

*The Relationship of Accommodations Clustering and Tourism Development in Cing  
Jing area of Taiwan*

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Abstract

This research, taking the example of Cing Jing area, examined the relationship analysis of accommodation units temporal-spatial clustering and Butler's TALC tourism development model. First, based on the time series data of the tourists' number of Cing Jing area, this research investigated to what degree of the TALC stage of tourism development in Cing-Jing area. Then, this research explored the temporal-spatial clustering of a set of accommodation units point locations using GIS spatial analysis method. Finally, a regression analysis of contrasting the growing extent of accommodation units and the tourism development of TALC model was conducted. Results of this research are as follow:

1. Although the curve of TALC model, instead of being approached to line segment, is not S-shaped, the TALC stage of tourism development of Cing Jing area, approximately accordance to Butler's TALC model, has experienced the exploration stage, the involvement stage and the development stage, among which the development stage is prolonging for attracting more and more tourists.
2. Using GIS standard deviational ellipses and buffer analysis, the accommodation units emerging from 1992 during the development stage of TALC were originally clustered in Youth District, as the increasing of tourists arrival then stretched to Song-Gang District along the main travel linkage-County Route No.14-A.
3. When a regression analysis based on the data type of the locations of accommodation units, the places with best of mountain views scored significantly higher than places with the top tourist spots. This suggested that the more grow of the tourism industry, the more accommodation facilities clustered at the places with the locations of being able to appreciate sea of clouds, snow scene, and cherry blossoms and enjoy serenity instead of noisy crowds.

Keywords: TALC, temporal-spatial clustering, GIS, accessibility, landscape, serenity

## **1. Introduction**

### ***1.1 TALC model***

Johnston (2006) revised Butler's TALC model with S-shaped curve to line segment with obvious turning points in different stages. Furthermore, the y-axis variable of Butler's TALC model represents the number of tourist arrivals instead of the number of accommodation units available at the destination. The slope of any particular segment was to show a relative relationship of speeding up of accommodation units in different stages. To mark the turning points of sequence of stages, S-shaped curve is more difficult to distinguish than line segment, so in this research we use the latter for analysis the TALC model of Cing-Jing area.

### ***1.2 industrial clustering and tourism development***

Porter's Diamond Theory indicated that spatial cluster of geographical phenomenon refers to the geographic cluster of companies and institutions in certain industries which results in complementary production and excellent customer distribution channels. Many clustering regions, combining relevant government agencies such as universities and vocational training institutions, provide specialized training, education, information, research and technical support (Porter, 1998:78-79). Many scholars have mentioned that the clustering of tourism-related industries can promote the development of tourism. Pavlovich (2003) analyzed the tourism development of Waitomo Caves in New Zealand from the viewpoint of networks, and pointed out that Waitomo Caves, as a single destination, attracted tourists with its unique karst limestone terrain. In its early phase, visitors stayed for a relatively short period of time, but with the increase of free and independent travelers (FITs), local tourism-related industries began to develop so that Waitomo Caves became more attractive to tourists with its strong tie with a variety of industries. As a result, the tourism development system turns into an organic operation network. In its system, many related industries take up an organizational nodal position. That is, the interdependent network formed by tourism-related industries promotes the tourist development of the Waitomo Caves. Telfer (2000) also indicated that the cluster of related industries such as liquor and food industries serves as an important factor in promoting the tourism development in Nicaragua, Canada. According to Michael (2002), antiques retailing in Australian rural areas attracts visitors, promotes regional economic development and results in obvious regional location industrial clustering phenomenon. Different regions can generate different tourist niche markets to meet the local social and economic needs. Taking the three wine regions in New Zealand-- Central Otago, Hawkes Bay and Marlborough for example, Hall (2005) suggested that industrial clusters of intellectual property, network,

brand, and talent were an important factor in the development of food tourism, and also explored the formation of the cluster network.

Therefore, the concept of clustering can be analyzed from two dimensions-spatial level and organizational level. For the former, it is geographical proximity among different locations, and for the latter, it is how people shape cooperative relationships among industries by connected relationships in a certain region. So, this research explores the clustering concept based on the spatial clustering and industrial clustering of accommodations in Cing Jing area, and the research purposes are as follow:

1. To examine the spatial clustering pattern of accommodations in Cing Jing area.
2. To explore the locational characteristics of accommodations clustering in Cing Jing area.
3. To analyze the relationship between the spatial clustering of accommodations and tourism development in Cing Jing area.

