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A Study on the Regional Innovation in an Industrial Cluster: Focusing on a Traditional Textile Industry of Nishijin Area

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Abstract

Fabric from Nishijin occupies a significant position in traditional Japanese culture and it holds a large industrial share in Kyoto City. This paper examines the regional "hollowing out" that has caused a decline in the industries surrounding Nishijin, as well as social changes, including building deterioration and regional economic stagnation and to suggest policies for regional innovation. The direction of political responses to this situation is also considered. To understand the uniqueness of Nishijin fabric and the potential that has accumulated over the process of industrial development, the structural change of Nishijin industry was investigated using statistical data from the " Nishijin Industry Survey Summary (2005, 2011)." The change in the cluster degree was also examined using Kyoto City Industry Statistics and the specialization coefficient. The implications of this study can be summarized as follows. First, the hollowing out of the manufacturing industry and regional stagnation in Nishijin can be attributed to diminished trust within the community following outsourcing and cost transfers to small Hataori. It is recommended that a new collaborative relationship be established where diverse interested parties participate from the beginning of production based on the concept of co-creation. Second, while textile manufacturing-related industries in Kyoto City are declining overall, Nishijin has experienced a relatively mild decrease, resulting in a cluster with a relatively higher degree of textile manufacturing. As long as Japanese society exists, there will be a demand for a traditional clothing. Therefore, industries should recover to bring new investment and regional innovation through reshoring. Third, a specialization coefficient analysis indicated that there exist irreplaceable products, such as materials manually woven by master craftspeople and finest quality fabricated thread.

Keywords: *Textile industrial, Nishijin, specialization coefficient, Regional Innovation*

1. Introduction

Nishijin, located in Kyoto City, Japan, is the largest cluster of traditional textile industries that manufacture fine fabrics, such as those used for kimonos. The clustering of traditional textile businesses here goes back approximately 500 years to the Muromachi period. Among these fabric-related industries clustered in Nishijin, Hataori, which was a small cloth-weaving factory in particular, played a key role in fabric manufacturing. Hataori employed family units and installed spinning machines in their homes. The operation was concentrated in the Nishijin textile manufacturing cluster rather than in a large-scale factory. However, Hataori, which simultaneously encompassed both family life and workplace, diminished due to a declining textile industry. Simple houses, small mansions and paid parking lots began to enter the region. Such changes are believed responsible for a series of regional problems in Nishijin, including regional stagnation and the loss of a driving force behind regional growth, devaluation of the Nishijin local brand, aging textile industry employees, a decrease in the job-creating capacity of the region, an increase in vacant dwellings and maintenance problems in region-specific traditional houses, and increasing concerns regarding the vicious cycle of regional decline.

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This paper examines the regional hollowing out problem caused by the decline of industry at Nishijin, as well as social changes, such as regional economic stagnation, and suggests specific political alternatives for regional innovation. To this end, the history of the rise and fall of the Nishijin textile industry was first examined through a review of previous studies and a literature review to understand the industry's distinct features and the regional potential that was accumulated through the process of industrial development. Moreover, industrial changes in Nishijin were examined using statistical data, and the change in the cluster was also investigated using Kyoto City Industry Statistics and the specialization coefficient.

This paper consists of six chapters. Chapter 2 explains the characteristics of the Nishijin textile industry and describes the differentiation of the process and industrial development as well as the formation of the village. Chapter 3 describes the decline of the Nishijin textile industry along with the subsequent regional problems and the causes behind them. Chapter 4 determines Nishijin's regional relics and industrial strengths through the computation of the specialization coefficient. Chapter 5 summarizes the implications of this study and proposes political alternatives for local innovation. Chapter 6 is the conclusion, which summarizes the achievements of this research, describes its limitations, and suggests future research topics.

