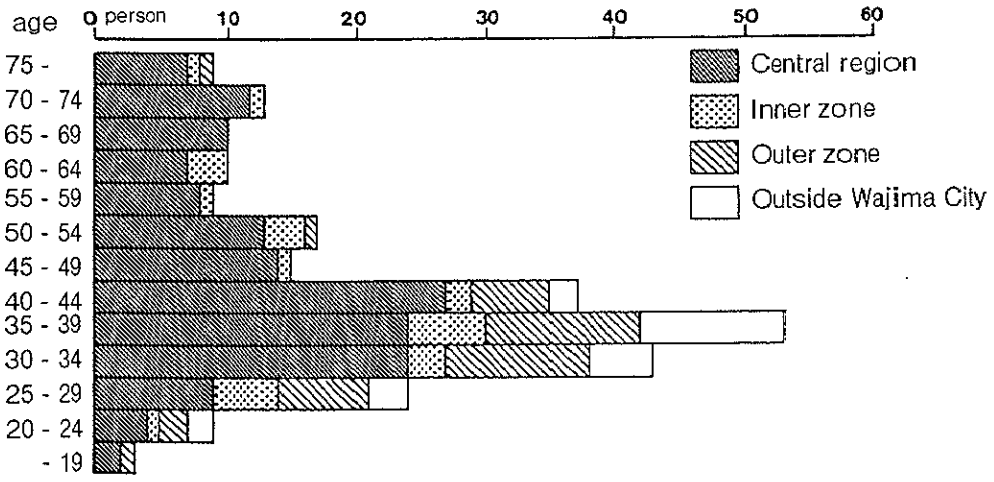


Fig. 16 Relationship between age and birthplace of *kashoku* artisans, 1991

Regional division is following in Fig. 14.

Data source: Questionnaire in August, 1991

skill for succession as the original function, falls into the second one. In contrast, the skill training for everyone as the secondary function became the first one.

From the viewpoint as reproduction of skilled labor, the function of the apprenticeship in the Wajima *shikki* industry changed qualitatively from stable simple reproduction of artisans for successors to expanded reproduction for everyone. The fact that the birth places of artisans differ from generations indicates that the change on the apprenticeship involves not only the shift of quality of apprentices, but that an expansion of labor supply areas. The Wajima *shikki* industry could earn a large labor supply resource.

CHAPTER V

REGIONAL MIGRATION PATTERNS OF ARTISANS BY REPRODUCTION UNDER APPRENTICESHIP

This chapter identifies regional migration patterns of artisans by analyzing their time-space behaviors from young unskilled labor to matured skilled artisans. As a viewpoint for the analysis, the time-spatial migration of an artisan is illustrated as a lifepath[33]. The lifepath data obtained by questionnaire are classified to extract the regional migration patterns.

1. Making a lifepath graph

Although the author limits object of study to *kashoku* artisans, their carriers differ from one another. It is therefore difficult to analyze them quantitatively, even if their time-spatial migrations are drawn. After finishing training, for example, an artisan may engage another job for several years and may come back to be a *kashoku* artisan again[34]. This study only analyzes the time-spatial behavior, that is related to reproduction activities of artisans. Therefore, it is necessary to extract some opportunities that they have commonly experienced in the process such as training to be artisan, being independence, succeeding the father's profession, and coming at present.

In this study, the author names such opportunities, as "passing points." There are three gateways that are indispensable to be artisan, as "entering" training, "independence," and "succession[35]." Adding to them, it is necessary to establish two other passing points: "birth" and "present." By limiting the behaviors to the five passing points, it is possible to simplify complex migration of artisans, and to extract migrations relating only to the reproduction.

A lifepath graph is drawn by plotting places in which an artisan reached the passing points. Plotting the places, the author adopts the regional division of Figure 14.

By adopting the regional division of Figure 14, the migration within same zone is regarded as a "stay."

A place plotted at a passing point is not a residential area, but a working place, except at the birth. Although residences are located in many cases factory, artisans who do not become independent often commute to working place. By plotting the working places, the places where apprentices learned skill became apparent. Because there is a considerable variation among artisans' life history, this study focuses its discussions on the places; the age crossing the point and the interval between two passing points are ignored.

2. Classification of artisans

Although all artisans have the "birth" and "present" passing points, other points differ among the artisans. For example, an artisan whose father had no relation to *shikki* does not pass the "succession." An artisan who succeeded his father's profession, does not experience "independence." Accordingly, the author classifies artisans into four types, by differences of passing points that lifepaths go through (Table 8).

The contents of the four types are as follows. Type A includes artisans who have finished training, but have not achieved the independence. Type B includes the artisans who achieved the independence as a *kashoku* maker after finishing the training. Type C includes the artisans who succeeded his father's profession. Type D includes artisans who were trained under another master, and succeeded their fathers' *kashoku* making. The Type A artisans have only the "apprentice" between the "birth" and "present" as the passing point. The Type B artisans experienced the "apprentice" and "independence" between them. The Type C artisans have only the "succession" between them. The Type D artisan experienced the "apprentice" and "succession" as well. The four types occupy 97.2 percent of all samples. The Type A has 39 samples. The Type B has 147 samples. The Type C has 40 samples. The Type D has 19 samples.

Figure 17 shows *kashoku* artisans' types by age. The figure shows the Type B

Table 8 Classification of artisans, 1991

Difinition	Type	Included passing points	Number of artisans
a. Engaging as artisan after apprentice	Type A	Birth, entering, present	39
b. Independent as artisan after apprentice	Type B	Birth, entering, independence, present	147
c. Succeeding father's profession	Type C	Birth, succession, present	40
d. Succeeding father's professin after apprentice	Type D	Birth, entering, succession, present	19
Impossible to classify			3
Unknown			4
			Total 252

Data source: Questionnaire in August, 1991

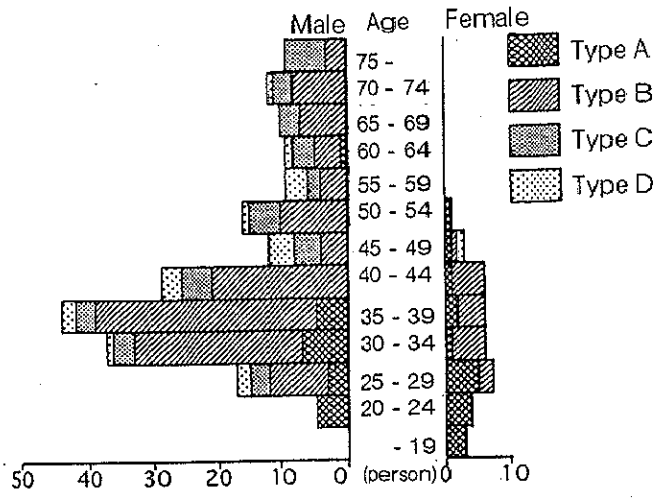


Fig. 17 Population pyramid of *kashoku* artisans, by types of them, 1991

Data source: Questionnaire in August, 1991

occupies high proportion in generations from 30 to 44 years old. Above all, 76.0 percent of artisans between 35 and 39 years old belong to the Type B. Qualitatively changes in the apprenticeship lead to the increase in the Type B artisans, because the workers who originally had no relation to *shikki* were added.

Type C or D artisans are successors of their fathers' profession. The higher the age is the larger the proportion of the successors becomes. Despite the tendency of the proportion, the number of the successors is stable in about five artisans in each generation. This means that the original function of apprenticeship, or inheritance of skill, still continues to exist, although its position becomes secondary. Lastly, Type A artisans are mainly in younger generations.

Table 9 shows the relationship between the types of artisans and their birthplaces. Table 10 shows the relationship between the types and working places. According to the Table 9, 92.3 percent of the artisans who belong to the Type C or D were born in the central region. In contrast, birthplaces of artisans in the Type A and B are distributed not only within the inner zone, but also outside the Wajima City, although more than half of them were born in the central region. Within the Type B, 57.8 percent of artisans were born in the central region. Similarly within the Type A, 46.2 percent of artisans were born there. Their percentages are particularly lower than the successors of the fathers' profession. The outer zone is the second largest birthplace for the Type A and B. Among the artisans who belong to the Type A, natives born in the outer zone reach more than two times as the ones born in the inner zone.

According to Table 10, 78.0 percent of artisans in the Type C and D work in the central region. Only 12.0 percent of their working places are distributed in the inner and outer zones. Also, working places of artisans in the Type A complete within the central region and the inner zone. Many *kashoku* makers are concentrated there. However, 67 artisans in the Type B work in the inner zone. The number is more than the number of artisans who work in the central place. Additionally, 15 artisans of the type are engaged in the outer zone. It is important that more than half of artisans in the Type A are engaged in *kashoku* makers located in the inner zone. They tend to prefer to receive training under

Table 9 Number of artisans by types and birthplaces, 1991

Unit: person (%)

Birthplace \ Type	Type A		Type B		Type C		Type D		Total
Central region	18	(46.2)	85	(57.8)	38	(95.0)	17	(89.4)	158
Inner zone	6	(15.4)	22	(15.0)	0	(0.0)	1	(5.3)	29
Outer zone	13	(33.3)	22	(15.0)	0	(0.0)	1	(5.3)	36
Outside Wajima	2	(5.1)	18	(12.2)	2	(5.0)	0	(0.0)	22
Total	39	(100.0)	147	(100.0)	40	(100.0)	19	(100.0)	245

Total number is the number in Table 8, subtracted unknown 7 artisans.
Regional division is following in Fig. 14.

Data source: Questionnaire in August, 1991

Table 10 Number of artisans by types and work places, 1991

Unit: person (%)

Work place \ Type	Type A		Type B		Type C		Type D		Total
Central region	17	(43.6)	63	(42.8)	32	(80.0)	14	(73.6)	126
Inner zone	22	(56.4)	67	(45.6)	8	(20.0)	4	(21.1)	101
Outer zone	0	(0.0)	15	(10.2)	0	(0.0)	1	(5.3)	16
Outside Wajima	0	(0.0)	2	(1.4)	0	(0.0)	0	(0.0)	2
Total	39	(100.0)	147	(100.0)	40	(100.0)	19	(100.0)	245

Total number is the number in Table 8, subtracted unknown 7 artisans.

Regional division is following in Fig. 14.

Data source: Questionnaire in August, 1991

younger masters who belong to the Type B. As a result, artisans working in the inner zone have increased, because there are many Type B artisans.

Figure 18, 19, 20, and 21 show artisans' lifepaths of each type. They indicate the zones where artisans experienced the passing points. The X-axis indicates the zones defined by Figure 14 according to the distance from the central region. While the Y-axis indicates the time sequence from the birth to the present. Hatched parts represent the passing points.

According to the lifepaths shown in Figure 18, their birthplaces are distributed in all four regions, including outside the Wajima City. However, places to be apprentices and present working places are concentrated only in the central and inner zones. The number of artisans who have entered into the training in the central region is 19. The number of those who have entered into the training the inner zone is 20. They are almost equal in numbers. Artisans who moved from one working place to another after entering are only six. The other 33 artisans are engaged in their work under their masters. The artisans in the Type A are mainly younger generations who do not have enough skill and capital for independence. Now they continue to learn skill after the apprentice period, while saving money for independence.

Similarly, birthplaces of artisans in Type B are distributed in all zones (Figure 19). The entering places are distributed in the central and inner zones, except four artisans. Concerning with places of independence and present working places, lifepaths that go through in the inner and outer zones increase. Between the entering and the independence, migrations from the central region and the inner zone to the inner and outer zones reach 53. Migrations in the inverse direction stay only 14. Furthermore, between the independence and the present, migrations from the central region and the inner zone to inner and outer zones are dominant. As a result, lifepaths that go through passing points in the inner and outer zones increase as time sequence. In contrast lifepaths that go through the points in the central region decrease as time sequence.

Artisans in Type C are 40. Among them, 39 artisans were born in the central region (Figure 20)[36]. Though the artisans in the Type B often move, they have a few

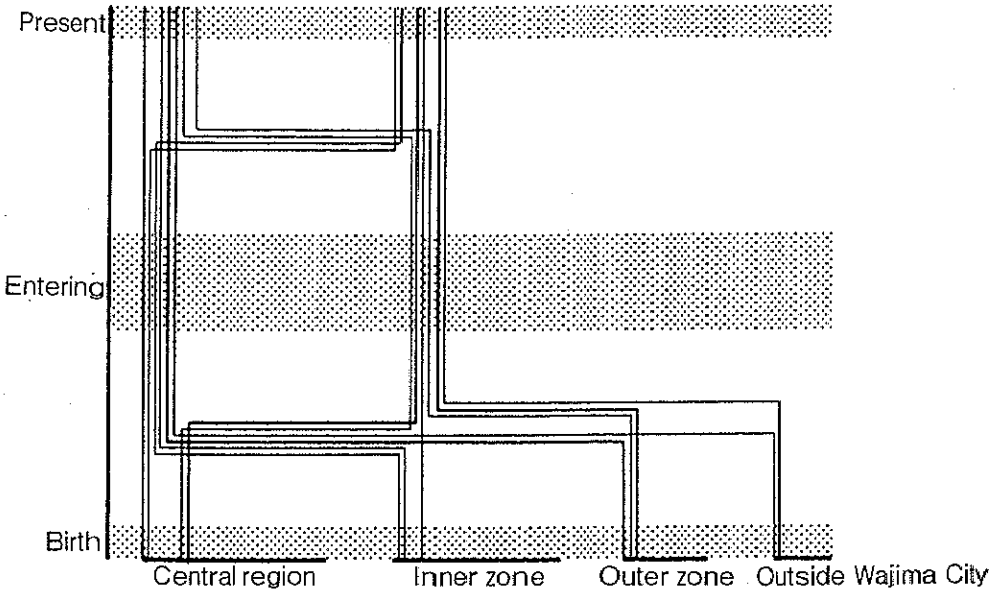


Fig. 18 Lifepaths of *kashoku* artisans belong to Type A, 1991

Regional division is following in Fig. 14.

