Empirical Study of Innovation Factors in Old Establishment Family Companies in Kyoto, Japan[*]

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Abstract

We investigate old establishment companies, hereafter *shinise* companies, with over 100 years of history in Kyoto Prefecture through questionnaires.

These companies have faced difficulties many times in their long history; for example, progressive globalization, decline in skills, shortage of successors, and influx of similar products from abroad. However, these companies have overcome these difficulties. Our motivation is that among *shinise* companies in Kyoto there are some spirits to overcome these difficulties and to live in the long history. One of the elements is innovation. In the history through several generations, *shinise* companies in Kyoto have been trying new challenges in addition to keeping their traditions. It looks that the current *shinise* companies in Kyoto are also striving for new innovations in many fields while they keep their traditions. We often refer that innovation is very important for *shinise* companies to continue their business and family. At the same time, serious consideration of tradition is also important. Our first research question is to confirm whether *shinise* companies in Kyoto are really eager to innovate. We also investigate the factors of innovation of *shinise* companies in Kyoto through an empirical analysis.

We send questionnaires to 1,373 companies confirmed as existing members of the Kyoto Company Century Club on March 16, 2016. We received replies from 366 companies. In our empirical analysis, we define the innovation as their motivation to change their management or products. We use 18 items as innovation variables. These items are followed in the research of Tokyo Chamber of Commerce and Industry. These items are divided into four categories; business style, products and production, transactions, and company organization. We use these innovation variables as dependent variables in our regression analysis.

We choose the factors which have effects on innovation as independent variables from our questionnaires. We choose the motivation for innovation of previous managers, firm's age in 2016 from their foundation, a manufacturing industry dummy variable, sales over the past 5 years, age when the current manager promoted to a manager, relation between a current and

previous manager, relation between a current manager and his founder, and the number of total employees in January 1, 2016. We use an ordered logit model for estimation.

From our analysis, we obtain several results. The attitude of previous managers are the strongest factor to affect that of current manager. The manufacturing industry dummy variable is significant in many cases about products and production.

Key words: *shinise* companies, Kyoto, innovation, tradition
Category & Number stated in the Call for Papers: 5
JEL Classification Code: C35, L14, M14

Empirical Study of Innovation Factors in Old Establishment Companies in Kyoto

1. Introduction

According to Teikoku Databank, there are 28,972 old establishment companies with over 100 years of history in Japan in 2016. They say such a large number of old establishment companies is very exceptional and that Japan is "great old companies power"[1]. These old establishment companies are called as *shinise*. In 2017, 1,011 companies celebrate their 100th year after foundation[2].

Viewed by region, the largest number of *shinise* companies are located in Tokyo Metropolitan Area (2,656 = 9.2%), followed by Osaka Prefecture (1,532=5.3%) and Aichi Prefecture (1,319 = 4.6%). Kyoto Prefecture occupies the 5th spot (1,255 = 4.3%). The cities and prefectures that host the largest number of *shinise* companies are concentrated in the metropolitan areas that host the largest number of companies as a whole. When we look at only the companies that were established prior to the Meiji Restoration (1868), Kyoto Prefecture ranks at the top position with 312 out of the total of 3,343 (9.3%) *shinise* companies in Japan.

In the ratio of long-standing companies among all the companies, Kyoto Prefecture further solidifies its position. While Yamagata Prefecture has the highest ratio of long-standing companies (4.78%), Kyoto Prefecture comes at a close second (4.75%)[3].

On the other hand, companies in many communities face a variety of issues today amidst progressive globalization including dwindling markets, decline in skills, shortage of successors, and influx of similar products from abroad. The *shinise* companies in Kyoto face similar challenges. Nevertheless, the *shinise* companies in Kyoto have the experience of having overcome difficult times one after the other. One element that has played a critical role in this experience is innovation. In the backdrop of their history of keeping business through several generations, the *shinise* companies in Kyoto have a history of making new challenges in addition to keeping their tradition. It looks that the current *shinise* companies in Kyoto are also striving for new innovations in many areas while they keep their traditions. This paper aims at

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[1] Teikoku Data Bank (2009), p. 51.

[2] From a total of 1,314,829 companies (after excluding religious corporations and public interest corporations) in the COSMOS2, a company overview summary database (of approximately 1.46 million corporations) maintained by Teikoku Databank as of May 17, 2016. As a side note, Tokyo Shoko Research conducted a similar survey and reported 33,069 companies with at least 100 years of history as of 2017 with 1,118 companies celebrating their 100th year in 2017. The difference in the 2 figures is likely due to Tokyo Shoko Research holding data of approximately 3.09 million more companies, and to including public interest corporations such as Ikenobo Society of Floral Art, a judicial foundation (founded in 587 A.D., Kyoto Prefecture).

[3] The ratios of *shinise* companies are higher in the coastal prefectures on the Sea of Japan such as Shimane (4.75%), Niigata (4.33%), and Fukui (3.89%) prefectures. Several factors have been pointed out such as "base for the shipping industry in Japan during the Edo period," "rich spas are in the area from olden times that helped the local industries to grow," "escape from ravishes of the war," and "the lack of newly established companies."

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illustrating the current state of innovation at *shinise* companies in Kyoto. Our first research question is to confirm whether *shinise* companies in Kyoto are really eager to innovate. We also investigate factors that bring about such innovations through an empirical analysis.