## **2. Method**

### ***2.1 Data collection***

The 100 legal accommodations related data in this research is provided by Nantou County Government, using these data which can be specified to X, Y coordinates of GPS locations of accommodations in TWD97 coordinate system so as to facilitate the GIS processing, and the analysis of spatial distribution and clustering pattern. In order to demonstrate the time series and locational conditions of accommodations clustering, a semi-structured questionnaire survey is adopted to conduct in-depth interviews with accommodations owners. The contents of in-depth interview include: 1.Time when accommodation owner began to run his accommodation 2.Relationship between accommodation owner and the nearby tourism-related industries 3.Reasons for accommodation to locate here.

### ***2.2 Data analysis***

In this research, the average nearest neighbor analysis is adopted to examine the spatial distribution pattern of accommodations. The average nearest neighbor analysis refers to statistical results of point to point distances, which provides the nearest neighbor index  $Z$  values indicating the clustering degree of points. If  $Z$  value  $>1$ , it indicates that spatial clustering pattern reduces to dispersed distribution; if  $Z$  value  $<1$ , it indicates that spatial clustering pattern reduces to clustering distribution; and if  $Z$  value approaches to 1, it means random distribution.

Point density analysis of GIS is an analysis tool based on the raster layer, according to which the number of points on each cell is presented as the cell value. In this research,

the cell size of 40 meters x 40 meters is adopted as the unit of analysis. The researcher calculates the cell value within a searching radius of 300 meters, and then classifies the cell value into five classes by means of the natural-break classification method. The bigger the cell value, the higher the degree of point density, that is, the clustering area of accommodations is demonstrated. This research also using buffer analysis tool analyzed the neighborhood of clustering area of accommodations within different ranges, for example, taking the Taiwan No. 14-A Highway as the butter center, comparing the percentages of accommodations within the range of 100 meters, 200 meters and 300 meters, respectively.

### ***2.3 Study Area***

Cing Jing area located between 4 km and 12.5 km along Taiwan No. 14-A Road, which covers an area of about eight hundred hectares and is divided into three districts- Song-Gang District, You-Shi District, and Cao-Yuan District. Cing Jing area was originally state-owned forest compartments and aboriginal reservations, with few privately-owned lands. After 2001, some of the lands have been converted into private ones for accommodations. The altitude of this area is between 1,600 to 2,100 meters, with beautiful scenery, fresh air and year-round fog. The tourist attractions include Livestock Center, Qing-Qing Grassland, Shou-Shan Park, Little Switzerland Garden, Maple Grove, Wu-Li-Po Viewing Platform, Butterfly Park, Guan-Shan Pastoral District, Xin-Cheng-Ze-Ling (Literally, as you wish) , Song-Gang Cultural Center, trekking walks, etc.

## **3. Results**

### ***3.1 Spatial distribution of accommodations development***

There are 100 legitimate accommodations in total in Cing Jing area, with 43 in Song-Gang District, 53 in You-Shi District, 4 in Cao-Yuan District. According to Rogers classification, from 2000 to 2003, the cumulative percentage of accommodations in Cing Jing area reached 14% of the population, which can be defined as primary stage of accommodations increasing; from 2003 to 2005, the cumulative percentage of accommodations in Cing Jing area reached 56% of the population, which can be defined as development stage of accommodations increasing; from 2005 to 2011, the cumulative percentage of accommodations in Cing Jing area reached 100% of the population as maturity stage.

Table 1 Time series of accommodations in Cing Jing area

year	Accommodation facilities	Cumulative percentage
2000	2	2%
2001	6	6%
2002	8	8%
2003	14	14%
2004	36	36%
2005	56	56%
2006	74	74%
2007	89	89%
2008	97	97%
2009	99	99%
2010	100	100%
2011	100	100%

### ***3.2 Primary stage of accommodations development (2000 to 2003)***

During this period, there were a total of 14 legitimate accommodations in Cing Jing area, with the cumulative curve rising to a small extent. The earliest accommodations in Cing Jing area appeared in Bo-Ai New Village of Song-Gang District. Bo-Ai New Village is the most representative military dependents' village where the Minority Culture of Yunnan was also preserved. In the 1980s, privatization of land brought the opportunity for the development of accommodations. The landscape, environment and air in Cing Jing area, after being reported by the news media, e.g. the special report of "Migrate to Mountain areas" in Business Week, have attracted many people who are tired of urban life to settle down.