2. Characteristics and Implications of the Nishijin textile Industry

2.1. Regional Structure and Growth into a Modern City

The history of the Nishijin textile industrial cluster traces back to the mid-fifteenth century. Farming, sericulture, and weaving began as early as the fifth and sixth centuries, well before the naming of Nishijin (Katagata, 1995). According to records regarding the formation of the city of Nishijin, including Katagata (1995) and Daniguchi (1993), the type of extensive urban renovation that built broad roads by piercing across the blocks connecting the opposite sides of the area in mid-century Kyoto did not take place in Nishijin due to the region's characteristic labor division and textile industry clustering, mostly consisting of independent families. During the extensive land readjustment and urban remodeling process in the modernization era, section readjustment was implemented considering the Nishijin textile industry and the labor division structure that connected households. As a result, the current village structure was formed similar to ancient cities in which many long horizontal blocks were thickly concentrated, joined by narrow roads, resulting in a spider web appearance. This village structure necessarily caused the formation of exclusive communities that were not conducive to the acceptance of outsiders. The alley structure made it nearly impossible for large-scale transportation to enter the village and those that could enter were only able to run on limited routes at slow speeds. Although this configuration created a pedestrian-centered working and living environment and provided comfortable housing, it was unfavorable for mass production in a modern manufacturing industry.

2.2. Characteristics of the Nishijin Textile Industry and the Process of Changing the Structure of the Regional Cluster Structure

The production process for Nishijin fabrics is divided into material preparation, planning and pattern design, weaving preparation, and weaving and finishing processes, each of which is further divided for a total of more than 20 processes. Master craftsmen specialized in each process as independent economic agents gathered to create a cluster complex in the form of a village. This was a traditional form of industry where people, products, trust, and information moved organically. Here were not only the enterprises in charge of production, but also clustered distribution and sales companies. White thread

was transformed into warm fabrics with glamorous patterns as it was passed from one neighbor to the next; these fabrics were then sold by brokers and wholesale dealers.

As it was often affected by national circumstances and economic cycles, Nishijin promoted diverse changes whenever it faced economic difficulties. After modernization, the fabric manufacturing method underwent corporatization processes, that is, a change from the traditional division of labor to the operation of large-scale factories with numerous employees. In 1965, a "synthetic textile" boom occurred with the development of nylon dyeing thread that could be used in traditional weaving businesses. The number of weaving machines used in direct manufacturing dramatically decreased from 4,132 to 2,759 as outsourcing to the Dango region rapidly increased, and there was also a transition to a mass-production system. Mass-production and cost-cut competition resulted in excessive production, which caused a "synthetic fiber recession." As a series of bankruptcies in mid-sized firms' continued, those who survived changed their raw thread from synthetic fibers back to twisted yarn. That is, production was again transformed from mass-oriented to high-quality. Moreover, production of the entire process, except for thread dyeing in one factory, became possible, which increased the size of production, calling for expanded sites. When there was a lack of available adjacent land, factories were sometimes built outside the Nishijin region (Katagata, 1995).

Figure1 depicts the the industry development process and the change of collaborative relationships within Nishijin. While fabric production jobs decreased over the late 1970s, companies that had prioritized sales and planning in their corporate activities began to emerge under the name of "kimono apparel makers." Moreover, weaving machines became smaller and lighter and the production process became faster, shortening the required operating hours. However, in the case of high-quality fabrics, hand-weaving could not be replicated by machines regardless of developments in computerization and innovations in precise machine manufacturing technology. Because of this situation, 80 mid-sized firms who belonged to the "Nishijin Fabric Industry Association" collaborated to establish the "Teori Obi Subcommittee" in 1993 to increase the production of hand-made, high-quality fabrics and to diversify their products. The structure at the time prescribed that manual weaving machines usually operated inside Nishijin under direct manufacturing. Therefore, automated equipment was widely distributed in cases of outsourcing, but the penetration rate of automated equipment was only about 30% in direct manufacturing. The primary companies focused on manufacturing high-quality products using manual craftsmanship. Even after mass-production, corporatization, mechanization, and information innovation, producers tried to restore the core value of Nishijin fabrics through classic, handcrafted products. The products of Nishijin were born from a strategy that aimed to maintain the fabric's value as "comparable to a piece of art".

The strategies that Nishijin chose for regional innovation were price competitiveness through mass-production and high-quality through small-quantity batch production. The establishment of a mass-production system, which was accomplished through the introduction of new synthetic textile technologies in 1970, as well as advanced weaving machines, all of which intensified price competition, resulted in the disintegration of the traditional manufacturing cluster of Nishijin textiles. These innovations rapidly dismantled the traditional production system, which used to produce value through the division of labor within the region, accelerating corporatization and specialization. The only survivors were small workshops where master craftspeople made products by hand, design companies that made new designs to bring to the market, and mid-sized firms that led the market.

