Cluster Analysis for the Questionnaire Investigation on the Needs at 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 shopping street. 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 works to be investigated.

Keywords: Fuji city, area rebirth, regional vitalization, festival, cluster analysis, multiple regression analysis

1. Introduction

In recent years in Japan, the national and local governments have been trying to attract foreign tourists by using strategic approaches and developing tourist facilities, with the aim of promoting regional exchange and generating economic benefits. Particular aims of local government are to overcome the common problems of an aging population and declining birthrate through tourism-generated income and to stimulate the local society through regional exchange and migration. However, in order to take measures that will increase tourism, it is necessary to understand the attraction of particular regions in Japan. Moreover, it is necessary to have a picture of the tourists that might want to visit such regions.

In order to investigate solutions to problems shared across regions it is necessary to carefully examine the critical basic data as well as appropriate methods of data collection. To try to obtain such data, preceding studies on tourist destinations that have statistically analyzed trends in tourist behavior will now be reviewed.

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.

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. 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. 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
3) Method: Local site, Dispatch sheet, Self-writing
4) Collection: Number of distribution 1400, Number of collection 982(collection rate 70.1%), Valid answer 982

2.2 Basic Statistical Results

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

2.2.1 Sex (Q7)

Male 48.9%, Female 51.1%

These are exhibited in Figure 1.
2.2.2 Age (Q8)
10th 16.2%, 20th 14.8%, 30th 22.4%, 40th 17.4%, 50th 11.6%, 60th 10.5%, More than 70 7.1%
These are exhibited in Figure 2.

2.2.3 Residence (Q9)
a. Fuji city 56.4%, b. Fujinomiya city 18.0%, c. Numazu city 7.2%, d. Mishima city 2.3%, e. Shizuoka city 4.2%, F. Else (in Shizuoka Prefecture) 5.1%, g. Outside of Shizuoka Prefecture 6.9%
These are exhibited in Figure 3.
2.2.4 How Often Do You Come to This Shopping Street? (Q1)

Everyday 17.4%, More than 1 time a week 16.5%, More than 1 time a month 25.8%, More than 1 time a year 31.6%, First time 4%. Not filled in 4.8%

These are exhibited in Figure 4.

2.2.5 What Is the Purpose of Visiting Here? (Q2)

Shopping 18.8%, Eating and drinking 13.4%, Business 7.4%, Celebration, event 40.2%, Leisure, amusement 4.0%, miscellaneous 16.1%

These are exhibited in Figure 5.
2.2.6 How do You Feel About the Image of the Surrounding Area at This Shopping Street? (Q3)
Beautiful 51.5%, Ugly 48.5%. Of the united feeling there is 45.6%, Scattered 54.4%, Varied 39.2%, Featureless 60.8%, New 32.4%, Historic 67.6%, Full of nature 54.5%, Urban 45.5%, Cheerful 46.5%, Gloomy 53.5%, Individualistic 44.0%, Conventional 56.0%, Friendly 59.5%, Unfriendly 40.5%, Healed 53.7%, Stimulated 46.3%, Open 46.2%, exclusive 53.8%, Want to reside 44.3%, Do not want to reside 55.7%, Warm 58.5%, Aloof 41.5%, Fascinating 45.5%, Not fascinating 54.5%, Want to play 47.4%, Want to examine deliberately 52.6%, Lively 38.4%, Calm 61.6%, Atmosphere of urban 29.1%, Atmosphere of rural area 70.9%
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 44.1%, Cannot use it 31.4%, Have no idea 24.5%
These are exhibited in Figure 7.

![Figure 7](http://ijba.sciedupress.com)

Figure 7. There 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>
<thead>
<tr>
<th>Step</th>
<th>Combined Cluster</th>
<th>Coefficient</th>
<th>First stage of cluster</th>
<th>Next Step</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cluster 1</td>
<td>Cluster 2</td>
<td></td>
<td>Cluster 1</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>11</td>
<td>595.000</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1199.500</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>12</td>
<td>1817.000</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
<td>15</td>
<td>2509.000</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>4</td>
<td>3240.000</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>10</td>
<td>3971.167</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
<td>4726.167</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>7</td>
<td>5540.250</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>6</td>
<td>6391.333</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>3</td>
<td>14</td>
<td>7286.833</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>13</td>
<td>8201.357</td>
<td>9</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
<td>8</td>
<td>9209.607</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>5</td>
<td>10726.136</td>
<td>11</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>3</td>
<td>13153.067</td>
<td>13</td>
</tr>
</tbody>
</table>

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

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

> /Friendly ~ Full of Nature
> /Beautiful ~ Want to play
> /Lively ~ New

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

/Friendly ~ Full of Nature : Warm and Healing
/Beautiful ~ Want to play : Beautiful 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. The results of Multiple Regression Analysis by 3 Clusters 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 cluster

