

Industrial Districts and Economic Development in Meiji Japan:
From the Viewpoint of Early Patenting Activities¹

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1. Introduction

This study aims to describe the characteristics of Japanese economic development based on industrial districts from the perspective of patenting activities. The literature on Japanese economic history has attributed Japanese industrialization in the modernization era to modern industries transplanted from the West and indigenous industries by localized small- and medium-sized workshops or putting-out organizations (Tanimoto, 2016). Based on the efficiency and competitiveness of the latter type of production organizations, this study considers how they deal with the patent system and technological progress.

Patents are granted to inventions that can cause changes in the production process or market conditions. This can also embody the flow of industrial knowledge. The role of patents and the patent system are important for understanding the adjusting process for indigenous industries to modern economic development. Therefore, the following section describes the characteristics of patenting activities and their regional differences by utilizing patent specification data for patents granted between 1885-1899.

2. Industrial districts and the patent system in Japanese economic history

Marshall (1920) explained industrial districts from the perspective of the external economy. In the 1980s, Piore and Sabel (1984) advanced the “flexible specialization” arguments that globally shed light on alternative production organizations to the mass production system. In contrast, with a relatively larger share of small- and medium-sized enterprises and self-employment, small businesses and localized industries have been an important research field in Japan for several decades (Tanimoto 1998b, 2006; Ueda 2000). For example, Abe (1989, 1990) described the

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development of regional agglomeration in the weaving industry, including small- and medium-sized manufacturers and putting-out systems, and explained their interdependent relationship with modern industries such as the cotton spinning industry. Tanimoto (1998a) focused on the putting-out system of the weaving industry concentrated in specific regions, elucidating the efficiency and flexibility of farmer households who supplied the labor force in the industry.

From the perspective of technological diffusion and progress, Kiyokawa (1995) observed wide and rapid technical diffusion in Japan and indicated competitiveness and socio-economic institutions, such as trade associations, as its background. Hashino (2007) analyzed the activities of various regional organizations to absorb modern technologies and emphasized the importance of organizationality of industrial districts. Previous studies have shown that industrial districts collectively achieve technical advances.

Considering that technological progress has a strong connection with the patent system, it can be expected that indigenous industries will utilize patents collectively to secure their technologies and expand possibilities. However, the story of collective advancement does not seem to be fully harmonious in reality since the patent system can be intrinsically individualistic and can increase socio-economic fluidity. For example, MacLeod (1988) scrutinized the attributes and social reputations of patentees in Britain and pointed out that the early patent system supported outsiders (p.95). Khan (2005) surveyed the US patent system as the institution which brought “democratization of invention.” Although the number of patents and their citations has been used as a proxy for the creation and diffusion of technological knowledge that is otherwise difficult to grasp quantitatively (e.g., Schmookler 1966), a sufficient interpretation of the patenting activity itself is also required. After all, inventions can occur outside the patent scheme, and patents can be granted to things that are not necessarily innovative.

In Japan, the modern patent system was introduced in April 1885, parallel with the abolition process of guilds and taxes based on guilds. Merchants and manufacturers not necessarily with the academic and technological knowledge quickly accepted it in metropolitan areas, such as Tokyo and Osaka. Some patentees invited conflicts with other merchants and manufacturers in former guilds because inventing and patenting activities were recognized as disorganization of orders in “their” field. The relationship between the collectiveness of industrial districts and inventing or patenting activities can be tense: the patent system intrinsically supports “novelty” and outsiders (Imaizumi

2017, 2020, 2022).

Then, a question arises on the relationship between industrial districts and patenting activity and how collective manufacturers utilize the patent system. This study is a preliminary step to tackle this question, starting with clarifying the overall distribution of patenting activities and their characteristics. This will contribute to a better understanding of Japanese economic development based on industrial districts.

3. Observation of patenting activity: patent specification data

For this purpose, detailed data describing the patents are required. In Japan, the history of patent system legislation, as well as the characteristics of Japanese innovations, has been explored based mainly on macroscopic data or biographies of significant inventors (e.g., Ishii 2005, Kiyokawa 1995, Guan 2003, Saito 2006). For analyses based on data at the individual level, Nicholas (2011) utilized randomly sampled data on Japanese patentees derived from patent specification documents. The specification is one of the documents that applicants are supposed to submit to the patent office and offer free access to the general public after a grant. It specifies the details of the invention combined with practical information on the patentee(s) as of its issue date.

