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**Where do Spa tourists come from?
-An application of Huff model to Japanese spa destination-**

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ABSTRACT

The purpose of this study is to reveal the “effect of travel time” in case of Japanese spa destination ‘ONSEN’. Revealing the effect of travel time from tourists’ living place (origin) to Spa destination (destination) means to derive the trading area of spa destination. The result of the effect of travel time is in almost same level to other service industries in previous studies. From this result, Huff model is applicable to estimate the trading area of Japanese spa destination. When the stakeholders in tourism destination draw up the efficient strategy of attracting tourists, our result can provide useful suggestion as a conceptual.

Keywords: *spa tourist, trading area, Japanese spa destination, the effect of travel time, Huff model.*

INTRODUCTION

The purpose of this study is to reveal the “effect of travel time” in case of Japanese spa destination ‘ONSEN’. Revealing the effect of travel time from origin (tourists’ living place) to destination (spa destination) means to derive the trading area of spa destination. When the trading area is derived, the appropriateness of the strategy for attract tourists will be assessed.

Japanese spa destinations have many kinds of attractiveness, such as effectiveness for health and beauty, relaxation and atmosphere etc. However many spa destinations don’t grasp where do ‘Spa tourists’ come. Without the appropriate understanding for origins of tourists, spa destinations cannot execute an efficient tourism strategy. In this sense, the research question of this study is ‘where do Spa tourists come from’.

The attractiveness of the tourism destination for one tourist changes depending on the distance to the destination. If the effect of travel time is low, the destination is attractive for not only the nearby tourist but also the distant tourist. To opposite, if the effect of travel time is high, the destination is not especially attractive for the distant tourist. From the viewpoint of tourist, we clarify the effect of travel time through the estimation of the probability selecting destination.

The expected contribution for stakeholder in spa destination, such as local government, tourism association, etc. is that they can grasp the trading area and so execute policies (promotion, etc.) to attract tourists efficiently. Based on the above-mentioned discussion, this study apply Huff model to Japanese spa and reveal the effect of travel time.

LITERATURES

The purpose of this study is to reveal the effect of travel time in case of spa destination. Based on this purpose, Huff model which was proposed by Huff (1964) is one of the most useful models. Huff (1964) proposed an alternative gravity model, the Huff model. Using Huff model,

the probability of potential tourists who live at place i visiting tourism destination j can be estimated. The formulation is as follows (Formula 1):

$$P_{ij} = \frac{a_j \cdot d_{ij}^{-\lambda}}{\sum_j a_j \cdot d_{ij}^{-\lambda}} \quad (\text{Formula 1})$$

where P_{ij} is the probability that a potential tourist living at place i visiting a tourism destination j , d_{ij} is the distance between i and j , and a_j is the attractiveness of tourism destination j . In general, distance between i and j implies travel time rather than road distance. So, λ is a parameter that describes the effect of travel time. This parameter is assumed to vary with different types of product classes.

Huff model has been chiefly used in the retail industry for the trading area analysis of the store. The effect of travel time is smaller in high grade goods than daily necessities. In other words, the effect of travel time is an index that shows how a certain facility is attractive for the people in the distance. Therefore, Huff model and related models such as gravity model have contributed to decide the location of new retail store, or to estimate the volume of demand of them.

Huff model coverage has expanded. Other studies which applied Huff model to service industry are followings. Yamazaki (2000) induced the trading area of fitness clubs in urban area. Kurihara and Okamoto (2001) induced the commune area of private junior high school. Takase and Yamada (2003) estimated the volume of patients and Aoyama et al. (2001) also considered hospital location when cities are merged.

Figure 1 compares the results of these previous studies. The effect of travel time is small as the hospital service. In the case of the daily use facility such as fitness club, on the other hand, the effect of travel time is large. The value is around 2.0 in the case of service industry according to the discussion in previous studies.