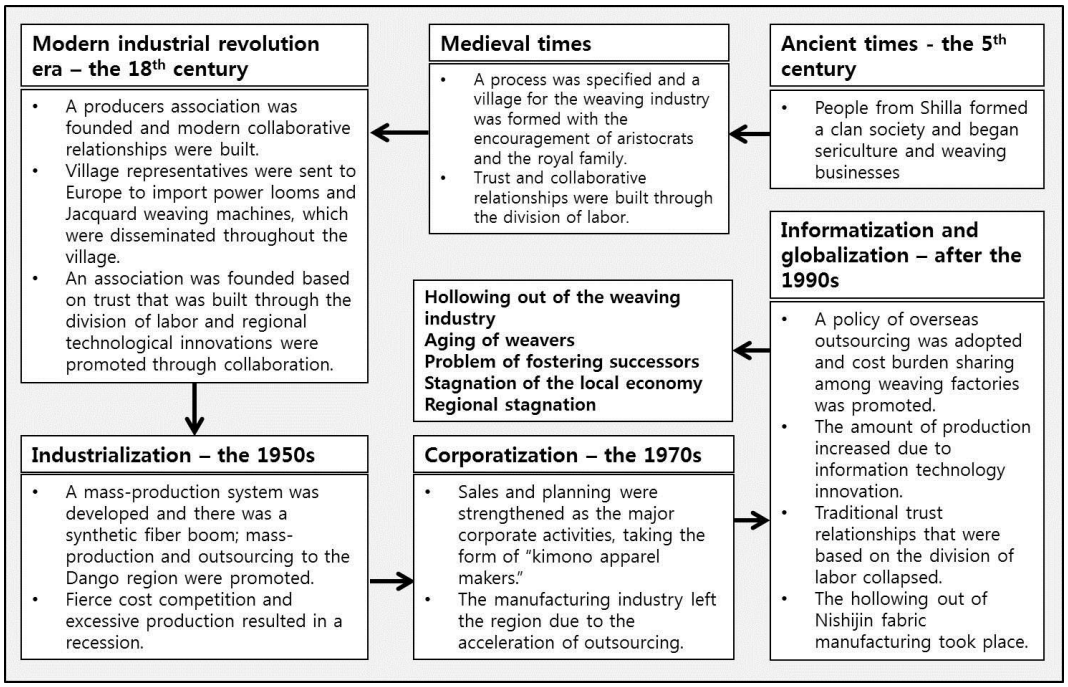


Figure 1. Industry Development and the Changes in Collaborative Relationships in Nishijin

After the decline of the manufacturing industry, the village was left with the remains of small cottage industries. In Nishijin village, which itself was once a huge production mechanism, small workshops that diligently fulfilled their roles with just one cogwheel rallied behind mid-sized firms that specialized in sales and planning. This resulted in the hollowing out of the manufacturing industry. The remaining houses became an urban planning issue and elderly residents who held on to their weaving businesses as hobbies could not stop their machines.

3. Decline of Nishijin Textile Manufacturing and Its Implications

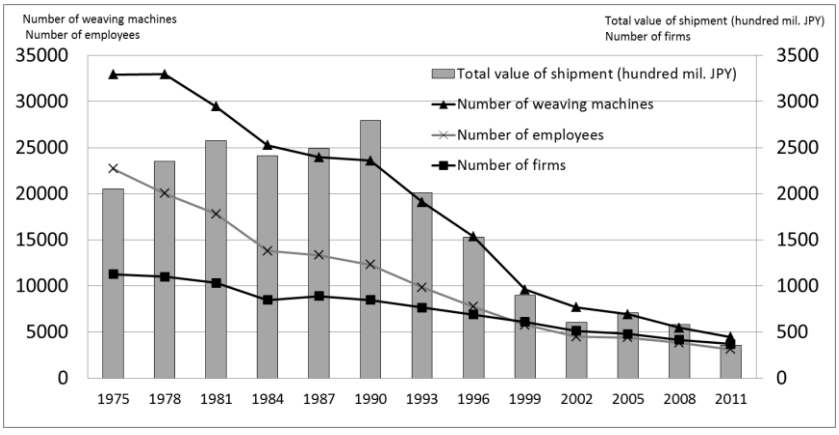
3.1. The Textile Manufacturing Trend in Nishijin

The specifics of the changing Nishijin industry were examined based on the Nishijin Textile Industry Survey Summary (2005, 2011). Figure 2 compares the number of employees, firms, and weaving machines, as well as the total value of shipments from 1975 to 2011. The total value of shipments from Nishijin began to decrease dramatically from 1993 after its peak in 1990. From 2005, there was an upward trend that recovered approximately 25% of the peak shipment values. Around 1990, the Japanese economy faced deepening economic stagnation after the collapse of a bubble and textile manufacturing in Nishijin was hit hard. The Survey Report on the Nishijin Industry (2005) analyzed that the industry decline could be attributed to changing external circumstances rather than internal issues. Thus, the industrial structural changes inside Nishijin and the subsequent changes in the village can be regarded as efforts to adapt to these changing external circumstances.