I constructed a patent specification dataset containing all patents issued in the first 14 years (August 1885–June 1899) of the modern patent system in Japan.² The first modern patent system in Japan was the Patent Monopoly Act [Senbai Tokkyo jōrei], adopted on April 18, 1885.³ The Patent Monopoly Act was replaced by the Patent Act [Tokkyo jōrei] in 1888 (enforced in February 1889). Under the Patent Monopoly Act and Patent Act, foreigners were not allowed to possess patents. Foreign patents began to appear in the late 1890s based on bilateral treaties. The Patent Act was revised as the Patent Law [Tokkyo hō] in 1899, and Japan joined the Paris Convention for the

² For the detailed explanation for the construction of this dataset, see the appendix of Imaizumi (2022). The specification documents were mainly collected through the Industrial Property Digital Library (today's J-Plat Pat, <https://www.j-platpat.inpit.go.jp/>) run by National Center for Industrial Property Information and Training (INPIT). I added some information with specifications or related documents (such as the Patent Gazettes) held by the Patent Office Library, the National Archives, the National Diet Library, the Patent Office, Hitotsubashi University Library, and Kyoto University Library. Supplementary patents, which were additionally granted for improvements to existing inventions, are not included in this dataset.

³ Regarding the history of the patent system, this study mainly relied on the following materials, unless otherwise stated: Tokkyochō (1955), Tsūshōsangyōshō(1964), Tokkyochō (1984) and Ishii (2005).

Protection of Industrial Property. The dataset this study explains covers patents issued under the Patent Monopoly Act and the Patent Act.

The initial years of the patent system and the “Industrial Revolution,” which were supposed to start in the latter half of the 1880s, overlapped with each other. The people in this dataset were the first movers in the patent system and were active figures in the early years of industrialization. How they responded to and participated in the new system could be useful for understanding Japan’s industrialization.

With this dataset, I have already elucidated that early Japanese patentees were strongly concentrated in metropolitan areas, especially Tokyo. They were ordinary businesspersons, manufacturers, or shop owners, not necessarily with academic knowledge or professional qualifications. The data also indicated regional differences in the activeness and characteristics of patenting activities, such as the tendency to share patents, allegedly reflecting the socio-economic institutions of each region (Imaizumi 2020, 2022). In contrast to my previous paper mainly focusing on metropolitan areas, here, I try to grasp the nationwide distribution, apart from the overwhelming accumulation in the metropolises.

Before moving into the analyses, the following information would be useful to avoid confusion.

(1) Patentees, inventors, and participants

In the modern Japanese patent system, inventors can share their patents with others or even relinquish their rights to others by specifying them at the time of application.⁴ Therefore, several types of people appear in the specification data: inventor-patentee, inventor-but-not-patentee, and patentee-but-not-inventor. All those who obtained patents were counted as patentees. On the other hand, I use “participants” when I indicate all of these different types of people who participated in patenting inventions.

(2) Patents, participants, and patenting activities

Some patents are shared by multiple patentees. Some patentees have obtained multiple patents.⁵ The dataset includes 3614 patents, some 4500 patentees, and some 4700 participants.

The number of patentees or participants may include one person several times; two participants

⁴ Of course, once granted, patentees can transfer their rights to others at their will. However, such transfers are not recorded in each specification, since specifications are drawn up at the grant point.

⁵ Note that my dataset ends in 1899. There may be inventors who continued to patent their inventions after the terminal year.

can either mean two different persons who participated in two separate patents, or only one person participated twice. In addition, two participants can also mean two persons who shared one patent. To paraphrase, what I count here is the number of “patenting activities.” Since some patents are shared inter-regionally, the regional variety analyzed in this study is based on the number of patenting activities instead of the number of patents. Note that the specification data only includes patenting activities that succeeded in obtaining patents. The failures cannot be grasped; the share of obtained patents against patent applications was around 20 percent in this period (Tokkyochō 1985, Imaizumi 2022).

(3) Prefectures, cities, counties, and villages

To understand the relationship between patenting activities and industrial districts, I utilized participants’ “current address” information. Japanese administrative territories are divided into 47 prefectures. Within each prefecture, urbanized areas were defined as cities, and the others were counties. Counties have towns and villages. However, aggregating patenting activities with the jurisdiction information originally indicated in each specification causes problems because the systematization of jurisdictions itself was established in 1888 and the territories were fluid in the period covered by the specification dataset. Therefore, I have adjusted all jurisdictional information as of 1903.⁶ For example, Osaka Prefecture had included a neighboring prefecture until 1887, but I counted patents in Osaka Prefecture separately, according to the jurisdiction territories as of 1903.⁷ The year 1903 was a convenient year because we had a national population survey in 1903 and a national factory survey in 1902 (Naikaku Tōkeikyoku 1906; Nōshōmushō Shōkōkyoku 1904).⁸

4. Patenting activity in Meiji Japan

⁶ For this procedure, I based on Chimei Jōhō Shiryōshitsu (1999) and Kadokawa Nihon chimei daijiten hensaniinkai (1978-1990). There are a few cases (about five percent of the total) where the address information as of 1903 cannot be accurately identified, mainly because of partitioning original territories. In Hokkaido and Okinawa, where the jurisdiction system was different from the other part of Japan, I categorized “ku” as cities.