Data source: Questionnaire in August, 1991

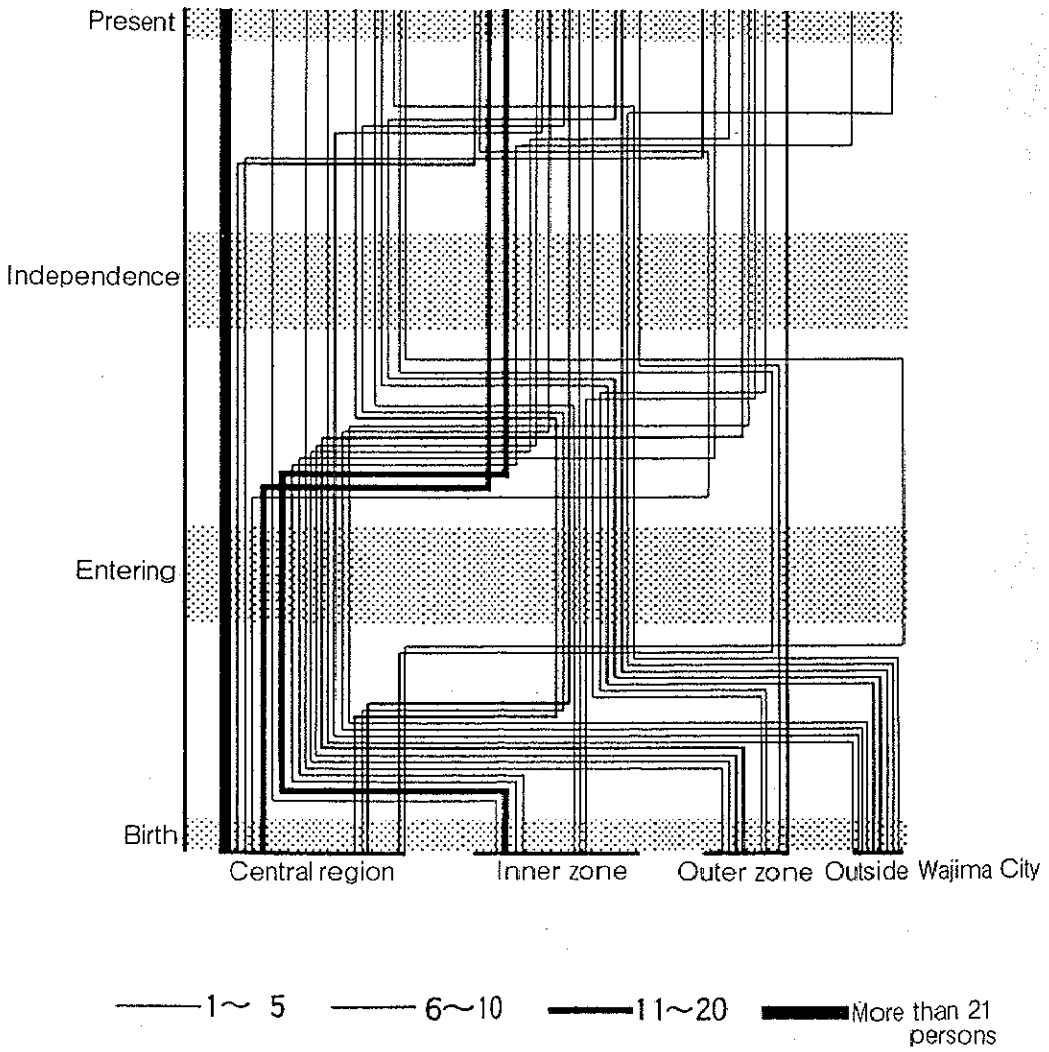


Fig. 19 Lifepaths of *kashoku* artisans belong to Type B, 1991

Regional division is following in Fig. 14.
Data source: Questionnaire in August, 1991

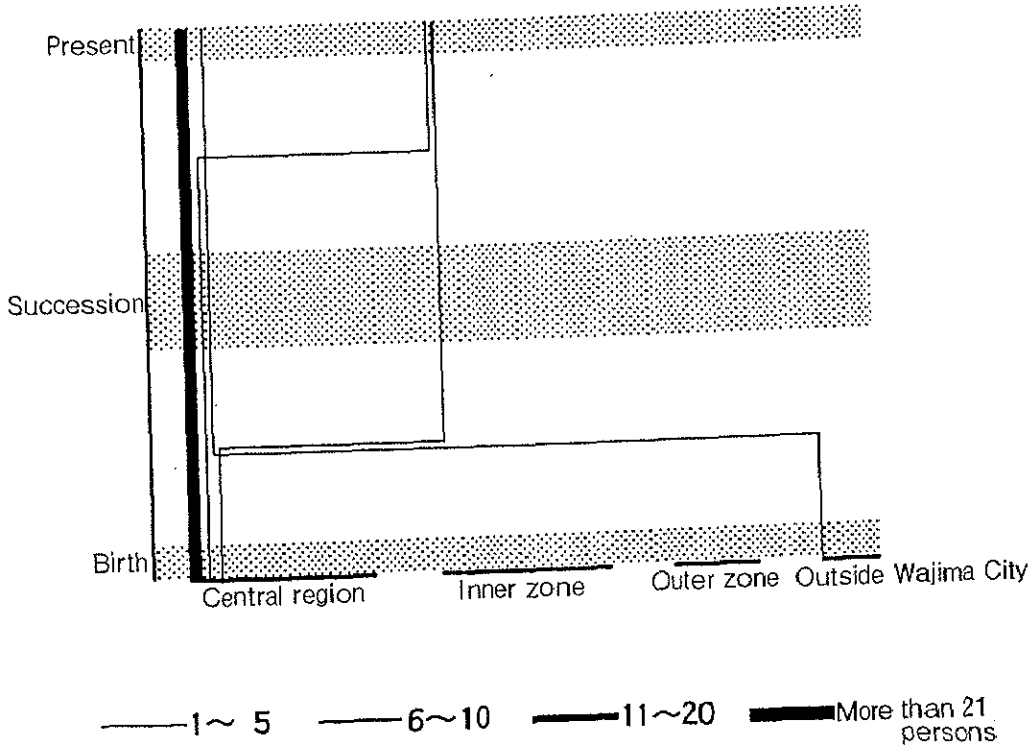
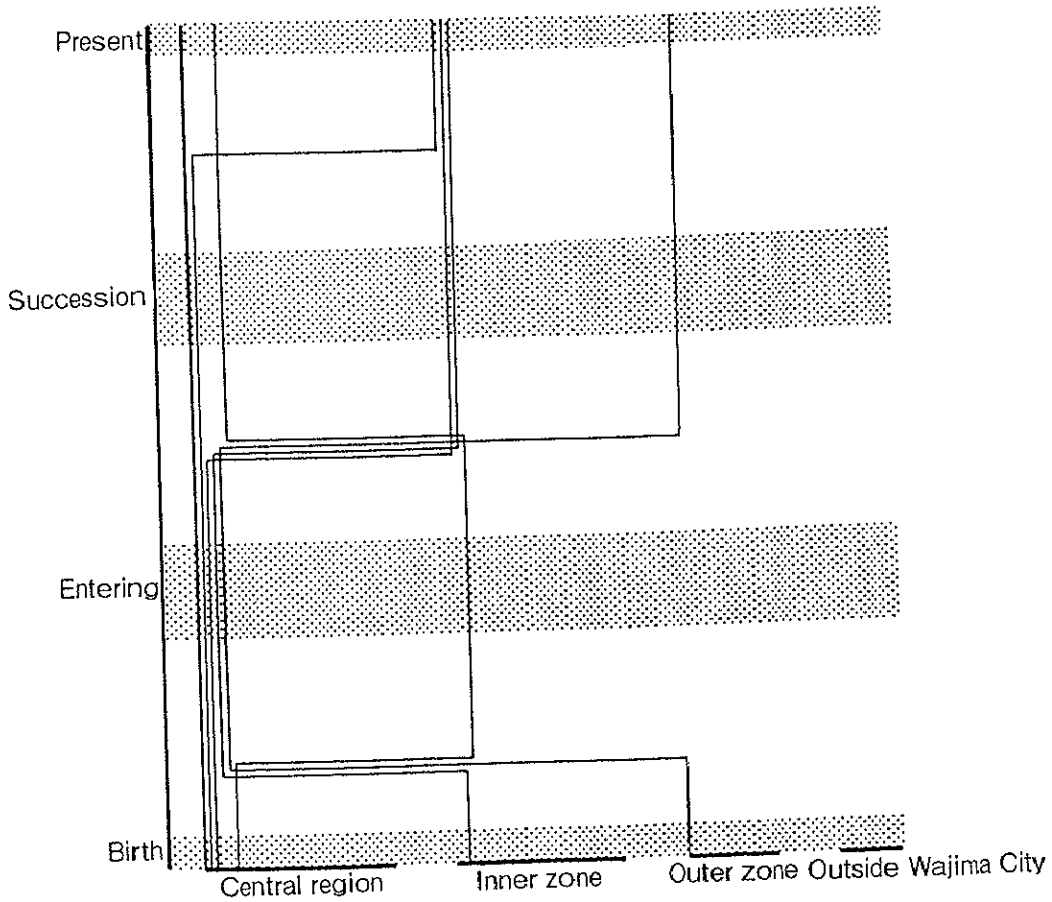


Fig. 20 Lifepaths of *kashoku* artisans belong to Type C, 1991

Regional division is following in Fig. 14.

Data source: Questionnaire in August, 1991



——1～ 5 ——6～10persons

Fig. 21 Lifepaths of *kashoku* artisans belong to Type D, 1991

Regional division is following in Fig. 14.

Data source: Questionnaire in August, 1991

experiences of migration. Artisans who stay in the central region without migration reach 30 among 40 artisans. Though artisans who have no move since birth exist in all types, they are particularly numerous in the Type C.

Although the artisan in Type D have the same profession of their fathers', they are trained under other masters. There are many artisans who consider to make their children entering under the other masters in the Wajima *shikki* industry. The reason is to eliminate favoritism to child and to make them learn the skills different from theirs. Therefore, the artisans in the Type D aim to succeed the fathers' profession. The period being apart from father is only when they were apprentices. This type possesses a similar characteristic with that of Type C.

Like Type C, 17 of 19 artisans in the Type D were born in the central region (Figure 21). Also, ten artisans have been staying in the central region like Type C. The places of entering are only within the central region and the inner zone. After the training, they return to their birthplaces to succeed their fathers' profession.

Artisans in the Type A or B came from all zones. They entered training in the central region and the inner zone. After independence, they spread to all over the Wajima City again, making core in the central region. On the other hand, the artisans in the Type C or D were mainly born in the central zone. Their migration with entering and succession complete within the central region and the inner zone. The lifepaths of artisans in the Type A or B spread widely and move constantly. In contrast, the lifepaths of artisans in the other types, stay in the central region without many moves.

3. Regional migration patterns of artisans

1) Extraction of migration patterns

This section extracts regional migration patterns of artisans based on the analysis of their lifepaths classified by migration types. As a classification index, the direction of migration is adopted. The migrations of artisans consist of three elements: (1) staying: no move in a region, (2) centripetal migration: the moves on a direction toward the central

region, and (3) centrifugal migration: the moves on a direction apart from the central region. Though migrations of artisans seem to be complex, they can be represented by the combinations of the three elements. By their combination, the author bundles *kashoku* artisans' lifepaths into five clusters of migration (Table 11).

The five clusters of migrations are as follows: Cluster I includes the artisans who stays and have not moved since their birth; Cluster II includes the artisans who moved on a direction toward the central region; Cluster III includes the artisans who moved on a direction apart from the central region; Cluster IV includes the artisans who once moved on a direction toward the central region, and moved in inverse direction again; Cluster V includes the artisans who once moved on a direction apart from the central region, and moved toward inverse direction again. The largest cluster of migration is Cluster I, with 101 artisans that occupy 41.2 percent of all. It is followed by Cluster II with 57 artisans and Cluster IV with 45. In summary, almost as the same numbers of artisans as the staying type, have moved apart from the central region.

Figure 22 shows the artisans' clusters of migration by age and sex. In the middle and older generations above 45 years old, more than half of the artisans in all generations fall into Cluster I. In the generations below 44 years old, the artisans in Cluster III or IV are dominant. Peculiarly, the generation from 30 to 34 years old has 37 artisans, which include 11 artisans in Cluster IV and 10 artisans in Cluster III. They occupy more than half of the types. Except for the generation from 35 to 39 years old, the number of artisans in Cluster I remains less than ten artisans. Artisans who are in Cluster III or IV are dominant mainly in the category of 30 to 39 years old. According to the Figure 17, the Type B dominates in the generations. In other words, the newcomers, with qualitatively changing of the apprenticeship, have large potential to be the Cluster III or IV. The Cluster I developed in the original function of the apprenticeship as making successors.

Table 12 shows the relationship between artisans' clusters of migration and birthplaces. Table 13 shows the artisans' clusters of migration and present working places. The number of artisans who were born in the central region reaches 105 among

Table 11 Classification of lifepaths by paterns of migration, 1991

Difinition	Cluster	Pattern of migration	Number of lifepaths
a. Staying in same region since birth	Cluster Ⅰ	Staying	101
b. Moving toward central region	Cluster Ⅱ	Centripetal	32
c. Moving apart from central region	Cluster Ⅲ	Centrifugal	57
d. Moving apart from center, after centripetal migration	Cluster Ⅳ	Centripetal-centrifugal	45
e. Moving toward center, after centrifugal migration	Cluster Ⅴ	Centrifugal-centripetal	13
Unknown			4
			total 252

Migration within a zone is regarded as staying.

Data source: Questionnaire in August, 1991

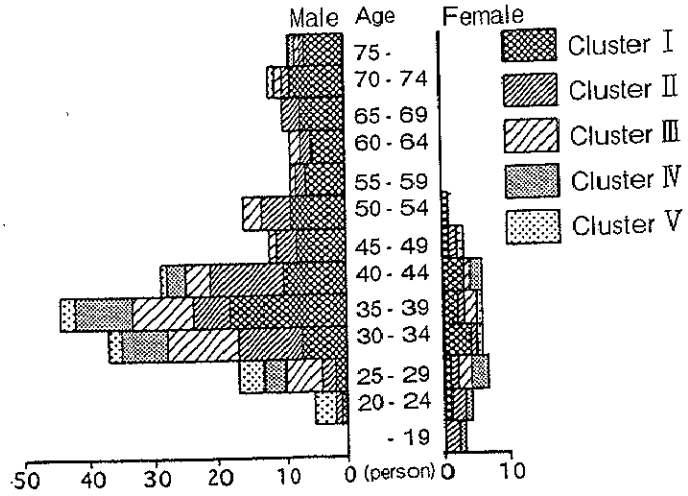


Fig. 22 Population pyramid of *kashoku* artisans, by types of migration, 1991

Total number is the number in Table 8, subtracted unknown 7 artisans.

