Hypothesis Testing for the Questionnaire Investigation on the Needs and Images at Fuji City in Shizuoka Prefecture

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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 district and two for Yoshiwara district). 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 shopping street. Hypothesis testing was executed based on that. There is a big difference between Fuji district and Yoshiwara district. Therefore we focus Yoshiwara district in this paper. We have set 9 Null hypotheses. In the hypothesis testing, 3 cases out of 9 null hypotheses were rejected and 1/3 of hypotheses were insisted clearly. We have obtained fruitful results. To confirm the findings by utilizing the new consecutive visiting records would be the future works to be investigated.

Keywords: Fuji city, area rebirth, regional vitalization, festival, hypothesis testing

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) made a study on the application of geothermal power generation to local revitalization in Obama Town. Kotani (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. (2009) 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. (2009) analyzed the image of the Izu Peninsula as a tourist destination in their 2003 study "Questionnaire Survey on the Izu Peninsula." Kano (2011) 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 district(Yoshiwara shopping street) and two big festivals at Fuji district(Fuji shopping street).

At Yoshiwara district, 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 district. 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 district: 448, Fuji district: 534).

Basic statistical analysis and Bayesian Network 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. Hypothesis testing was executed based on that. There is a big difference between Fuji district and Yoshiwara district. Therefore we focus Yoshiwara district in this paper. Another one will be discussed in another paper. We have set 9 Null hypotheses. Some interesting and instructive results are obtained.

The rest of the paper is organized as follows. Outline of questionnaire investigation is stated in section 2. In section 3, Hypothesis testing is executed which is followed by the Remarks is stated 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.

(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 Characteristics of Answers

(1) Sex (Q7)

Male 55.6%, Female 44.4%

These are exhibited in Figure 1.

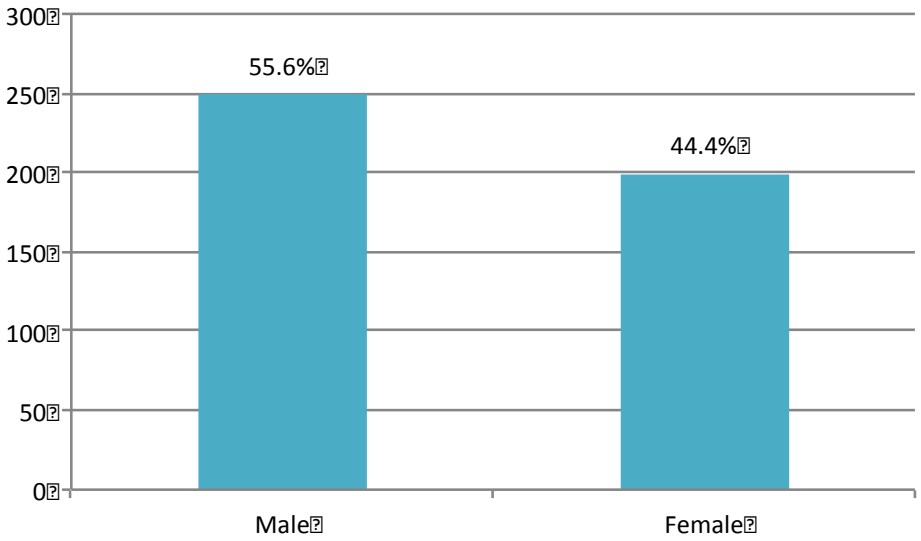

Figure 1. Sex (Q7)

(2) Age (Q8)

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

These are exhibited in Figure 2.

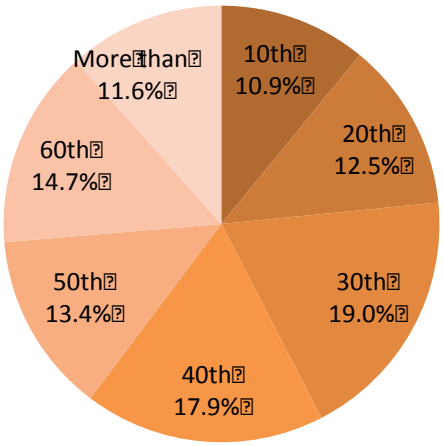

Figure 2. Age (Q8)

(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.