⁷ Chimei Jōhō Shiryōshitsu (1999) and Kadokawa Nihon chimei daijiten hensaniinkai (1978-1990). Imaizumi (2022) used the original jurisdiction information, so some numbers may differ.

⁸ The factory survey covers factories with ten or more workers. The data of the factory survey was constructed by the project on spatial economic history organized by Professor Tetsuji Okazaki and supported by JSPS KAKENHI Grant Numbers JP21330064.

Using the patent specification dataset, we describe the early patents and their regional characteristics. Data and information about the patents mentioned in this paper are based on this dataset unless otherwise stated. The data show that, despite the exceptionally strong concentration of patenting activities in metropolises, there was a wide spread of patenting activities even in rural areas.

(1) Overview of patents during this period

An inventor of an invention related to the machine or miscellaneous industries applying for a 15-year patent alone, waiting for approximately eight months, and obtaining a patent --- this is the average image of patenting activity in the early period of the modern Japanese patent system. The patent office used four industrial patent categories: “machine,” “chemical,” “electric,” and “miscellaneous” (Tokkyokyoku 1909). Based on this classification, the 3416 patents in the dataset can be classified as follows: “machine” and “miscellaneous” occupied around 41-42 percent, “chemical” occupied 16 percent, and “electric” patents occupied only one percent.⁹ The average number of participants per patent was 1.3. Approximately 77 percent of the patents indicated sole participants. Applicants were supposed to choose the duration of patents as 5, 10, and 15 years with patent fees of 10, 15, and 20 yen, respectively. Most chose 15 years; approximately 10 percent of patents chose 5 years, 29 percent chose 10 years, and 62 percent chose 15 years. The average number of days required to obtain patents after the application was 262. Once granted, approximately 98 percent of the patents survived the expected patent term.¹⁰

(2) Variety of patenting activities by prefectures

Which prefecture produced participants?¹¹ As Imaizumi (2022) emphasized, although all prefectures produced at least one participant within the dataset, the number of participants living in Tokyo or Osaka Prefectures indicated overwhelming shares of 38 percent and 12 percent,

⁹ Some specifications indicate the industrial categories. For others without the category, I used Tokkyokyoku (1909) to confirm the classification.

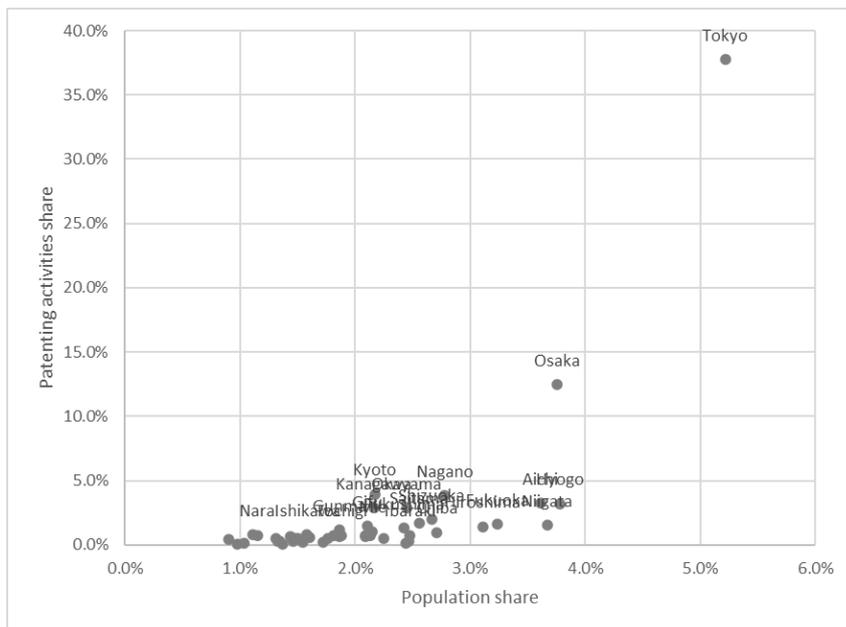
¹⁰ Some specifications indicate the date and reason of expiration. For others without information, I used Tokkyokyoku (1909) to confirm it.

¹¹ In the regional analyses of this paper, foreign participants whose addresses were overseas are excluded from the total. One Japanese who lived in Korea is also excluded, whereas two explicit foreigners living in Japan are included (in Tokyo and Kanagawa Prefectures respectively).

