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Cluster Analysis for the Questionnaire Investigation on the Needs at Yoshiwara Shopping Street in Fuji City

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Abstract

Shopping streets at local city in Japan became old and are generally declining. In this paper, we handle the area rebirth and/or regional revitalization of shopping street. We focus on Fuji city in Japan. Four big festivals are held at Fuji city (two for Fuji Shopping Street Town and two for Yoshiwara Shopping Street Town). Many people visit these festivals including residents in that area. Therefore a questionnaire investigation to the residents and visitors is conducted during these periods in order to clarify residents and visitors' needs for the shopping street, and utilize them to the plan building of the area rebirth and/or regional revitalization of

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shopping street. There is a big difference between Fuji Shopping Street Town and Yoshiwara Shopping Street Town. Therefore we focus Yoshiwara Shopping Street in this paper. These are analyzed by using Cluster Analysis and Multiple Regression Analysis. These are utilized for constructing a much more effective and useful plan building. We have obtained fruitful results. To confirm the findings by utilizing the new consecutive visiting records would be the future works to be investigated.

Mathematics Subject Classification: 62H30

Keywords: Fuji City, Area rebirth, Regional vitalization, festival, Cluster Analysis, Multiple Regression Analysis

1 Introduction

Shopping streets at local city in Japan are generally declining. It is because most of them were built in the so-called “High Growth Period (1954-1973)”. Therefore they became old and area rebirth and/or regional revitalization are required everywhere.

There are many papers published concerning area rebirth or regional revitalization. Inoue (2017) has pointed out the importance of tourism promotion. Ingu et al.(2017) developed the project of shutter art to Wakkanai Chuo shopping street in Hokkaido, Japan. Ohkubo (2017) has made a questionnaire research at Jigenji shopping street in Kagoshima Prefecture, Japan and analyzed the current condition and future issues. For about tourism, many papers are presented from many aspects as follows.

Yoshida et al. designed and conducted a visitor survey on the spot, which used a

questionnaire to investigate the activities of visitors to the Ueno district in Taito ward, Tokyo. Doi et al. analyzed the image of the Izu Peninsula as a tourist destination in their 2003 study “Questionnaire Survey on the Izu Peninsula.” Kano conducted tourist behavior studies in Atami city in 2008, 2009, 2014 and in other years.

In this paper, we handle the area rebirth and/or regional revitalization of shopping street. We focus on Fuji city in Japan. Fuji city is located in Shizuoka Prefecture. Mt. Fuji is very famous all around the world and we can see its beautiful scenery from Fuji city, which is at the foot of Mt. Fuji. There are two big shopping street in Fuji city. One is Yoshiwara shopping street and another one is Fuji shopping street. They became old and building area rebirth and regional revitalization plan have started. Following investigation was conducted by the joint research group (Fuji Chamber of Commerce & Industry, Fujisan Area Management Company, Katsumata Maruyama Architects, Kougakuin University and Tokoha University). The main project activities are as follows.

A. Investigation on the assets which are not in active use

B. Questionnaire Investigation to Entrepreneur

C. Questionnaire Investigation to the residents and visitors

After that, area rebirth and regional revitalization plan were built.

In this paper, we handle above stated C. Four big festivals are held at Fuji city. Two big festivals are held at Yoshiwara Shopping Street Town and two big festivals at Fuji Shopping Street Town. At Yoshiwara Shopping Street Town, Yoshiwara Gion Festival is carried out during June and Yoshiwara Shukuba (post-town) Festival is held during October. On the other hand, Kinoene Summer

Festival is conducted during August and Kinoene Autumn Festival is performed during October at Fuji Shopping Street Town. Many people visit these festivals including residents in that area. Therefore questionnaire investigation of C is conducted during these periods. Finally, we have obtained 982 sheets (Yoshiwara Shopping Street Town: 448, Fuji Shopping Street Town: 534). Basic statistical analysis, Cluster Analysis and Multiple Regression Analysis are executed based on that.