Data source: Questionnaire in August, 1991

Table 12 Number of artisans by patterns of migration and birthplaces, 1991

Unit: person (%)

Birthplace \ Cluster	Cluster Ⅰ		Cluster Ⅱ		Cluster Ⅲ		Cluster Ⅳ		Cluster Ⅴ		Total
Central region	92	(91.1)	0	(0.0)	53	(98.1)	0	(0.0)	13	(100.0)	158
Inner zone	8	(7.9)	3	(9.4)	1	(1.9)	17	(37.7)	0	(0.0)	29
Outer zone	1	(1.0)	19	(59.3)	0	(0.0)	16	(35.6)	0	(0.0)	36
Outside Wajima	0	(0.0)	10	(31.3)	0	(0.0)	12	(26.7)	0	(0.0)	22
Total	101	(100.0)	32	(100.0)	54	(100.0)	45	(100.0)	13	(100.0)	245

Total number is the number in Table 8, subtracted unknown 7 artisans.

Regional division is following in Fig. 14.

Data source: Questionnaire in August, 1991

Table 13 Number of artisans by patterns of migration and work places, 1991

Unit: person (%)

Work place \ Cluster	Cluster Ⅰ		Cluster Ⅱ		Cluster Ⅲ		Cluster Ⅳ		Cluster Ⅴ		Total
Central region	92	(91.1)	21	(65.6)	0	(0.0)	0	(0.0)	13	(100.0)	126
Inner zone	8	(7.9)	11	(34.4)	51	(94.4)	31	(68.9)	0	(0.0)	101
Outer zone	1	(1.0)	0	(0.0)	0	(0.0)	12	(26.7)	0	(0.0)	13
Outside Wajima	0	(0.0)	0	(0.0)	3	(5.6)	2	(4.4)	0	(0.0)	5
Total	101	(100.0)	32	(100.0)	54	(100.0)	45	(100.0)	13	(100.0)	245

Total number is the number in Table 8, subtracted unknown 7 artisans.

Regional division is following in Fig. 14.

Data source: Questionnaire in August, 1991

114 artisans in Cluster I and V. Even at present, the same number of artisans work in the central region. The migration of the artisans in the clusters almost completes at the birth and the present. Birthplaces of artisans in Cluster IV are distributed in all zones except for the central region. However, 68.9 percent of them are working in the inner zone. Although it is contrast with Cluster IV that all but are artisans in Cluster III were born in the central region, it is similar to Cluster IV, of which 94.4 percent work in the inner zone. According to the migration patterns of the Cluster IV and III, the inner zone seems to be a new agglomeration area of the *kashoku* artisans. In the Cluster II, 90.6 percent of artisans were born in the outer zone or the outside the Wajima City. Working places of artisans in the cluster complete within the central region and the inner zone.

2) Comparison with types of artisans

Though the lifepaths were analyzed by clusters of migration, it is impossible to compare the lifepaths of different categories because the passing points of artisans are different among the types. In order to solve the difficulty, the numbers of artisans belong to the each clusters are compared by types of artisans (Table 14).

According to Table 14, the artisans in Type B have 50 artisans in Cluster I, 42 in Cluster II, and 33 in Cluster IV. The artisans in Type C are 30 in Cluster I. The artisans in Type D occupy more than half in Cluster I. The artisans in Type A reach 16 in Cluster II. Main five groups shown in Table 14 are Cluster I, III, and IV of Type B, Cluster I of Type C, and Cluster IV of Type A. These five groups include 171 artisans, or 69.8 percent of all samples. Therefore by examining the lifepaths of the five groups, it is possible to explain almost 70 percent of regional migration patterns of the *kashoku* artisans.

3) Characteristics in main regional migration patterns

Figures 23 and 24 demonstrate the regional migration patterns of Cluster I. The former shows the lifepaths of Type C, while the latter represents those of Type B. Among 80 artisans in this group, 74 are stayers in the central region. The 74 artisans include 30 in Type C and 44 artisans in type B. These 74 artisans occupy 30.2 percent of all samples. The 30 stayers in the central region occupy 75.0 percent of the 40 artisans of

Table 14 Relation between types of artisans and pattern of migration, 1991

unit; person

Type \ Pattern	Cluster Ⅰ	Cluster Ⅱ	Cluster Ⅲ	Cluster Ⅳ	Cluster Ⅴ	Total
Type A	11	**16**	10	1	1	39
Type B	**50**	14	**33**	**42**	8	147
Type C	**30**	2	8	0	0	40
Type D	10	0	3	2	4	19
Total	101	32	54	45	13	245

Fig. 23 to 27 show lifepaths in bold numbers.
Total number is the number in Table 8, subtracted unknown 7 artisans.
Data source: Questionnaire in August, 1991

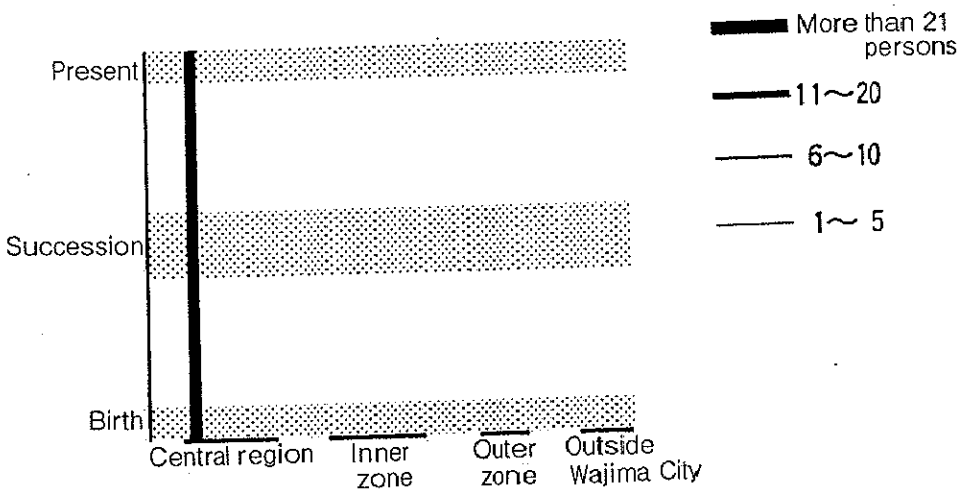


Fig. 23 Lifepaths of *kashoku* artisans (Cluster Ⅰ, Type C), 1991

Regional division is following in Fig. 14.

Data source: Questionnaire in August, 1991

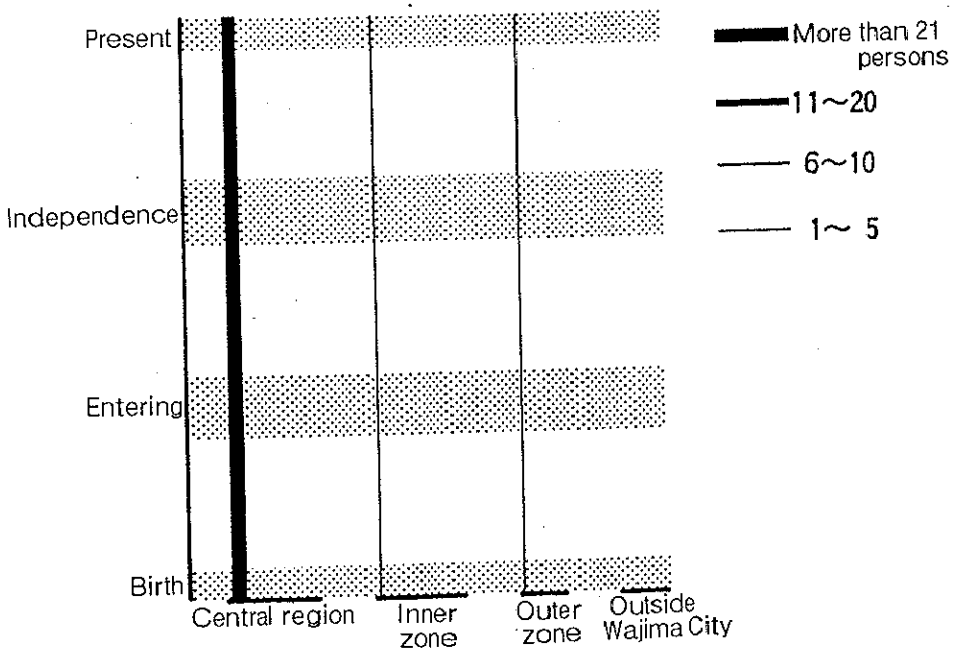


Fig. 24 Lifepaths of *kashoku* artisans (Cluster Ⅰ, Type B), 1991

Regional division is following in Fig. 14.

Data source: Questionnaire in August, 1991

Type C. In contrast, among 147 artisans in the Type B, stayers in the central region occupy only 29.9 percent.

The type B artisans with Cluster IV occupy 17.1 percent of all samples (Figure 25). Birthplaces of the artisans in the group are distributed except in the central region. However, 88.1 percent of artisans 37 people entered training there. Among them, 33 artisans moved to the inner or outer zone for independence. Moreover, four artisans who had been already independent moved to the inner zone until present. In other words, centripetal migrations take place when the people become apprentice in the central region, while centrifugal migrations from the central region occur when they became independent. These artisans in Cluster IV occupy 93.3 percent of Type B people. Cluster IV with centripetal-centrifugal migration is characterized by Type B artisans.

Figure 26 shows lifepaths of artisans in the Type B with the Cluster III. This group includes 33 people which occupies 13 percent of all artisans. Except for one, all of them were born in the central region. Moreover, 23 of them entered training in the some region. The other ten entered training in the inner zone. Among the artisans entered training in the central region, 16 artisans moved to the inner and outer zones before independence. Seven other artisans moved after the independence. The artisans who work in the inner zone are 30. It is one of characteristics of the group. Because the group occupies 66.1 percent in Cluster III of 54 artisans, Cluster III is also characterized by the independent type.

Finally, Figure 27 shows the lifepaths of artisans in Type A with Cluster II. The group includes 16 artisans, which are 6.5 percent of all artisans. They all were born in the zones out of the central region. After entering training in the central region and the inner zone, they are employed as artisans. The artisans in the group will be independent *kashoku* makers. In the case, they have a large potential to move to the inner and outer zones, like artisans with Cluster IV.

From the analysis, three regional migration patterns of artisans are identified. The first pattern is characterized by the artisans who were born in the central region and have been staying there. This pattern includes 75.0 percent of the successor type and 29.9

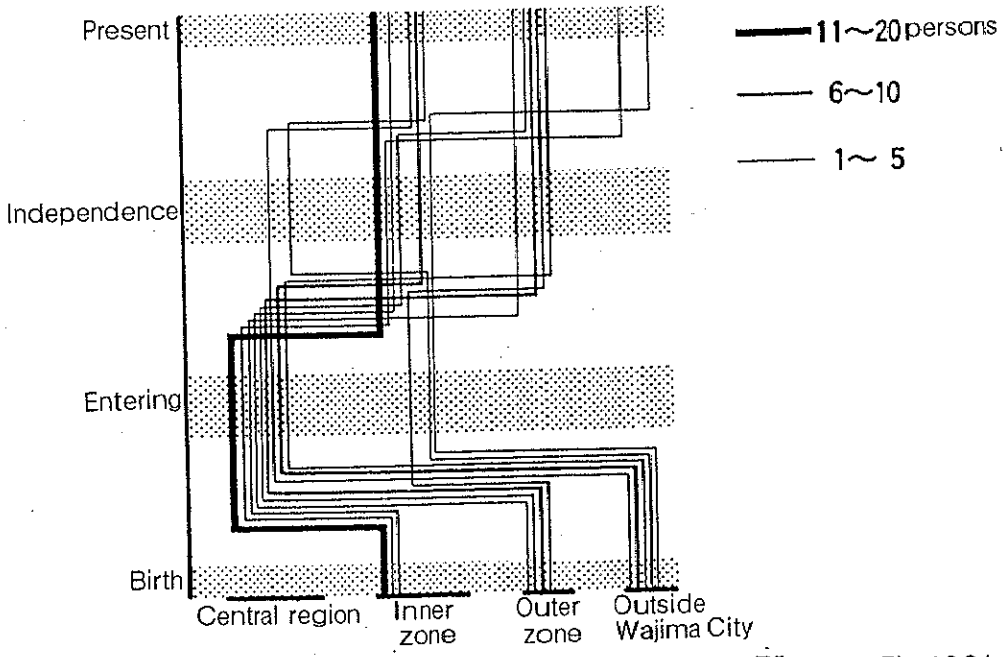


Fig. 25 Lifepaths of *kashoku* artisans (Cluster Ⅳ, Type B), 1991

Regional division is following in Fig. 14.