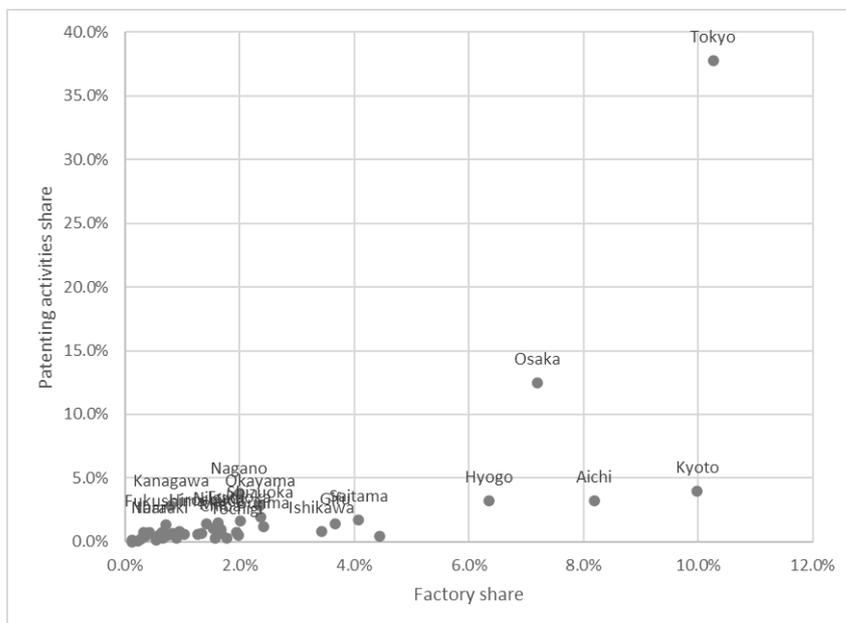
respectively (Figure 1). These shares are also larger than those of the populations and factories. It is clear that early patenting activities were strongly concentrated in metropolises (Imaizumi 2022).

