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一、中文摘要

傳統探討觀光資源分配常以靜態方式分析，然而這種方式不容易對一區域內所有觀光景點之動態結構關係進行比較分析，容易造成資源配置失當。本研究將南投縣境內著名觀光景點分成十六個地點，運用網絡分析模型與指標，針對旅客遊覽南投縣之觀光動線與景點，進行動態網絡關係探討。試圖研究南投縣觀光動線網絡特徵、以及探討各個觀光景點的網絡結構位置特徵，以有效計畫觀光資源的配置與利用。

關鍵詞：觀光景點、觀光動線、網絡分析

Abstract

Many studies on the resource allocation of the tourism management utilize the static perspective which, however, would lead to inappropriate resource allocation due to it can not compare the dynamic relationships and structural characteristic among all of the tourist destinations within a certain area. This study identifies 16 Nantou famous tourist destinations, and uses the model and indicators of network analysis to examine the dynamic network relationships among these 16 tourist destinations. This study aims to effectively allocate tourism resource based on the understanding of the dynamic linkage and structural characteristic of the 16 tourist destinations in Nantou County.

Keywords: destination; tourist route; network analysis

二、Research Background

Since the appearance of Butler's resort cycle (Butler, 1980) as an investigative model for describing the

growth of tourism at particular destinations, the development of tourism destinations has become one of the most popular topics in the tourism literature (e.g. Phelps, 1986; di Benedetto & Bojanic, 1993; Pearce, 1997; Weaver, 2000; Pike, 2002; Pavlovich, 2003; Enright & Newton, 2004; etc.). A tourism destination, as a setting comprising economic, cultural and social activities, has come to be understood as a product on offer, and thus the public institutions responsible for that destination and the regional tourism organizations operating within that destination see themselves as obliged to establish a set of facilities and actions that ensure the best possible positioning in a highly competitive market when it comes to attracting tourists (Beerli & Martin, 2004). However, every destination within a certain area should be configured with appropriate touring facilities according to the network characteristics relating to its position on various touring routes. In response to this realization, local and state government and regional tourism associations can plan the destinations at which they should locate new tourist facilities, what type of facilities should be located there, and what kind of themed touring routes could be promoted. The practical method of answering the above questions is via an investigation of the characteristics of drive tourism destination networks by adopting "network analysis", which is a well developed set of methods for systematically studying social structures.

三、Network analysis

Network analysis, derived from graph theory, attempts to describe the structure

of relations (displayed by links) between given entities (displayed by nodes), and applies quantitative techniques to produce relevant indicators and results for studying the characteristics of a whole network and the position of individuals in the network structure. This study employs network analysis to explore the structural characteristics of multiple drive tourism destinations, where the destinations are treated as nodes and the tourist routes among destinations are treated as a series of links.

One of the main applications of network analysis is the identification of the “important” actors in their network (Wasserman & Faust, 1994). The most important or prominent actors generally occupy strategic locations within a network. The idea of the centrality of individuals in their network is one of the earliest to be pursued by network analysts (Scott, 2000), and is used to acquire the positional features of individual actors within networks. Freeman (1979; 1980) identified three forms of centrality. Degree centrality is the simplest and most intuitive, which measures the centrality of an individual in terms of the number of actors to which a particular actor connects. In directed networks, degree centrality can distinguish between the indegree and the outdegree of each actor to measure its in-degree and out-degree centrality, respectively (Knoke & Burt, 1983). The in-degree centrality ($C_{D,in}$) and out-degree centrality ($C_{D,out}$) of a given actor are formally defined as:

$$C_{D,in}(n_i) = \sum_{j=1}^I r_{ij,in}; C_{D,out}(n_i) = \sum_{j=1}^I r_{ij,out} \quad (1)$$

where r_{in} and r_{out} respectively denote one of the inward and outward connections of actor n_i , and I indicates the number of actors within the network. The use of these two indicators corresponding to the investigation of the network characteristics of tourism destinations as

inward and outward connections of a destination represents the receipt and transmission of numerous tourism routes, respectively. Comparing the two measures of in-degree and out-degree of a given destination can reveal whether the focal destination is a “beginning”, “core”, or “terminal” destination for various routes.