2. Literature Review

In Kyoto Prefecture (1970), features of old establishment companies are self-innovation attitude, human resource training, and serious consideration on regional favour. There are many articles about old establishment companies, but not so many studies of innovation in old establishment companies. Nagasawa and Someya (2007) studies the method of product development in *shinise* by the case of Toraya. Through this study they pointed out the factor of success in *shinise* business is creation of experience value. Otsu and Nagasawa (2013) studied the case of Tsuruya Yoshinobu and found the coexistence of sustainable innovation and destructive innovation in this company.

Those studies are descriptive analysis of innovation activity in *shinise* and there are a few numerical empirical studies of innovation in *shinise* companies. In Matsuoka (2013), *shinise* business continuity and innovation were studied by a questionnaire in 2011. They sent a questionnaire to 960 companies which established older than 100 years, of which Companies were received from 224, for a response rate of 23.3%. Current *shinise* owners inherited their businesses around the age of 40. Their predecessors averaged 64 years old. Nearly 80% of successors are sons of their predecessors. The current proprietors have been in their positions for about 20 years, during which time they have been involved in innovating their companies through new product sales and development, cultivating new customers, and expanding into new fields of business. Unlike *shinise* in other parts of Japan, many Kyoto *shinise* don't have any form of family precepts. The *shinise* that are performing well are mid-sized companies that are enthusiastic about coming up with new products and businesses. The predecessors did not make any particular plans for the continuity of the business, and since their retirement they have tended not to participate in the business at all. In addition, the current proprietors have experience working for companies in other industries. We believe this survey has revealed one aspect of the *shinise*, but many questions remain to be answered before the whole picture can be revealed. One of those questions concerns the local characteristics of Kyoto. For example, the religious context of Kyoto, with its many historical shrines and temples, and the oral traditions passed down through the meetings of the so-called *shinise* masters, among other things, may have had a major influence on the management of today's *shinise*. These are all starting points for further exploration.

Tokyo Chamber of Commerce and Industry (2015) is exceptional empirical study of innovation in *shinise* companies in Tokyo. They sent questionnaires for 3,096 *shinise* companies and got 420 answers from them. In this questionnaire, they asked whether preceding managers changed managerial decisions. They asked whether current mangers change managerial decisions as well. As the result of this survey, they divided *shinise* companies into 4 types. The first type is "Serious consideration of tradition" and in this type both preceding and current managers are passive for change. 30.4% of sample *shinise* companies are classified in this type. The second type is "Changing activity firmly established" type which preceding managers are proactive but current managers are passive. The share of this type of *shinise* companies was 19.1%. The third type is "Transition of changing activity" type, where preceding managers were passive but current managers are proactive for change of managerial decisions. The share of this type is 14.1%. The last type is "Continuation of changing activities" type, where both preceding and current managers are proactive for changing of managerial decisions. 36.4% of sample *shinise* companies were classified in this category and this is the largest type.

In our study, with the permission of Tokyo CCI, we also ask the attitude for changing of managerial decisions by preceding and current managers in Kyoto.

3. Overview of Old Establishment Companies, *Shinise*, in Kyoto

（1）Periods of Establishment

The periods of establishment of responding companies are shown in Table 1. The ratio of companies founded before 400 years is 4.9%. The oldest company was established in 885.

Table 1　Period of Establishment

	Current Survey	
	Number of Companies	Ratio （%）
Older than 400 years (-1616)	18	4. 9
300 years (1617 – 1716)	29	7. 9
200 years (1717 - 1816)	41	11. 2
100 years (1817– 1916)	247	67. 5
Unknown	31	8. 5
Total	366	100. 0

Source: Authors (The following tables and charts were all created by the authors.)

(2) Business field

While the most common business fields were manufacturing and retail, there were many companies involved in both industry and commerce, with companies involved in both manufacturing and retail accounting for 19.9% and companies involved in both manufacturing and wholesale accounting for 10.9%.

Table 2-1　Industry

	Number of Companies	Ratio (%)
Manufacturing	168	45. 9
Retail	169	46. 2
Wholesale	82	22. 4
Service	52	14. 2
Other	40	10. 9
Total No. of Respondents	366	100. 0

Table 2-2　Companies Involved in Multiple Industries

	Number of Companies	Ratio (%)

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Manufacturing/retail	73	19.9
Manufacturing/wholesale	40	10.9
Manufacturing/service	8	2.2
Retail/wholesale	41	11.2
Retail/service	10	2.7
Total No. of Respondents	366	—

(3) Company Size

The most common company size as measured by annual turnover was between ¥10 and ¥50 million, accounting for 28.1%. 57.3% had annual sales of ¥100 million or less, while 75.9% had sales of ¥500 million or less. The most common number of persons engaged in business including the company president was between 1 and 4, accounting for 37.4% of companies. Compared to the previous survey, there were more small companies measured in terms of both sales and persons engaged in business.