In this paper, a questionnaire investigation is executed in order to clarify residents and visitors' needs for the shopping street, and utilize them to the plan building of the area rebirth and/or regional revitalization of shopping street. There is a big difference between Fuji Shopping Street Town and Yoshiwara Shopping Street Town. Therefore we focus Yoshiwara Shopping Street in this paper. Such multivariate analysis as Cluster Analysis and Multiple Regression Analysis are executed based on that. Some interesting and instructive results were obtained.

The rest of the paper is organized as follows. Outline of questionnaire investigation is stated in section 2. In section 3, Cluster Analysis is executed which is followed by the Multiple Regression Analysis in section 4.

2 Outline and the Basic Statistical Results of the Questionnaire Research

2.1 Outline of the Questionnaire Research

A questionnaire investigation to the residents and visitors is conducted during these periods in order to clarify residents and visitors' needs for the shopping street, and utilize them to the plan building of the area rebirth and/or regional

revitalization of shopping street. The outline of questionnaire research is as follows. Questionnaire sheet is attached in Appendix.

(1) Scope of investigation: Residents and visitors who have visited four big festivals at Fuji city in Shizuoka Prefecture, Japan

(2) Period:

Yoshiwara Gion Festival: June 11,12/2016

Yoshiwara Shukuba (post-town) Festival: October 9/2016

Kinoene Summer Festival: August 6,7/2016

Kinoene Autumn Festival: October 15,16/2016

(3) Method: Local site, Dispatch sheet, Self-writing

(4) Collection: Number of distribution 700, Number of collection 448 (collection rate 64.0%), Valid answer 448

2.2 Basic Statistical Results

Now, we show the main summary results by single variable.

2.2.1 Sex (Q7)

Male 55.6%, Female 44.4%

These are exhibited in Figure 1.

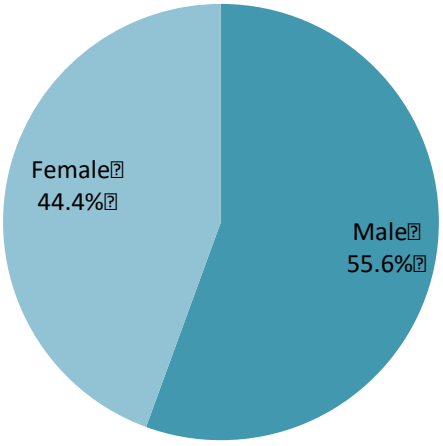

Figure 1: Sex (Q7)

2.2.2 Age (Q8)

10^{th} 10.9%, 20^{th} 12.1%, 30^{th} 19.0%, 40^{th} 17.9%, 50^{th} 13.4%, 60^{th} 14.7%, More than 70 11.6%

These are exhibited in Figure 2.

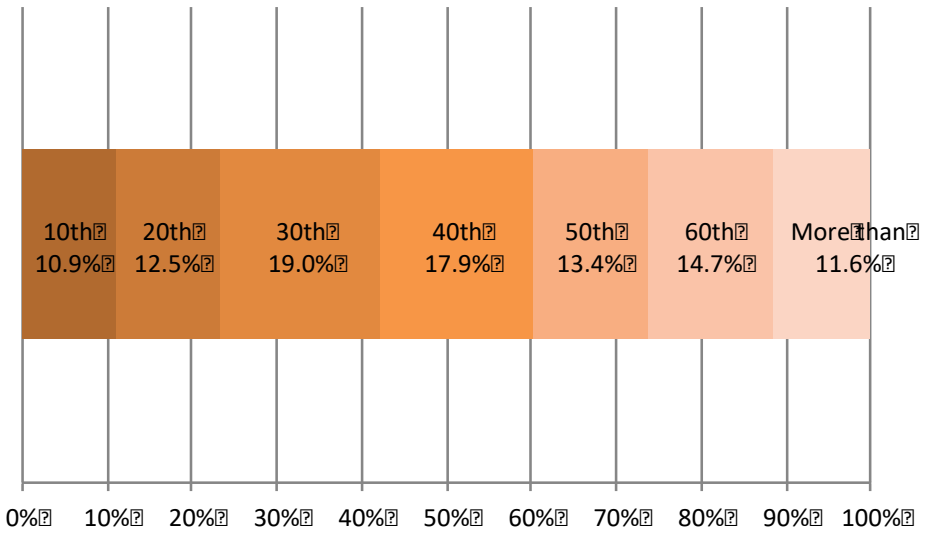

Figure 2: Age (Q8)

2.2.3 Residence (Q9)

a. Fuji city 78.3%, b. Fujinomiya city 6.9%, c. Numazu city 4.5%, d. Mishima city 1.3%, e. Shizuoka city 2.9%, F. Else (in Shizuoka Prefecture) 2.5%, g. Outside of Shizuoka Prefecture 3.6%

These are exhibited in Figure 3.