The upturn in 2005 is explained as follows by the Survey Report on the Nishijin Fabric Industry. First, as the quality of the products compared to cost could not be guaranteed by overseas production in China and elsewhere, in cases of high-quality materials such as Obi textiles, production began to return to the domestic region. Second, the demand for traditional clothing began to increase following the “the third kimono boom.” Third, new

market demand expanded as young entrepreneurs who had inherited mid-sized firms pioneered new product fields. Finally, collaborative relationships with other industries, such as fabrics for automobiles and trolleys, resulted in increased demand.

Comparing the quantitative change of production amounts and means of production, the number of employees, firms, and weaving machines continued to decrease even during the boom period between 1975 and 1990. The first reason was constant advancements in production after the introduction of modern technology. It is understood that structural adjustment of the industry took place, which enabled sustained production capacities that were able to respond to the market demand while decreasing the number of employees and machines through advancements in production technology and outsourcing. Second, since a few modern corporations progressed in a situation where numerous small family-managed businesses had dominated, the number of employees, firms, and weaving machines continuously decreased in Nishijin in 1990 when the shipment value and profit increased. At this point, the weaving machines and employees who disappeared from Nishijin began to transfer to the Dango region, which was a backward suburban region of Kyoto City that had very low land and labor costs. Another characteristic of the weaving business is that it does not require enormous physical strength. Weaving was an industry in which young male workers did not necessarily dominate; women and the elderly could easily work in the industry. The latter were even sometimes superior to men in their diligence. Thus, the Dango region, which was the center of the primary industry and had a huge elderly population, had lower labor costs than Kyoto and there, it was easy to secure a good, inexpensive labor force. Taniguchi (1993) investigated outsourcing to the Dango region and mentioned the following: "The number of machines inside Nishijin as of 1990 cannot fully explain the decline of Nishijin textile industry. It is because outsourcing occupied over 70%. However, it is proven that the village of Nishijin is facing the very 'hollowing' condition. Hence, Nishijin is not a decline of Nishijin fabric, but a decline of fabric producer." Considering this, it is easy to understand the contradictory change of increased production and decreased means of production in 1990, as shown in Figure 2. This confirms that an industrial boom does not necessarily cause a regional boom.

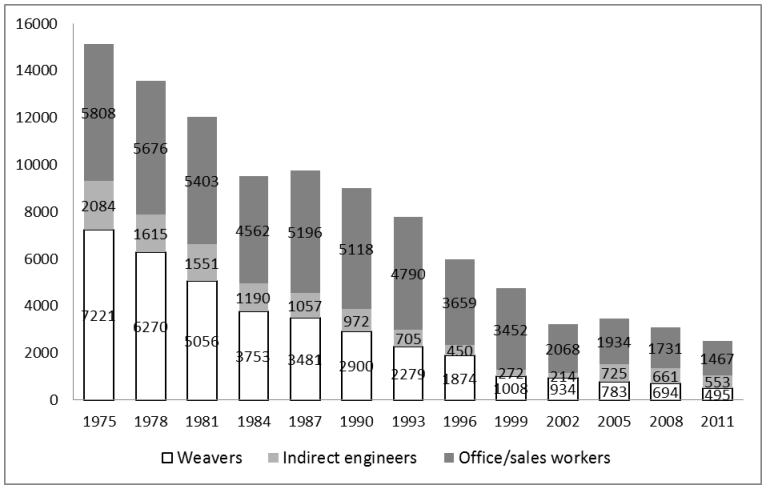


Source: Based on "Nishijin Company Survey Summary (2005, 2013)" by the Survey Committee of the Nishijin Textile Industry

Figure 2. Comparison of the Number of Employees, Firms, and Weaving Machines from 1975 to 2011