Figure 1 Distribution of Patenting Activities

(a) Patenting activities and population



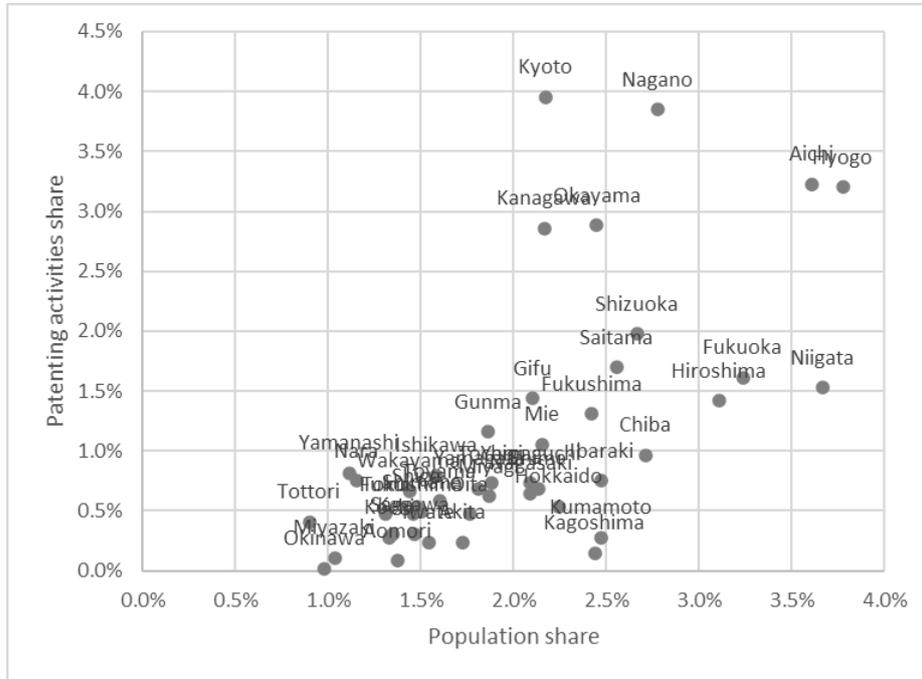
(b) Patenting activities and factories



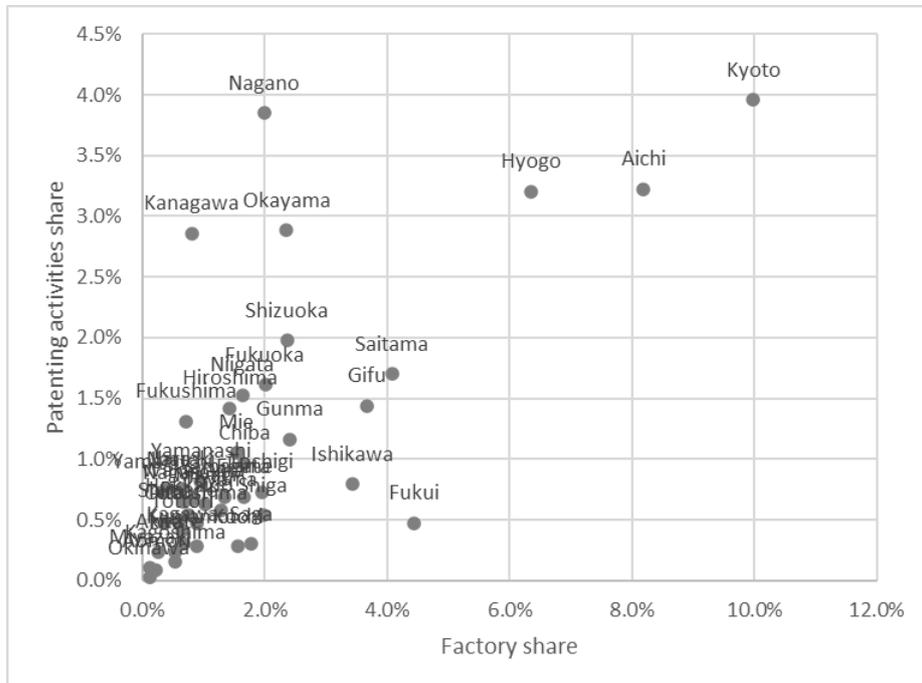
Source: The patent specification data, Naikaku Tōkeikyoku (1906), and Nōshōmushō Shōkōkyoku(1904). See the text.

Figure 2 Distribution of Patenting Activities (excluding Tokyo and Osaka)

(a) Patenting activities and population



(b) Patenting activities and factories



Source: The patent specification data, Naikaku Tōkeikyoku (1906), and Nōshōmushō Shōkōkyoku(1904). See the text.

If these exceptionally large prefectures are excluded, a different pattern will appear. There are also several prefectures with larger shares than their population or factory shares (Figure 2), such as Okayama, Kanagawa, and Nagano Prefectures. Although smaller than their population or factory shares, Kyoto, Aichi, and Hyogo also show large shares of patenting activities. Kyoto and Aichi Prefectures had prominent cities with relatively large populations—Kyoto and Nagoya. Kanagawa and Hyogo Prefectures neighbored Tokyo and Osaka Prefectures and had treaty ports—Yokohama and Kobe, respectively. These prefectures were similar to large metropolises in that they included important economic centers. In contrast, Okayama and Nagano are unique as per active patenting without large business centers or treaty ports and are geographically apart from metropolises.

Approximately 59 percent of the patenting activities were implemented by the sole participants. Metropolitan prefectures (Tokyo and Osaka) showed a slightly higher share of sole participants, whereas single patenting was less frequent in some prefectures. For example, in Okayama or Nagano Prefectures, mentioned above as “unique” regions with active patenting, single patenting occupies around 40–43 percent. As mentioned in Imaizumi (2020, 2022), there are regional variations in how to participate in patenting.

One might imagine that patents in metropolises were for high-quality technologies, but the dataset included little information on the quality of patents. The distribution of patent duration shows no clear difference between large metropolises and other regions, but the former indicates a slightly larger percentage (nine percent) for 5-year patents compared to the latter (seven percent). The industrial category of patents even gives rise to doubt that patents in urban areas are for inventions with higher quality and complexity. Among four industrial categories of patents, namely machine, chemical, electric and miscellaneous, metropolitan prefectures such as Tokyo and Osaka showed a lower percentage of “machine,” around 34 percent, and a higher percentage of “miscellaneous,” around 47 percent, compared to the national average in which “machine” occupied 43 percent and “miscellaneous” occupied 40 percent.¹² The average of all prefectures, excluding Tokyo and Osaka, indicates that “machine” occupies 51 percent and “miscellaneous” 33 percent. In Okayama Prefecture, for example, “machine” shows no fewer than 78 percent. Clearly, patenting activities in the metropolitan area show more weight on “miscellaneous” than in other areas, where more than

¹² Note that the percentage numbers in the previous section calculated with the number of patents, whereas the numbers indicated in this paragraph are based on the number of patenting activities.

half were patenting for machines. “Miscellaneous” includes socks, stationery, safe boxes, lighting instruments, and so on. On the contrary, the “machine” category is represented by weaving machines, filature-related machines, agricultural instruments, vehicles, and so on. Patents in metropolitan areas are relatively for consumer goods, whereas those in other areas are primarily for production goods.

These findings indicate that there are two different types of patenting activities. One is the overwhelming number of patenting activities in metropolitan areas that dominate the whole average. Patenting activities in metropolitan areas are more for consumer goods and are done by single participants, whereas in other regions, a relatively larger number of people jointly participate in patenting for production goods. Among such areas, some prefectures showed particular activity.