The second measure of actor centrality, closeness, is based on distance or closeness. The measure focuses on how close an actor is to all the other actors in the set of actors (Wasserman & Faust, 1994). This is a global measurement that brings into play the closeness to all network members, not just connections to immediate neighbors as like degree centrality (Degenne & Forse, 1999). The closeness centrality (C_C) of an actor is defined as:

$$C_C(n_i) = \frac{1}{\sum_{j=1}^I d(n_i, n_j)} \quad (2)$$

Here, the count $d(n_i, n_j)$ denotes the geodesic distance, which is defined as the length of the shortest path between actor n_i and n_j . In a directed network, closeness centrality can be seen in terms of what might be termed “in-closeness” and “out-closeness”, respectively, based on inward and outward connections, even so both formulas are the same as (2). This indicator reflects the idea that an actor is central if it can quickly interact with all other actors. In the context of tourism destination network, as a destination has numerous reachable other destinations and it is closer apart in distance from these reachable destinations, its closeness centrality will be high, since it is more central and closer to all of the other destinations, and vice versa.

The third concept of actor centrality is betweenness, which measures the extent to which a particular actor lies between the various other actors in the set of actors (Scott, 2000). This betweenness centrality is another global measurement that

elaborates the ability of a given actor to control interactions between pairs of other actors in the network. The betweenness centrality (C_B) of an actor is defined as:

$$C_B(n_i) = \sum_j \sum_k \frac{g_{jk}(n_i)}{g_{jk}}, \quad j \neq k \neq i \quad (3)$$

where g_{jk} denotes the number of geodesics between actor j and k , and $g_{jk}(n_i)$ denotes the number of geodesics linking the two actors that contain actor n_i . The betweenness of an actor measures the extent to which it can play the role of a broker or gatekeeper with a potential for control over others (Marsden, 1982). Applying this indicator to the network of tourism destinations, a particular destination with high betweenness centrality means that it is a highly critical intermediary between pairs of other destinations, since most tourists will stop at this destination while traveling between other various destinations.

Scholars of social networks describe actors' social capital as a function of brokerage opportunities. Betweenness centrality is an appropriate indicator measuring the extent to which actors broker indirect connections between all other actors in a network. However, increasing redundant connections in a network decreases the efficacy of the brokerage advantage of actors; increasing non-redundant connections would improve. Empirically, two criteria govern the creation of redundant connections: cohesion and equivalence (Burt, 1992; Degenne & Forse, 1999). Cohesion states that redundancy arises when two of the ego's relations share a direct link. The equivalence criterion takes into account indirect connections and suggests that redundancy occurs while two actors are structural equivalence to each other. Burt (1992) formalized this important property and proposed the idea of "structural holes", which stand for a competitive advantage for an actor with relationships spanning different groups resulting from efficacious non-redundant connections.

Burt (1992) suggests two concepts for measuring structural holes: redundancy and constraint. The general meaning of redundancy is that the ego network of an actor is redundant to the extent that its links are also connected to each other. Redundancy can be measured using the indicator effective size of the egocentric network of each actor, which is formally defined as:

$$\text{Effective size of } n_i\text{'s network} = \sum_j \left(1 - \sum_q p_{iq} m_{jq} \right), \quad q \neq i, j \quad (4)$$

The effective size of n_i in Eq. (4) varies from one, indicating that all members enjoy strong links to each other, up to the observed number of n_i 's links in the network, indicating that network members share no links to one another. The ratio of the effective size divided by the number of the ego's total relations measures the indicator of efficiency, and varies from a minimum approaching zero, indicating high contact redundancy and therefore low efficiency, to a maximum of one, indicating that every contact in the network is nonredundant.