3.2. Regional Problems Following the Decline in Fabric Production

Although outsourcing has cost cutting effects, in the long term, the reverse holds true. For example, the number of consumers who exited the market due to overall product quality decline increased and operating profits shrank following the downward standardization of the product price due to fierce price competition. Moreover, deviation of the manufacturing industry from the region can cause serious problems, such as unemployment, an aging workforce, and a sluggish regional economy. In the 2000s, mid-sized firms that had originally grown based on regional collaboration began to promote outsourcing overseas rather than to the Dango region. It was a survival strategy that the mid-sized firms chose due to the dramatically decreasing demand for traditional clothing after the collapse of the bubble. However, this became a trap for the aging workforce and the hollowed out regional manufacturing industry.



Source: Based on Data from the 20th Survey Committee of the Nishijin Textile Industry (2013)

Figure 3. Employee Trends in Direct Manufacturing by Occupation

Those who handled Jacquard weaving machines were called “weavers,” a unique name used within Nishijin. Figure 3 shows the number of weavers, indirect engineers, and office/sales workers from 1975 to 2011. In the overall decline of the industry, this decline started to slow down in 2002. It is noted that the number of weavers kept decreasing while the office/sales workforce increased over twice from the lowest point. This proves that outsourcing in the industry became the norm. It can be interpreted that this reflects the aging of the weavers and their retirement without successors.

As shown in Figure 3, the number of weavers fell dramatically from 7,221 in 1975 to 491 in 2011 (The number of weavers represents only those belonging to the sample in the Nishijin Textile Industry Survey; it is not the total number of weavers in the region). Weavers in Nishijin possessed their own weaving machines. They earned a living by processing earnings as they received orders from a primary company and delivered the product. As they were highly dependent on the primary company, they often faced deteriorating economic situations when orders decreased due to a decline in fabric sales. This made it difficult to maintain Hataori, which was both their home and workplace. In most cases, monthly earnings ranged from approximately 50,000 JPY ($500) to 80,000 JPY ($800) and many people depended on a pension. In the case of younger workers, Kyoto City supported a “successor cultivating fund.” However, the fund supported only 15 selected individuals and the annual allowance was merely 400,000 JPY ($4,000) per person. It was not a very effective youth employment policy. The crisis of Nishijin Hataori affected other businesses that formed organic systems within the village.

Shutdown of manufacturers of weaving machinery and tools that lacked successors was also frequently observed.

Two main reasons were defined for the decline of the Nishijin industry: economic change and decreased demand for traditional clothing following the changing lifestyle. This kind of decline is inevitable in some sense. However, the regional decline of Nishijin was also caused by a disregard for the regional collaboration structure for the purpose of maximizing corporate profit. Reviewing the analysis on the trends in textile manufacturing in Nishijin, it is clear that three phenomena were simultaneously occurring: ① the decline of industry in Nishijin, ② regional hollowing out in Nishijin, and ③ the aging of employees. Moreover, the decline of Nishijin clearly revealed the decline of the function of the fabric producer, rather than a decline of the textile industry. Following the decline of the function of the fabric producer, Nishijin residents' perception of a "livable place" also changed.

Despite the diminishing size of the traditional clothing market over the strong adjustment in the aftermath of the bubble collapse, the textile industry is one where demands will exist as long as Japanese society continues. In light of this, the current situation where fostering new successors is nearly impossible means a weakened industrial base for Nishijin. The region has grown and overcome the crisis so far due to collaboration and the contributions of weavers. Thus, securing the next generation remains the most important task for the Nishijin textile industry. Efforts to establish a collaboration structure that can establish a fostering system of successors of small Hataori through the active participation of mid-sized firms are required to overcome the problem of aging craftspeople. Moreover, to maximize the diversity of fabric and to attract young and experimental weavers, shared distribution and sales networks where Hataori can independently introduce their new finished products into the market should be established with the cooperation of the local government.