Data source: Questionnaire in August, 1991

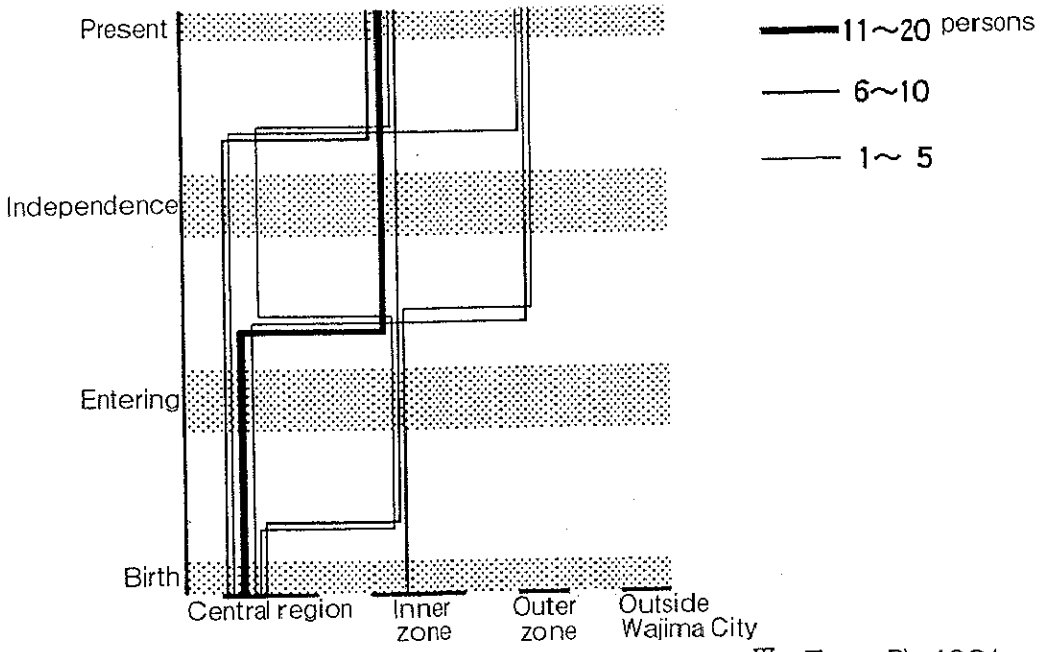


Fig. 26 Lifepaths of *kashoku* artisans (Cluster Ⅲ, Type B), 1991

Regional division is following in Fig. 14.

Data source: Questionnaire in August, 1991

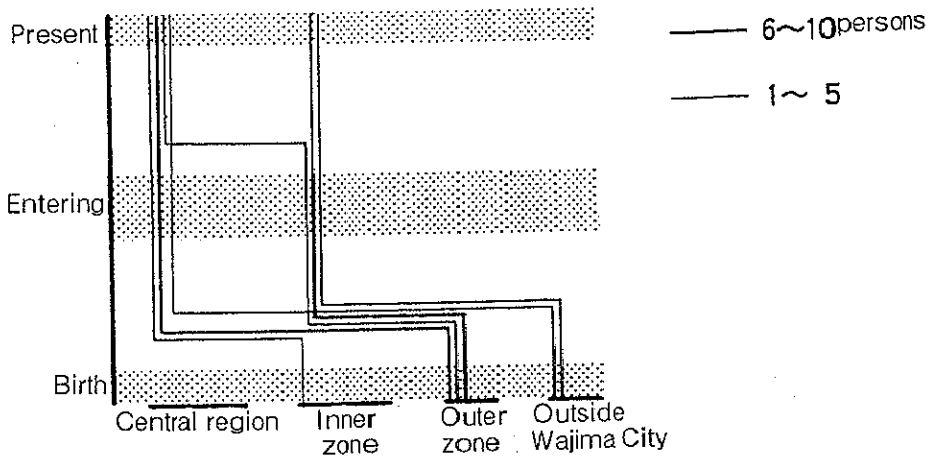


Fig. 27 Lifepaths of *kashoku* artisans (Cluster Ⅱ, Type A), 1991

Regional division is following in Fig. 14.

Data source: Questionnaire in August, 1991

percent of the independent type. In case of the artisans in the successor type, they do not need to move with inherited factories and residences from parents. The artisans are the majority of *kashoku* makers. They become stayers in the central region. In case of Type B artisans, they have enough space for residence and factory in the central region. They can be independent only by improving a room for processing[37].

The second pattern is characterized by the artisans who were born in outside the central region, entered into training under *kashoku* maker in the central region, and became independent mainly in the inner zone. According to Figures 15, 16, and 25, this group consists of newcomers, now from thirties to forties, who were encouraged by the increase of the Wajima *shikki*. Moreover, the artisans in Type A with Cluster II have a large potential to move to other groups in the future.

The final group is the pattern of artisans who were born in the central region, entered into training there, and moved to the inner zone. Many of the artisans who have the pattern are in Type B. Lifepaths that they have are similar to the ones of artisans in Type B with Cluster I, during the birth and the entering. Because their home were close and space were inadequate, they moved to the inner zone when they become independent.

In the reproduction of skilled labor, the three patterns are also factors of expansion of the establishments related to *shikki*. The distribution of the *shikki* establishments was expanded as the centripetal-centrifugal and centrifugal migration patterns. In the centripetal-centrifugal migration shown by Cluster IV, the Type B artisans who were born in the inner and outer zones move. The participants of the centrifugal migration, shown by Cluster III are Type B artisans who were born in the central region. At the same time, the artisans in Type C have been staying in the central region, and functioning to continue the agglomeration of the *shikki* establishments.

CHAPTER VI

SOCIO-ECONOMIC LAND CONDITIONS OF ESTABLISHMENTS RELATED TO *SHIKKI* AND THEIR MIGRATION WITH ARTISANS

The restructuring of the Organization and the reproduction of skilled artisans were developed mainly within a small area of the former Wajima Town. We can identify such changes in the distribution of new establishments, factory relocation, and the abandonment of business. On the other hand, it is important to purchase suitable land for factory and residence when an artisan starts or removes his *shikki* establishment. While an artisan is a manager of a *shikki* establishment, he moves his factory and residence to land, which has a suitable size and quality for his family and business. Therefore, the interaction between the land and artisan's conditions determines the location of the factory and residence. The land conditions include land use, land ownership, development age, and price. The artisan's conditions include business and family.

Therefore, the land conditions are important elements to identify the factors of continuance and development in the Wajima *shikki* industry. It is necessary to explain socio-economic conditions related to land, on which artisans' factories and residences are located. For the same reasons, it is also necessary to analyze the relationship between migrations of artisans and land. In this chapter, the author adopts socio-economic land conditions as the third viewpoint to clarify the factors of the continuance and development in the Wajima *shikki* industry. The mechanism of selecting land for his business and family is examined. This chapter makes intensive analysis of two communities as a case study. One community is located on the central region, which has an agglomeration of the *shikki* establishments. Another community is located in the inner zone, which accepted the inflow of *kashoku* artisans and new *shikki* establishments after 1960.

1. Socio-economic land conditions and artisans' migration in the central region: the case of Kamihonmachi community

1) Characteristics on land use an land ownership

Kamihonmachi community is selected as a case of the central region. Kamihonmachi community belongs to Kawai-machi 1 *bu* (the *bu* means lower unit of *machi,* in the former Wajima Town). Kamihonmachi lies on the eastern part of the Wajima River (Figure 28). North, south, and west sides are faced by wide streets, while inside the area contains some alleys. The community consists of 29 families. The *shikki* establishments are particularly concentrated in the community today as were in 1967. The continuing concentration is the reasons for selecting this community as a typical case of the central region.

The community contains alleys of two to four meters' width and accumulating buildings. In 1991, the land price on a surrounding wide street was 100 to 120 thousand yen per square meter. The land prices in the community were less than 30 thousand yen. Among the 29 families of Kamihonmachi, 12 live in the leaseholds. Because *Renko-ji* Temple owns them, the people of the Wajima built up area call the leaseholds as "*Renko-ji Yashiki* (*Yashiki* means residence)[38]." Besides the *Renko-ji Yashiki*, there were some leaseholds in the built up area until the 1970s. For example, *Juzo* Shrine owned them in Kawai-machi, and *Sumiyoshi* Shrine owned them in Fugeshi-machi. Rental charge of the *Renko-ji Yashiki* is two thousand yen per 3.3 square meter for a year. It is remarkably cheap as the land in the built up area.

Figure 29 shows the land use of Kamihonmachi community. Commercial and service facilities are located along wide streets of north and west. The northern part is a part of the largest shopping mall, called "*Asaichi* street" (*Asaichi* means periodical market). Inhabitants mainly live in houses along alleys. The *shikki* establishments are 21 and are distributed mainly in the southwest. They are located with mixture by residences.

Among commercial and service facilities, only five are used exclusively as store; other five buildings are used both as a shop and warehouse. All other buildings are all

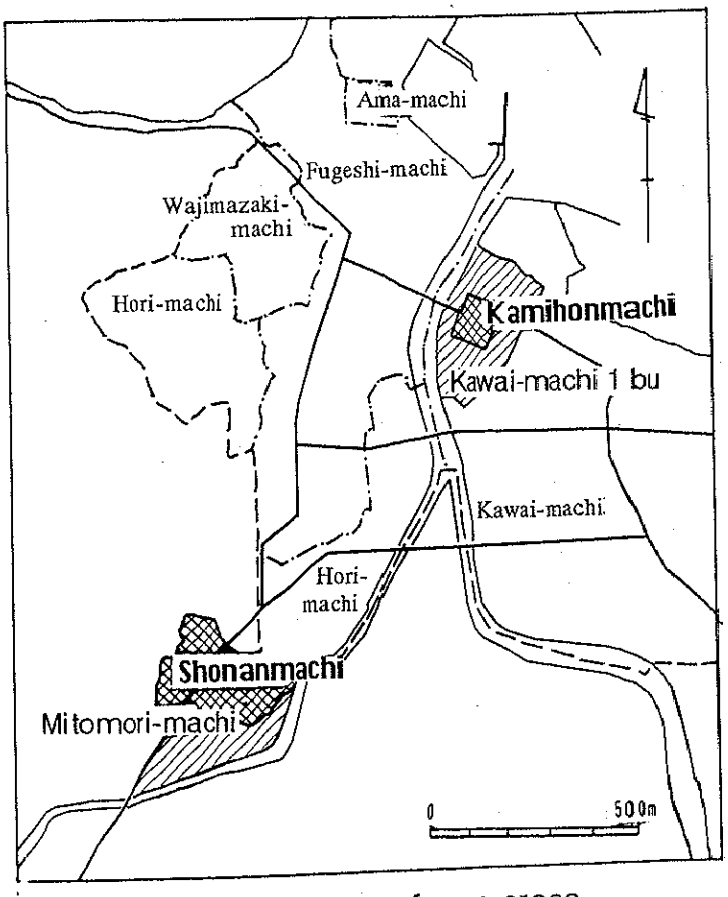


Fig. 28 Location of case areas

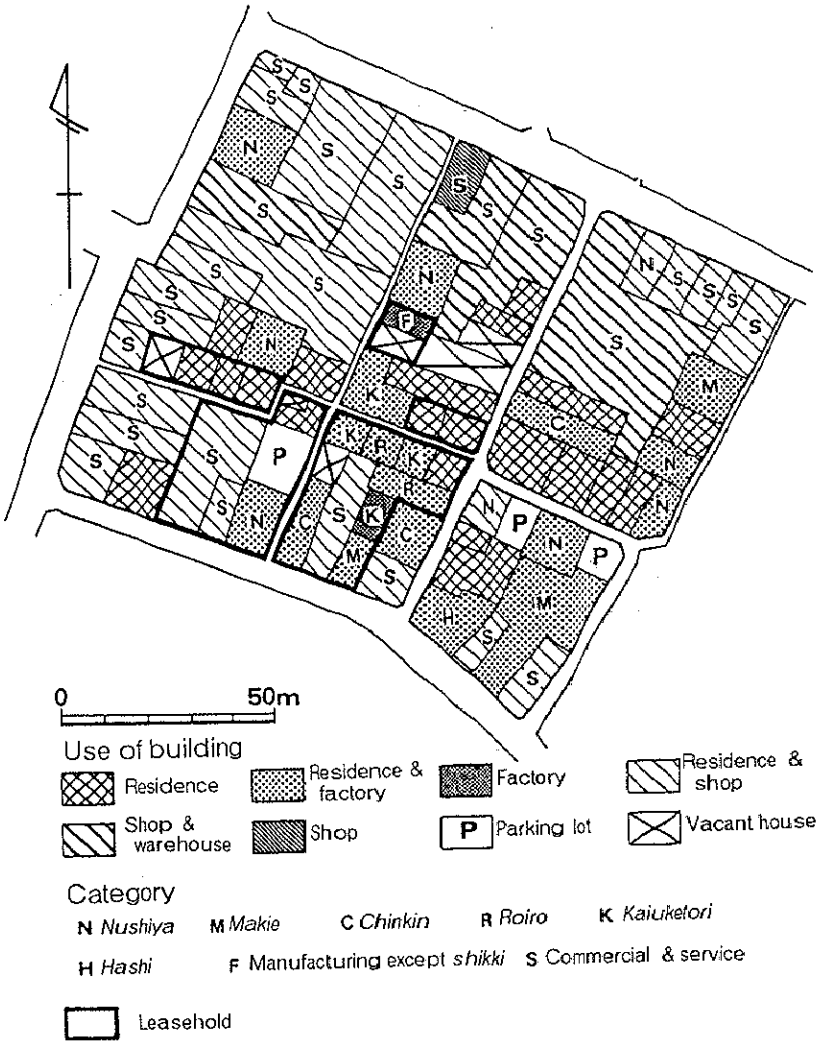


Fig. 29 Land use in Kamihonmachi, 1992

Data source: The author's field survey in January, 1992

used both for stores and for residences. In cases of the *shikki* establishments, only one building is used exclusively as a factory. The other 20 buildings are all for combined use of residences and factories. The floor area of a *shikki* establishment ranges between 70 and 120 square meters. Each of the building occupies most of its lot. A factory and a residence coexist in a same building. The building contains a residential section on the first floor and factory section on the second floor. Moreover, for efficient use of a small lot, some buildings have three stories.

In the area, the commercial and service facilities are located along wide streets with high land prices. On the other hand, the *shikki* establishments are distributed along the alleys mixing with home. Many buildings are the combination of stores, factories, and residences. Inside the area, there are also parking lots and vacant houses. Various land uses coexist in the area.

2) Residences of artisans and their migration

Kamihonmachi community is examined in the aspects of employment, removal of residence, and land ownership (Table 15).

Families in the community are classified into three categories by relationship to *shikki* industry The category 1 families manage *shikki* establishments, by themselves. The families in category 2 include members who work in the *shikki* industry. The families in the category 3 have no member who works in the *shikki* industry. Category 1 consists of 12 families: five *nushiyas*, three *kaiuketori* subcontractors, two *chinkin* makers, and two *roiro* makers. Among them, the 11 establishments are small, and use their residence as factories or stores. All members of the families are engaged in their family professions without employing others[39]. Additionally, the No. 7 and 9 families newly took part in the *shikki* industry.