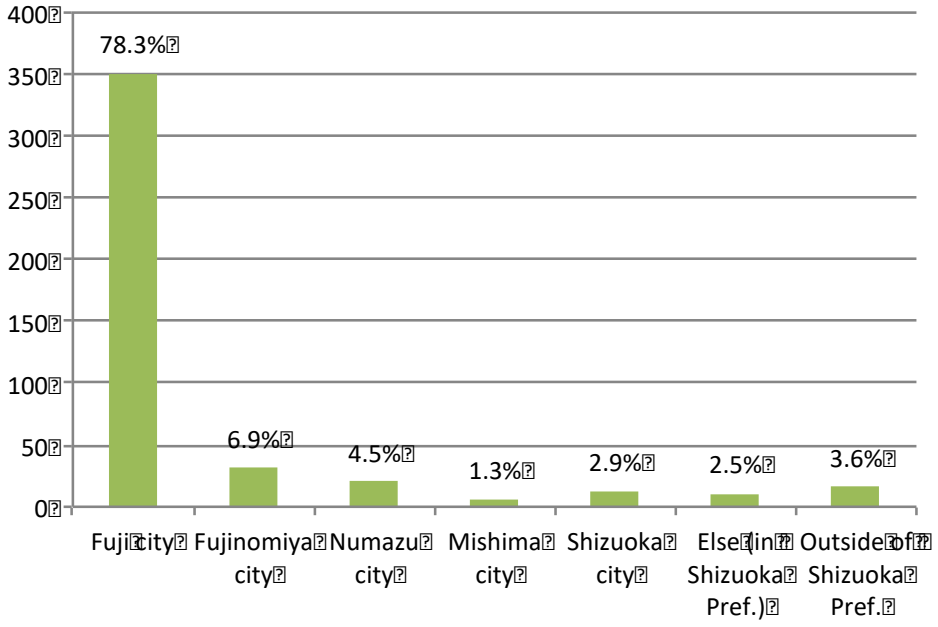

Figure 3: Residence (Q9)

2.2.4 How often do you come to this shopping street? (Q1)

Everyday 12.9%, More than 1 time a week 15.6%, More than 1 time a month 23.4%, More than 1 time a year 37.3%, First time 5.1%, Not filled in 5.6%

These are exhibited in Figure 4.

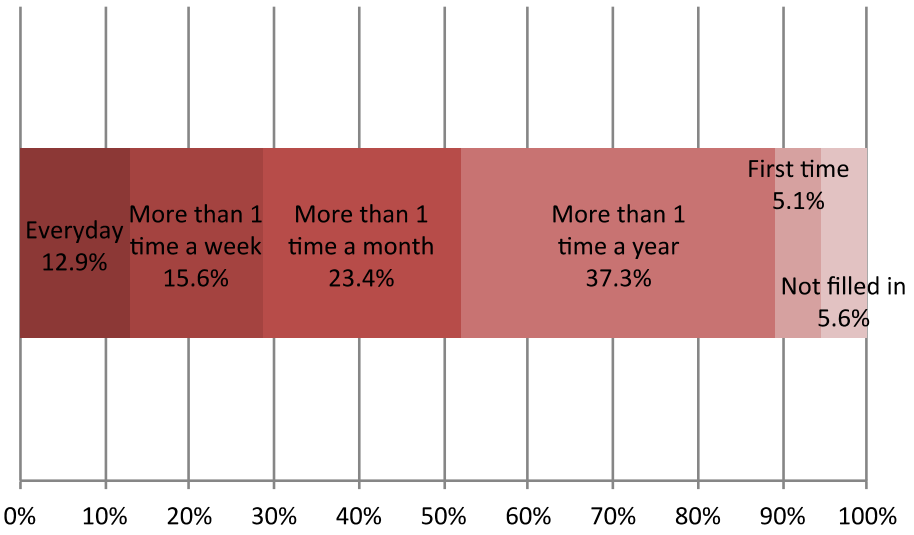

Figure 4: How often do you come to this shopping street? (Q1)