Table 3-1　Sales

Sales	Current		2011 Survey	
	Number of	%	Number of Companies	%
-　¥10 million	58	15.8	11	4.9
¥10 – 50 million	103	28.1	31	13.8
¥50 – 100 million	49	13.4	35	15.6
¥100 – 500 million	68	18.6	64	28.6
¥500 million – 1 billion	26	7.1	65	29.0
¥1 - 2 billion	19	5.2		
¥2 - 3 billion	8	2.2		
Over ¥3 billion	16	4.4	15	6.7
No response	19	5.2	3	1.3
Total Number of Companies	366	100.0	224	100.0

Table 3 – 2 Total Number of Persons Engaged in Business (including president, officers, including temps and part-time employees) (As of Jan. 1, 2016) (The 2011 survey was number of employees)

	Current		2011 Survey	
	Number of Companies	Ratio (%)	Number of Companies	Ratio (%)
1 – 4 individuals	137	37.4	44	19.6
5 – 10 individuals	83	22.7	53	23.7

11 – 20 individuals	52	14. 2	37	16. 5
21 – 50 individuals	38	10. 4	41	18. 3
51 – 100 individuals	18	4. 9	25	11. 2
101 – 300 individuals	15	4. 1	15	6. 7
More than 301 individuals	7	1. 9	7	3. 1
No response	16	4. 4	2	0. 9
Total	366	100. 0	224	100. 0

(4) Business Conditions

With regard to recent performance, 23.5% of companies increased sales, 22.1% increased profit, and 15.0% increased the number of employees. The improvement in performance amidst a difficult economic environment is noteworthy.

1) Sales

   23.5% of all companies increased sales. This is higher than the 15.9% in the previous survey. While the ratio of companies with flat growth was also higher than the previous survey, the ratio of companies that replied "Decreased" was also lower. These results indicate an improvement in the business conditions compared to 2011.

Table 4 - 1   Business Conditions – Changes in Sales

	Current		2011 Survey	
	Number of Companies	Ratio (%)	Number of Companies	Ratio (%)
Increase (10% or more)	39	10. 7	35	15. 6
Increase (Less than 10%)	47	12. 8		
Flat	133	36. 3	63	28. 1
Decrease (Less than 10%)	74	20. 2	120	53. 6
Large decrease (10% or more)	62	16. 9		
No response	11	3. 0	6	2. 7
Total	366	100. 0	224	100. 0

2) Profits

   While 21.1% increased profits, the percentage of companies with decreased profits rose to 37.4%. Increase/decrease in profits was not asked in the 2011 survey.

Table 4 – 2 Change in Profit

	Number of Companies	Ratio (%)
Increase (10% or more)	30	8. 2
Increase (Less than 10%)	51	13. 9

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Flat	136	37.2
Decrease (Less than 10%)	85	23.2
Large decrease (10% or more)	52	14.2
No response	12	3.3
Total	366	100.0

3) Number of Employees

The results for change in the number of employees did not differ much from the previous survey. There were a large number of non-Companies to this question. When the non-Companies were disregarded, the ratio of companies that increased their number of employees was higher at 18.3% in the current survey compared to 15.1% in the previous survey.

Table 4 - 3   Trends in Number of Employees over the Past 5 Years

	Current		2011 Survey	
	Number of Companies	Ratio (%)	Number of Companies	Ratio (%)
Increase (10% or more)	17	4.6	33	14.7
Increase (Less than 10%)	38	10.4		
Flat	187	51.1	132	58.9
Decrease (Less than 10%)	36	9.8	54	24.1
Large decrease (10% or more)	22	6.0		
No response	66	18.0	5	2.2
Total	366	100.0	224	100.0

4) Performance Results Compared to Other Companies in the Same Industry

   For the results of performance compared to other companies in the same industry, the combined ratio for companies responding "good" or "somewhat good" decreased 10 percentage points to 27.3% compared to 37.6% in the prior survey. There were more non-Companies of "don't know" in the current survey for this item as well, which possibly impacts this decline.

Table 4 - 4   Performance Results Compared to Other Companies in the Same Industry

	Current		2011 Survey	
	Number of Companies	Ratio (%)	Number of Companies	Ratio (%)

Good	25	6. 8	19	8. 5
Somewhat good	75	20. 5	64	28. 6
Same as other companies	104	28. 4	97	43. 3
Somewhat poor	31	8. 5	22	9. 8
Poor	29	7. 9	13	5. 8
Don't know	88	24. 0	9	4. 0
No response	14	3. 8		
Total	366	100. 0	224	100. 0

(5) Current Management

1) Overview

The most common age of management was between 60 and 69 years old (36.6%) with an average age of 61.8 years old. 5 generations or more but less than 10 generations was the most common (46.2%) response with an average of 6.75 generations. The most common age that management assumed the reins of management was between 40 and 49 years old (33.3%), with an average age of 41.8. 63.7% were led by the eldest son of the previous generation, while 88.8% of management was comprised of relatives. There were no major differences between the current and previous survey with regard to overall management characteristics.