Members of the families from No. 13 to 18 work in the *shikki* industry. The heads of families from No. 13 to 15 are artisans being employed in *nushiya* or *hashi* maker. The members of families from No. 16 to 18 are engaged in the work related to the *shikki*, e.g., the *Shikki* Cooperative. In total, 18 of 29 families depend a part of their income on the *shikki* and related professions. Moreover, seven of the 18 families live in

Table 15 Resident's professions and residential change in Kamihonmachi, 1992

Category	No.	Land ownership	Use of building	Employment of family members: House holder	Wife of holder	Successor	Wife of successor	Other male	Other female	Migrated year	Former residence	Landuse before migration
Family managing *shikki* industry	1	Self-owning	R+F	**N**	×	**N**	×	C		*		Residence
	2	Leasehold	R+F	**K**	**T**				×	1982	kawai-machi (leasehold)	*Nushiya*
	3	Leasehold	R+F	**R**	**R**				×	1981	No. 5	*Roiro*
	4	Leasehold	R+F	**K**					T	1950	kawai (lease)	Residence
	5	Leasehold	R+F	**R**	×	**R**	**R**		×	1980	Kamihonmachi (leasehold)	Clothier
	6	Leasehold	R+F	**C**					N	*		Residence
	7	Self-owning	R+S	**N**	**T**				×	*		Residence
	8	Self-owning	R+F	**N**	×					1962	kawai-machi (leasehold)	Public residence
	9	Self-owning	R+F	**C**	**C**					*		Residence
	10	Self-owning	R	**N**	×					*		Residence
	11	Self-owning	R+F	**K**	**T**					*		Residence
	12	Self-owning	R+F	**N**	×	**N**	▲			*		Residence
Family including member engaged in other *shikki* industry	13	Self-owning	R	N	◇					*		Residence
	14	Leasehold	R	N						1983		Residence
	15	Self-owning	R+F	H					T	1968	kawai-machi (self-owning)	Public residence *Kijiya*
	16	Self-owning	R	▲	×					1954	Fugeshi-machi (self-owning)	*Nushiya*
	17	Self-owning	R	▲	×					*		
	18	Leasehold	R	▲	▲					1991	No. 17	Warehouse
Family having no relation to *shikki* industry	19	Leasehold	R	●	◇					1989	Ama-machi (self-owning)	Residence
	20	Leasehold	R	●	●					1980	kawai-machi (self-owning)	*Nushiya*
	21	Leasehold	R	◎	◎					1975	Out of Wajima	Residence
	22	Leasehold	R	◎	◇					1972	Inner zone (self-owning)	Residence
	23	Leasehold	R	▲	▲					*		Residence
	24	Self-owning	R	×	×					1950	Out of Wajima	*Nushiya*
	25	Self-owning	R	●	●				●	1955	Kamihonmachi (leasehold)	Public residence
	26	Self-owning	R							1963	Fugeshi-machi (leasehold)	Public residence
	27	Self-owning	R	●	●	●	●		×	1963	Kawai-machi (leasehold)	Public residence
	28	Self-owning	R		×					1954	kawai-machi	Residence
	29	Self-owning	R	●	●					1960	Inner zone	*Nushiya*
No resident	30	Leasehold	F									*Nushiya*
	31	Leasehold	V									*Chinkin*
	32	Leasehold	V									
	33	Leasehold	P									*Kaiuketori*
	34	Self-owning	V									

Use of building R :Residence F :Factory S :Shop P :Parking lot V :Vacant house

Employment of family members **N** *Nushiya* **C** *Chinkin* **R** *Roiro* **K** *Kaiuketori* H *Hashi* **T** *Togimono*

Bold character means self-management. Other means employed.

● Self-management other than shikki. ◎ Office worker in private enterprise.

▲ Office worker in pubulic faculity. ◇ Asa-ichi × No profession

Migrated year * means migration before 1945

Data source: The author's field survey in January, 1992

the *Renko-ji Yashiki*.

Since the second World War, 18 present families have moved into the community. The former residential places of families in the categories 1 and 2 are distributed within Kawai and Fugeshi-machi. In contrast, the families that have no relationship to *shikki* came from wide area ever from outside Wajima. The reasons of moving in includes establishing branch families, and starting and expansion of businesses. Some families had to move their residences because of the repair of the Wajima River[40].

Concerning with the land use in past time, ten *shikki* establishments were located on the community before moving into the present residents. They moved to the central region and to the inner zone. The 10 establishments have moved from this community to other areas to expand their businesses on a larger land. For example, the *nushiya* No. 10 used its building both as a residence and a factory. It moved the factory to Yokoji-machi in the south of the built up area to expand the factory and to open a shop, in 1962. The building in Kamihonmachi became exclusively a residence of the family.

When an artisan purchased a land, personal contacts through the *shikki* industry often work effectively[41]. The head of No. 2 family moved into the house of his master of *nushiya* when his master moved out. On the present lot of No. 33, a *nushiya* lived till about 1960. After the *nushiya* moved out, an employed artisan became a *kaiuketori* subcontractor, and converted the building as a factory till 1990. In such ways, the built up area of Kamihonmachi can supply small but cheap lands to new *shikki* establishments. It is possible to supply vacant houses and parking lots as land to the *shikki* establishments.

The Kamihonmachi community is located on the mixed area of residences and factories. The buildings used both as residences and factories or stores are standing closely. About 40 percent of the families manage the *shikki* establishments by themselves in the community. All members of most families work in their own establishments. More than half of families of category 2, depend their income on the *shikki* industry.

3) Lifepaths of artisans

Previous analyses clarified the characteristics of the former Wajima Town as the agglomeration of *shikki* establishments, training center of artisans in all types, and an opportunity for independence of artisans on the cheap lands. In this subsection, the *kashoku* artisans' lifepaths in Kawai-machi 1 bu are examined from the questionnaire data (Figure 30).

The *kashoku* artisans, in Kawai-machi 1 bu consist of five Type C, two Type B, and four Type A members. More than half of them are the final successors. Artisans, who were born outside the former Wajima Town are only five. They all belong to Types A or B. On the other hand, the final successors were all born in the former Wajima Town. Similarly, all entering places but one are in the former Wajima Town. Therefore, migrations of artisans are remarkable in Types A and B at the passing points of the entering and of the independence. Artisans without migration experience exist among the successors of their fathers' profession. Moreover, three of four artisans in Type B achieved independence on the leasehold.

These types of migration are mainly in Clusters I and III. Cluster I includes the successors of their fathers' profession. Cluster III includes the artisans before independence. The successors of their fathers' profession have no experiences of migration, or only have experiences to start being trained in the former Wajima Town. All Type A artisans were born outside the former Wajima Town. Their centripetal migration caused at the entering.

More than half of the families depend their living on the *shikki* industry in the Kamihonmachi community. According to the lifepaths, the former Wajima Town, including Kawai-machi 1 bu, is not only the agglomeration area of the *shikki* establishments and training center of the artisans, but also residential area of the successors. At the same time, backstreets of the community function as stage on which the artisans achieve independence. The half of the families, that depend on the *shikki* industry, live in the leaseholds.

It becomes an important factor to supply cheap and adequate land for young

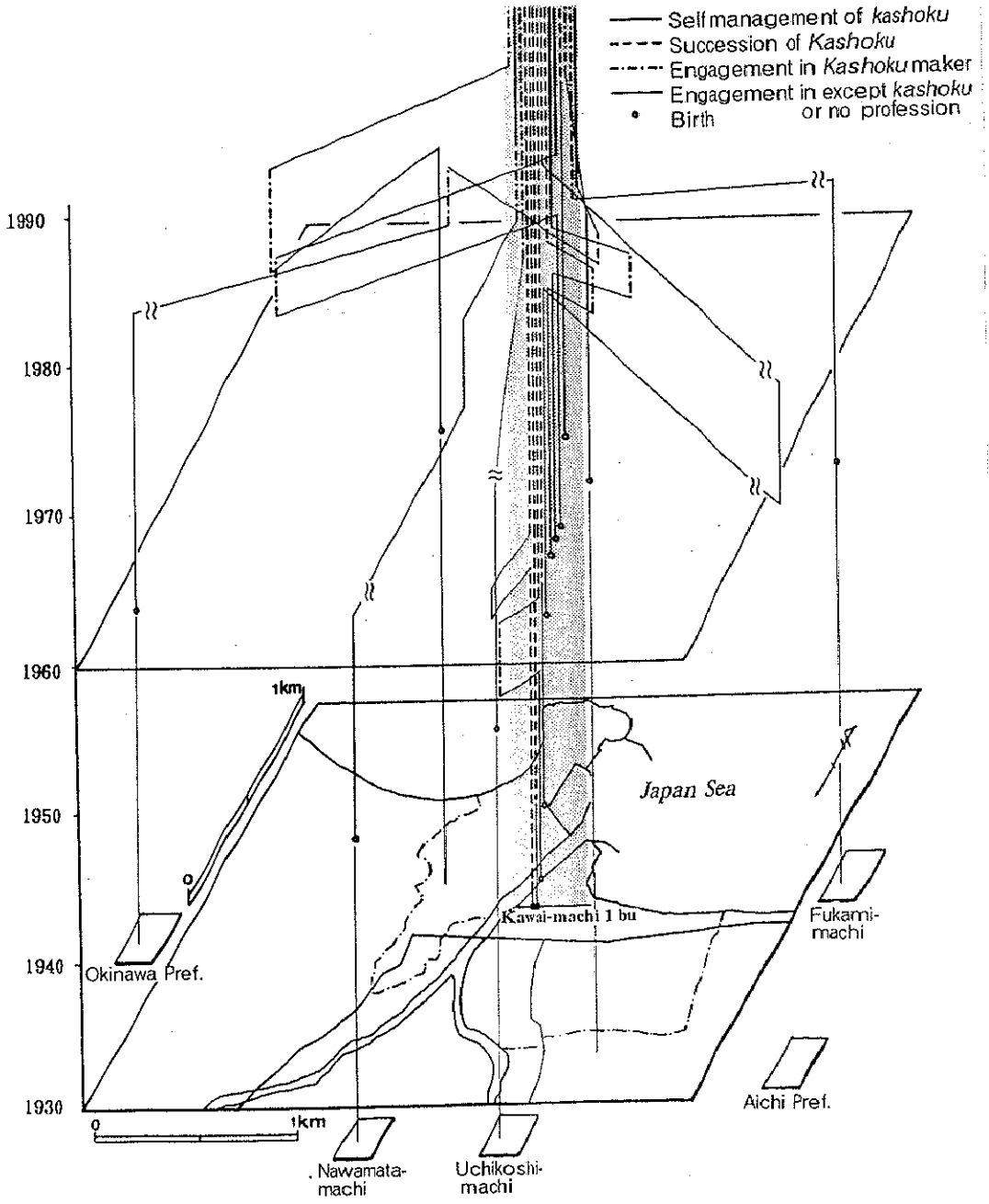


Fig. 30 Lifepaths of *Kashoku* artisans in Kawai-machi 1 bu, 1992

Data source: Questionnaire in August, 1991

artisans for the existence of leaseholds in the center of the built up area. The land secures their independence. Therefore, the community works as an incubator to assist the independence of the young artisans. Though the incubator is a conception in study of metropolis, it can apply in small cities as Wajima with function to assist new establishments. Moreover, personal contacts of the industry often work to them effectively, because of the agglomeration of the *shikki* establishments there. The contacts works as external economics, and assists to start new *shikki* establishments. When they accumulate the capital, they move out of the community to expand their business.

2. Socio-economic land conditions and artisans' migration in the central region: the case of Shonanmachi community

The inner zone receives the migrations from the central region. This section discusses the relationship between residential migration and land conditions by examine a case of the inner zone. The author selects the Shonanmachi community as the case. The reason is that relatively many *shikki* establishments are distributed in the community.

1) Characteristics on land use an land ownership

The Shonanmachi community is located on the southeast of the central region apart one kilometer from the largest shopping mall in the built up area (Figure 28). A former settlement was located along the Route 249. Farmlands are distributed around the settlement. Residential area has been developed in the eastern part since 1980. The land price on street in the community ranged from 15 to 20 thousand yen per one square meter in 1991. The price was only about 20 percent of the highest price of Wajima.

According to Figure 31, while agricultural land use is dominant, the urban land use is developed in the eastern part and along the main road in the community. Most of the urban land use is residential; only four are located commercial and service facilities along the main road. The *shikki* establishments consist of five *makie* makers, two *nushiyas*, two *roiro* makers, two *kijiyas*, and one *kaiuketori* subcontractor. In addition, the lacquer refining plant owned by the *Shikki* Cooperative is located in the community. Among the establishments, seven are distributed in the eastern residential area.