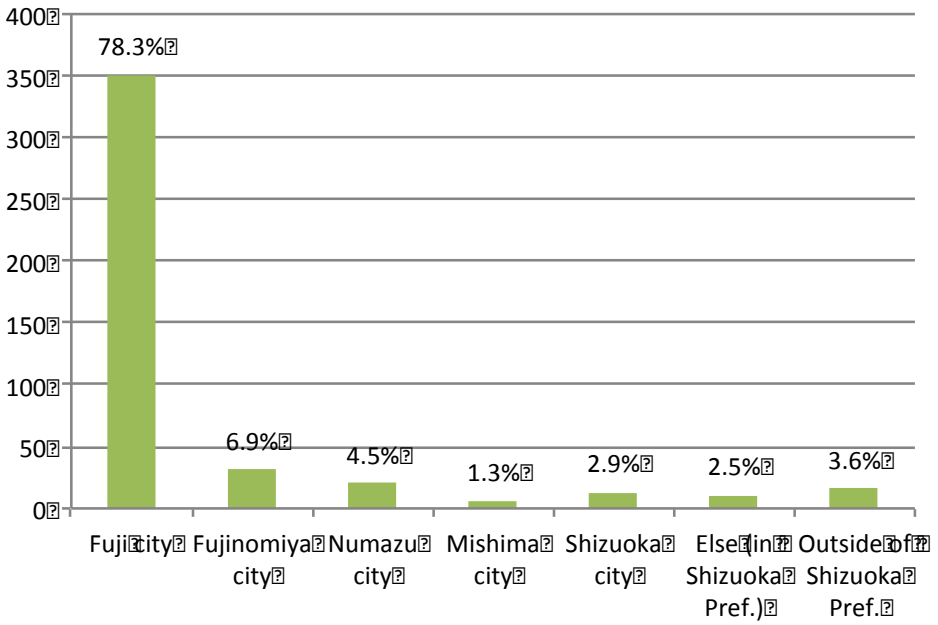

Figure 3. Residence (Q9)

2.2.2 Summary Results for the Items Used in Hypothesis Testing

(1) 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.

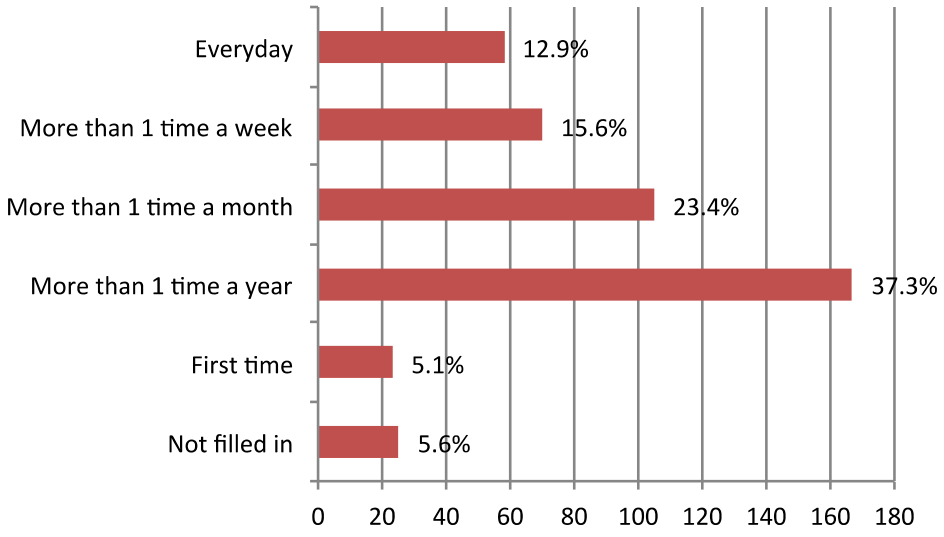

Figure 4. How often do you come to this shopping street? (Q1)

(2) 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.

