A Study on Local Airports Contributions to Tourism Industry in Japan

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Abstract

This study examines the impacts of local airports on the regional tourism industry in Japan. A series of indexes of the tourists and a new measure of the time index have been developed based on our four-cell model to analyze the correlation between different indexes such as the number of airport tourists and the time used by public transportation. During the verification process, a correlation has been discovered between the number of tourists in the city where the airport is located and the number of airport users for specific regionally managed airports. Furthermore, regarding access to tourist attractions from airports, a strong negative correlation is confirmed between the evaluation index and the state of development of public transport, suggesting the importance of developing public transport, including airports, in attracting tourists.

Keywords: Tourism industry, Local Tourism, local airport, public Transport

1. Introduction

In recent years, tourism industry in Japan is becoming a hot issue as one of the attractive policies to revitalize regional economy. According to publications from the Japan Tourism Agency of the MLIT [1], the tourism industry is expected to have an economic scale of 7.0 trillion yen, and it will employ 6.13 million people as a large industry in both economic and employment viewpoints. From a global perspective, as can be seen from documents from the World Tourism Organization [2], it is an industry to be expected to grow. In order to develop this industry efficiently, it is required to statistically analyze the behavior of tourists and promote the destination appropriately. On the other hand, tourists need a means of transportation to visit the destinations they are interested in, and the convenience and maintenance of such means of transportation is also expected to have a strong impact on tourists' plans. In Japan, the fastest and most convenient way to travel from overseas or urban areas to local tourists' destinations is by plane. Therefore, this study aims to make contribution to new insights into efforts to revitalize the tourism industry in regional areas by clarifying the impact that regional airports have on regional tourism, and the impact that the development of airport-based transportation networks has on the tourism industry.

2. Literature review

There is a plethora of studies on the tourism industry from various perspectives. Tiefenbacher et al. [3] focused on the presence of repeat tourists in tourism and analyzed the impact of repeat tourists in the analysis of tourism success. Anna Ju. Aleksandrova et al, [4] focused on the periodicity of tourism activity and mathematically examined the periodicity of international tourism development at the global, regional, and local levels. Mahdi Samadzad et al. [5] aimed to characterize future urban air mobility travel demand for weekly business, airport access, and regional tourism trips in Iran, and showed that urban air mobility for weekly business trips is the most feasible market segment. Clement Kong et al [6]. empirically examined the benefits and impacts of airport subsidies to promote domestic tourism development in China, and empirically showed that the government's airport subsidy system for small and

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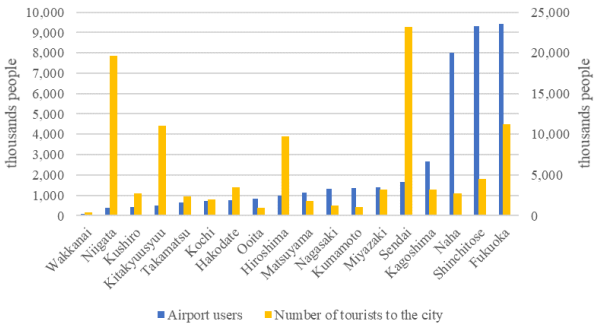
medium-sized airports is effective in supporting the development of aviation and tourism in ethnic minority areas, poor areas, and remote areas with poor land transportation. Tsutomu Ito et al. [7] analyzed the factors that attract visitors to regional tourism, and in their paper, a 4-cell model is proposed. The 4-cell model performs positioning in each quadrant based on the time series changes in the number of tourists and the number of tourist spots, and the first quadrant has a weight of 4, the second quadrant has a weight of 3, the third quadrant has a weight of 2, and gives a weight of 1 to the fourth quadrant. Ito et al. analyzed the characteristics of prefectures that are successful in attracting tourists and those that are not, depending on the public transportation development status of each prefecture in Japan. In addition, there are studies that have investigated the relationship between airport development and tourism, such as [8] and [9], but previous studies have mainly focused on tourists and tourist elements, and very few analysis has been conducted on the relationship between the development of infrastructure that supports tourism and regional tourism.

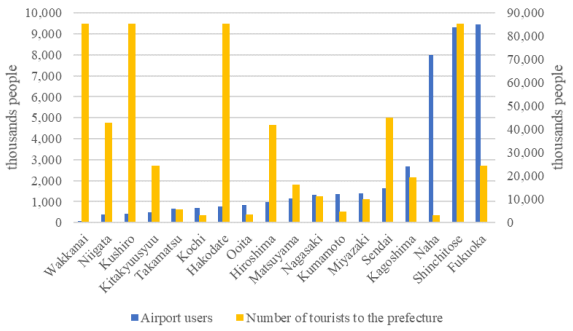
3. Classification of airports in Japan

In Japan, airports are classified according to the Airport Act[10]. In this study, we focus on regional domestic routes and regional, second-class airports.