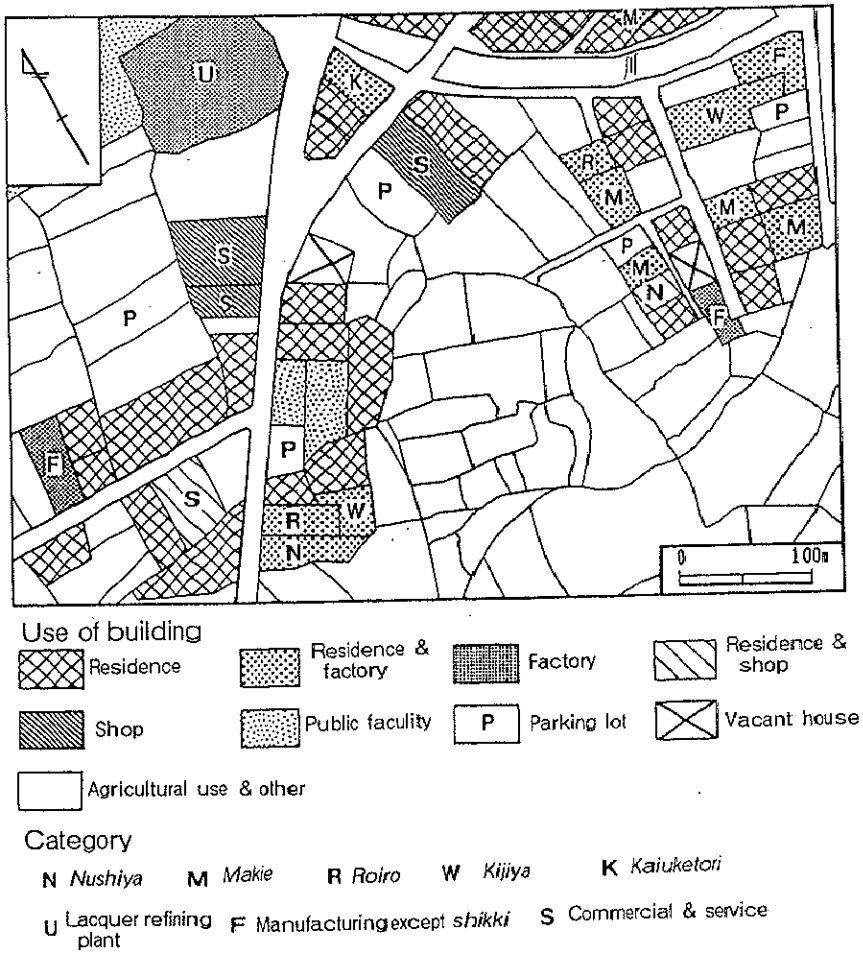


Fig. 31 Land use in Shonanmachi, 1992

Data source: The author's field survey in March, 1992

Though the most buildings are exclusively used a residences, most of the residences of the *shikki* establishments are joined with factories or shops. Unlike Kamihonmachi, a lot ranges between 150 and 200 square meters, which is twice the size of that in Kamihonmachi. There are two *shikki* establishments which have a factory separate from a house within the same lot. In order to avoid dust and to receive daylight, *shikki* establishments make a factory on the second floor. To prevent direct rays, moreover they usually make windows in the north. In these ways, they can adopt suitable house planning for their processes. The *shikki* establishments in the community possess good environment for processes.

The combined use buildings of the *shikki* establishment and the exclusive use of residences coexist in the Shonanmachi community. The environment for production and living is good with large lots for those buildings.

2) Residence of artisans and their migration

Table 16 shows the land ownership, residential migration, and employment of family members in the community. Among the 36 families, 16 families manage the *shikki* establishment by themselves. They consist of nine *kashoku* makers, as which include *makie*, *chinkin*, and *roiro* artisans.

Among the self-managing families, five own factories in other areas while using their building in the community as houses. Since three families are successors, their parents live in the former residences combined with factories. The reason for their migration is such changes of family conditions as marriage, birth, and growth of children.

There are three families with employees of the *shikki* establishments, in the community. The employees are not the heads of families, but successors or other members. For example, two sons of No. 19 family are engaged in the *shikki* establishment in the community. Like Kamihonmachi, 19 families in total, which are more than half of them, depend their income on the *shikki* industry.

There is a distinctive contrast between the two communities in terms of land ownership. While all families possess their own land in Shonanmachi, leasehold

Table 16 Resident's professions and residential change in Shonanmachi, 1992

Category	No.	Land ownership	Use of building	Employment of family members: House holder	Wife of holder	Successor	Wife of successor	Other male	Other female	Migrated year	Former residence	Landuse before migration
Family managing *shikki* industry	1	Self-owning	R+F	**R**	**N**	**R**				1982	Kawai-machi (leasehold)	Field
	2	Self-owning	R+F	**M**	**M**					1982	Fugeshi-machi (leasehold)	Puddy field
	3	Self-owning	R	**W**	●					1972	Fugeshi-machi (leasehold)	Residence(No. 4)
	4	Self-owning	R+F	**W**	**W**			**W**		1980	No.3 (owning)	Factory (kiji)
	5	Self-owning	R+F	**M**	**M**					1989	Fugeshi-machi (leasehold)	Puddy field
	6	Self-owning	R+S	**N**	**N**					1989	Fugeshi-machi (self-owning)	Puddy field
	7	Self-owning	R+F	**M**	**M**					1983	Fugeshi-machi (leasehold)	Puddy field
	8	Self-owning	R	**H**	**H**					1988	Inner zone (self-owning)	Puddy field
	9	Self-owning	R+F (Separate)	**M**	**M**				M	1985	Kawai-machi (self-owning)	Puddy field
	10	Self-owning	R	**M**	◎					1984	Inner zone (self-owning)	Unused land
	11	Self-owning	R+F	**K**	**K**				◎	1975	Kawai-machi (leasehold)	Puddy field
	12	Self-owning	R+F	**R**	**R**					1987	No.13(owning)	Unused land
	13	Self-owning	R+F	**W**	**R**					1982	Kawai-machi (self-owning)	Unused land
	14	Self-owning	R+F	**N**	**N**					1990	Fugeshi-machi (Owning)	Factory
	15	Self-owning	R+S (Separate)	**M**	●					1968	Fugeshi-machi (self-owning)	Puddy field
	16	Self-owning	R	**C**	**C**					1954	Fugeshi-machi (self-owning)	Residence
Family including member engaged in other industry	17	Self-owning	R	●	H					1990	Inner zone (self-owning)	Puddy field
	18	Self-owning	R	●	◇	M		N		*	Fugeshi-machi (self-owning)	Agricultural laboratory
	19	Self-owning	R	◎	×	M	N	N	×	1965	Fugeshi-machi (leasehold)	Puddy field
Family having no relation to *shikki* industry	20	Self-owning	R	◎	●					1985	Inner zone	Puddy field
	21	Self-owning	R+F (Separate)	●	●	●			●	1974	Wajimazaki (self-owning)	Unused land
	22	Self-owning	R	◎	◇				×	1989	Fugeshi-machi (leasehold)	Puddy field
	23	Self-owning	R	◎	◎					1989		Puddy field
	24	Self-owning	R	◎	◎							
	25	Self-owning	R	◎	×					1991	Kawai-machi	Puddy field
	26	Self-owning	R		●	●						
	27	Self-owning	R	×	×					1977	Kawai-machi (self-owning)	Puddy field
	28	Self-owning	R	×	×					1954	kawai-machi (self-owning)	Puddy field
	29	Self-owning	R	×	×	▲	×			1946		
	30	Self-owning	R	◎	×					1978	Inner zone (self-owning)	Puddy field
	31	Self-owning	R	●	●					1991	kawai-machi (leasehold)	
	32	Self-owning	R	●		●	●			1980	Kawai-machi (self-owning)	Puddy field
	33	Self-owning	R	×	×							
	34	Self-owning	R	▲	×	◎				1978		
No resident	35	Self-owning	R									
	36	Self-owning	F	●	●					1986		

Use of building R :Residence F :Factory S :Shop

Employment of family members **N** *Nushiya* M *Makie* **C** *Chinkin* K *Kiji* **R** *Roiro* **K** *Kaiuketori* H *Hashi* T *Togimono*

Bold character means self-management. Other means employed.

● Self-management other than shikki. ◎ Office worker in private enterprise.

▲ Office worker in pubulic faculity. ◇ Asa-ichi × No profession

Migrated year * means migration before 1945

Data source: The author's field survey in January, 1992

residents are dominated in Kamihonmachi. Moreover, employment of artisans is different between them. Six families employ artisans, while six other families have members employed in other businesses.

Among the 34 families in the community, 20 families moved into there after 1980. The land before their migrations were mainly farmlands. Only five families owned land. Concerning with *shikki* relating families, 14 of 19 families have been moved since 1980. The former residential areas were mainly in the central region. Among the 16 families managing *shikki* establishment, 6 used to live in leaseholds.

For example, a head of the No. 2 family, became independent as a *makie* maker at leasehold of less than 60 square meters in Fugeshi-machi, 1977. In 1982, he moved into the present place of 250 square meters. The reason for the migration is a desire for a good and large residence and a factory. His former residence was too small to expand his business. Reasons to select Shonanmachi include the existence of newly developed residential area and relatively cheap price of land as 70 thousand yens per one square meter and the proximity to the built up area. These motives are common to the *shikki* establishments which used to use building both as residences and factories.

3) Lifepaths of artisans

Figure 32 shows the lifepaths of the artisans in Mitomori-machi including the Shonanmachi community. The 12 artisans in Mitomori-machi, consist of two Type A, eight Type B, two Type C members. More than half artisans in Kawai-machi 1 bu are the final successors. However, newcomers in Type B occupy 60 percent in Mitomori-machi. The birthplace of the most members (9) is the former Wajima Town. Seven other artisans were trained in the former Wajima Town.

The families in Shonanmachi have buildings on large lot and possess the land by themselves. They are particularly different from the families in Kamihonmachi in two ways. First *shikki* establishment managers' buildings are used exclusively for residence. Second *shikki* establishment managing families have members employed in other establishments. The artisans who moved into Shonanmachi, are mainly leaseholds residents who have been independent there. The lifepaths on the Figure 32 shows a

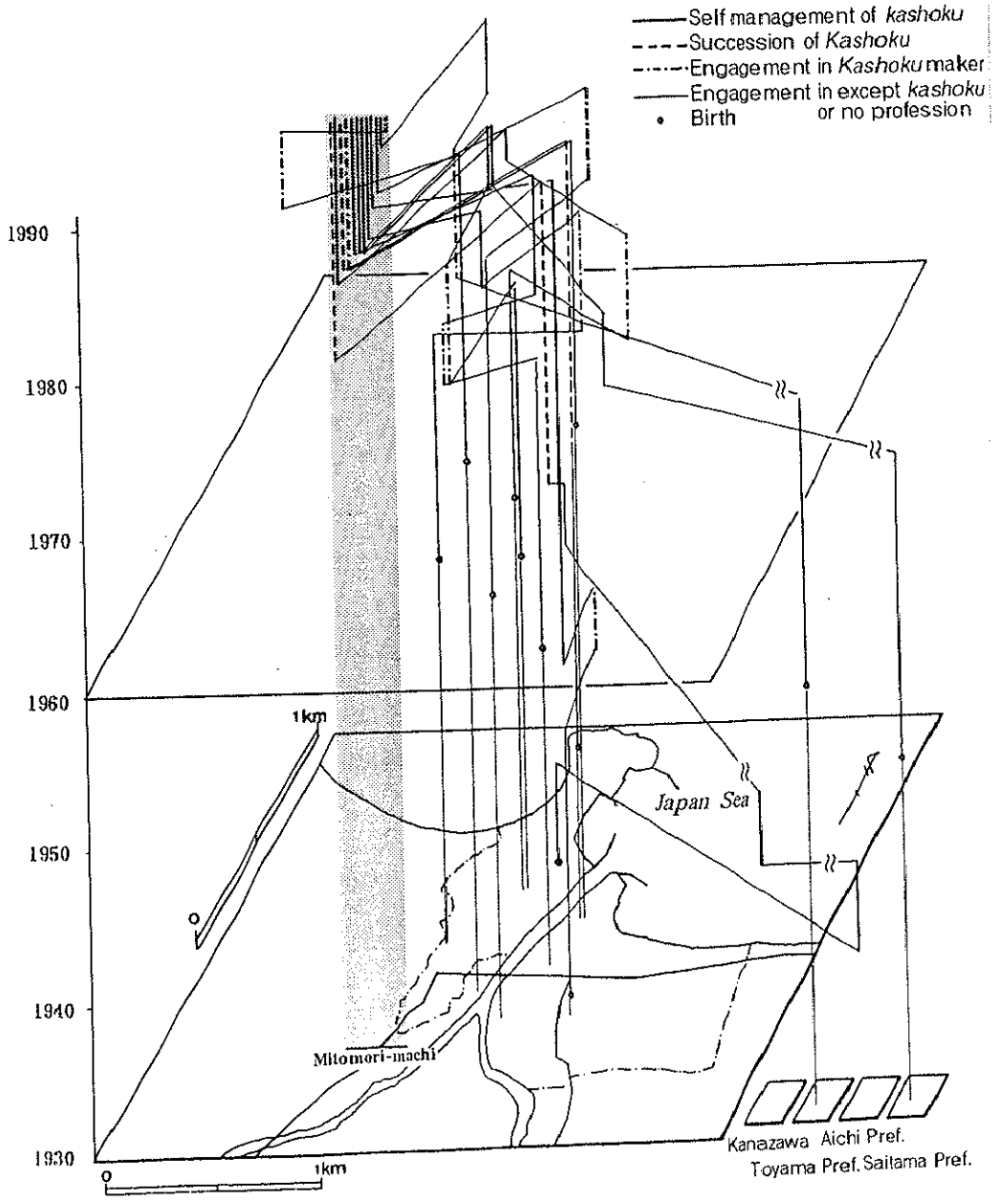


Fig. 32 Lifepaths of *Kashoku* artisans in Mitomori-machi, 1992

Data source: Questionnaire in August, 1991

convergence from the former Wajima Town to Shonanmachi. The artisans, being independent in the former Wajima Town, moved into the inner zone after accumulating the capital The reasons of migration are the desire to expand their business in a good environment .

Migrations of artisans in Kawai-machi 1 bu are relatively a few. They stay within the former Wajima Town except during the training period. By contrast the artisans in Mitomori-machi have moved frequently since the entering because all artisans in Mitomori-machi were born in other areas, especially in the former Wajima Town. Moreover, many of them are not successor, but newly independent artisans. They became independent after being trained in the former Wajima Town. After the independence, they moved into Mitomori-machi. In other words, Mitomori-machi is the region into which artisans move from the former Wajima Town. Even successors move there from the former Wajima Town because of the expansion of business or marriage.

In the inner zone adjacent the central region, a residential area with good residential and production environment has been developed. The artisans own buildings in the residential area for both residences and factories. Their residential lots are exceedingly larger than those in the central region. Artisans moved into the inner zone consist of two groups. One is artisans, who planned to expand their business, after the independence at the incubator in the central region, because they could accumulate enough fund. The other group lived in small residences. The former belongs to the Type B, and has Cluster IV type migration. The latter also belongs to the Type B, but has Cluster III type migration. Additionally, even artisans who belong to Type C, sometimes move their residences to the inner zone in such opportunities as marriage or birth.