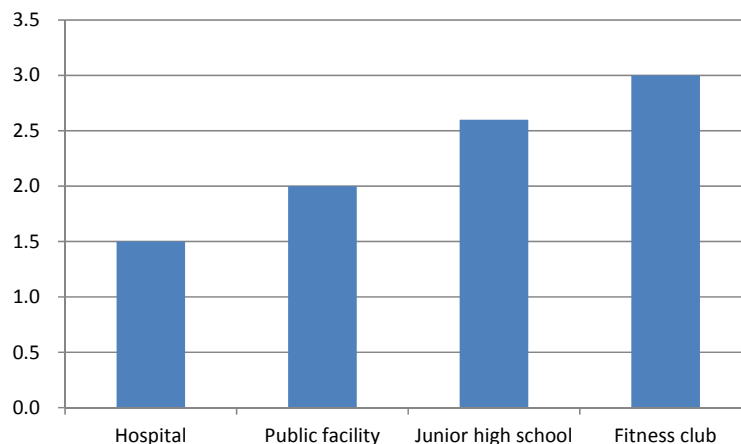


Figure 1
Comparison of the effect of travel time “λ” in service industry

However, there are few previous studies which the trading area model is applied to tourism. For example, Getz (1986) employed the gravity model which include a parameter of that describes the effect of travel time and proposed the possibility of estimating the demand of tourism. Mayo, Jarvis and Xander (1988) provided the result which the distance between origin and destination is “attractiveness” rather than “friction” in some cases. Kozu (2011) applied Huff model to four airports in Japan and estimate their trading area using the data of inbound tourists. Miura (2004) estimated the probability of tourists visiting prefectures in Japan by Huff model. Misui, Kamata and Yamauchi (2012) applied Huff model to derive the size of trading area of spa destinations in Japan. Although this is the first study that applied Huff model to Japanese spa

destination, the sample size is only 6 spa destinations due to the restriction of statistical data. As a result, the estimation result of “ λ ” was 5.1 which is larger than the results in service industry suggested by previous studies. In this mean, Misui, Kamata and Yamauchi (2012) is trial study using small sample and we need to verify the result using large sample.

The difference among this study and these previous studies is the research objective. The objective of this study is Japanese spa destination. This study extends Misui, Kamata and Yamauchi (2012). The main extended points are sample size and the selected data of “attractiveness” and “distance”.

METHODS

In this study, we attempt to estimate λ that describes the effect of travel time from P_{ij} , a_j and d_{ij} of the Huff model using the public data of spa destination. The sample size of this study is 1504 Origin-Destination. Origins are 47 prefectural capitals (all prefectures in Japan). Destinations are 32 representative spa destinations in Japan. For the variable of “d”, we employ the travel time from each origin to each spa destination by searching the route guide of website (Yahoo! Japan). For the variable of “ a_j ”, we employ the publication data from Nikkei Research Institute of consumption and industry (2003) which presented the attractiveness of 66 spa destinations in Japan. 32 spa destinations which samples of this study are comprised in this 66 spa destinations. This selection is based on the statistical data availability. In addition, we use the overnight stay data (4 years: 2008-2011) provided from Japan tourism agency as the statistical data.

Table 1 shows the attractiveness and the number of overnight stay tourists of 32 spa destinations in order with high attractiveness. There are spa destinations that the number of overnight stay tourists is little even if the attractiveness is high such as Unzen. On the contrary, some spa destinations have the large number of overnight stay tourists even if the attractiveness is low such as Atami.

Table 1
Attractiveness and overnight stay data of 32 spa destinations

Spa destinations	a_j	Overnight stay data (average: 2008-2011)	Spa destinations	a_j	Overnight stay data (average: 2008-2011)
Kusatsu	8.1	1,308,366	Shiobara	6.2	1,079,066
Unzen	7.1	398,312	Ito	6.2	879,383
Arima	7.0	904,320	Kamisuwa	6.2	445,241
Ibusuki	7.0	644,629	Sounkyo	6.1	640,140
Ikaho	6.8	1,092,274	Hanamaki	6.0	816,577
Dogo	6.8	803,092	Minakami	5.9	864,702
Tamatsukuri	6.7	568,269	Beppu	5.9	926,360
Misasa	6.7	371,347	Tokachigawa	5.8	383,970
Nasu	6.6	1,423,766	Nagatoyumoto	5.8	285,208
Yugawara	6.6	438,894	Jozankei	5.7	1,285,579
Nachikatsuura	6.6	607,898	Kinugawa	5.7	1,422,510
Hakoneyumoto	6.5	813,855	Echigoyuzawa	5.6	694,964
Wakura	6.5	802,415	Awara	5.5	767,568
Gero	6.5	733,842	Isawa	5.5	967,578
Nankishirahama	6.3	1,265,586	Atami	5.4	2,074,133
Akiu	6.2	827,611	Iizaka	5.0	593,597

We consider that the prime factor of this gap between attractiveness and the number of tourists is the location of the spa destination. It is necessary for about five hours to move from

Tokyo to Unzen which is in Nagasaki prefecture, Kyushu region. At the same time, it is necessary for only an hours and a half to move from Tokyo to Atami which is in Shizuoka prefecture, nearby Kanto region. Actually, 13% of the tourist to Unzen is from Nagasaki prefecture and 43% is from Kyushu region. In the same way, 8% of the tourist to Atami is from Shizuoka prefecture and 78% is from Kanto region.