2.2.5 What is the purpose of visiting here? (Q2)

Shopping 20.7%, Eating and drinking 13.1%, Business 7.5%, Celebration, event 47.5%, Leisure, amusement 1.5%, miscellaneous 9.7%

These are exhibited in Figure 5.

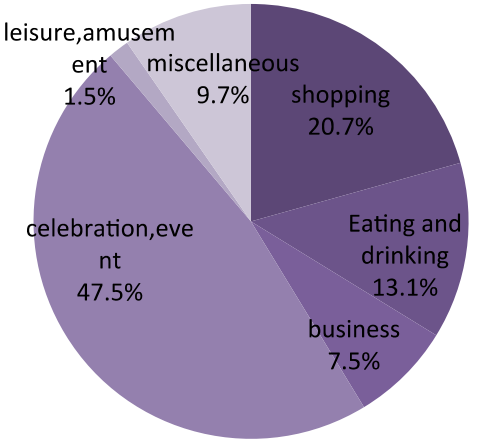

Figure 5: What is the purpose of visiting here? (Q2)

2.2.6 How do you feel about the image of the surrounding area at this shopping street? (Q3)

Beautiful 51.9%, Ugly 48.1%, Of the united feeling there is 47.2%, Scattered 52.8%, Varied 40.0%, Featureless 60.0%, New 32.5%, Historic 67.5%, Full of nature 53.1%, Urban 46.9%, Cheerful 49.4%, Gloomy 50.6%, Individualistic 46.3%, Conventional 53.7%, Friendly 61.6%, Unfriendly 38.4%, Healed 54.2%, Stimulated 45.8%, Open 47.9%, exclusive 52.1%, Want to reside 45.1%, Do not want to reside 54.9%, Warm 62.6%, Aloof 37.4%, Fascinating 49.6%, Not fascinating 50.4%, Want to play 47.8%, Want to examine deliberately 52.2%, Lively 40.3%, Calm 59.7%, Atmosphere of urban 30.5%, Atmosphere of rural area 69.5%

These are exhibited in Figure 6.