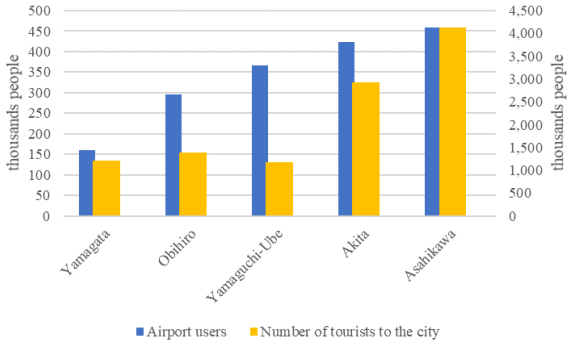
Most of the second-class airports are airports that are established and managed by the national government. Nineteen relatively large airports, including Tokyo International Airport, Shin Chitose Airport, Itami Airport, Kitakyushu Airport, and Fukuoka Airport, are classified as nationally managed airports. Local governments have little involvement in the management and operation of nationally managed airports, and all funding is provided by the national government. These airports include Tokyo International Airport and 18 other airports designated by government ordinance. For Tokyo International Airport, the national government covers the full cost of construction of basic facilities and ancillary facilities. For airports designated by government ordinance, the national government covers the full cost of ancillary facilities, while the national government covers two-thirds of the basic facilities, and the local government covers one-third. For airports in Hokkaido, Okinawa, and remote islands, the national government's share of the cost of basic facilities is set at between 80% and 95% by the Airport Act and Special Regional Acts.



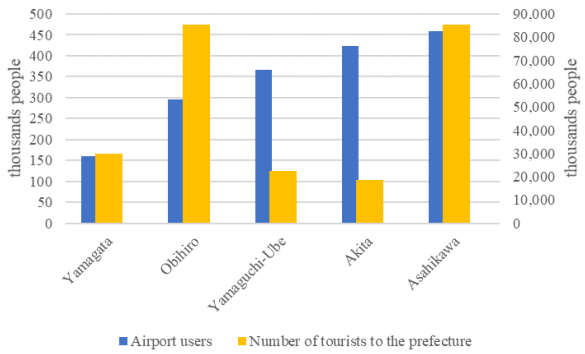
(a) Number of airport users and of tourists to the city



(b) Number of airport users and of tourists to the prefecture



(c) Number of designated airport users and of tourists to the city



(d) Number of designated airport users and of tourists to the prefecture

Figure 1 Comparative Result of Airport Users and Tourist Number.

On the other hand, there are five airports that were established by the national government and managed by local governments. They are Yamaguchi Ube Airport, Yamagata Airport, Akita Airport, Obihiro Airport, and Asahikawa Airport. These are called designated local airports. As stipulated in Item 6, Paragraph 1, Article 4 of the Airport Act, these are "airports designated by government ordinance as hub airports for international or domestic air transport networks," and the national government is to cover 55% of the construction costs for basic facilities, while local governments are to cover 45%. Ancillary facilities are to be borne by local governments, but the national government can subsidize up to 55% of the construction costs. For airports in Hokkaido, Okinawa, and remote islands, the proportion of construction costs borne and subsidized by the national government is higher due to the Airport Act and Special Regional Acts.

4. The impact of airport location on the tourism industry

We analyze whether the number of tourists that an airport can attract extends to the city where the airport is located or to the entire prefecture.

To work through this, we analyze the correlation between the number of airport users and the number of tourists in the city and prefecture where the airport is located and clarify the extent of the effect of airport location on the tourism industry. The number of airport users and the number of tourists is the dataset collected from 2021[11]. Figure 1(a) shows the number of tourists to regional airports and cities. Similarly, Figure 1(b) shows the number of tourists to regional airports and prefectures. Figure 1(c) and Figure 1(d) show the number of users of designated regionally managed airports and the number of tourists to cities and prefectures, respectively. No correlation was found between regional airports and the number of tourists in both cities and prefectures. This indicates that air routes to regional areas have business demand and tourism is not mainstream. On the other hand, in the case of designated regionally managed airports, no correlation was found between airport users and the number of tourists to prefectures. We confirmed that there is a correlation coefficient of 0.77 between the number of tourists to cities and the number of airport users. The P value is 0.13, which is not statistically significant, but this is thought to be influenced by the fact that there are only five samples of designated regionally managed airports. From the results mentioned above, it is seen that designated regional airports in which local governments are involved in the operation have a certain degree of tourist attraction effect on the cities in which they are located.

