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## Clustering analysis on inbound tourism market in Shandong province

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# Clustering analysis on inbound tourism market in Shandong province

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**Abstract:** According to the relevant data of inbound tourism in Shandong province from 2008 to 2017, the development situation and source composition of inbound tourism in Shandong province were analyzed with the help of Excel software, and the source market and destination market of inbound tourism in Shandong province were analyzed by using SPSS23.0 software. The results show that the inbound tourism in Shandong province has a good momentum of development and plays a positive role in promoting the development of tourism in Shandong province. According to cluster analysis, the source market of inbound tourism in Shandong province is divided into three categories: Korea is the first category, Japan is the second category, and other countries are the third category. Inbound tourism destination market of Shandong province can be divided into four types, Qingdao is the first major categories, Yantai and Weihai as the second major categories, Zibo, Linyi, Jinan, Weifang, Jining, Taian and seven cities such as sunlight as the third category, Dongying, Liaocheng, Binzhou, Zaozhuang, Dezhou, Laiwu and Heze seven cities as the fourth categories, should increase the strength of the tourism resource development and promotion.

## 1. Introduction

Inbound tourism is an important part of China's tourism market and an important symbol to measure the level of regional tourism development. In order to fully understand the development of inbound tourism in Shandong Province, this paper chooses 16 major tourist countries and 17 destination cities of Shandong Province as the research objects. Based on the relevant data of Shandong Tourism Statistics (2009-2018), the development situation and the composition of inbound tourism in Shandong Province are analyzed by Excel software, and the inbound tourism in Shandong Province is analyzed by SPSS23.0 software. In order to provide policy basis for the development of inbound tourism market in Shandong Province, cluster analysis is carried out on tourist source market and destination market.

## 2. Overview of Inbound Tourism Market Development in Shandong Province

Shandong Province is located on the coast of East China and is the northernmost province of East China. Shandong is the birthplace of Confucian culture. It has well-known scenic spots at home and abroad, such as Mount Tai. It is known as a cultural holy place and a holiday paradise. It attracts many foreign tourists to Shandong for tourism and vacation.

According to Shandong Province's inbound tourism statistics, using Excel software to draw the trend chart of inbound tourists and Tourism Foreign Exchange Income in Shandong Province from 2008 to 2017 (Fig. 1). From Fig. 1, it can be seen that the development trend of inbound tourists and Tourism Foreign Exchange Income in Shandong Province in 2008-2017 shows a steady growth trend



on the whole. Although there has been a slight decline in 2013 and 2014, it has been from 2015. Growth began to return. The number of inbound tourists increased from 2.538 million in 2008 to 4.944 million in 2017, an increase of 94.8%, but the number of inbound tourists declined in 2015, which deserves attention. The trend of foreign exchange income of international tourism basically keeps pace with the number of inbound tourists, from \$1.39 billion in 2008 to \$3.17 billion in 2017, an increase of 128.1%. The above data show that the inbound tourism industry in Shandong Province has a good momentum of development and has a positive role in promoting the development of tourism in Shandong Province.