4. Analysis of the Textile Manufacturing Cluster in Nishijin using the Specialization Coefficient

Industry in Nishijin experienced a harsh adjustment process as it navigated the collapse of the bubble in the 1990s and the global financial crisis in 2008. Therefore, the currently remaining manufacturing industry can be a consequence of the items among the diverse product classifications in textile manufacturing and the processes that have strong viability in that they overcame the recession. As such, a process where Nishijin possesses strength can be derived by closely investigating the current situation of the fabric manufacturing industry. As the specialization coefficient indicates in which field the regional industry structure is concentrated, it can be used to analyze regional strength.

$$\text{Specialization coefficient} = \frac{\dfrac{\text{Number of employees by industry in Kamikyo-ku}}{\text{Total number of employees in Kamikyo-ku}}}{\dfrac{\text{Number of employees by industry in Kyoto City}}{\text{Total number of employees in Kyoto City}}} \quad (1)$$

To obtain the specialization coefficient by textile manufacturing-related industry within Nishijin, the survey area was limited to Kamikyo-ku and the specialization coefficient was computed following the definition in Equation 1. The ratio of the number of employees in Kamikyo-ku was compared to the total composition ratio in Kyoto City. A specialization coefficient larger than 1.0 indicates a region's specialization in that field, that is, a high degree of cluster. The number of employees in textile manufacturing and other manufacturing industries were compared based on middle-classification manufacturing industry data in Kyoto City and Kamikyo-ku in 2007 and 2013, as shown

in Table 1. As of 2007, the number of employees in the textile industry in Kamikyo-ku was 1,742(51% of the total employees). Since 2008, structural adjustment in the overall manufacturing industry took place in the aftermath of the global financial crisis, as previously mentioned. In 2013, Nishijin experienced a relatively small decrease when 48.6% of the overall textile industry in Kyoto City decreased, resulting in a further increase of the specialization coefficient from 3.95 to 5.06.

Table 1. Number of Employees and Specialization Coefficients by Middle-Classification Manufacturing Industry in Kamikyo-ku, Kyoto

Middle-classification industry	Kyoto City (persons)		Kamikyo-ku (persons)		Specialization coefficient	Specialization coefficient
	2007	2013	2007	2013	2007	2013
Food manufacturing industry	9351	8120	716	427	1.66	1.26
Beverage, tobacco, and forage manufacturing	1713	1690	29	27	0.37	0.38
Textile industry	9555	5875	1742	1238	**3.95**	**5.06**
Wood product manufacturing industry	537	370	6	0	0.24	0.00
Furniture and equipment manufacturing	963	778	35	16	0.79	0.49
Pulp, paper, and converted paper product	1901	1433	85	80	0.97	1.34
Printing and related industries	8130	5210	275	289	0.73	1.33
Chemical industry	2301	2001	5	5	0.05	0.06
Petroleum and coal product manufacturing	29	54	0	0	0.00	0.00
Plastic product manufacturing industry	1459	1231	9	0	0.13	0.00
Rubber product manufacturing industry	11	50	0	0	0.00	0.00
Leather, leather product manufacturing	546	351	93	125	3.69	8.55
Kiln, sand, and stone product manufacturing	1281	957	0	0	0.00	0.00
Steel industry	195	174	0	0	0.00	0.00
Non-metallic mineral manufacturing	1118	822	0	0	0.00	0.00
Metal product manufacturing industry	3897	2985	17	22	0.09	0.18
Machinery and equipment manufacturing	7442	5954	67	46	0.19	0.19
Electric machines and equipment manufacturing	6864	7687	49	123	0.15	0.38
Information and communication machines	276	4827	5	0	0.39	0.00
Electric components and device manufacturing	3944	6171	13	67	0.07	0.26
Transport machines manufacturing industries	3441	239	20	0	0.13	0.00
Precise machines and equipment manufacturing	7343	2761	177	38	0.52	0.33
Other manufacturing industries	2042	1630	92	54	0.98	0.80
Total	74339	61370	3435	2557	1	1

Source: Kyoto Industry Statistics (2007, 2013)

To investigate the specific field of concentration within the textile industry, the number of employees by textile manufacturing-related industries was summarized, as shown in Table 2, based on small-classification industry data from Kamikyo-ku in 2001 and 2006 from Kyoto Industry Statistics data. “Statistics on Small-classification Manufacturing Industry by Administrative District,” which belonged to the Industry Survey was integrated into the Industry Census Survey to simplify the middle-classification, and thus, the data from 2006 is the latest available data (Japanese government statistics, 2015). In particular, textile manufacturing-related businesses of the small-classification manufacturing industries were compared to compute the quantitative change over five years to examine changes in the specialization coefficient. The number of employees in textile manufacturing-related industries in Kyoto City decreased by approximately 9,000 from 2001 to 2006 and Kamikyo-ku also experienced a decrease of approximately 3,000. However, the textile manufacturing-related specialization coefficient is increasing in the