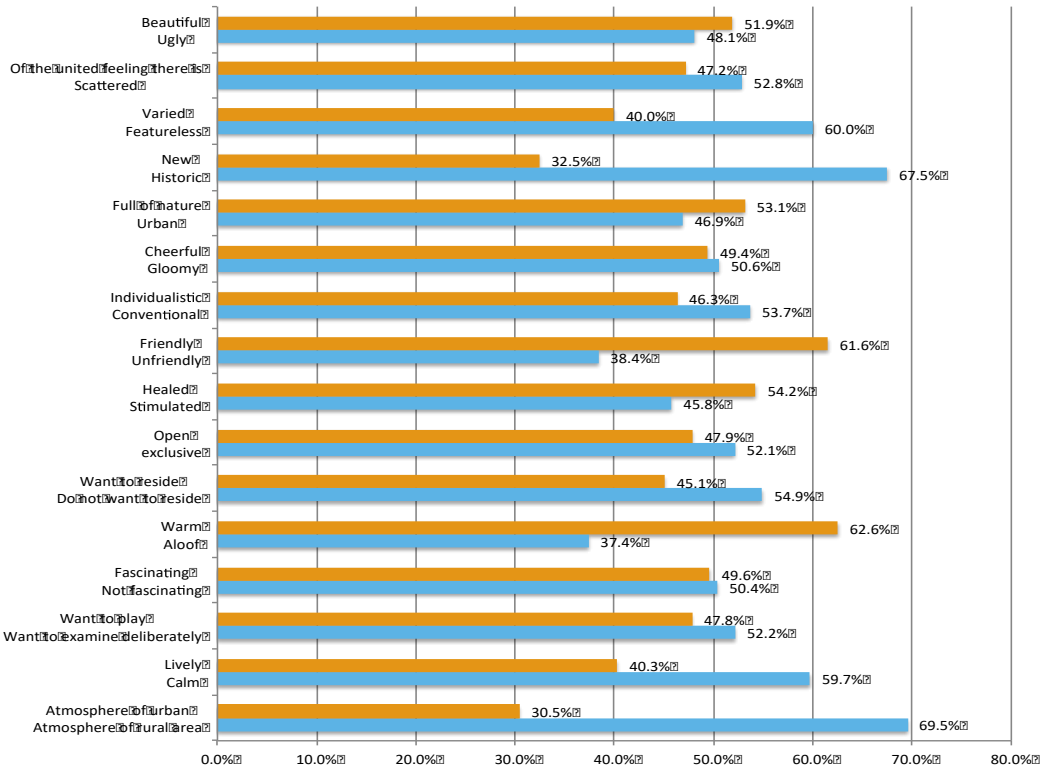

Figure 6: How do you feel about the image of the surrounding area at this shopping street? (Q3)

2.2.7 There are many old building at the age of nearly 50 years. Do you think we can still use them? (Q4)

Can use it 38.6%, Cannot use it 33.9%, Have no idea 27.5%

These are exhibited in Figure 7.

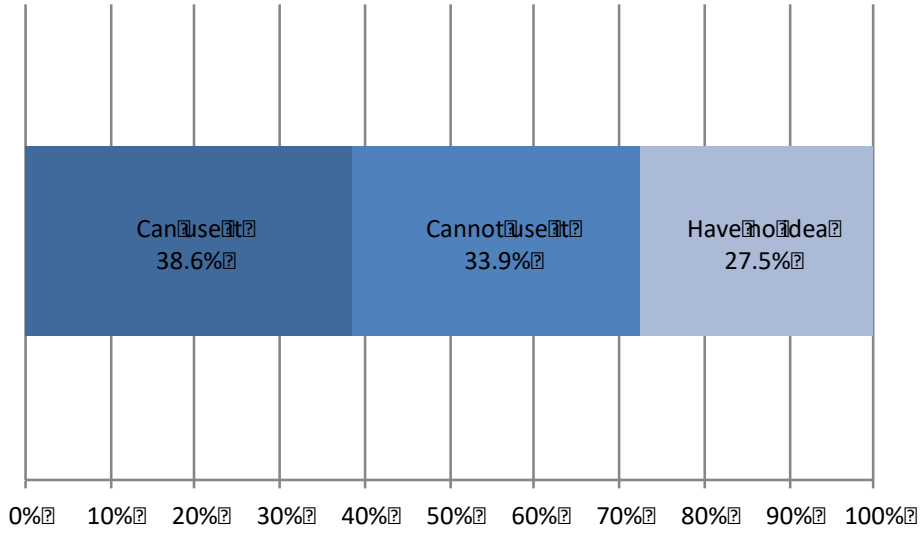

Figure 7: here are many old building at the age of nearly 50 years. Do you think we can still use them? (Q4)

3 Cluster Analysis

Cluster analysis is executed in order to confirm the relationship/closeness among items. First of all, cluster cohesion process is exhibited in Table 1.

Table 1: Cluster Cohesion Process

Step	Combined Cluster		Coefficient	First stage of cluster		Next Step
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	1	6	275.000	0	0	4
2	8	11	554.000	0	0	13
3	9	12	872.500	0	0	7
4	1	2	1208.833	1	0	8
5	14	15	1545.833	0	0	11
6	3	4	1903.833	0	0	11
7	9	10	2280.667	3	0	10
8	1	7	2687.583	4	0	9
9	1	13	3105.333	8	0	10
10	1	9	3561.375	9	7	12
11	3	14	4029.875	6	5	14
12	1	5	4550.056	10	0	13
13	1	8	5165.136	12	2	14
14	1	3	6374.133	13	11	0

Distance is calculated by using Euclidean square distance. Dendrogram by Ward method is exhibited in Figure 8.