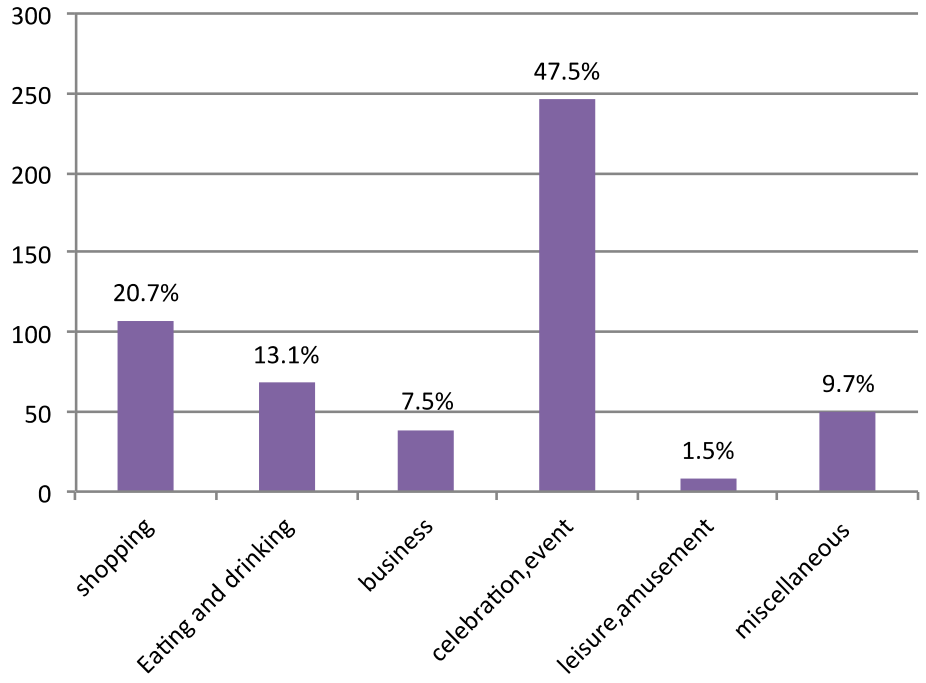

Figure 5. What is the purpose of visiting here? (Q2)

(3) 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.