(3) Variety of patenting activity by city-county distinction

Each prefecture has its own urbanized areas. In the Japanese jurisdiction system, cities and counties are both under a prefecture and exclusive of each other: if a region is a city, it is not a county and vice versa.¹³ Here, I distinguished patenting activities in cities and counties based on participants’ “current address” information, adjusted as of 1903.

The national average share of patenting activities in cities was 64 percent. More than half of patenting activities were observed in cities. This proportion is larger than that of the other economic indicators. The city population was 14 percent of the whole population in 1903, and the share of factories in cities was 31 percent in 1902. However, Tokyo and Osaka again indicate a high city ratio of over 90 percent, in addition to the exceptionally large absolute number of patenting activities that can dominate the national average. If these two prefectures are excluded, the average city ratio drops to approximately 33 percent. The city population and city factories were nine percent and 21 percent, respectively, excluding Tokyo and Osaka Prefectures. Although the weight was still in cities, more than half of the patenting activities were in relatively rural areas. For example, in Okayama and Nagano Prefectures, the share of city patenting was approximately 18 percent.¹⁴ The number of

¹³ In many cases, a town (or a combination of several towns and villages) in counties gets urbanized and carves themselves out to become a city.

¹⁴ Between these two prefectures, Okayama was more urbanized: the city population share was seven percent in Okayama and three percent for Nagano. The share of factories in cities was 11 percent for Okayama and six percent for Nagano.

participants per patent was slightly larger in counties: 1.6 in cities whereas 1.8 in counties.

The tendency of the industrial categories of patents was similar to that of the previous explanation. The share of “machine” patents was around 57 percent in counties and 35 percent in cities. The occupation of participants was already observed in Imaizumi (2022), who emphasized that manufacturers and merchants were the main subjects. Those who declared their occupations as “no occupation” and “miscellaneous occupations” also indicated non-negligible shares. However, if they are divided into cities and counties, the share of participants who are engaged in agriculture comes from behind and exceeds that of merchants in counties. Carpenters and academics/teachers/students (mainly elementary school teachers) also indicated a relatively larger share compared to cities, whereas “no occupation” and “miscellaneous occupations” were smaller than those in cities.

These findings describe two types of patenting activities: city patenting – more frequent, more on consumer goods, with a small number of participants, by manufacturers and merchants, and county patenting – less frequent, but more than half if excluding Tokyo and Osaka, more on production goods, with larger participation by manufacturers, farmers, and merchants.

(4) Sharing networks in patenting activity

Joint participation in patenting activities implies information flow among participants. Within the 3614 patents in the dataset, approximately 23 percent of patents have multiple participants. Joint participation can be classified into five types: type A, all of the plural inventors become patentees; B, inventors (an inventor) relinquish(es) right to others; C, inventors (an inventor) share(s) right with others; D, a part of co-inventors relinquish their rights; E, a mixture of types C and D (Imaizumi 2022). Among patents with multiple participants, 16 percent was patents with inter-prefectural participation.

Joint participation was more frequent in cities, with 60 percent of the joint participants in cities. However, if Tokyo and Osaka were excluded, 59 percent were counties. Interestingly, inter-prefectural joint participation was more frequent in counties (24 percent in counties and 19 percent in cities against each regional total). It can be stated that the network of information flow in rural areas is not necessarily limited compared to urban areas. Inter-prefectural joint participation tended to be type C patents mentioned above (about 30 percent), compared to those within a prefecture,

about 60 percent of which were type A and 14 percent were type C. This implies that inter-prefectural joint participation involves inter-regional knowledge flow from inventors to other assignees, whereas those within a prefecture tend to be co-inventions.

Imaizumi (2022) described the inter-prefectural network of joint participation with participants in the Tokyo and Osaka Prefectures. Participants in Tokyo joined in patenting with other participants all over the nation (relatively excluding the areas surrounding Osaka), whereas those in Osaka mainly shared patenting with those in South and West Japan. Regarding ordinary prefectures other than Tokyo and Osaka, 43 out of 45 prefectures had at least one joint participant, and nine prefectures did not participate in inter-prefectural participation. Inter-prefectural joint participation was fairly widespread, to say nothing about joint participation as a whole. For example, Okayama and Nagano Prefectures respectively showed a joint network wider than merely neighboring prefectures, mainly with a metropolitan prefecture near them.

Knowledge creation also seems to have been widely dispersed. Among the cases where “inventors” and “other participants” (assignees, etc.) can be distinguished, the share of “inventor-patentee” was over 80 percent of participants, whether in the metropolitan prefectures or average of others or in average of cities or counties. Inventors without patents (inventor-but-not-patentee) were slightly more observed in cities, which implies that there were more inventors in cities who merchandised their inventions and relinquished their rights to others at the stage of application, whereas most inventors became patentees and exploited their inventions by themselves, at least as the initial status.