5. Access to tourist attractions from the airport and tourism attraction

5.1. *4-cell model*

In order to clarify the factors that attract visitors to each tourism element, an index has been proposed that classifies the number of tourists by purpose and evaluates them [7]. Seven types of tourism elements have been published in the Japan Tourism Agency's reference. They are: 1) nature, 2) hot springs, 3) history and culture, 4) sports, 5) urban tourism, 6) events, and 7) others. Thus, we use the Japan Tourism Agency's classification, as well as dataset of the number of visitors and tourism facilities, to analyze. We calculated the increase or decrease in the number of tourists for all elements and calculated the slope of the change in the number of tourists over a seven-year period. In addition, the increase or decrease in the number of tourist destinations was also applied as time-series data to calculate the slope of the change. A method called a four-cell model has been proposed that uses this slope to simultaneously express the fluctuations in the number of tourists and the number of tourism facilities. This four-cell model creates an evaluation index by taking the slope that represents the change in the number of tourist destinations on the horizontal axis and the slope that represents the increase or decrease in the number of tourists on the vertical axis.

5.2. *Evaluation of travel time*

We measured the evaluation index obtained from previous research and the travel time from airports in each prefecture to famous tourist destinations when traveling by car and/or using public transportation. Because the area of each prefecture varies greatly, we calculate the travel time divided by the area to smooth out the difference in travel time due to the size of the prefecture and make it easier to compare.

The estimated travel time is calculated using the following formula.

$$\text{Travel time index} = \frac{Travel\ time\ from\ the\ airport\ to\ tourist\ spot}{Area\ of\ Prefecture}$$

5.3. *Results and discussion*

Comparing the evaluation travel time and the evaluation index of the four-cell model, it is confirmed that the travel time per unit area tends to be short in Hokkaido and Hiroshima Prefecture when using public transportation, while it takes longer in Shimane Prefecture and Ehime Prefecture when using public transportation. When using a car, the results showed that it took less time overall, and it is confirmed that it took short time to travel by car in Shimane Prefecture and Hokkaido in particular. We assumed that when tourists from urban areas or abroad use local airports, it is more convenient to use public transportation rather than traveling by rental car. We compared the evaluated travel time with the evaluation indexes based on the four-cell model. The results are shown in Figure 2. Orange is the evaluation travel time

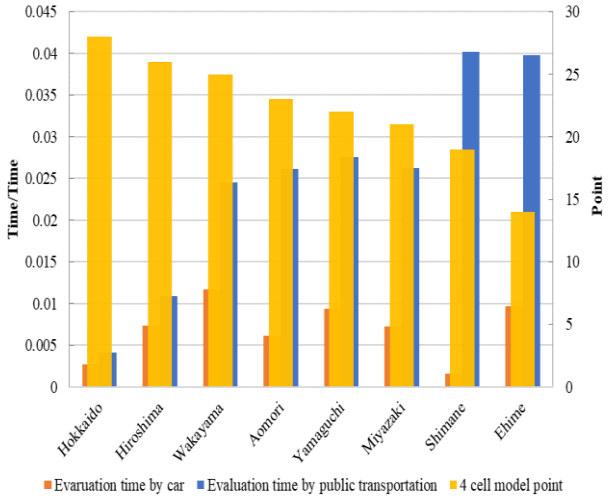


Figure 2 Comparison of evaluation travel time and evaluation indicators by prefecture.

when using a car, and blue is the evaluation travel time when using public transportation. Yellow is the evaluation index based on the four-cell model. From the figure, it is found that the higher the evaluation index, the shorter the time it takes to travel by public transportation. It was found that there was an inversely proportional relationship between the evaluation index and the unit travel time using public transportation from the airport to the tourist destination, with a strong negative correlation coefficient of -0.901. In addition, this result was confirmed to be statistically significant with a p-value of 0.002. Based on this result, it can be considered that the development of public transportation from the airport to the tourists' destinations is important for attracting tourism to rural areas.

6. Conclusion

In order to consider how airports can be utilized for regional tourism, this study aimed to understand the range of activities of airport users, and to clarify whether access from airports to tourists' destinations has an impact on attracting tourists. We confirmed whether there is a correlation between the number of airport users and the number of tourists, and conducted verification using a method called a four-cell model.

During the verification process, a correlation has been found between the number of tourists in the city where the airport is located and the number of airport users at specific regionally managed airports. Furthermore, regarding access to tourist elements from airports, a strong negative correlation has been confirmed between the evaluation index and the state of public transport development, suggesting the importance of developing public transport, including airports, in attracting tourists.

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