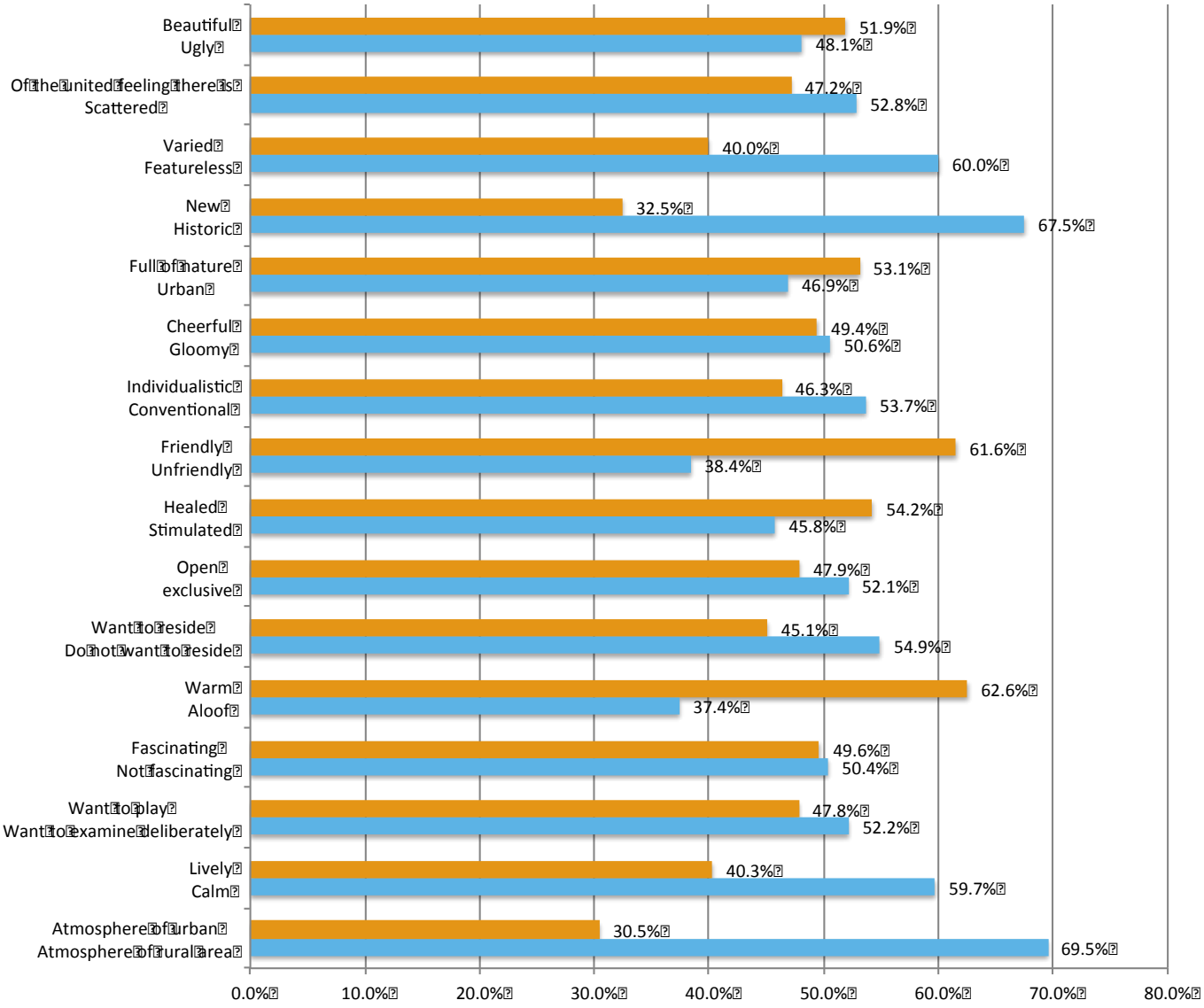

Figure 6. How do you feel about the image of the surrounding area at this shopping street? (Q3)

(4) 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.

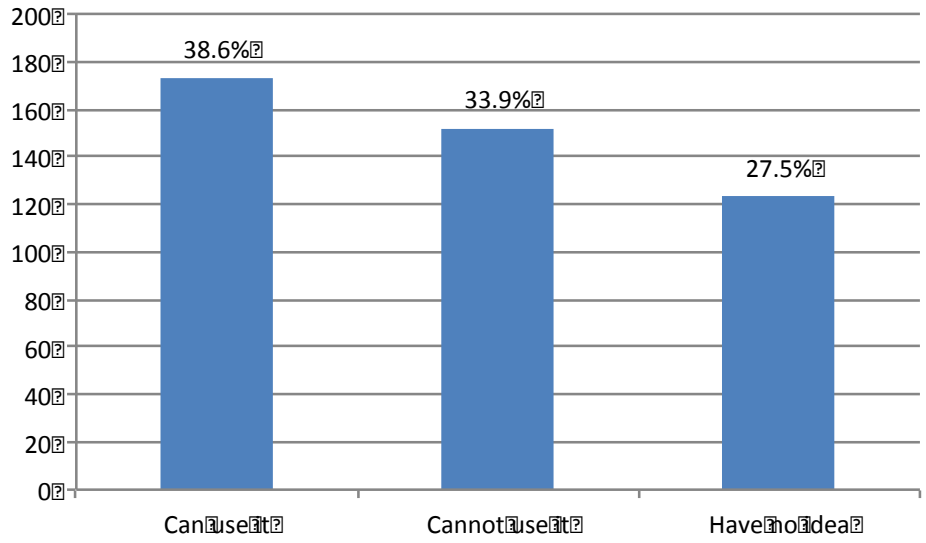

Figure 7. There are many old building at the age of nearly 50 years. Do you think we can still use them? (Q4)

3. Hypothesis Testing

Hereinafter we make hypothesis testing based upon the questionnaire investigation data.