<table>
<thead>
<tr>
<th>Cluster</th>
<th>B</th>
<th>Standard error</th>
<th>β</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warm and Healing</td>
<td>0.086</td>
<td>0.014</td>
<td>0.214</td>
<td>**</td>
</tr>
<tr>
<td>Beautiful and Attractive</td>
<td>0.054</td>
<td>0.011</td>
<td>0.228</td>
<td>**</td>
</tr>
<tr>
<td>Varied and Urbane</td>
<td>0.054</td>
<td>0.015</td>
<td>0.135</td>
<td>**</td>
</tr>
</tbody>
</table>

adjusted R-square: 0.228 **

N=981, **p <0.01

From Table 2, we can see that the Cluster 2 is best in β. Therefore we select “Beautiful and Attractive” cluster and examine it in detail.

Table 3 shows the summary of the model.

Table 3. The results of multiple regression analysis for each variable in “beautiful and attractive” cluster

<table>
<thead>
<tr>
<th>Variable</th>
<th>model 1</th>
<th></th>
<th>model 2</th>
<th></th>
<th>model 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>sig</td>
<td>β</td>
<td>sig</td>
<td>β</td>
<td>sig</td>
</tr>
<tr>
<td>Open</td>
<td>0.399</td>
<td>**</td>
<td>0.281</td>
<td>**</td>
<td>0.254</td>
<td>**</td>
</tr>
<tr>
<td>Fascinating</td>
<td>0.264</td>
<td>**</td>
<td></td>
<td></td>
<td>0.221</td>
<td>**</td>
</tr>
<tr>
<td>Beautiful</td>
<td>0.128</td>
<td>**</td>
<td></td>
<td></td>
<td>0.128</td>
<td>**</td>
</tr>
</tbody>
</table>

adjusted R-square: 0.158 ** 0.213 ** 0.226 **

N=982, **p <0.01

Looking at this table in detail, we can observe that the most influential factor for “Want to reside” is “Open” and then “Fascinating”, “Beautiful” 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. 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. 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 three big clusters as follows.

- /Friendly ~ Full of Nature
- /Beautiful ~ Want to play
- /Lively ~ New

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

- /Friendly ~ Full of Nature : Warm and Healing
- /Beautiful ~ Want to play : Beautiful 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 coefficients table in detail, we can observe...
that the most influential factor for “Want to reside” is “Open” and then “Fascinating”, “Beautiful” follow. This will be applied to other shopping street in Japan. The concrete methods to attack this would be different in each place and it should be investigated consecutively. 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. The results of the survey were reported to the staff of Fuji city with a great concern and told to make it utilize for the regional revitalization of shopping street.

There is a limitation in this research that the research period is restricted during the festival time. As for this, the questionnaire investigation should be executed in the plural years and should be analyzed. Further study on this will bring forth much more exquisite 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

The authors are grateful to all those who supported us for answering the questionnaire investigation.

References


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.

<table>
<thead>
<tr>
<th>Beautiful</th>
<th>• • • •</th>
<th>Ugly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of the united feeling there is</td>
<td>• • • •</td>
<td>Scattered</td>
</tr>
<tr>
<td>Varied</td>
<td>• • • •</td>
<td>Featureless</td>
</tr>
<tr>
<td>New</td>
<td>• • • •</td>
<td>Historic</td>
</tr>
<tr>
<td>Full of nature</td>
<td>• • • •</td>
<td>Urban</td>
</tr>
<tr>
<td>Cheerful</td>
<td>• • • •</td>
<td>Gloomy</td>
</tr>
<tr>
<td>Individualistic</td>
<td>• • • •</td>
<td>Conventional</td>
</tr>
<tr>
<td>Friendly</td>
<td>• • • •</td>
<td>Unfriendly</td>
</tr>
<tr>
<td>Healed</td>
<td>• • • •</td>
<td>Stimulated</td>
</tr>
<tr>
<td>Open</td>
<td>• • • •</td>
<td>exclusive</td>
</tr>
<tr>
<td>Want to reside</td>
<td>• • • •</td>
<td>Do not want to reside</td>
</tr>
<tr>
<td>Warm</td>
<td>• • • •</td>
<td>Aloof</td>
</tr>
<tr>
<td>Fascinating</td>
<td>• • • •</td>
<td>Not fascinating</td>
</tr>
<tr>
<td>Want to play</td>
<td>• • • •</td>
<td>Want to examine deliberately</td>
</tr>
<tr>
<td>Lively</td>
<td>• • • •</td>
<td>Calm</td>
</tr>
<tr>
<td>Atmosphere of urban</td>
<td>• • • •</td>
<td>Atmosphere of rural area</td>
</tr>
</tbody>
</table>

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 than 70

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