RESULTS

There are two main findings in this study. Firstly, we derived the consistency of parameter “ λ ” is calculated by minimizing the square of sum of the difference between the estimated result and the statistical data.

The result of the effect of travel time “ λ ” is 2.36 (4 years average, 2008-2011). This value is in almost same level to other service industries in previous studies. The correlation between the estimated result and the statistical data is 0.75 (4 years average, 2008-2011). This result shows the effect of travel time “ λ ” is stable and reliable result.

The real size of trading area of each spa can be quantified using the estimated “ λ ”. Figure 2 shows the comparison between statistical data (blue: real data of spa destination) and estimated result (red: potential of spa destination). As showing in Figure 3, there are the differences between the estimated result and the statistical data in each spa destinations. We assume that the spa destinations which blue one exceeds red one may conduct efficient strategy to attract tourists. The details of the factor of result are future issues.

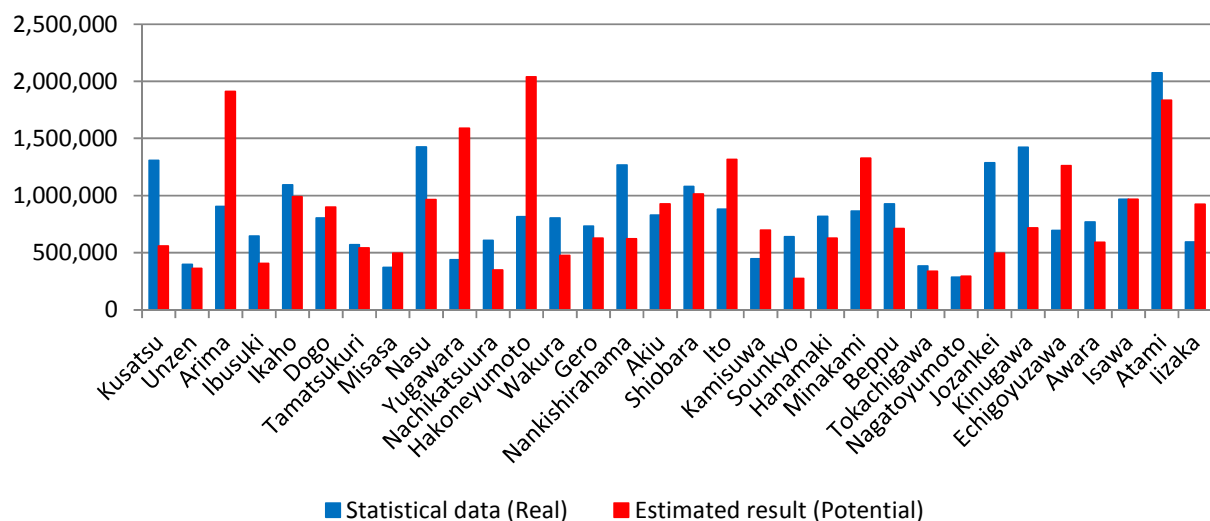


Figure 2
Comparison of the estimated result of tourists with the statistical data