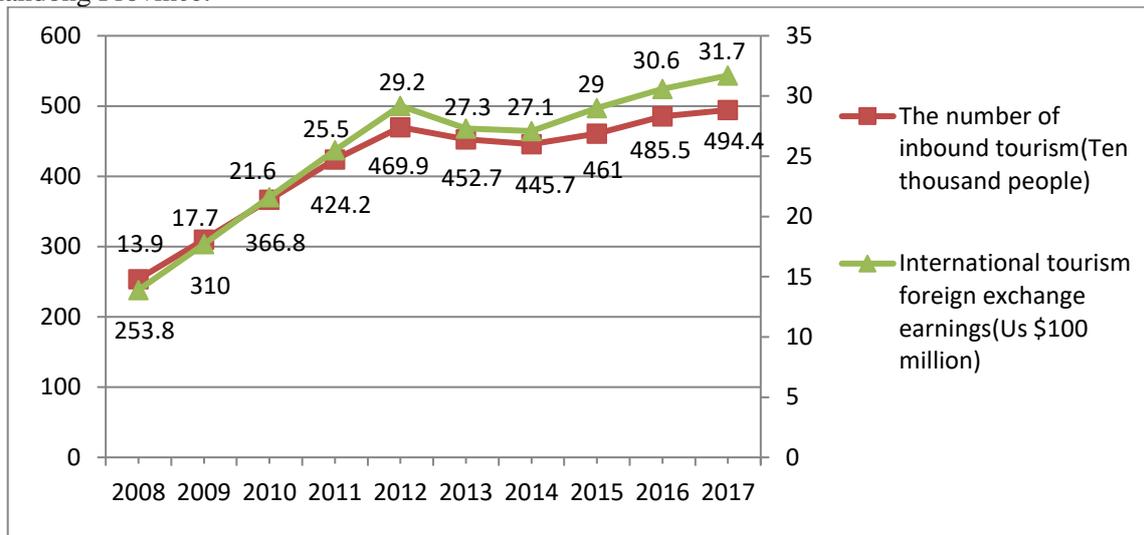


Figure 1: The tendency chart related to the number of inbound tourists and the foreign exchange earnings from tourism in Shandong from 2008 to 2017.

### 3. Analysis of Inbound Tourist Source Structure in Shandong Province

As can be seen from Table 1, South Korea, Japan and the United States firmly occupy the top three inbound tourist source countries in Shandong Province. Korea has always been the largest source of inbound tourism in Shandong Province, and the number of inbound tourists is far ahead of other countries. Japan is the second largest source of inbound tourism in Shandong Province, but since 2010, the number of Japanese tourists has increased negatively year by year, from 567,000 in 2010 to 391,000 in 2017, a decrease of 31.4%. The United States is the third largest source of inbound tourism in Shandong Province. The number of inbound tourists has increased steadily, from 99,000 in 2008 to 222,000 in 2017, an increase of 124.2%. Out of the 16 major source countries, except Japan, the number of inbound tourists in all 15 countries has increased, with Russia increasing by 317.2%.

Table 1: The number of inbound tourists from the main tourist source countries in Shandong from 2008 to 2017. Unit: Ten thousand people

Year source countries	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Korea	105.1	115.2	129.3	138.9	153.3	149.6	151.8	158.1	168.4	160.7
Japan	43.5	54.1	56.7	52.5	48.2	38.1	35.4	35.8	37.5	39.1
America	9.9	10.4	13.3	17.8	19.9	20	19.3	19.7	21.1	22.2
Russia	2.9	4.4	6.3	8.7	10.3	9.7	9.9	10.3	10.9	12.1
Singapore	4.7	6.7	7	8.6	10	9.5	9.4	9.5	9.9	10.3
England	3.8	4	6.3	8.3	9.9	8.6	8.3	8.2	8.9	9
Germany	3.7	4.4	6.4	8.4	9.3	8.8	8	8.1	8.6	8.8
France	2.4	2.9	4.1	5.3	6.8	7.1	6.6	6.7	7.1	7.2

Malaysia	3.7	3.2	4	5.5	6.3	6.3	6	6.3	6.5	6.9
Australia	2.7	3.4	4.1	5.7	6.3	5.6	5.6	5.8	6.3	6.6
Canada	2.5	3.3	4	5.2	5.6	5.1	4.8	5.5	5.3	5.6
Italy	1.7	2	2.5	3.2	3.5	3.5	3.3	3.4	3.5	3.8
Philippines	2.2	2.8	4.2	4.6	4.1	4.1	3.4	3.4	3.7	3.7
India	1.6	1.9	2.4	2.9	2.9	3.1	3.1	3.3	3.3	3.4
Indonesia	1.1	1.7	2.5	3	3	3.3	3	3	2.9	3.1
Thailand	1.1	1.3	1.3	1.7	1.8	2.2	2.2	2.2	2.3	2.8

