VISUALIZATION AND QUANTIFICATION OF REGIONAL TOURISM BY THE SPATIAL CHARACTERISTICS ANALYSIS OF TOURIST FACILITIES- UTILIZING TOURISM REGIONAL ECONOMIC RESEARCH AND PHONE DATA

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1. Introduction

With the rapid development of tourism statistics, it has been able to watch economic trends in tourist regions. However, it is a few cases that researches understand the tourism industry in the point of spatial analysis such as tourism establishments are where they located in the tourism region, and an accumulation of the establishments. It is considered the accumulation and spatial characteristic of tourism establishment contribute greatly the attraction of tourism regions. Moreover, it is necessary to understand the spatial characteristics that what tourism establishment contribute goods and services by visualizing.

In addition, Regional Tourism Economic Survey (RTES) ³⁾ conducted by Japan Tourism Agency (JTA) ³⁾ surveyed minutely economic conditions of tourism establishment in more micro than the level of cities. By combining these data, it is possible to clarify whether tourism establishments located in the tourism regions of what kind of economic scale.

By using RTES by JTA, we understand the economic characteristics of the whole tourism regions. Considering this, we collect data about tourism establishment in tourism regions, and clarify the spatial characteristics of the establishment in tourism regions by visualizing with spatial information.

We thought that because of RTES had been conducted 2 years ago, there are few studies with RTES.

In order to clarifying the economic impacts of visit japan travelers, Kurihara¹⁾ calculated economic impacts with sales costs data of each payee regions in the establishment and questionnaire made by himself. In the point of the comparative analysis in tourism regions and cities, Tonomura and Miyashita²⁾ classified tourist city with a tourism statistics, and analyzed the changes of retail sales and day-time population in central city area. Moreover, Miyagawa et al.,3) estimated tourism sales

amounts with information of guidebook and spatial characteristics of tourism establishment in target area of RTES.

In this study, with combining these data, it is possible to clarify whether tourism establishments located in the tourism regions of what kind of economic scale. This study has a feature in the point of clarifying the spatial characteristics with not only distributing of tourism establishments, but business types, accessibility, accumulation of the establishment.

2. Construction

Target area are 78 that have been published on a reported aggregate RTES. As a research method, to perform the classification of tourist region in the economic data from the scale of revenue and the amount the number of employees from the tourist region Economic Research. In addition, the facility data in order to obtain information on tourist facilities, are disclosed in the i town page of NTT, collect the addresses and telephone numbers, and determine the location characteristics of the facility. By combining the data of these last, we location characteristics analysis of tourist destination facility between the classification in each economy.

3. Abstract of Regional Tourism Economic Survey

The purpose of RTES is "we obtain a basic data for tourism industry policies through clarifying that tourism industry have an effect on regional economy and conditions of tourism industry" ⁴⁾. Table.1 shows the abstract of this survey. The latest data surveyed in 2012. Survey periods is from January to February in 2011, and this means that the survey method is required to answer sales amounts at last year in 2012. Target area included tourism spot are 561 regions, and the section of this areas conform to the old city section of the premerger in 1950.

Therefore, rather than have repeated municipal area the current large merger, there are greatly micro areas. The definition of a tourism spot is from the tourism spot in "the common standards for the number of visitors by JTA". The survey is a form of posting to tourism establishments, and the percentage of collect is 49%. There are 904 regions which the percentage of collect is good, and is able to open data. Because the survey is conducted at a unit of establishment, it has the number of employee, types of office, sale amount and conditions of business. This data is linked to the latest " Economic Census", and does an extrapolation as a tourism regions. 78 regions in the survey, as a rapid result, are available. These areas have no less than 60 questionnaires, and the error of estimation is no more than 0.2 in detail.

Survey period	JanDec. , 2011
Survey regions	Of the 11,000 former regional municipalities of 25 years before the merger Showa,
	5,861 areas where there are tourist spot
	Tourist destinations that are specified in the $ m ``common \ standards$ for tourist visitors
	Nyukomi statistics" Tourism Agency, I meet the following criteria.
Deffinition of	•Non-daily use in many cases, the number of customers can be grasped properly
tourism regions	enters tourism
	\cdot 1 million people or more per year, tourist arrivals Nyukomi of 2010 is the last year
	survey year is more than 5,000 people in the month of either.
Mathad	The mailed questionnaire tourism-related establishments in the study area (Table 2),
Method	and have them return
	number of tourism offices:88,575
Survey result	Number of valid responses:35,603(Percentage 49.9%)
	Samples in open data:904 (pronpt report):78
	The number of employees of the office, Management organization, Handling of the
	consumption tax, Cost and sales, Percentage or by business sales amount, The tourist
Survey item	rate in percent of sales and business major, Monthly breakdown of sales amount,
	Payee regional rate and itemized breakdown of annual operating expenses,
	Implementation status of the business, Passengers

Table 1 Abstract of the regional tourism economic survey

4. Analysis of regional characteristics

In this chapter, we understand the characteristics of the 78 tourist regions by using the tourist region economic survey. City of various levels exist to small and medium-sized cities from large cities in 78 regions. Therefore, we classify target areas considering the level of population belonging to each cities.