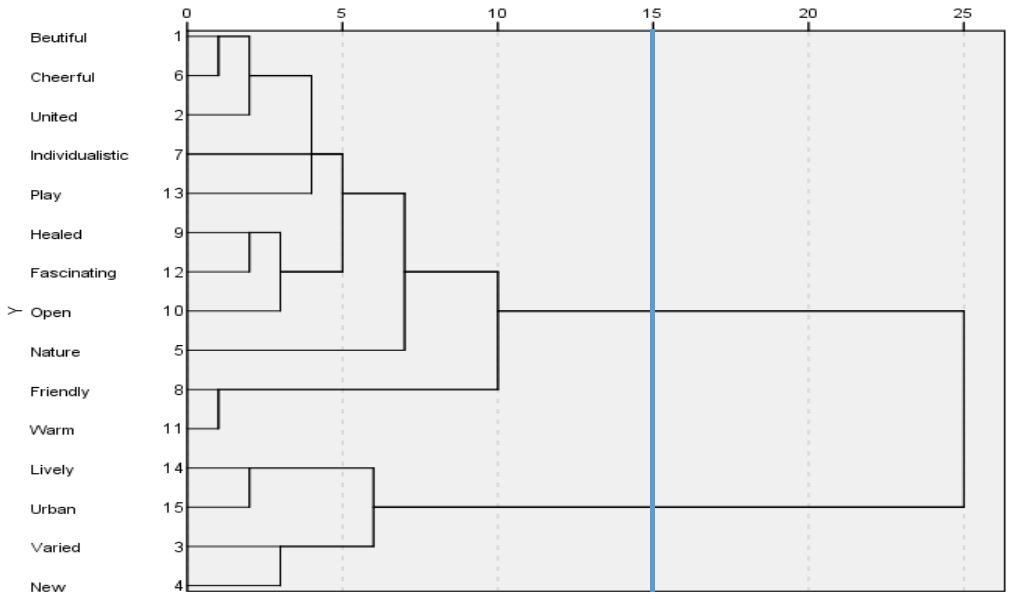

Figure 8: Dendrogram by Ward method

Distance is calculated by using Euclidean square distance. Dendrogram by Ward method is exhibited in Figure 8.

From the results of Cluster Analysis, we can observe two big clusters as follows.

- /Beautiful ~ Warm
- /Lively ~ New

For these clusters, we can name them as follows from its components.

/Beautiful ~ Warm : Countryside beauty and Attractive

/Lively ~ New : Varied and Urbane

These classification is used in the next Multiple Regression Analysis.

4 Multiple Regression Analysis

Multiple Regression Analysis is executed in order to find the most contributive factor for the specified purpose. The data used are the same with those of Factor Analysis. First of all, Descriptive statistics for the three big clusters which is derived from the Cluster Analysis are exhibited in Table 2. The value of each item in each cluster is summarized and then calculated in statistics.

From the Cluster Analysis, “Want to reside” does not seem to be the regular component, therefore we treat it as an objective function.

Table 2. The Results of Multiple Regression Analysis by 3 Clusters

	B	Standard error	*β*	*sig*
Countryside beauty and Attractive	0.054	0.009	0.318	**
Varied and Urbane	0.059	0.020	0.148	**
adjusted R-square			0.170	**

N =448, **p <0.01

The dependent variable: Want to reside

From Table 2, we can see that the Cluster 1 is best in β. Therefore we select "Countryside beauty and Attractive" Cluster and examine it in detail.

Table 3. The Results of Multiple Regression Analysis for each variable in "Countryside beauty and Attractive"

	model 1		model 2		model 3	
	β	*sig*	*β*	*sig*	*β*	*sig*
Fascinating	0.344	**	0.230	**	0.165	**
Warm			0.228	**	0.208	**
Beautiful					0.185	**
adjusted R-square	0.117	**	0.154	**	0.180	**

	model 4		model 5		model 6	
	β	*sig*	*β*	*sig*	*β*	*sig*
Fascinating	0.133	*	0.130	*	0.104	
Warm	0.186	**	0.194	**	0.172	**
Beautiful	0.172	**	0.173	**	0.154	**
Healed	0.116	**	0.138	**	0.130	**
Nature			-0.111	*	-0.115	**
Open					0.112	*
adjusted R-square	0.189	**	0.199	**	0.207	**

N =448, **p <0.01, *p <0.05

The dependent variable: Want to reside

Looking at this table in detail, we can observe that the most influential factor for "Want to reside" is "Warm" and then "Beautiful", "Healed" follow. These

results coincide with those of Bayesian Network Analysis we have conducted before.