case of Kamikyo-ku. That is, while the textile manufacturing-related industry in Kyoto City is declining overall, the decrease in Kamikyo-ku is relatively mild. Consequently, the degree of the textile manufacturing cluster is relatively increasing. In particular, the thread manufacturing industry, twisted yarn manufacturing industry, textile industry, and lace and miscellaneous textile product manufacturing industries showed an extremely high specialization coefficient. In conclusion, while the collective decline of textile manufacturing in Kyoto City and Nishijin continued, some textile manufacturing businesses were still closely attached to the region and raised the relative distribution density within Nishijin.

Specialization coefficient analysis on the Nishijin manufacturing industry can provide an objective explanation of the irreplaceable process in the Nishijin manufacturing industry and the areas that have strong survival power. Overcoming the adjustment phase and the pressure of outsourcing to other advantageous domestic regions or overseas is proof that products from Nishijin are irreplaceable and cannot be produced elsewhere. In addition to the quantitative analysis results from the specialization coefficient, there exists an area of irreplaceable technology in the case of Nishijin fabric, as was mentioned in Chapter 2. That is, regardless of technological innovation, certain items cannot be produced without the handiwork of Nishijin's master craftspeople. As mentioned in the quantitative review in Chapter 2, the finest quality products from handlooms and twisted yarn manufacturing processes represent the examples of twisted yarn and textile manufacturing mentioned in Table 2.

Table 2. Number of Employees and Specialization Coefficient by Small-Classification Textile Manufacturing-Related Industries in Kamikyo-ku, Kyoto

	Kyoto City		Kamikyo-ku		**Specialization coefficient**	
	2001	**2006**	**2001**	**2006**	**2001**	**2006**
Manufacturing industry	122,318	108,329	9,132	7,078	1.10	1.03
Textile industry	18,341	14,114	4,490	3,335	**3.63**	**3.75**
Thread manufacturing	58	26	24	17	**6.14**	**10.38**
Twisted yarn manufacturing	584	365	236	161	**6.00**	**6.99**
Textile manufacturing	5,050	3,859	2,548	1,947	**7.49**	**8.00**
Dyeing industry	10,399	8,068	919	678	1.31	1.33
Lace and miscellaneous textile manufacturing	693	545	338	244	**7.24**	**7.10**
Other textile industries	1,519	1,224	421	288	4.11	3.73
Clothing and other textile product manufacturing	6,848	7,178	1,120	669	2.42	1.47
Clothing and shirt manufacturing (textiles excluded)	1,200	902	167	55	2.06	0.96
Traditional clothing and sock manufacturing	3,090	2,585	618	371	2.96	2.27
Other textile product manufacturing	1,461	1,203	143	95	1.45	1.25
Total number of employees	754,316	734,400	50,803	46,282	1	1

Source: Kyoto Industry Statistics(2006)

5. Implications and Policy Suggestions

Innovation requires time and money. When timing is missed, one necessarily faces culling as the situation changes without acquiring innovation. Meanwhile, cutting innovation time comes at a price. In the end, innovation can be considered a battle between time and money. Nishijin depended on the power of collaboration when its textile industry was in trouble as a means of securing the time and cost for innovation. Although collaboration is the best way to save time and cost, strong trust among the collaboration members is a necessary condition. Textile

manufacturing workers in Nishijin were village members as well as family and neighbors. Dividing the production among neighbors, a process of ordering and delivery was repeated endlessly where they confirmed to the payment deadline and appointed date of payment regarded the quality of the output with pride. Strong trust relationships were naturally formed. The structure of separate primary companies and Hataori grew within such mutual trust while enjoying the economic boom after the war. Eventually, the primary companies were transformed into modern enterprises. As primary companies were actively involved in outsourcing to lower the wages of weavers and secure corporate profits, the trust relationships between the primary companies and individual weavers began to collapse. Following the decline in manufacturing in the region due to outsourcing, the regional economy also began to stagnate. It was time to build a new collaborative relationship in order to create a new industrial structure.