Table 5 - 2   Averages and Standard Deviations for Age, Number of Generations, and Age of Succession to Current Management

	Current		2011 Survey	
	Average	Standard Deviation	Average	Standard Deviation
Age as of Jan. 2016 (Previous was age as of Jan. 2011)	61.8 years old	12.7 years old	59.3 years old	10.52 years old
Generations from founding	6.75th generation	5.2th generations	5.11th generation	2.53th generation
Age when became manager	41.8 years old	10.6 years old	40.5 years old	9.70 years old

2) Relationship with Most Recent Previous Generation of Management
Table 5 – 2 Relationship between Current and Most Recent Previous Generation of Management

	Current	2011 Survey

Relationship with Previous Generation	Number of Companies	Ratio (%)	Number of Companies	Ratio (%)
Eldest Son	233	63. 7	142	63. 3
Son other than Eldest	40	10. 9	27	12. 1
Daughter	11	3. 0	4	1. 8
Son-in-law	29	7. 9	15	6. 7
Spouse	8	2. 2	3	1. 3
Other relative	16	4. 4	21	9. 4
Employee	7	1. 9	3	1. 3
Other	12	3. 3	4	1. 8
No response	10	2. 7	5	2. 2
Total Companies	366	100. 0	224	100. 0

3) Relationship between Current Management and Founder

Table 5 – 3 Relationship with Founder

	Current		2011 Survey	
	Number of Companies	Ratio (%)	Number of Companies	Ratio (%)
Relative of founder	325	88. 8	204	91. 1
Not a relative of founder	31	8. 5	17	7. 6
No response	10	2. 7	3	1. 3
Total	366	100. 0	224	100. 0

4. Change/Innovation of *Shinise* Companies - Empirical Research -

As stated previously, we analyze the tradition and innovation of *shinise* companies in Kyoto through a questionnaire. In this section, we explore the innovation in their management.

We ask whether they changed (or want to change) their management in 18 categories[4] or not. Table 1 shows their Companies for "want to change" or "do not want to change". This table shows the ratios (%) of respondents that intend to change each corporate management factor.

Table 6   Attitude to Change Business Decisions by the Current Managers (%)

	Do not want to change	Under consideration	Want to change	Changed a little	Changed	No response
Company name	76.5	1.1	1.9	6.3	6	8.2

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[4] We follow the questionnaire by the Tokyo Chamber of Commerce and Industry in 2014. We use similar questions under permission of the Tokyo Chamber of Commerce and Industry. These questions attempt to clarify by comparing the characteristics of Kyoto's *shinise* companies with those in Tokyo. Some questions are changed by adding or deleting some items. The details are referred in the survey by the Tokyo Chamber of Commerce and Industry (2015).

Company motto and/or family precept	69.9	2.5	3	7.1	3.3	14.2
Business philosophy	68.0	2.5	3.6	8.2	4.4	13.4
Reputation and compliance	76.5	0.8	1.6	5.2	3.6	12.3
Business field	56.8	3.0	4.4	18	6.3	11.5
Core business	65.0	1.6	2.7	9.8	4.9	15.8
Main product and service	50.8	2.7	6.6	18.9	8.5	12.6
Development system	28.7	5.2	15.3	22.4	10.7	17.8
Pricing structure	25.7	5.7	13.7	24.6	14.2	16.1
Production methods	34.2	3.0	7.1	20.8	7.7	27.3
Suppliers	32.0	4.6	7.7	32.2	12.3	11.2
Subcontractors	29.2	6.0	7.4	24.6	10.7	22.1
Customers	31.1	4.4	9.6	24	16.4	14.5
Sales network	24.0	6.3	9.8	26	13.7	20.2
HR systems and HR development	24.0	10.9	19.9	16.1	10.9	18.0
Organizational structure	30.1	9.3	11.7	14.8	11.5	22.7
Fund collecting	39.3	9.3	8.7	17.8	6.3	18.6
Asset management	32.8	14.5	12	15.3	5.7	19.7

The ratio of "Do not want to change" is higher in the category of the company itself such as "company and trade name" and "company credo, company motto and family motto." On the other hand, the ratio of "Has changed a little" and "Changed" is much higher in the category of products and production such as development system, pricing structure and in the category of distribution such as suppliers, subcontractors, customers, sales networks.

We compare which is more innovative between the current managers and previous managers in about various fields. We calculate the average scores over all managers' Companies of both current and previous managers in various fields.

To calculate the average, we assign a value to each response as follows: "Do not want to change" is assigned 1, "Under consideration" and "Want to change" = 2, "Changed a little" = 3, "Changed" = 4, in the current managers' question. In the previous managers' question, we assign a value to each response as follows: "Not changed at all" = 1, "Hardly changed" = 2, "Changed a little" = 3, "Changed quite a bit" = 4, and "Completely changed" = 5.

In the current managers, sales network and distribution channels has the largest average (2.37). Other fields which have high average are pricing structure (2.33), purchasers and customers (2.30), suppliers and raw material suppliers (2.28), and subcontractors (2.21). On the other hand, the lowest average, or in other words, the fields with the strongest intent not to change was trust first and focus on compliance (1.27). Next lowest average is company credo and company motto or family motto (1.34), company and trade name (1.40), business philosophy (1.41), and core business (1.46). These results suggest that businesses focus on trust, and that management does not want to change fundamental business concepts pertaining to the company name, business philosophy, or core business, while they tend to embrace change of transactional relationships including sales networks and pricing structures, business partners (suppliers, purchasers), etc. Nevertheless, the average value was less than 3 ("Want to change") which suggests the lack of strong desire to change on average.