Thus we could derive the influential factor to the specified purpose by utilizing Cluster Analysis and Multiple Regression Analysis.

5 Conclusion

Shopping streets at local city in Japan became old and are generally declining. In this paper, we handle the area rebirth and/or regional revitalization of shopping street. We focus on Fuji city in Japan. Four big festivals are held at Fuji city(two for Fuji Shopping Street Town and two for Yoshiwara Shopping Street Town). Many people visit these festivals including residents in that area. There is a big difference between Fuji Shopping Street Town and Yoshiwara Shopping Street Town. Therefore we focus Yoshiwara Shopping Street in this paper. A questionnaire investigation to the residents and visitors is conducted during these periods in order to clarify residents and visitors' needs for the shopping street, and utilize them to the plan building of the area rebirth and/or regional revitalization of shopping street. These are analyzed by using Cluster Analysis and Multiple Regression Analysis.

The results for Cluster Analysis are as follows. From the results of Cluster Analysis, we can observe two big clusters as follows.

- /Beautiful ~ Warm
- /Lively ~ New

For these clusters, we can name them as follows from its components.

/Beautiful ~ Warm : Countryside beauty and Attractive

/Lively ~ New : Varied and Urbane

These classification is used in the next Multiple Regression Analysis.

The results for Multiple Regression Analysis are as follows. Looking at the coefficient table in detail, we can observe that the most influential factor for “Want to reside” is “Warm” and then “Beautiful”, “Healed” follow. These results coincide with those of Bayesian Network Analysis we have conducted before. Thus we could derive the influential factor to the specified purpose by utilizing Cluster Analysis and Multiple Regression Analysis.

These are utilized for constructing a much more effective and useful plan building. Although it has a limitation that it is restricted in the number of research, we could obtain the fruitful results. To confirm the findings by utilizing the new consecutive visiting records would be the future works to be investigated.

Acknowledgements

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Appendix

Questionnaire Sheet about the Image Around the Shopping Street

1. How often do you come to this shopping street?

   a. Everyday b. ( ) times a week c. ( ) times a month d. ( ) times a year e. miscellaneous ( )

2. What is the purpose of visiting here? (Plural answers allowed)

   a. shopping b. eating and drinking c. business d. celebration, event e. leisure, amusement f. miscellaneous ( )

3. How do you feel about the image of the surrounding area at this shopping street? Select the position.

Beautiful	・・・・・	Ugly
Of the united feeling there is	・・・・・	Scattered
Varied	・・・・・	Featureless
New	・・・・・	Historic
Full of nature	・・・・・	Urban
Cheerful	・・・・・	Gloomy
Individualistic	・・・・・	Conventional
Friendly	・・・・・	Unfriendly

Healed	· · · · ·	Stimulated
Open	· · · · ·	exclusive
Want to reside	· · · · ·	Do not want to reside
Warm	· · · · ·	Aloof
Fascinating	· · · · ·	Not fascinating
Want to play	· · · · ·	Want to examine deliberately
Lively	· · · · ·	Calm
Atmosphere of urban	· · · · ·	Atmosphere of rural area

4. There are many old building at the age of nearly 50 years. Do you think we can still use them?

   a. Can use it b. Cannot use it C. Have no idea

5. Is there any functions or facilities that will be useful?

6. Comments

7. Sex

   a. Male b. Female

8. Age

   a.10th b.20th c.30th d.40th e.50th f.6th g. More than70

9. Residence

   a. Fuji City b. Fujinomiya City c. Numazu City d. Mishima City e. Shizuoka City f. Miscellaneous in Shizuoka Prefecture g. Outside of Shizuoka Prefecture [ ]