We listed indicators by each types, and clarify the characteristics. With the previous chapter, RTES have many data about sale amount about the establishment. To clarify the regional economics by this data, we set a 4 indicators the following below.

① Sales efficiency : Sales amount of per employee in food-lodging industry

② User density : the number of users per one establishment which is industry of food and retail sales.

- ③ Regional contribution : the city percentage of operating expenses payee
- ④ Tourism dependence : the ratio of tourism sales amount in all sales. For the setting of indicators, was referring to the precedents of the Tourism Agency⁵⁾.

Figure 1 shows that it organize the indicators by population size. In index ①, numerical value as small cities is high. In index ②, index higher number of users as large cities, it is the opposite of the results as an indicator ①. In index ③, metropolis as operating expenses ratio in the city is high, the high economic effect in the region. In index ④, the group of 10-15 million people city

has high percentage of sales amount, and the group of 15-30 million people city is the lowest.

Thus, the economic impact for tourism have a trend to be as high as small city. But each establishments has big incomes without sales amount. A small city has a high tourism dependence and sales efficiency. But if the tourism consumption is increased, it is tend to flow out of the regions. It needs to promote the local production for local consumption of materials and services used in the tourism establishments.



Figure 1 Characteristics of tourism region

5. Phone Data Analysis

5.1 Introduction

In this study, we understand another viewpoint of the spatial characteristics of the local economy. We make a distribution of tourism establishment using the information of business type and spatial information in the establishments by phone data. The phone data is collected from 1970 to now, and the record is published in every year. This data will be possible to access to the information of the past establishment which is impossible to do a field study. With linked to the accumulation of RTES data, it will understand a detail change of regional economics. Thus, it will be able to visualize the regional economics which we can't understand by statistics values. The phone data contribute the decision making tourism policies cooperated with urban planning.

5.2 Selection of research area

Target areas of RTES are level of not city but regions. But, regional sections is not sections which is premerger, there are big difference in each regions. If we analyze too large target area, the area is possible to have a low percentage of sales amount in all sales. It is difficult that tourism industries don't effect on such regional economies. This study aims to select the areas; there are many use of visitors. So, we selected target areas the following below.

A: Ratio of tourism sales in all sales is no less than 30 %.

B: It is small areas; the ratio of the latest administrative boundaries is no more than 50 %.

C: Target area is no more than 40 km². X Expected island region

Result of this selection, the number of target areas is 9 regions. Table.2 shows the abstract of each regions. Also, to represents the characteristics in the target areas, it shows popular sightseeing spot. The "Population size" represents a population in latest administrative boundaries. Exception of Nagaoka city, there are smaller than the population size of 15 million. The ratio of sales amount is high in these area by the analysis of the previous chapter. The result of selecting target areas related to a tourism industry. It can select better narrow regions than latest regions except of Yugawara town. Moreover, the area of target area is also small.

Prefecture	Name in 1950	Name in 2010	Population size	Sightseeing spot	Ratio of tousim sales to all	Ratio of old areas to now	Area (km2)
Ibaraki	Isohama	Ōarai	50 thousand and under	Ōarai Shrine, Outlet shopping 39%		26%	6.05
Tiba	Iwai	Minamiboso	50 thousand and under	Sea, Roadside Sta.	48%	5.5%	12.6
Kanagawa	Yugawwara	Yugawara	50 thousand and under	Hot spring town	56%	47%	19.3
Niigata	Teradoma	Nagaoka	150-300 (thousand)	Cape, National park	58%	4.3%	38.4
Niigata	Yuzawa	Yuzawa town	50 thousand and under	Ski sports, Hot spring town	70%	4.6%	16.3
Ishikawa	Yamashiro	Kaga	50-100 (thousand)	Hot spring town	36%	4.2%	12.9
Shizuoka	Gotenba	Gotenba city	50–100 (thousand)	Outlet shopping	31%	14%	28.0
Mie	Toba	Toba city	50 thousand and under	Sea, Hotel resort	61%	11%	11.7
Shimane	Taisha	Izumo	100-150 (thousand)	Izumo shrine	32%	1.1%	6.04

 Table 2
 The list of research regions in regional tourism economic survey

5.2 Method of spatial analysis

(1) Abstract of Phone data

The private company, it is called NTT, has managed the all fixed – line phone data in Japan. NTT has also phone data of we use in this study. General establishments has various fixed – line phone number. It is get the address in the establishment through a phone number. The town page is called such as recoding the detail business types, address and phone number. The town page has been a

book published every year in general since 1970. In addition, there are many information on the internet, it is called " i town page". This study used information of " i town page" in April 2014 ⁶⁾.