3.1 Setting Hypothesis

We set the following 9 themes before setting Null Hypothesis.

A-1) Those who come frequently (every day) think that old buildings cannot be used.

A-2) Those who do not come so often (once a year) think that old buildings cannot be used.

A-3) Those who are at the age of less than 40 think that old buildings can be used.

A-4) Women think that old buildings cannot be used.

A-5) Those who answered that old buildings can be used think that they want to reside.

A-6) Those who answered that the image of the street is lively think that they want to reside.

A-7) Those who came from far away (Miscellaneous in Shizuoka Prefecture, Outside of Shizuoka Prefecture) think that they cannot judge whether old buildings can be used or not.

A-8) Those who answered that the purpose of visiting the shopping street is eating and drinking are male in majority.

A-9) Those who live in Fuji city have the purpose of eating and drinking while visiting the shopping street.

Now, we set the following 9 Null hypotheses.

B-1) There is not so much difference whether “those who come frequently (every day) think that old buildings cannot be used” or not.

B-2) There is not so much difference whether “those who do not come so often (once a year) think that old buildings cannot be used” or not.

B-3) There is not so much difference whether “those who are at the age of less than 40 think that old buildings can be used” or not.

B-4) There is not so much difference whether “women think that old buildings cannot be used” or not.

B-5) There is not so much difference whether “those who answered that old buildings can be used think that they want to reside” or not.

B-6) There is not so much difference whether “those who answered that the image of the street is lively think that they want to reside” or not.

B-7) There is not so much difference whether “those who came from far away (Miscellaneous in Shizuoka Prefecture, Outside of Shizuoka Prefecture) think that they cannot judge whether old buildings can be used or not” or

not.

B-8) There is not so much difference whether “t hose who answered that the purpose of visiting the shopping street is eating and drinking are male in majority” or not.

B-9) There is not so much difference whether “those who live in Fuji city have the purpose of eating and drinking while visiting the shopping street” or not.

3.2 Hypothesis Testing

x^2 hypothesis testing is executed in order to clarify tourists’ behavior. x^2 hypothesis testing is to clarify the difference between the expected value and the observed data, which is shown in Eq.(1).

$$x^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i} \tag{1}$$

Where O_i is an observed data and E_i is an expected value. The results of statistical hypothesis testing are as follows.

Null Hypothesis B-1) There is not so much difference whether “those who come frequently (every day) think that old buildings cannot be used” or not.

Summary table concerning Null Hypothesis B-1**)** is exhibited in Table 1.

Table 1. Summary table for Null Hypothesis B-1**)**

Q1: How often do you come to this shopping street? Everyday

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

			Q4		
			Can use it	Cannot use it /Have no idea	Total
Q1	Everyday	Frequency	25	33	58
		%	43.10	56.90	100.00
	Less than that	Frequency	140	225	365
		%	38.36	61.64	100.00
Total		Frequency	165	258	423
		%	39.01	60.99	100.00

Significance probability 0.491

The null hypothesis is not rejected. It can be said that there is not so much difference whether “those who come frequently (every day) think that old buildings cannot be used” or not.

Null Hypothesis B-2): There is not so much difference whether “those who do not come so often (once a year) think that old buildings cannot be used” or not.

Summary table concerning Null Hypothesis B-2) is exhibited in Table 2.