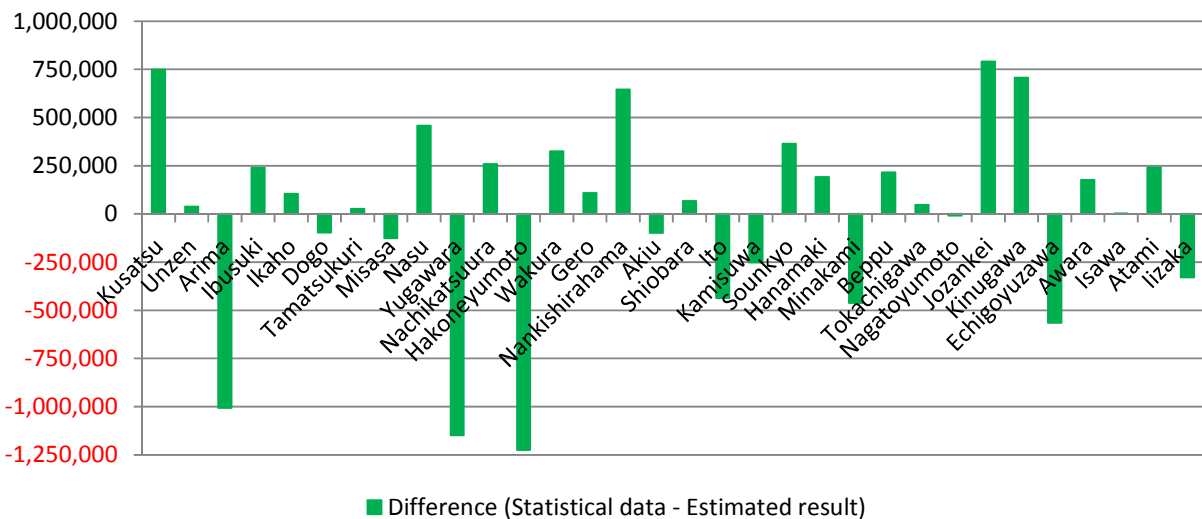


Figure 3
Difference: Statistical data - Estimated result

Secondly, we derived seasonality of the effect of travel time. Figure 4 shows the value of the effect of travel time in the third quarter (July-September) is lower than the values in other quarters for 2008-2011.

The third quarter is high season of travel in Japan, so many people tend to take longer vacation. As a result, there might be many people who travel to a distant spa destinations. If so, it is efficient to promote to city areas in only high season for the distant spa destination from urban areas such as Tokyo. The details of the factor of result are future issues.

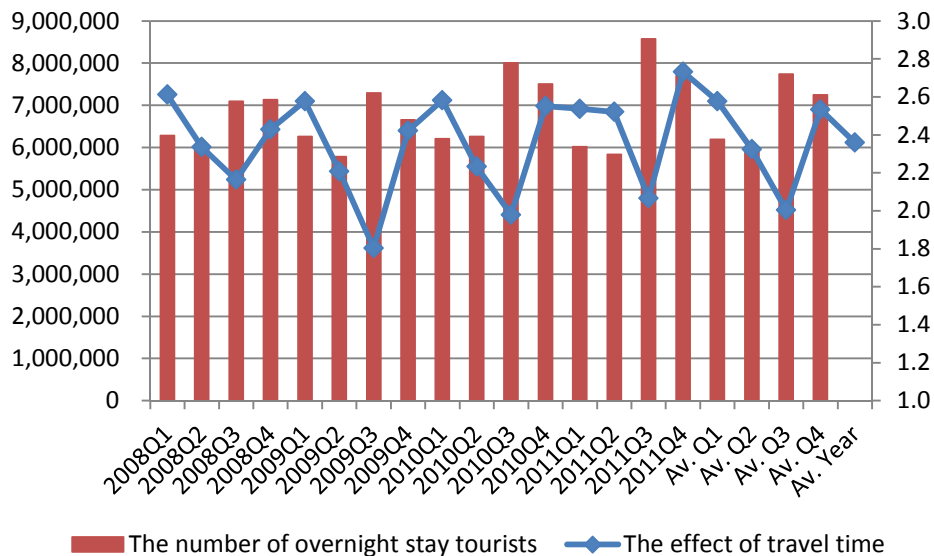


Figure 4
Difference: Statistical data - Estimated result

CONCLUSION

The most meaningful contribution of this study is to show that Huff model is applicable to estimate the trading area of tourism destination. The result of correlation analysis between the

estimated result and the statistical data is 0.75. This result suggests that the result of this study is estimated with considerable accuracy.

Furthermore, the effect of travel time “ λ ” is 2.36 and it means that the trading area of spa destination is in almost same level to other service industries. When the stakeholders in tourism destination draw up the strategy of attracting tourists, our result can provide useful suggestion as a conceptual.

Future assignments are followings: elaboration of analysis using Huff model, qualitative research to capture the difference between the estimated result and the statistical data and applying Huff model for other tourism destination to compare with spa’s result.

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