CHAPTER VII

CONCLUSION

This purpose of this study is clarify regional bases in a traditional industry region, which is maintaining traditional production technology and continuing development without modernizing. To achieve this purpose, the author analyzed the Wajima *shikki* industry from three viewpoints: as the organization of production and distribution, the labor force, and socio-economic land conditions. Concerning the Organization, restructuring is analyzed, mainly as demonstrated in *nushiya*s and *kaiuketori* subcontractors. Concerning the labor force, the author analyzed reproduction of skilled artisans and regional migration patterns under apprenticeship. Concerning socio-economic land conditions, the author analyzed land use, land ownership, and migration of artisans, adopting conceptions of industrial community and the incubator hypothesis. The results of the analyses are as follows:

(1) With wide scale conversion into production of substitute items' using plastics and chemical paint in many *shikki* production regions in the 1960s, demand for high-grade goods concentrated in a few regions including Wajima. Besides the traditional method of consumer sales, the Wajima *shikki* industry began business with outside commercial capital from wholesale dealer and department store. At the same time, *nushiya* diversified into four types, with different sales methods. Thus, the Wajima *shikki* industry as a whole could take advantage of various sales methods.

The Wajima *shikki* industry did not introduce modern production facilities and new materials to achieve efficient production. They achieved mass production by hand, delegating *kyushitsu* processes partially to *kaiuketori* subcontractors. The *kaiuketori* subcontractors became independent makers of parts of the *kyushitsu*, in order to increase their incomes. On their side, the *nushiya* could control their labor costs by giving *kyushitsu* artisans independence as *kaiuketori* subcontractors.

The diversification of sales methods and the increase in the members of the *kaiuketori* subcontractors are responses to increased demand in the two aspects of production and distribution. By placing orders with the *kaiuketori* subcontractors, the Wajima *shikki* industry could mass-produce by hand. By diversification of sales methods, and use of outside commercial capital, it became more efficient at selling its products.

Additionally, two elements influenced the continuance and development of the Wajima *shikki* industry. One is that the *Shikki* Cooperative mines *jinoko*, the material used for *shikki*, for its members. Another is the acquisition of material supplement functions, to acquire and sell materials such as lacquer and woods.

(2) Artisans who produce *shikki* have learned their skills under apprenticeship. As a result of the restructuring of the Organization, it was necessary for the Wajima *shikki* industry to train many new skilled artisans. The Wajima *shikki* industry responded by training unskilled workers, having no previous relation to *shikki*, and was encouraged by the resulting production increase. Originally, the apprenticeship system repeated simple reproduction of artisans passing down skills. With the acceptance of the unskilled labor, expanded reproduction of workers became the first function. As a result, apprenticeship changed qualitatively.

The qualitatively change in apprenticeship is reflected in regional migration patterns of artisans, and in their reproduction process. Successors, who should inherit skills, have stayed in the central region. The artisans who belong to Type B have experienced centripetal-centrifugal migration, moving to the central region to learn skills, and then returning to the inner and outer zones. They were born outside the central region, and had no relationship to the *shikki* industry. In the same time, Type B artisans who were born in the central region have experienced centrifugal migration. The artisans who belong to Type B, and who have either migration pattern, expanded distribution of the *shikki* establishments outward.

While the apprenticeship changed qualitatively, to cope with production increases, it could strengthen the reproduction function by expansion of the labor

supplement area. In the *kyushitsu* part as well, the apprenticeship made the reproduction of artisans smoothly. The number of *kyushitsu* artisans who could be *kaiuketori* subcontractors grew by reproduction. This is a base for mass production by hand, without introducing modern facilities, in the *kyushitsu* part.

(3) There are several leaseholds with small lots and cheap rents in the built-up area of Wajima City. Because of the agglomeration of *shikki* establishments in the built-up area, it is an advantageous area for face-to-face contact and gathering information. These leaseholds have an advantageous influence as external economics of the Wajima *shikki* industry, for the management of *shikki* establishments. The area includes leaseholds which are reasonable in scale and cheap to rent. This is a suitable area for artisans, who had no relation to *shikki* and belong to Type B, to work as independents. The existence of such area, as an incubator, secures and assists the independence of young artisans.

The artisans who achieved independence in the incubator, inside the built-up area, belong to Type B. After accumulating capital, they move to the inner zone, to a better environment for production and life. This pattern is called centripetal-centrifugal migration. In the inner zone, residential areas suitable for artisans' life have developed. In the inner zone, artisans own their residences, often combined with their factories. The areas of lots in particular are larger than in the incubator. Also, artisans who were born in the central region often moved to the inner zone, from their former houses. They have experienced centrifugal migration.

From the above discussion, the author suggests three factors as regional bases for continuance and development of the Wajima *shikki* industry: The first one is connection with outside commercial capital and mass production by hand. Division of the *nushiya* introduced the connection. Through the connection with commercial capital, *nushiya* could use various sales methods. Development of *kaiuketori* subcontractors made mass production possible. Dependence on the *kaiuketori* subcontractor made production more efficient. The second factor is strengthening of the reproduction function of skilled artisans by apprenticeship. While the original function of

apprenticeship as the inheritance of skill has weakened, the new system has expanded the labor supplement area, accepting unskilled workers who had no relation to *shikki*, and has achieved expanded reproduction. The qualitative change in apprenticeship developed not only in the *kashoku* part, but also in the *nushiya*. This is a reason for the increase in the number of *kyushitsu* artisans' who can be *kaiuketori* subcontractors. The third factor is the existence of an incubator area in the built-up area. In the incubator, it is possible to use external economics with the help of low rents. The area attracts younger artisans, and assists their success in business. Artisans accumulate capital in the area, and then move to the inner zone, to have a better environment for their production and lives.

The author also describes the original characteristics of Wajima. They include reproduction of skilled artisans by apprenticeship, and the fact that areas owned by temples or shrines become incubators. These are special elements for the continuance of the Wajima *shikki* industry. They aid the development of *kaiuketori* subcontractors, and make possible mass production by hand. Monopolistic mining of *jinoko* by the *Shikki* Cooperative is another original base for the industry in Wajima.

Generalizing from the case of the Wajima *shikki* industry, the author demonstrates several regional bases for continuance and development, without modernization, in a traditional industry region: (1) Diversification and rationalization of distribution by the restructuring of the Organization, and efficient production by dependence on outside orders. (2) A reproduction system of skilled labors who possess traditional production skills. (3) An incubator area which assists new independent producers in the agglomerated area, and better residential areas in the outer zone. In regions where such factors are aperative traditional industry that maintains traditional production processes can continue and develop.

Notes

1) The other requisites of the designation of the traditional craft industries are as follows; industry that produces daily goods, industry that includes handicraft processes mainly, industry that uses traditional materials, industry that makes regional agglomeration (Association for the Promotion of Traditional Japanese Crafts, 1993).

2) The Wajima *nuri* is name of a traditional craft industry, designated by the Ministry of International Trade and Industry. The Wajima City, as the study area, includes production without the traditional craft. So the author adopts term as Wajima *shikki* industry, in this study.

3) The Oku-Noto district consist of Wajima City, Suzu City, Anamizu Town, Monzen Town, Noto Town, Yanaida Village, and Uchiura Town. During from 1960 to 1990, population of the district decreased with 30.9 percent.

4) The number of employee in the *shikki* industry is statistics by the Cooperative of Traders and Manufacturers in Wajima *Shikki* in 1989.

5) The *sashimono kiji* is one of process methods of wood body made from *ate* (Hiba Abror Vitae, *Thujopsis dolabrata Hondae*). It forms straightly, and is good for nest of boxes, shelf, and so on. The *ho kiji* has curved form using *honoki* (Silverleaf magnolia, *Magnolia obovata*). It is good for foot of table, or flower stand. The *magemono kiji* is good for tray or lunch box, rounding thin and narrow *ate* board. The *wan kiji* processes *keyaki* (Japanese selkova, *Zelkova serrata*), for bowl and dish, by turner.

6) The *jinoko* is a powder made by burning diatomate mined in Kominyama in Kawai-machi. It consists of glass, including small holes. Mixture with law lacquer makes hard priming layer (Association of Japanese Lacquer craft, 1987).

7) Mechanism in drying lacquer is oxidation of urushiol as principal ingredient, by enzyme namely lacase. The lacase activates in from 75 to 85 percent of humidity, and 25 degree of temperature. Therefore, it dries faster in summer, and slower in winter (Association of Japanese Lacquer craft, 1987).

8) The *makie* is one of technique in surface decoration, to sprinkle golden powder on design drawn by lacquer. The *chinkin* is technique to carve on surface with chisel, to inject lacquer, and to inlay gold foil into the hollow. The *roiro* is technique polishing with charcoal and titan powder, or sprinkling fragments of abalone.

9) In 1959, one extreme right Japanese broke into the People's Republic of China's ship,

and took down her flag, in Nagasaki Harbor. The Chinese government protested it, and prohibited trade with Japan, as revenge.

10) The former Wajima Town consists of Kawai-machi, Fugeshi-machi, Wajimazaki-machi, and Ama-machi, shown in the Figure 3.

11) Sato and Haneda (1964) divided *shikki* production regions into two types. One was region led by manufacturer (as manufacturing capital) such as *nushiya*. It suggested Wajima and Kawatsura (Akita Prefecture) as the typical regions. Another was region led by wholesale dealer (as commercial capital). It suggested Yamanaka (Ishikawa Prefecture) and Aidzu-Wakamatsu (Fukusima Prefecture) as the typical regions.

12) Wajima *shikki* industry cannot use capital efficiently, because it needs more than half year to finish processes. Settlement of accounts among Wajima *shikki* industry is by cash in principal. Most of proceeds become working capital. Therefore, *Nushiya* could not make their capital into loan as *ginshikata*.

13) Business with department store consists of temporary and permanent one. The temporary business is carried out for exhibition by department store. This study regards only permanent business as wholesale to department store.

14) The type D is not *nushiya* in traditional term. However, the author decides it as nushiya having new management. The reasons are, that it orders to the *shikki* establishments, by its own decision, and that everyone calls them *nushiya*, in Wajima.

15) The *Shikki* Cooperative started to grow lacquer trees, by assistance of central and local governments, in 1971. It had planted 827,200 saplings until 1983. However, because of growth impediment, It is impossible to gather lacquer.

16) "List of imported items in Fugeshi-machi" in 1849 shows *ate* boards came from Minadzuki (Monzen Town), and Ozawa (Wajima City) (Committee of Compilation of the History of Wajima, 1973).

17) The *makie* includes various techniques such as, *hira-makie, taka-makie, togidashi-makie, kinji, hyomon,* and so on.

18) The *kokuso* powder is ground sawdust of *keyaki* in *wan kiji*. At the first of the *kyushitsu* process, artisan shaves bad part on *kiji*, and fills the hole with mixture of lacquer and it.

19) The *kijiya* establishes smithy to process blade. Generally, it makes chisel or plane by itself. It depends bit for lathe on ironworks.

20) The *denki buro* is facility to dry *shikki* finishing *uwanuri*. It is box that has two meters' height, 2.7 meters' width, and 1.8 meters' depth. Inside the box, shaft pierces horizontally, loading board. The board, that placed *shikki*, rotates at same interval, to avoid to hang down coated lacquer. In 1928, a *shikki* material merchant in Kawada

(Fukui Prefecture) made it. In about 1955, it developed to drive electricity.

21) The *Shikki* Cooperative waits payment for lacquer price for only three months. Despite high price, *nushiya* and *kaiuketori* subcontractors, that do not have much capital, buy lacquer from urushi merchant.

22) Though prices of the Chinese lacquer are from 12 to 15 thousand yens per 1 kg, the Japanese ones are from 50 to 100 thousand yens, in 1990.

23) It regards the apprenticeship as efficient skill education method. Many enterprises adopt OJT (on the job training), that originates in the apprenticeship broadly.

24) The period of apprentice was 13 years, in Edo era, seven yours, before the second World War. Apprentices had to work a year under their master, finishing the period. (Wakabayashi, 1952).

25) Also in Narakawa (Nagano Prefecture), there are many parties of the *deshi-kyodai* (Ito and Udagawa, 1985).

26) Demand of *nushiyas*' masters who, could not teach *uwanuri* because of busy for sales, made Wajima *Shikki* Cooperative Highly Vocational School to establish. It teaches *uwanuri* to *kyushitsu* artisans once a week.

27) The Training Institute of Lacquer Craft Technique consists of four divisions, as *kiji*, *kyushitsu*, *makie*, and *chinkin*. It teaches high technique and skills in lacquer craft to artisans finished the apprenticeship. To learn in the institute, is start point for lacquer craft artist. Graduate of it often wins a prize in major exhibition.

28) Course of Interior in Wajima Vocational High School purposes growth of successor in the *shikki* industry. Students in the school learn basic *shikki* production technique within three years. Until 1990, about 350 graduates engage the Wajima *shikki* industry.

29) The artisans who work in the *nushiyas* are eight. Their attributes are so similar with the others, that the author counts them in samples.

30) The *Makie*, *Chinkin* and, *Roiro* Cooperatives condition to be member, that he has finished four years training.

31) Some *kashoku* artisans were born in reasons far from Wajima, such as Okinawa, Aomori, Tokyo, and Kagawa.

32) The inner zone includes 2 areas, that have less than 10 artisans, and that should be the outer zone. However, because they adjoin the central region and the inner zone, and because both residents and natives are only four, the author decided them as the inner zone.

33) The lifepath is a method to grasp human activities. It observes spatial activities from birth to death, as the series of time-spatial migration (Takahashi, 1990). Typical provable

studies using lifepath, are Ozeki and Takahashi (1984) and Kawada (1993), in Japan.

34) About 30 percent of the samples have experiences engaged in professions except *shikki* industry.

35) When the successor trains under his father, they often do not hold distinctive ceremony. Concerning with the case, the author decided the time of "succession", as when he started training.

36) The One artisan, born outside the Wajima City, moved to the Former Wajima Town, when he was infant, as adopted child. So substantially all artisans in the type are natives of the central region.

37) In *kashoku* parts, it is enough to work about 10 square meters.

38) The *Renko-ji Yashiki* originates in territory, that contributed by wife of Toshiie Maeda, in 1599. It separates in three areas in Kawai-machi, including Kamihonmachi. In present, it holds 16 thousand square meters and 130 families.

39) Though the *togimono*, engaged by wives of No. 2, 7, and 11 families, is division within family, they often take orders from other *nushiya*s. The *togimono* is work like a side job, mainly engaged by women in middle and old generations.

40) After flood disaster of the Wajima River in 1959, mouth of the river was improved widely. According to the construction, 40 families moved. Among them, three families moved into Kamihonmachi (Committee of Compilation of the History of Wajima, 1976).