Table 2. Summary table for Null Hypothesis B-2)

Q1: How often do you come to this shopping street? 1 time a year

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

			Q4		
			Can use it	Cannot use it /Have no idea	Total
Q1	1 time a year	Frequency	73	94	167
		%	43.71	56.29	100.00
	More than that	Frequency	92	164	256
		%	35.94	64.06	100.00
Total		Frequency	165	258	423
		%	39.01	60.99	100.00

Significance probability 0.109

The null hypothesis is not rejected. It can be said that there is not so much difference whether "those who do not come so often (once a year) think that old buildings cannot be used" or not.

Null Hypothesis B-3) There is not so much difference whether "those who are at the age of less than 40 think that old buildings can be used" or not.

Summary table concerning Null Hypothesis B-3) is exhibited in Table 3.

Table 3. Summary table for Null Hypothesis B-3)

Q8: Age

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

			Q4		
			Can use it	Cannot use it /Have no idea	Total
Q8	Less than 40th	Frequency	106	164	270
		%	39.26	60.74	100.00
	More than 50th	Frequency	67	111	178
		%	37.64	62.36	100.00
Total		Frequency	173	275	448
		%	38.62	61.38	100.00

Significance probability 0.731

The null hypothesis is not rejected. It can be said that there is not so much difference whether "those who are at the age of less than 40 think that old buildings can be used" or not.

Null Hypothesis B-4) There is not so much difference whether "women think that old buildings cannot be used" or not.

Summary table concerning Null Hypothesis B-4) is exhibited in Table 4.

Table 4. Summary table for Null Hypothesis B-4)

Q7: Sex

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

			Q4			
			Can use it	Cannot use it	Have no idea	Total
Q7	Male	Frequency	96	89	64	249
		%	38.55	35.74	25.70	100.00
	Female	Frequency	77	63	59	199
		%	38.69	31.66	29.65	100.00
Total		Frequency	173	152	123	448
		%	38.62	33.93	27.46	100.00

Significance probability 0.976

The null hypothesis is not rejected. It can be said that there is not so much difference whether "women think that old buildings cannot be used" or not.

Null Hypothesis B-5) There is not so much difference whether "those who answered that old buildings can be used think that they want to reside" or not.

Summary table concerning Null Hypothesis B-5) is exhibited in Table 5.

Table 5. Summary table for Null Hypothesis B-5)

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

Q3: How do you feel about the image of the surrounding area at this shopping street? : Want to reside

			Q3: Want to reside		
			Think so/ Not specified	Do not think so	Total
Q4	Can use it	Frequency	116	57	173
		%	67.05	32.95	100.00
	Cannot use it /Have no idea	Frequency	157	118	275
		%	57.09	42.90	100.00
Total		Frequency	273	175	448
		%	60.94	39.06	100.00

Significance probability 0.035

The null hypothesis is rejected with 4% significance level. It can be said that those who answered that old buildings can be used think that they want to reside.

Null Hypothesis B-6) There is not so much difference whether "those who come frequently (every day) think that old buildings cannot be used" or not.

Summary table concerning Null Hypothesis B-6) is exhibited in Table 6.

Table 6. Summary table for Null Hypothesis B-6)

Q3: How do you feel about the image of the surrounding area at this shopping street? : Lively

Q3: How do you feel about the image of the surrounding area at this shopping street? : Want to reside

			Q3: Want to reside		
			Think so/ Not specified	Do not think so	Total
Q3: Lively	Think so/ Not specified	Frequency	159	63	222
		%	71.62	28.38	100.00
	Do not think so	Frequency	114	112	226
		%	50.44	49.56	100.00
Total		Frequency	273	175	448
		%	60.94	39.06	100.00

Significance probability 0.000

The null hypothesis is rejected with 1% significance level. It can be said that those who answered that the image of the street is lively think that they want to reside.

Null Hypothesis B-7) There is not so much difference whether "those who came from far away (Miscellaneous in Shizuoka Prefecture, Outside of Shizuoka Prefecture) think that they cannot judge whether old buildings can be used or not" or not.

Summary table concerning Null Hypothesis B-7) is exhibited in Table 7.