Based on the findings above, participants other than metropolises were involved in information networks that were not necessarily limited quantitatively or geographically, although metropolitan areas were undoubtedly important hubs of patenting. Inter-prefectural joint participation includes relatively more assignees who exploit others’ inventions. There were more inventors in cities who relinquished patents, which implies a regional variety of complexity in patenting activities or attitudes toward participating in patenting, as Imaizumi (2022) emphasized. It is important to note that there were a few regions left behind without connection to such networks, even though they varied in degree.

(5) Summary

Patenting activities in metropolitan areas occupy an overwhelming share and dominate the average image of patenting activities. However, this does not mean that people only in metropolitan areas recognized and utilized the patent system. Rather, there seemed to be a steady basis for patenting activities widely, including in rural areas. Both types, as well as their interactions, are worth scrutinizing for a better understanding of economic development.

5. Implications to industrial districts in Meiji Japan¹⁵

The findings in the previous section shed light on widespread patenting activities in relatively rural areas. The next questions to consider regarding the relationship between patenting activities and industrial districts will be: How did patenting activities in rural areas become possible, and what is the significance of their existence?

One of the characteristics of rural patenting—joint patenting with many participants—was the first tip. As mentioned in the previous section, the number of participants was smaller in cities or metropolises. Extracting patents with five or more participants yielded 20 patents and a total of 121 participants (the largest number of participants per patent was ten). Among these participants, only 22 people were in Tokyo and Osaka Prefectures, which indicates a wider dispersion compared to the total proportion.

These joint patents seem to be based on localized industries (Imaizumi 2020, 2022). For example, patent number 227 was for a tie-dyeing machine shared by ten people, all of whom were merchants of tie-dyeing fabric named “Arimatsu shibori” living in a particular county in Aichi Prefecture. Tie-dyeing is a representative industry in this region. Patent number 1964 was for a vermilion ink for ceramic wear shared by ten people, all of whom were in the same county in Gifu Prefecture. This prefecture is a prominent region for the pottery and porcelain industries. The inventors of this patent were a pottery manufacturer, farmer, and person engaged in copperplate printing, and seven pottery merchants joined as assignees. Patent number 2530 is for a straw-mat-making machine shared by nine people in Okayama. The inventor was a merchant in Okayama city and relinquished his rights to eight other farmers and merchants in a county in Okayama. Okayama was prominent for straw mats, and there was another patent (patent number 2442) that was also for a

¹⁵ For the details of examples in this section, see Imaizumi (2020, 2022).

straw mat-making machine participated by five persons. A carpenter and a farmer both in a county of Okayama Prefecture invented it and applied for a patent (the carpenter relinquished his right) with three additional people – a kimono fabric dealer and a person declaring “no occupations” both in a city in Okayama and a patent agent in Osaka city.

In fact, patenting activities in Okayama were strongly concentrated in machines and tools related to straw-mat making. A non-negligible part of patenting activities in Nagano was for devices related to its primary industry, the silk industry. Such connections between localized industries and patenting activities could have been facilitated and accelerated by several factors. Here, the following three points can be pointed out: collective effort for technological development, usually based on trade associations and enhanced by the central and local governments; supportive services contributing to the diffusion of information and the assistance of patent work or marketing; and patent conflicts.

The significance of trade associations and collective efforts for progress have been emphasized in the literature. In fact, the government had initially been reluctant to formalize trade associations from the viewpoint of free trade but accepted them, expecting the role of examining and improving the quality of products (Yui 1964, 34-43). Thus, they were originally in a responsive position to technical problems in their own regional industry and advanced their efforts to research new technologies and train themselves. Hashino (2007) described the trend of establishing training organizations in the late 19th century in each region, in many cases supported by trade associations (p. 103-142). For example, in the region in Aichi, which produced patent number 227 above, people engaged in the tie-dying industry formed several private associations in the region and encouraged themselves to develop new machines, new methods, or new designs. They contracted a patent agent, who was supposed to buy intellectual property rights from members and offer them collective property in the region (Arimatsu chōshi hensan iinkai 1956, 154-174; Imaizumi 2020).

The government’s policy for supporting technical improvements in indigenous industries accelerated the diffusion of relevant information. The Ministry of Agriculture and Commerce (Nōshōmushō) aimed to develop indigenous industries by sending technical instructors or supporting the implementation of kyōshinkai in each region (Yui 1964, 23-34). Kiyokawa (1995) argued that competitive exhibitions such as kyōshinkai (literally means “a meeting for collective progress”) announced the level and direction of technologies one should aim at and evaluated the present level

of each product so that people engaged in each industry in each region can be stimulated for favorable development (p. 241-280). Supported by these institutions, information of patenting activities and prominent inventions might have been easily shared within each region.