#### 4. Cluster Analysis of Inbound Tourism Market in Shandong Province

##### 4.1. Cluster Analysis of Inbound Tourist Source Market in Shandong Province

Cluster analysis is a method to classify data based on the information of data itself. According to Shandong Province's inbound tourism data, set  $X_1 = \text{Korea}$ ,  $X_2 = \text{Japan}$ ,  $X_3 = \text{the United States}$ ,  $X_4 = \text{Russia}$ ,  $X_5 = \text{Singapore}$ ,  $X_6 = \text{Britain}$ ,  $X_7 = \text{Germany}$ ,  $X_8 = \text{France}$ ,  $X_9 = \text{Malaysia}$ ,  $X_{10} = \text{Australia}$ ,  $X_{11} = \text{Canada}$ ,  $X_{12} = \text{Italy}$ ,  $X_{13} = \text{Philippines}$ ,  $X_{14} = \text{India}$ ,  $X_{15} = \text{Indonesia}$ ,  $X_{16} = \text{Thailand}$  [2], using SPSS23.0 software for systematic cluster analysis, Shandong Province's inbound tourism is obtained. Cluster analysis pedigree of main tourist market (Figure 2). As can be seen from Figure 2, from 2008 to 2017, Shandong Province's inbound tourist market can be divided into three categories, Korea as the first category, Japan as the second category, and other countries as the third category. Cluster analysis shows that Korea is the primary target market of inbound tourism in Shandong Province, and measures should be taken to consolidate this most important market. Japan is the secondary target market of inbound tourism in Shandong Province, and positive measures should be taken to reverse the negative growth trend. The United States, Russia, Singapore and the United Kingdom are the three-tier markets for inbound tourism in Shandong Province. We should strengthen the development efforts and actively expand this part of the market.

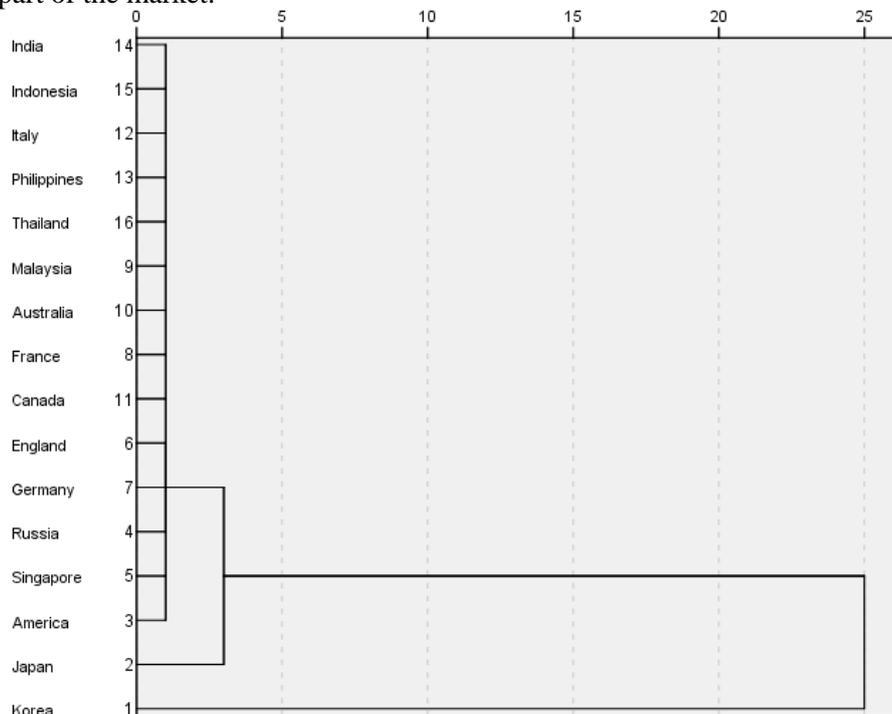


Figure 2: Clustering analysis pedigree chart for the main tourist source markets related to inbound tourism in Shandong from 2008 to 2017.

*4.2. Cluster Analysis of Inbound Tourist Destination Market in Shandong Province*

According to the relevant data, set  $X_1 = \text{Jinan}$ ,  $X_2 = \text{Qingdao}$ ,  $X_3 = \text{Zibo}$ ,  $X_4 = \text{Zaozhuang}$ ,  $X_5 = \text{Dongying}$ ,  $X_6 = \text{Yantai}$ ,  $X_7 = \text{Weifang}$ ,  $X_8 = \text{Jining}$ ,  $X_9 = \text{Taian}$ ,  $X_{10} = \text{ Weihai}$ ,  $X_{11} = \text{ Rizhao}$ ,  $X_{12} = \text{Laiwu}$ ,  $X_{13} = \text{Linyi}$ ,  $X_{14} = \text{Dezhou}$ ,  $X_{15} = \text{Liaocheng}$ ,  $X_{16} = \text{Binzhou}$ ,  $X_{17} = \text{Heze}$  [3], and use SPSS23.0 software to carry out systematic cluster analysis of Shandong's inbound tourism destinations. (Figure 3).