The largest average values for changes by previous managements were purchasers and customers (3.13), sales network and distribution channel (3.09), pricing structure (3.07),

subcontractors (2.99), and suppliers and raw materials suppliers (2.95). Conversely, the lowest average values were for trust first and focus on compliance (1.60), company credo and company motto or family motto (1.75), business philosophy (1.87), and core business (1.86). The results were similar to current management.

This demonstrates the trend for previous managements to not change categories pertaining to fundamental business concepts, similar to current management. Nevertheless, the average values for all items except for development system were higher than current management, with the 3 categories of "pricing structure", "purchaser and customers", "sales network and distribution channels" over the numerical value of 3 ("Changed a little"). It also appears that some companies throughout their long histories have made changes including the company name as the average value for "company and trade name" was 2.13.

Furthermore, by using the scores, we categorize the companies into 4 types[5]. If the score is beyond the average, we call "proactive". If the score is below the average, we call "passive". Type 1 is defined that both current and previous managers are "proactive". Type 2 is defined that both current and previous managers are "passive". Other two types are defined that current managers are "proactive", but previous managers are "passive" and *vice versa*. We calculate the scores by averaging over the scores of all fields about the managements. The average score for the current managers is 1.8890, while the average score for previous managers is 2.3438.

Figure 1, Average Attitude for Change/Innovation: Previous Managers and Current Managers

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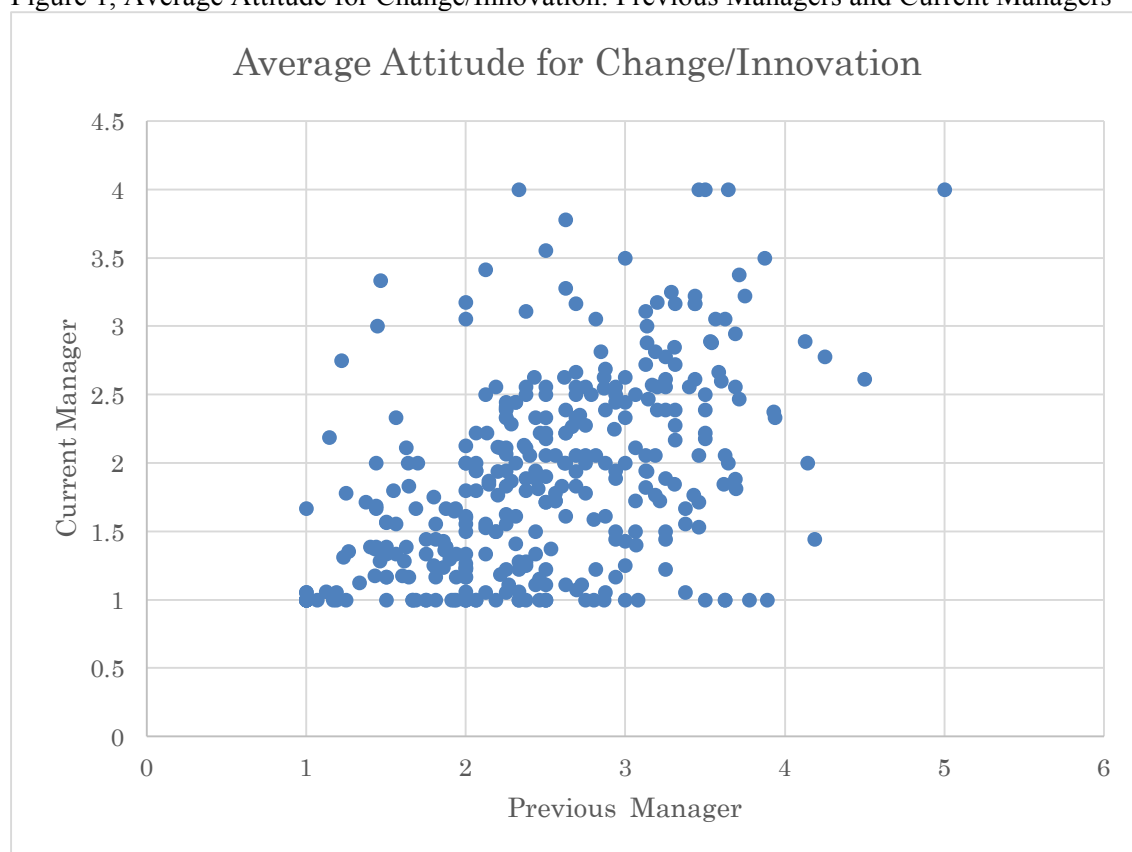
[5] In accordance with Tokyo Chamber of Commerce and Industry's "4 Categories of Changes Observed in Survey Results" (2015), p. 51.

Table 7-1　Attitudes toward Change

		Current Managers		Total
		Passive	Proactive	
Previous Managers	Proactive	52　(16.8%)	103　(33.2%)	155
	Passive	111　(35.8%)	44　(14.2%)	155
Total		163	147	347

　31.7% of *shinise* companies in Kyoto are categorized into "Proactive and Proactive", that is both current and previous managers are "proactive" toward innovation. On the other hand, 37.2% are categorized into "Passive and Passive", that is both current and previous managers are "passive". Other types are minor.

　When we focus on family *shinise* companies, we get almost same result. 33.2% of family *shinise* companies in Kyoto are categorized into "Proactive and Proactive", and 35.8% are categorized into "Passive and Passive". Bith results shows, the share of "Passive and Passive" is larger than the share of "Proactive and Proactive".