41) The connections within *shikki* industry appear in daily life. Among the 18 families, 11 of them have relationship in marriage or adoption with other *shikki* establishments.

BIBLIOGRAPHY

Akahane, T. (1975): Regional structure of the electronic parts industry in the Kami-Ina district, Nagano Prefecture. *Geographical Review of Japan*, **48**, 275-296. (*in Japanese with English abstract*)

_____. (1980a): Regional structure of the electric machinery industry in the Minami-Saku district, Nagano Prefecture. *Geographical Review of Japan*, **53**, 493-510. (*in Japanese with English abstract*)

_____. (1980b): The educing-structure of farmers labor forces to the electric machinery industry: case study of Minami-Saku district, Nagano Prefecture. *Annals of Association of Economic Geographers*, **26**, 229-244. (*in Japanese with English abstract*)

Aoki, H. (1970): The development of industry in Yokkaichi City, Mie Prefecture. *Geographical Review of Japan*, **43**, 548-566. (*in Japanese with English abstract*)

_____. (1987): *Kogyo chiiki no rodo-ryoku jukyu* (*Demand and supply of labor force in manufacturing area*). Taimeido, 157p. (*in Japanese*)

Association for the Promotion of Traditional Craft Industries (1993): *Zenkoku dento-teki kogeihin soran* (*Conspectus of the traditional crafts*). The Association for the Promotion of Traditional Craft Industries, 421p. (*in Japanese*)

Association of Japanese Lacquer Craft (1987): *Nippon no shikki, sono ichi: zairyo to yogu* (*Lacquer craft in Japan, Vol. 1: materials and tools*). Association of Japanese Lacquer Craft, 186p. (*in Japanese*)

Baba, A. (1977): A consideration in use of substitutive lacquer in main lacquer ware production regions, in 1965: varnish technique, mainly in priming processes. *Annals of the Geography*, **19**, 25-32. (*in Japanese*)

_____. (1981): Difference technical changes and productive structures of *shikki* industries between Kainan and Aizu Region. *Geographical Review of Japan*, **54**, 493-512. (*in Japanese with English abstract*)

_____. (1986): Differences in technical changes and manufacturing structures of the *shikki* industry between Shizuoka and Kiso area. *Geographical Review of Japan*, **59A**, 213-227. (*in Japanese with English abstract*)

_____. (1989): Rise and fall of *ikkan-bari shikki* and hard coat *shikki* industries in

Nagoya. *Annals of the Geography*, **31**, 5-12. (*in Japanese*)

_____. (1990): Technical changes and productive structure of *shikki* industry in Sabae. *Historical Geography*, 148, 1-11. (*in Japanese*)

Cameron, G. C. (1980): The inner city: new plant incubator. In Evans, A. and Eversley, D. eds. : *The inner city: employment and industry*, Heinemann, London, 351-366.

Committee of Compilation of the History of Wajima ed. (1973): *Wajima shi-shi, Shiryo hen 6, Wajima shikki* (*History of Wajima, Materials Vol. 6, Wajima shikki*). Wajima City Office, 844p. (*in Japanese*)

_____. (1976): *Wajima shi-shi* (*History of Wajima*). Wajima City Office, 936p. (*in Japanese*)

Fagg, J. J. (1980): Re-examination of the incubator hypothesis: a case study of Greater Leicester. *Urban Studies*, **17**, 35-44.

Goda, S. (1971): Cotton weaving industry in the Chita district, Aichi Prefecture. *Geographical Review of Japan*, **44**, 498-514. (*in Japanese with English abstract*)

Goda, S., Suzuki, E., Fujimura, M., and Uehara, M. (1985): The traditional Hida Shunkei lacquer ware (*shikki*) industry in Takayama city, Gifu Prefecture. *Annals of Association of Economic Geographers*, **31**, 44-61. (*in Japanese with English abstract*)

Harima, K. and Kokon, S. (1976): *Wajima shikki* (*Wajima shikki*). Hokkoku Press, 180p. (*in Japanese*)

Hoover, E. M. and Vernon, R. (1959): *Anatomy of a metropolis*. Harvard University Press, Cambridge, 345p.

Ide, S. (1973): On the regional structure of small industries concentrated area in large cities. *Geographical Review of Japan*, **46**, 668-674. (*in Japanese with English abstract*)

Ishikawa Prefecture ed. (1963): *Ishikawa ken-shi: gendai hen (2)* (*History of Ishikawa Prefecture: Present (2)*). Ishikawa Prefecture, 1039p. (*in Japanese*)

Ito, A. and Udagawa, T. (1985): Indigenous industry and community: socio-antholopological study of *shikki* industry in Hirasawa, Kiso district. *The proceedings of the department of humanities Collage of Arts and Sciences*, University of Tokyo, **82**, 1-49. (*in Japanese*)

Kato, K. (1985): Urban structural change and its problem. In Sakamoto, H. and Hamaya, M. eds. : *Saikin no chirigaku* (*Recent geography*). Taimeido, 185-194. (*in Japanese*)

Kawada, T. (1993): The entrance behavior of university candidates and the occupation behavior of university graduates from Saku region, Nagano Prefecture. *Geographical Review of Japan*, **63A**, 26-41. (*in Japanese with English abstract*)

Kiyokawa, Y.(1987): Technology development in Japan: its characteristics and significance. In Minami, R. and Kiyokawa, Y. eds. : *Nippon no kogyo-ka to gijutsu hatten* (*Industrialization and technological development in Japan*). Toyokeizai shinpo-sha, 288-304. (*in Japanese*)

Koyano, S. (1979): *Dento sangyo gijutsu to shokunin no yakuwari* (*Technology of traditional industry and role of artisans*). United Nations University, 23p. (*in Japanese*)

Kumano, T. (1984): *Wajima nuri no hensen to shikki kumiai* (*Development of Wajima shikki and the Shikki Cooperative*). (Private press), 109p. (*in Japanese*)

Kusakabe, T. (1984): Modernization of the Ashikaga textile industry and the regional pattern of its production structure. *Geographical Review of Japan*, **57A**, 71-88. (*in Japanese with English abstract*)

Kyochokai (1936): *Totei seido to gijutsu kyoiku* (*Apprenticeship and technology education*). *Kyochokai* (Reprinted in, *Kyochokai* (1985): *Fukkoku, Totei seido to gijutsu kyoiku* (*Reprint, Apprenticeship and technology education*). Hobunkaku, 385p.). (*in Japanese*)

Lee, C. W. (1991): Significance and issues in the study of indigenous industry. *Human Geography*, **43**, 143-165. (in Japanese with English abstract)

Leone, R. A. and Struyk, R. (1976): The incubator hypothesis: evidence from five SMSAs. *Urban Studies*, **13**, 325-331

Matsui, K. (1979): The structure of *Nishijin* industrial region: study of the small-scale wearing industry in Kyoto metropolitan area. *Human Geography*, **31**, 117-136. (*in Japanese with English abstract*)

_____. (1986): On the relationship between industrial society and structure of industrial region: a case study of socks production area in Nara Prefecture. *Studies in Geography Nara Women's University*, **2**, 114-135. (*in Japanese with English abstract*)

Misawa, K. (1952): *Fudo sangyo* (*Regional industry*). Kokon shoin, 257p. (*in Japanese*)

Miyakawa, Y. (1974): Region and industry: Progress of industrial geography in 50 years. *Human Geography*, **26**, 31-76. (*in Japanese*)

_____. (1977): *Kogyo haichi-ron* (*Industrial allocation*). Taimeido, 1086p. (*in*

Japanese)

More, C. (1980): *Skill and the English working class, 1870-1914*. Croom Helm, London, 252p.

Narita, K. (1987): *Daitoshi suitai chiku no saisei* (*Revival of declining district in metropolis*). Taimeido, 482p. (*in Japanese*)

Nicholson, B. M., Brinkley, I., Evans, A. W. (1981): The role of the inner city in the development of manufacturing industry. *Urban Studies*, **18**, 57-71.

Oguchi, E., Yoneyama, N., and Fujita, H. (1973): Rental factories in the process of industrial zone development in Higashi-Osaka. *Geographical Review of Japan*, **46**, 811-825. (*in Japanese with English abstract*)

Oguchi, E. (1980): Social structure and indigenous industry. In Itakura, K. and Kitamura, Y. eds. : *Jiba-sangyo no chiiki* (*Region of indigenous industry*). Taimeido, 191-200. (*in Japanese*)

Okahashi H. (1978): The change of agriculture in mountain village around industrialized areas: a case study of *Mikawa* Mountains area (Aichi Pref.). *Human Geography*, **30**, 97-116. (*in Japanese with English abstract*)

Ota, I. (1975): A direction of industrial geography. *Chiri* (*Geography*), **20**(1), 25-32. (*in Japanese*)

Oyama, K. (1934): Geographical study of Wajima *shikki* industry (1). *Otsuka Geography papers*, **2**(2), 27-62. (*in Japanese*)

Ozeki, Y. and Takahashi, N. (1984): Geographical study of migration in central Hokota Town. *Area Research Reports*, **6**, 85-104. (*in Japanese*)

Saito, O. (1990): Skill, training, and labor market: for consideration of industrialization and technology transfer. In Shibata, M., Itagaki, Y., Ninomiya, H., Kawakita, M., Goto, A., Kotani, H., and Hamashita, T. eds. : *Seikatsu no gijutsu, seisan no gijutsu* (*Technology in life and technology in production*). Iwanami shoten, 157-192. (*in Japanese*)

Saito, K. (1967): Comparative study on seven textile industry regions in the Northern Kanto district. *Annual Report of Faculty of Education Gunma University* (*Ser. 8, Cultural Science*), **17**, 167-176. (*in Japanese*)

Saito, K. ed. (1972): *Ate zorin-shi* (*History in ate afforestation*). Ishikawa Prefecture Forestry Laboratory, 190p. (*in Japanese*)

Sato, M. and Haneda, A. (1964): The "Craftsman" and "Merchant" types in community: structure of japanned lacquer-ware producing centers. *Japanese Sociological Review*, **14**(3), 74-95. (*in Japanese with English abstract*)

Sato, M., Sada, G., Haneda, A., and Itagaki, M. (1962): *Totei kyoiku no kenkyu: shikki totei no shakai-shi teki bunseki* (*A study of apprentices education: socio-historical analysis of shikki apprentices*). Ochanomizu shobo, 503p. (*in Japanese*)

Section of Leading in Small and Medium-Sized Enterprises, Department of Commercial Industry and Labor, Ishikawa Prefecture (1984): *Wajima shikki-gyo sanchi shindan hokoku-sho* (*Report for promotion of Wajima shikki industry*). Ishikawa Prefecture, 147p. (*in Japanese*)

Takahashi, N. ed. (1990): *Nippon no seikatsu kukan* (*Life space in Japan*). Kokon shoin, 259p. (*in Japanese*)

_____. (1969): The development of the porcelain industry in the Hizen area of Kyushu, Japan. *Annals of Association of Economic Geographers*, **15**(2), 1-25. (*in Japanese with English abstract*)

Takeuchi, A. (1973): A regional structure of the concentrated area of the manufacturing industry in a large city: the case of Tokyo. *Annals of Association of Economic Geographers*, **19**, 40-57. (*in Japanese with English abstract*)

_____. (1974): Integrated industrial-residential areas of Tokyo. *Geographical Review of Japan*, **47**, 748-760. (*in Japanese with English abstract*)

_____. (1976): The regional structure of the foundry industry in Kawaguchi City. *Geographical Review of Japan*, **49**, 780-791. (*in Japanese with English abstract*)

Tomozawa, K. (1989a): Industrial location and structure of manufacturing labor force in a peripheral region: the case of middle-south Kyushu. *Geographical Review of Japan*, **62A**, 289-310. (*in Japanese with English abstract*)

_____. (1989b): Growth of 'externally controlled industries' and structure of the local labor market in a peripheral region: the case of Amakusa region, Kumamoto Prefecture. *Annals of Association of Economic Geographers*, **35**, 201-220. (*in Japanese with English abstract*)

Tsujimoto, Y. (1959): The productive structure of the pottery industry in the Tokai district. *Bulletin of Tokyo Gakugei University* (*Ser. 9*), **10**, 1-13.

Ueno, K. (1973): Structural change of the weaving industry in Chichibu, Saitama Prefecture. *Geographical Review of Japan*, **46**, 397-407. (*in Japanese with English abstract*)

_____. (1977): Development of the cloth industry in northern Saitama Prefecture. *Geographical Review of Japan*, **50**, 319-334. (*In Japanese with English abstract*)

_____. (1978): A structural change of the weaving industry in the Ohra district of Gunma Prefecture. *Geographical Review of Japan*, **51**, 209-222. (*in Japanese with English abstract*)

_____. (1980): Isesaki weaving industry and region. *Chiri* (*Area*), 5, 19-24. (*in Japanese*)

_____. (1984): Productive structure of *Enshu-becchin* and *Koru-ten*. *Annals of Association of Economic Geographers*, **30**, 66-76. (*in Japanese*)

_____. (1986): Research notes on concept of local industry. *New Geography*, **34**(2), 40-46. (*in Japanese*)

Wakabayashi, K. (1952): The industrial system of Wajima lacquerware production. *Bulletin of the Faculty of Education Kanazawa University*, **1**, 70-75.

Wajima City Office (1980): *Dento sangyo Wajima nuri* (*Traditional industry Wajima shikki*). Wajima City Office, 47p. (*in Japanese*)

Yamaguchi, M. (1967): The geographical study on the areal-agglomeration (*chiiki shudan*) of hardware manufacturing in Japan: part one, an aspect of the industrial geography. *Geographical Review of Japan*, **40**, 488-497. (*in Japanese with English abstract)*

_____. (1969): The geographical study of the areal-agglomeration (*chiiki-shudan*) of cutlery-manufacture in Japan; part two, the formation of the areal-agglomeration. *Tokyo Geography Papers*, **13**, 25-42. (*in Japanese with English abstract)*

_____. (1970): The geographical study on the areal-agglomeration (*chiiki shudan*) of hardware manufacturing in Japan: part three, the component and structure of the areal-agglomeration. *Bulletin of Historical Geography*, **12**,149-181. (*in Japanese*)