The second factor contributing to the dispersion of patenting activities is supportive services. Many patent agents spontaneously started their business well before the regulations on patent agents were introduced in 1899 (Tsūshō sangyōshō, 1964, 137; Nicholas and Shimizu, 2013). Most agents were in Tokyo and Osaka (Nōshōmushō Tokkyōkyoku 1903), but their contracts seemed dispersed. For example, patent number 2442, by participants in Okayama, included a patent agent in Osaka. A patentee in Nagano utilized a patent agent in Tokyo when he was involved in a patent nullity suit.¹⁶

A commission agent executing the merchandising of invented products can also be a supportive service. For example, an inventor in Tokyo with several patents, such as toys and pipes, utilized an agent to merchandise his patented goods (Imaizumi 2022). For patentees who do not have enough economic and managerial knowledge to exploit their rights, such agents may have been helpful,¹⁷ considering that the patent regulation in this era required patentees to supply patented products (by merchandising or exploiting by themselves) within a designated period of time. Their merchandising efforts could inform ordinary people in remote places about the patent system and various patented goods and stimulate them for their own participation.

From the introduction of the patent system, newspapers announced the information about the new regulation and the way to apply for a patent and regularly reported the list of patents in a period or details on noticeable patents. On advertisement pages, many manufacturers and merchants posted advertisements proclaiming that their products were “patented.” Such media also contributed to promptly making the word “patented” or “inventions” familiar to ordinary people in this era (Imaizumi 2022).

However, a harmonious story with collective efforts and supporters does not describe the total. The patent system also introduced competition and conflict across industries and regions, and such disputes themselves stimulated the inevitable involvement of ordinary people in the system.

The repeating and inter-regional disputes in the “motoyui” industry offer relevant case studies

¹⁶ “Tabishō kumiai no benpakusho” (The refutation report by the association of “tabi” merchants), Tokyo Asahi shinbun (Tokyo Asahi Newspaper), September 10, 1891.

¹⁷ “Tokkyohin daihanbaiten setchi no keikaku” (A plan for establishing a grand shop of invented goods) Yomiuri Shinbun (Yomiuri Newspaper) September 23, 1890.

(Imaizumi, 2020). “Motoyui” is a paper-made string for tying the hair in the traditional Japanese hairstyle. When a person in Tokyo developed a new type of “colored motoyui” and received a patent (patent number 780), an association of “motoyui” merchants in Tokyo strongly resisted and filed a nullity judgment, saying that the patented good had no novelty. A similar case was also reported in other industries, for example, in the “tabi” industry.¹⁸ “Tabi” means socks in traditional Japanese costume. A person in Nagano developed a new method to cut out materials from a piece of cloth and received a patent (patent number 1143), but an association of “tabi” merchants in Tokyo strongly criticized it.

Some patents were even more critical for others in the same industry because, as discussed in previous literature (Imaizumi 2020), patenting intrinsically encourages outsiders. In 1899, a person developed “motoyui” made of cotton yarn. This product has been patented (patent number 3251) and has gained massive demand in the market. Traditional merchants and manufacturers faced a decline in demand and outflow of workers and were forced to develop their own alternative ways to improve their products (Imaizumi, 2020).

These disputes, along with various other cases, have usually been reported in detail in newspapers. Allowing someone’s patenting can make others’ livelihoods dangerous. This pressure inevitably forced people to recognize and utilize the system to protect their industries. Some would file suits to prevent patenting, while others try their own technical progress. As Hashino (2007) described, collectiveness was enhanced by market changes and technical problems. Competition surrounding patents and the collective effort for patenting stimulated one another, connecting every region in a nationwide economic sphere and leading to a raise of technological standards for regions and industries as a whole.

6. Conclusion

This study attempts to observe early patenting activities and consider their characteristics in relation to industrial districts and their contributions to Japanese economic development. By utilizing patent specification data, we can obtain a detailed image of the participants in each invention.

Considering that the patent system offered a new form of property rights (Imaizumi, 2020),

¹⁸ “Shinkufū no tabi, tabiya no shūkai” (Newly devised tabi, meeting of tabi merchants), Tokyo Asahi Shinbun (Tokyo Asahi Newspaper), May 23, 1891.

observation of patenting activities can elucidate not only technological progress but also the economic behaviors of ordinary people.

According to the analyses, patenting activities in this period were a combination of two types: the overwhelming accumulation in metropolitan areas and the steady basis involving wide regions. Collective efforts supported by trade associations and governmental policies, supporting services, and competition are identified as contributors to this structure. Enhanced competitive pressure inevitably involved many people in this era and accelerated industrialization.

Although competition enhanced collectiveness, one should also be aware that competitive pressure can also dismantle collectiveness. For example, we should consider how collectiveness is compatible with patenting completely innovative products. The balance between competitiveness and collectiveness, as well as its historical change, is an important and interesting issue in understanding Japanese economic development.

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