　This is a little contrasting to the case of *shinise* in Tokyo. In the Tokyo Chamber of Commerce and Industry (2015), 36.4% of *shinise* companies in Tokyo are categorized into "Proactive and Proactive". On the other hand, 30.4% are categorized into "Passive and Passive". We find that *shinise* companies in Kyoto are more passive for change than *shinise* companies in Tokyo. In other words, they are more traditional or more conservative than shinise companies in Tokyo.

Table 7-2　Attitudes toward Change/Innovation for Family *Shinise* Companies

		Current Managers		Total
		Passive	Proactive	
Previous Managers	Proactive	52　(16.8%)	103　(33.2%)	155
	Passive	111　(35.8%)	44　(14.2%)	155
Total		163	147	310

5. Econometric Analysis

　In this section, we analyze the factors which have effects on the tradition and innovation of *shinise* companies in Kyoto by econometric model. Especially, we focus the those factors of family businesses of *shinise*. In our questionnaire, we asked whether the current Fmanager is a member of founding family. If the current manager is a member of founding family, we defined the company as a family business. From our 366 companies, 325 companies are selected as family business.

　As shown in Table 1, we asked attitude to change many kinds of business decisions, but in this section we focus decisions relating to production of their product or services, and transaction relationship as the investigation of attitude to change or to innovate. Managerial decisions of industry and business field, core business, main product and service, development

system, pricing structure, and production methods are decisions relating to production of their product or services. Managerial decisions of suppliers and raw material suppliers, subcontractors, purchasers and customers, sales network and distribution channel are included in transaction relationship

5.1 Explained Variable

Explained variable in our estimation is the attitude to change for each category by the current manager. We ask the current managers whether they change, want to change and don't want to change in the several categories. We allocate the values in each degree of change: "Do not want to change" =1, "Under consideration or not to change" and "Want to change" =2, "Have changed a little" =3, and "Have changed" = 4.

5.2 Explaining Independent Variables and Our Hypothesis

We choose some explaining variables as factors for innovation. We choose these variables based on our correlation analysis and our previous research in Matsuoka (2013). By the correlation analysis, there is not a multi-correlation problem among explaining variables.

1)The Attitude for Change by Previous Managers

We ask the current managers whether their management changed in their previous managers' era or not in several categories. The categories are the same as in the explained variables. For previous management innovation, we assign values in each degree of change: "Not changed at all" = 1, "Hardly changed" = 2, "Changed a little" = 3, "Changed quite a bit" = 4, and "Completely changed" = 5.

Our hypothesis is that there must be their company culture or tradition. Current managers have a tendency to follow those culture or tradition. So, expected sign of estimated coefficient is positive.

2)Years of Operation

We calculate years in business operation since founding year in our survey. We expect that older companies may be more conservative for change/ innovation than younger companies. So, expected sing of estimated coefficient is negative. However in our previous study showed different result about the relationship between innovation and years of operation[6]. We cannot therefore decide the expected sign of the estimated coefficient.

3)Business Field

We ask their applicable business field such as manufacturing, retail, wholesale, service, or other. We allow to answer the businesses across multiple industries. We use a manufacturing industry dummy variable. If the company has manufacturing section, we assign 1, otherwise 0. Our hypothesis is that if a *shinise* company has a manufacturing division, he is more proactive for challenging new business. So, expected sign of estimated coefficient is positive, because he has more opportunities for change/innovation.

4)Sales over the Past 5 Years

We adopt sales over the past 5 years as a business performance variable. We assign values as follows: Increase (10% or more) = 1, Increase (Less than 10%) = 2, Flat = 3, Decrease (Less than 10%) = 4, Large decrease (10% or more) = 5. The category of bigger sales is assigned less value. So, we use inverse to avoid an opposite sign. In the result of our previous study, the better of business performance, the more proactive for change/innovation. So expected sign of estimated coefficient is positive.

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[6] Matsuoka (2013), p. 42, Table 2-4.

5)Age When Promoted to a Manager's Post
   We ask the current managers their age when they were promoted to be a manager. If a current manager was promoted to be a manager when he/she was young, it means that he/she has a long carrier as a manager, and may have more opportunities to innovate. Moreover, in the long carrier as a manager, he/she can accumulate more capabilities. So, he/she may be more positive to change managerial decisions. So expected sign of estimated coefficient is negative.

6)Number of Total Employees
   We ask the number of total employees (including president, officers, temps and part-time employees) as of January 1, 2016. This is the variables of company size. We assign the values as follows: 1 - 4 employees= 1, 5 - 10 employees= 2, 11 - 20 employees= 3, 21 - 50 employees= 4, 51 - 100 employees= 5, 101 - 300 employees= 6, and 300 or more employees= 7. The relationship between company size and innovation is a very controversial topic. In the Schumpeterian hypothesis, larger company is more innovative. On the other hand, we know many innovative start-up businesses, but those star-ups are not *shinise* companies. So expected sign of estimated coefficient is positive.

7)Average Age of Employees
   We ask the average age of employees as of January 1, 2016. Our hypothesis is that a company with younger employees are more proactive for innovation, because those young employees may stimulate for change/innovation. So expected sign of estimated coefficient is negative.