(2) Method of making data of equipment

This study create a data of establishments from the phone data. In order to understand the spatial characteristics of establishments, this study is essential to acquire the detailed location information. Phone book data contains address information, such as latitude and longitude information is not included. It is difficult to obtain a highly accurate positional information for the vast office information.

So this study get the spatial information (longitude and latitude) with the address matching service by "CSIS" in Tokyo university ⁷⁾ and geo-cording systems by " Google maps api⁸⁾" This study get the 2,578 address information in all target areas. Moreover, the establishment has attribute of business types. This study classifies 8 types by TSA standards after adjusting business information in town page.

5.3 Spatial analysis of tourism regions

Figure.2 shows the distribution of office for nine regions. It is not possible to show full areas of target area due to space limitations. All figures in Figure.2 visualize the main tourism areas around each region. The black line in Figure.2 shows in target area. The distribution of establishments is largely different in each region. Among the many retail and food and drink service in most of the target area, accommodations in Iwai town are concentrated. In addition, in order to emphasize the location characteristics, we generate a concentric 30m from each establishment, and determine the continuity of the office location. If the store is adjacent, this study binds with concentric circles each other of 30m, and create a new areas. This was carried out in all of the establishments, this study define the continuity of the tourism establishment as a cooperation area. Figure 3 shows the result. The more the store is continuous, it can be seen that the continuous charge of area increases. This study visualize where bustle of the local economy.

So, if the establishments located and distributed respectively, it is small ream responsible area and it represents no accumulate locations. On the other hand, when the density of the establishment is high, and it is located widely in succession, a cooperation area grows big and expresses the site location being the unity. Isohama town is remarkable for a former example. In addition, as a characteristic to be seen in many target areas, there are one point that a cooperation area has a big exists. Other cooperation areas tend to be low. However, in Iwai town, plural points that a cooperation area had a big existed, and it was revealed that a sightseeing establishment was located intensively.



Figure 2 The location of tourism offices in 9 regions



Figure 3 The location of tourism offices in 9 regions

Table.3 shows an index to clarify spatial characteristics of the establishment. It is thought that an establishment located near the node which visitors depart and come home, we measured the distance from a station, a bus stop, the parking lot from each establishment, and calculated the average distance in every target area ⁹). In addition, we calculated the number of the types of industry and the number of the types of industry per 1 establishment. Furthermore, we showed the maximum of the cooperation area from a result of the visualization.

The distance to the station is located to the distance that Toba-city is the closest, and Terado town is the longest. In addition, the distance from a bus stop and the parking located in Terado town is the longest, too. In Yamashiro town, although the distance to the station is far, it is very close in the distance to the bus stop.

In Taisya town, the distance to the parking lot is the closest. The type of industry refers to service contents, and it shows that many types have many products and services. In Yuzawa town, the number of types per one establishment is the biggest (value: 1.95). It was revealed that the cooperation area most greatly had an area of 38,005m² in Gotemba town.

Name	Average distance from offices to nearst Sta. (m)	Average distance from offices to nearst Bus sta. (m)	Average distance from offices to nearst car park (m)	Total number of offices	Total number of types	Number of types per an office	Max value of continuity are(m2)
Isohama(Ōarai)	1,207	133	581	318	548	1.72	8,208
Iwai(Minamiboso)	717	311	1,455	117	154	1.32	22,341
gawwara(Yugawar	1,126	163	1,071	480	730	1.52	12,512
eradoma(Nagaoka	4,737	568	7,142	79	142	1.80	20,589
ızawa(Yuzawa tow	433	377	473	241	471	1.95	11,871
Yamashiro(Kaga)	3,221	173	522	326	582	1.79	22,984
otenba(Gotenba cit	979	178	735	596	920	1.54	38,005
Toba(Toba city)	406	230	732	250	425	1.70	10,138
Taisha(Izumo)	567	246	385	164	253	1.54	11,835
Average	1,488	264	1,455	286	469	1.65	17,609

Table 3 The list of tourism regions

7. Conclusion

In this study, we understood a local characteristic and the location characteristic of the establishment using a sightseeing regional economy investigation and telephone book data for the purpose of visualization, quantification of the regional economy. Moreover, it is clear that the economic characteristic of the sightseeing area. The higher Sales efficiency is, the smaller cities are. But the user density in big cities is higher than small cities. In addition, it selected 9 areas from RTES area, clarify location properties of the establishment and analyzed it using phone data.

In addition, as well as the simple distribution of the establishment, we calculated a continuity of the site location and the average distance from a station, a bus stop, the parking.

In Teradomari town, the average distance is the longest. In Godenba city, the maximum cooperation

area is the biggest in target areas.

RTES examines a sightseeing local domain setting and investigation item against what sightseeing have difficult such as a definition of "Tourism", and counting visitors. In fact, all tourism regions in RTES are not only high use by visitors, services is supplied to the general inhabitants and business. The ratio of tourism sales tends to be low in big cities, and it is difficult to understand regional tourism economy in big cities. Therefore, according to the analysis of this study, it is necessary to select the regions which the ratio of tourism sales is high.

REFFERENCE

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