From figure 3, we can see that from 2008 to 2017, Shandong's inbound tourism destination market can be divided into four categories, Qingdao is the first category, Qingdao is near the Yellow Sea, is a national historical and cultural city, has unique advantages in developing inbound tourism. Yantai and Weihai are the second largest cities, both of which are coastal cities with abundant tourism resources. Tourism propaganda should be strengthened. Seven cities, Zibo, Linyi, Jinan, Weifang, Jining, Tai'an and Rizhao, are the third largest. They have their own characteristics in tourism resources. It is suggested that the construction of tourism infrastructure should be strengthened and tourism products with distinctive characteristics should be developed. Dongying, Liaocheng, Binzhou, Zaozhuang, Dezhou, Laiwu and Heze are the fourth largest cities. The development of tourism economy in these cities is relatively backward, and the development of tourism resources needs to be strengthened.

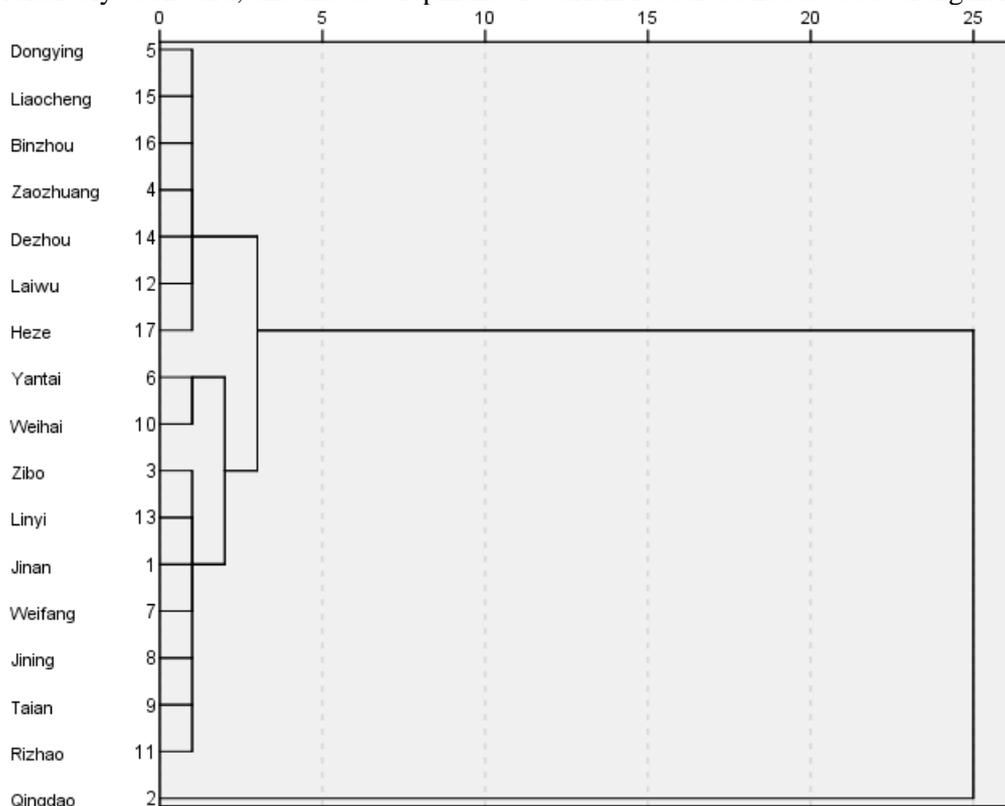


Figure 3: Clustering analysis pedigree chart for the tourist destination markets related to inbound tourism in Shandong from 2008 to 2017.

**5. Conclusions**

The inbound tourism industry in Shandong Province has a good momentum of development and has a positive role in promoting the development of tourism in Shandong Province.

The results of cluster analysis show that the inbound tourist market in Shandong Province can be divided into three categories: Korea as the first category, Japan as the second category and other countries as the third category; the inbound tourist destination market in Shandong Province can be divided into four categories, Qingdao as the first category, Yantai and Weihai as the second category, Zibo, Linyi, Jinan, Weifang, Jining, Taian and Rizhao as seven cities. The third category is Dongying,

Liaocheng, Binzhou, Zaozhuang, Dezhou, Laiwu and Heze, and seven other cities are the fourth category. We should strengthen the development and propaganda of tourism resources.

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