8)Correlation analysis
   Correlations between the utilized explaining variables were investigated. This is because the problem of multiple collinearity occurs. It appears that a high degree of correlation was not found between utilized explaining variables. It appears that there is no multiple collinearity problem through utilization of these variables as explaining variables in the same regression model.

5.3 Econometric model
   While the explained variables are discrete variables, we use an ordinal logit model because the order is clear[7]. We use Stata 14 for estimation.
The regression model is as follows:

$$y_i^* = \sum \beta j x_j + \varepsilon_i$$

y_i^* is potential utility level, x_j are explaining varibales, β_j are estimated coefficients and ε_i is the error term.
We explain ordinal logit models as the random utility model. Since we have 4 categories.

y_i=1 if $c_{-1} < y_i^* \leq c_0$
  =2 if $c_0 < y_i^* \leq c_1$
  =3 if $c_1 < y_i^* \leq c_2$
  =4 if $c_2 < y_i^* \leq c_3$

   c is a threshold value for selecting a given category. We estimate not only parameter β, but also the threshold value c by the maximum likelihood method.

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[7] Greene and Hensher (2010) is referred about the details of ordered logit model.

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5.4 Estimation results

We analyze the factors of innovation in their products and production, and their distribution such as procurement and sales. Table 8 illustrates the estimation results of products and production, and Table 9 illustrates the estimation results of distribution such as procurement and sales.

(1) Change/Innovation in Products and Production

Table8-1. Estimation results of products and production

Variables	Business field	Core business	Main product and service
Previous management	0.6883***	1.4293***	0.6018***
Years in operation	−0.0016	−0.0065**	−0.0004
Manufacturing industry dummy	0.5566	1.2352***	1.0210***
Change in sales (inverse)	1.8440***	0.7604	1.5776**
Age promoted to management	−0.0185	−0.201	−0.0096
Number of persons engaged in business	0.0875	0.0844	0.1661
Average age of persons engaged in business	−0.0064	−0.0085	0.0036
/cut1	2.1324	3.0102	2.9246
/cut2	2.5847	3.3921	3.5633
/cut3	4.5913	5.2169	5.3717

Table8-1. Estimation results of products and production (continued)

Variables	Development system	Pricing structure	Production methods
Previous management	0.4451***	0.5557***	.7056***
Years in operation	−0.0011	−0.0013	−0.0017
Manufacturing industry dummy	0.9762***	0.7174***	−0.0906
Change in sales (inverse)	1.2992**	1.8691***	1.1816*
Age promoted to management	−0.0129	−0.0066	−0.0203
Number of persons engaged in business	0.1572	0.0975	0.2530**
Average age of persons engaged in business	−0.0038	−0.0058	0.0006
/cut1	0.8318	1.1299	1.4412
/cut2	2.2522	2.5533	2.1678
/cut3	4.0191	4.1962	4.4315

1) Business Field

For the explained variable "business field", the variables of previous management and change in sales have positive coefficient and are significant at 1% level. The sign of them are same with our expectation and they confirm our hypothesis.

2) Core Business

The variables of previous management and manufacturing industry dummy have positive coefficient and are significant at 1% level. The sign of them are same with our expectation and they confirm our hypothesis. The variable of years in operation has negative coefficient and are significant at 5% level. The company which has a longer history is passive for change/innovation.

3) Main Product and Service

The variables of previous management and manufacturing industry dummy have positive coefficient and are significant at 1% level. Change in sales has positive coefficient and are significant at 5% level. The sign of them are same with our expectation and they confirm our hypothesis.

4) Development System

The variables of previous management and manufacturing industry dummy have positive coefficient and are significant at 1% level. The variable of change in sales has positive coefficient and is significant at 5% level. The sign of them are same with our expectation and they confirm our hypothesis.

5) Pricing Structure

The variables of previous management, manufacturing industry dummy and change in sales have positive coefficient and are significant at 1% level. The sign of them are same with our expectation and they confirm our hypothesis.

6) Production Methods

The variable of previous management has positive coefficient and is significant at 1% level. The variable of number of persons engaged in business has positive coefficient and is significant at 10% level. The sign of them are same with our expectation and they confirm our hypothesis.

Summaries

The variable of previous management has positive coefficient and is significant at 1% level in all fields. The variable of manufacturing industry dummy and change in sales have positive coefficient and are significant at 1% level in many fields. But the variable of average age of employee does not have any significant estimation.

(2) Change/ innovation in Transaction Relationship

Table 8-2 Estimation results of transaction relationship

Variables	Suppliers	Subcontractors	Customers
Previous management	0.7199***	0.9975***	0.7420***
Years in operation	−0.0032**	0.0000	−0.0011
Manufacturing industry dummy	0.5982**	0.6744**	0.6842**
Change in sales (inverse)	0.0179	0.1235	0.2259
Age promoted to management	−0.0125	−0.0196	−0.0290*
Number of persons engaged in business	0.1698*	0.2666***	0.1381
Average age of persons engaged in business	−0.0246*	−0.0024	0.0147
/cut1	−0.0387	2.4408	1.6248

/cut2	0.7466	3.5037	2.4666
/cut3	2.8330	5.4330	3.9650

Table 8-2 Estimation results of transaction relationship (continued)