Table 7. Summary table for Null Hypothesis B-7)

Q9: Residence

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

			Q4		
			Can use it	Cannot use it /Have no idea	Total
Q9	Neighborhood	Frequency	161	260	421
		%	38.24	61.76	100.00
	Far away	Frequency	12	15	27
		%	44.44	55.56	100.00
Total		Frequency	173	275	448
		%	38.62	61.38	100.00

Significance probability 0.521

The null hypothesis is not rejected. It can be said that there is not so much difference whether "those who came from far away (Miscellaneous in Shizuoka Prefecture, Outside of Shizuoka Prefecture) think that they cannot judge whether old buildings can be used or not" or not.

Null Hypothesis B-8) There is not so much difference whether "t hose who answered that the purpose of visiting the shopping street is eating and drinking are male in majority" or not.

Summary table concerning Null Hypothesis B-8) is exhibited in Table 8.

Table 8. Summary table for Null Hypothesis B-8)

Q7: Sex

Q2: What is the purpose of visiting here? : Eating and drinking

			Q2: Eating and drinking		Total
			No	Yes	
Q7	Male	Frequency	197	52	249
		%	79.12	20.88	100.00
	Female	Frequency	183	16	199
		%	91.96	8.04	100.00
Total		Frequency	380	68	448
		%	84.82	15.18	100.00

Significance probability 0.000

The null hypothesis is rejected with 1% significance level. It can be said that those who answered that the purpose of visiting the shopping street is eating and drinking are male in majority.

Null Hypothesis B-9) There is not so much difference whether "those who live in Fuji city have the purpose of eating and drinking while visiting the shopping street" or not.

Summary table concerning Null Hypothesis B-9) is exhibited in Table 9.

Table 9. Summary table for Null Hypothesis B-9)

Q9: Residence

Q2: What is the purpose of visiting here? : Eating and drinking

			Q2: Eating and drinking		
			No	Yes	Total
Q9	Fuji city	Frequency	293	58	351
		%	83.48	16.52	100.00
	Else	Frequency	87	10	97
		%	89.69	10.31	100.00
Total		Frequency	380	68	448
		%	84.82	15.18	100.00

Significance probability 0.131

The null hypothesis is not rejected. It can be said that there is not so much difference whether "those who live in Fuji city have the purpose of eating and drinking while visiting the shopping street" or not.

4. Remarks

The Results for Hypothesis Testing are as follows.

We set the following 7 themes.

A-1) Those who come frequently (every day) think that old buildings cannot be used.

A-2) Those who do not come so often (once a year) think that old buildings cannot be used.

A-3) Those who are at the age of less than 40 think that old buildings can be used.

A-4) Women think that old buildings cannot be used.

A-5) Those who answered that old buildings can be used think that they want to reside.

A-6) Those who answered that the image of the street is lively think that they want to reside.

A-7) Those who came from far away (Miscellaneous in Shizuoka Prefecture, Outside of Shizuoka Prefecture) think that they cannot judge whether old buildings can be used or not.

A-8) Those who answered that the purpose of visiting the shopping street is eating and drinking are male in majority.

A-9) Those who live in Fuji city have the purpose of eating and drinking while visiting the shopping street. 3 cases out of 9 are rejected and 1/3 of hypotheses (A-5, A-6, A-8) were insisted clearly.

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. Many people visit these festivals including residents in that area. Therefore a questionnaire investigation to the 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. Hypothesis testing was executed based on that. There is a big difference between Fuji district and Yoshiwara district. Therefore we have focused Yoshiwara district in this paper.

In the hypothesis testing, 3 out of 9 null hypotheses were rejected and 1/3 of hypotheses (A-5, A-6, A-8) were insisted clearly. 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

This study was made possible through the extensive cooperation of the Fuji Chamber of Commerce and Industry, Fuji-city, Kogakuin University KINOSHITA Laboratory, KATSUMATA MARUYAMA ARCHITECTS Co., Ltd. , and others. And finally, the authors are grateful to all those who supported us for answering the questionnaire investigation.

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