### ***3.3 Development stage of accommodations development (2003 to 2005)***

During this period, there were a total of 74 legitimate accommodations in Cing Jing area, and newly built accommodations were mainly distributed in You-Shi District. The increasing number of accommodations in You-Shi District was respectively not much as in Song-Gang area in primary stage because there was a large accommodation set up (National Hotel) by government departments available in 19990s to facilitate tourists. After the 2000s, many celebrations and festivals such as the Cing Jing Windmill Festival and Torch Festival were held by government departments in You-Shi District, attracting a large number of tourists. With the increase in the number of tourists in Cing Jing area, You-Shi District then witnessed the increase in numbers

of accommodations.

### ***3.4 Saturation stage of accommodations development (2005 to 2011)***

There were a total of 100 legitimate accommodations in 2011 of Cing Jing area, and it gradually entered the saturation stage. At this stage, newly built accommodations were mainly distributed in Song-Gang District, since there were no longer suitable lands in the lower Cing Jing area (You-Shi District) for construction. The accommodations in Cing Jing area mainly clustered in Song-Gang District and You-Shi District from primary stage to saturation stage, which respectively revealed different regional competitiveness along with the tourism development, so as to Song-Gang District the upper Cing Jing and You-Shi District the lower Cing Jing. With the altitude range of 500 meters between the upper and the lower Cing Jing area, the upper Cing Jing area featured snowing scenery in winter, while the low Cing Jing area which had been developed in the early times, boasted its special location characteristics-ethnic traditions, and a wide range of recreational facilities, catering services, the earliest and the nicest convenience stores and coffee chain shops, as well as National Hotel run by government departments. There was a large park lot and Swiss style garden in front of National Hotel, which were crisscrossed by many footpaths, by way of which you may walk around to enjoy the fresh air. Not far up, you would see the Qing-Qing Grassland, and along the way there were a lot of vendors and stores, where tourists could buy souvenirs or local agricultural products. Because of the limited land and water resources, Cing Jing area began to suffer negative impact at saturation stage, such as conflicts for insufficient water supply and the problem of soliciting customers among accommodations owners.

### **4. Conclusion and Discussion**

This research using mean nearest neighbor analysis to examine the spatial distribution of accommodations in Cing Jing area is approaching to cluster pattern ( $Z$  value  $< 1$ ), and in the processing of point density analysis defines two clustering areas of accommodations of Cing Jing area. This research also using mean center analysis examined the two clustering areas (Song-Gang District and You-Shi District), then along Taiwan No. 14-A Road for buffer analysis. In Song-Gang District, with Green Space Building as 500 meters buffer analysis center, there are 27 accommodations in buffer neighborhood, accounting for 23% of the total; while there are 46 accommodations for 1,000 meters buffer analysis, accounting for 40% of the total. In You-Shi District, with National Hotel as 500 meters buffer analysis center, there are 25 accommodations in buffer neighborhood, accounting for 22% of the total; while there are 53 accommodations for 1,000 meters buffer analysis, accounting for 46% of the total. The buffer analysis indicates that nearly half of the accommodations are

respectively distributed in the buffer neighborhood of 1,000 meters from the centers, Green Space Building and National Hotel. According to buffer analysis along Taiwan No. 14-A Road, 94% of the accommodations are mainly clustered in the buffer neighborhood of 200 meters. When overlay the layers of accommodations distribution, DTM layer, and river layer, this research defined the suitable location of accommodations clustering limited to be on the side of river valley with natural landscape, serenity and accessibility.

Table 2 Buffer analysis of accommodations in Cing Jing area

Buffer Center	Range(meter)	Cumulative Number	Total Number Percentage
Taiwan No. 14-A Road	100	96	83%
Taiwan No. 14-A Road	200	109	94%
Taiwan No. 14-A Road	300	110	95%
Green Space Building	500	27	23%
Green Space Building	1000	46	40%
National Hotel	500	25	22%
National Hotel	1000	53	46%

**Figure 1. Buffer analysis of accommodations for 1000 meters**

**Figure 2. Overlay with accommodation layer, DTM layer and river layer**

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