Variables	Sales Network and Distribution Channels
Previous management	0.4520***
Years in operation	−0.0005
Manufacturing industry dummy	0.7588***
Change in sales (inverse)	0.3939
Age promoted to management	−0.0257
Number of persons engaged in business	0.2150**
Average age of persons engaged in business	0.0079
/cut1	0.6333
/cut2	1.6017
/cut3	3.3553

*** 1% significant level ** 5% significant level * 10% significant level

1) Suppliers
　The variable of previous management has positive coefficient and is significant at 1% level. The variable of years in operation has negative coefficient and is significant at 5% level. The variable of manufacturing industry dummy has positive coefficient and is significant at 5% level. The variable of average age of persons engaged in business has negative coefficient and is significant at 5% level. The variable of number of persons engaged in business has a positive and is significant at 10% level.The variable of average age of employee has a negative and is significant at 10% level. This is the only estimation that this variable gets significant coefficient. The sign of them are same with our expectation and they confirm our hypothesis.
2) Subcontractors
　The variable of previous management number of persons engaged in business have positive coefficients and are significant at 1% level. The variable of manufacturing industry dummy has positive coefficient and is significant at 5% level. The sign of them are same with our expectation and they confirm our hypothesis.
3)　Customers
　The variable of previous management has positive coefficient and is significant at 1% level. The variable of manufacturing industry dummy has positive coefficient and is significant at 5% level. The variable of age promoted to management has negative coefficient and is significant at 10% level. The sign of them are same with our expectation and they confirm our hypothesis.
4) Sales Network
　The variable of previous management and manufacturing industry dummy have positive coefficients and are significant at 1% level. The variable of number of persons engaged in

business has positive coefficient and is significant at 5% level. The sign of them are same with our expectation and they confirm our hypothesis.

Summaries
   The variable of previous management has positive coefficient and is significant at 1% level in all categories. If their previous managers are positive for change/innovation, the current managers are also positive for innovation. The variable of manufacturing industry dummy has positive coefficient and is significant at 5% level for two categories and at 10% for one category. The variable of change in sales could not get a significant estimation

5.5 **Observations**
   From the estimation results, we summarize the factors of innovation. Table 6 summarizes the number of explained variables significant for each explaining variable.

Table 10 The Number of Explained Variables Significant for Each Explaining Variable

	The number of explained variables with significance (at least 10%)
Previous managers	10
Years of operation	2
Manufacturing industry dummy	8
Change in sales	5
Age promoted to management	1
The number of persons engaged in business	3
Average age of persons engaged in business	1

   This section discusses explaining variables that have a major impact on innovation for the current manager.
"Company culture / Tradition"
   In the all regression analysis, we find that the coefficients of previous manages' attitude toward innovation are positive and significant at 1% level for all industry. Previous manages and current managers have the same tendency for the attitude toward change/innovation. We can explain this finding as "Company culture/ Tradition".
   As we show in Figure 1, where it depicts the attitudes of current and previous managers for change/innovation, it is evident that the attitudes toward innovation of current and previous managers have the same trend. In other words, if previous managers are proactive for innovation, current managers also tend to be proactive for innovation. On the other hand, if previous managers demonstrated a passive or conservative for innovation, current managers also tend to be passive.
   Figure 2 is the scatterplot of average scores for innovation of previous and current managers. In Section 3, we have already shown the classifications of proactive or conservative attitudes toward innovation of previous and current managers. The correlation coefficient is 0.4870, which does not represent a strong correlation. Nevertheless, it is evident that a large amount of data is accumulated around the origin. In other words, if the previous managers are conservative, the current managers tend to be conservative. Combined with the results in Section 3 demonstrating that Kyoto is more conservative than Tokyo, we suggest that *shinise* companies in Kyoto tend to have more conservative, rather than innovative, company cultures. Stating in another way, the results show that these companies emphasize tradition.

"Manufacturing"

Many *shinise* companies in Kyoto are involved in multiple business fields such as production and sales. 33.1% of all the *shinise* companies are involved in multiple fields such as manufacturing and sales or services, while only 12.8% (47 companies) are solely engaged in the manufacturing industry. In 8 estimations, especially in products and production, manufacturing industry dummy has positive coefficients and are significant. It means that family *shinise* companies involved in manufacturing are proactive for change/innovation.

6. Conclusion

We analyze the attitude for change/innovation of 325 family *shinise* companies in Kyoto through our survey. Our estimation results by regression analysis show that "innovative mind of previous managers" has the strongest impacts on the innovative mind of current managers. This means that if previous managers are proactive for innovation, current managers would also tend to be proactive. However, this means that if previous managers are passive for innovation, the current managers would also be passive. This finding says that the family *shinise* companies in Kyoto are traditional or in other words conservative. However, we couldn't conclude almost all the family *shinise* companies in Kyoto are traditional or conservative for change/innovation because 33.2% of family *shinise* companies are classified as the group where both previous managers and current managers are proactive .

We also find that manufacturing industry dummy (engaged in manufacturing) is significant in many cases. The increase in turnover has a major impact.

In this study, we focus on the quantitative analysis for change/innovation. We often hear that tradition and innovation are closely connected each other in family *shinise* companies. Our statistical analysis confirm this.

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