Based on these insights, the characteristics of this study can be summarized as follows. First, the current situation of the manufacturing industry's hollowing out and regional stagnation in Nishijin can be attributed to a loss of trust inside the community, which was caused by an outsourcing industrial structure that prioritized short-term profit and increased the burden on small Hataori to cut production costs. Thus, the solution for mitigating the current regional stagnation and industry decline should be found within the establishment of new collaborative relationships. Second, although the textile manufacturing-related industry in Kyoto City is declining overall, an administrative district in Nishijin of Kamikyo-ku is experiencing a relatively growing textile manufacturing cluster. Despite the diminishing size of the traditional clothing industry, it is one where demands over a certain level will always exist as long as Japanese society continues. Therefore, if production within a region can be recovered through reshoring, new investment and regional innovation can be expected. Third, the specialization coefficient analysis results indicate that high-quality artificial threads and twisted yarns that weavers create manually possess competitiveness as they maintain steady regional production amid the trend of outsourcing.

Second, a policy that supports diversification and production expansion of the selected products is necessary. Among the products currently under production in Nishijin, those that are robust to market fluctuation should receive support. Considering the implications from the specialization coefficient analysis, handwoven materials and high-quality threads are the items that have experienced sustained regional production amid the trend of outsourcing. These products have common features in that their production requires a high degree of skill, but difficulties are encountered in successor training. Trust relationships and active communication are crucial for the health of the community. Apart from this, community members should also be young; a community without children has no future. For this reason, policies that promote stable incomes and independence are required to encourage young people to settle in the region. Such policies might include affordable rent for the growing number of empty houses in Nishijin, free weaving machines, or building consortiums in which administrations and mid-sized firms participate to help young people, who weave diverse fabrics with new sensitivity, successfully settle in as residents.

Third, there should be a plan to support the independence of Hataori through a linkage with the concept of co-creation in business administration. Co-creation is an innovative concept that has recently emerged as a new industrial trend. New innovation methods come to the fore from a background of discordance of perceived value between firms and customers and the emergence of a new value ecosystem. Hong (2014) defines co-creation as "a type of collaboration that creates new common value and achieves it as diverse interested parties from diverse industries

participate in value system to satisfy the sophisticated customer demands." Nishijin is capable of handling every process inside the village from raw materials to finished product. Applying the co-creation concept to Hataori, which have traditionally depended on primary companies, a system can be introduced where diverse market stakeholders can participate right from the beginning stage of production. In this way, Hataori can provide designs based on customers' individual orders. Through this, the establishment of a market structure can be attempted where product planning and distribution and sales can be independent. Hataori independence can produce other ripple effects. Minute differences in planning and weaving techniques among households can result in the introduction of diverse products in small quantities into the market, creating an ecosystem of unique products, ultimately increasing the probability of the birth of innovative products.

6. Conclusion

This paper aimed to verify social change, such as the hollowing out of an industry and regional economic stagnation that were caused by the decline of Nishijin textile industry, and to provide specific political direction for local innovation. To this end, a literature review was conducted and statistics and a specialization coefficient analysis were employed. This research examined the characteristics of the Nishijin textile industry and the procedure of village formation where processes were divided and the industry developed. The decline of the textile industry and the subsequent regional problems in a village that regarded manufacturing of fabric as its regional identity were investigated and the causes of these problems were described. Additionally, Nishijin's regional relics and industrial strength were examined through the investigation of the reasons for regional problems and a specialization coefficient analysis. The implications obtained from this research were summarized and suggestions for local innovation were proposed.

This study has made the following contributions. Academically, the paper investigated the correlation between collaboration among the local members and industrial development using the case of Nishijin and proposed a solution for the regional problems from an aspect of co-creation. Moreover, the paper contributes to the socio-geographic understanding of Nishijin in that it sheds light on the current situation in the area and deals with its regional problems. From a practical perspective, this paper suggests direction for Nishijin's reform based on the derivation of industrial strength and the regional relics that Nishijin can make use of by applying industry statistics and the computation of specialization coefficients.

This study had the following limitations. Although local development and industrial growth built by the collaborative relationship in the past in Nishijin was specifically investigated, only the necessity of the establishment of a collaborative relationship was mentioned in this new era where industrial structure is changing and local stagnation is occurring. Specific forms of the collaborative relationship were not proposed. Moreover, the paper was limited in the sense that it merely provided an opinion from a large framework that chose a new concept of co-creation as a basis. Empirical research will be required in the future through a co-creation technique, surveys, and interviews for the purpose of finding diversified and specific plans for local innovation as a means of building a healthy community.

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