The other concept used to measure structural holes is constraint, that is the extent to which node is directly and indirectly dependent on others, via crisscrossing connections and the absence of structural holes. The value of constraint, CT_i , is given by:

$$CT_i = \sum_j \left(p_{ij} + \sum_q p_{iq} p_{qj} \right)^2, \quad q \neq i, j \quad (5)$$

The application of structural holes corresponding to the study of tourism destinations, a particular destination with numerous advantages of structural holes represents more opportunities to broker the flow of tourists among other destinations, and means that it is located at a non-substitutable location. However, on the other hand, it would cause a serious bottleneck of tourist flows due to the lack of substitute destinations and routes that can replace this destination. In addition,

owing to physical limitations associated with roads and landscape features, several sub-groups of destinations would naturally be generated in a given area. Some overlapping destinations between sub-groups is apparent, and results from the existence of connections between destinations from different sub-groups. A destination with advantages of structural holes, which is generally the overlapping destination between sub-groups, has more capacity to control the tourist routes that bring together destinations from opposite sides of the focal destination, and then it should possess competitive advantages in terms of the allocation of tourist resources offered by government and regional tourism associations.

四、The survey

The survey was administered by telephone from 10 to 23 January, 2005. Respondents were interviewed by telephone during the evening, primarily between 6 p.m. and 8 p.m. Phone numbers were selected from the residential pages of the current telephone directory, and a stratified random sampling was established relative to respondent region of residence, with proportional to the distribution of tourists who had visited Nantou, based on the previous survey conducted by the Tourism Bureau (2004). The last digit of the selected phone number was reduced by one to further randomize the sample by including unlisted numbers, although this created some additional difficulties in completing calls by including non-working numbers and business listings (Brody & Stone, 1989). Each respondent was asked to remember their last trip to Nantou either driving themselves or being driven by relatives or friends, and to describe which one of these 16 destinations they had visited, and in what sequence. To avoid memory distortion effects only those respondents who had visited Nantou within the three months prior to taking

the survey were interviewed. That is, the subjects were eliminated if he/she had not made a driving excursion to Nantou during the three months prior to taking the survey. Total 2,142 calls were completed. The average number of destinations per trip was 2.88, and 815 samples only visited one of the 16 destinations in Nantou. For the purpose of this study, subjects that only visited one destination were eliminated, and therefore the size of the valid samples was just 1,327 and the average number of destinations visited in a multi-destination trip was 4.04.

五、Results and discussion

The indicator of degree centrality indicates that a given destination is either dependent (the in-degree centrality measuring actor's dependence) or conductive (the out-degree centrality measuring actor's conductivity). Furthermore, comparing the in-degree and out-degree of each destination reveals that destination as a beginning, core or terminal destination of tourist routes. The network graph displays two beginning destinations, namely destinations 1 (Jiujiu Mt.) and 2 (Jiji). Located at the first visited destination when tourists take a trip to Nantou, the beginning destinations, particularly destination 2, are provided with appropriate introductory facilities, such as tourist information centers. In addition, the tourism network contains three core destinations: destinations 5 (Puli), 11 (Sun Moon Lake) and 13 (Shueili). The core destinations are connected to numerous adjacent destinations, and thus are situated at the center of the tourism network. An agglomeration of complementary and even substitute facilities and services would naturally appear at these core destinations. Regarding the terminal destinations, destinations 8 (Lushan Hot Spring) and 14 (Dongpu Hot Spring) are located at this type of position. Interesting, these two destinations are well-known for their hot

spring attractions, implying that Taiwanese tourists like to complete their trips with a visit to hot springs. Facilities and services that allow tourists to rest and shop, such as accommodation, restaurants and souvenir outlets, tend to congregate at these terminal destinations.

Assessing the indicators of in-closeness and out-closeness centralities reveals the extent to which a particular destination is reachable from and to other destinations, respectively. Destinations 5 and 11 have the highest in-closeness centrality, which means that they can be reached from most other destinations by various tourist routes. They are so accessible and popular that lots of themed touring routes always include these destinations with high in-closeness centrality. In addition, destinations 8 and 13 also possess high in-closeness. As for out-closeness centrality, the highest rating of destination 2 results from its network position as a gateway for tourists visiting Nantou. Destinations 5, 11 and 13 also possess high out-closeness. The introduction-related facilities and services are highly appropriate for these high out-closeness destinations.

The betweenness centrality of a destination discloses the extent to which the tourists would make a stop at this focal destination during their routes between pairs of other destinations. The rating of betweenness centrality in the tourism network ranges between 0 and 56.02, causing the average variability between destinations to be 19.1 (S.D.), exceeding their mean (13.75). Consequently, considerable variation exists in the betweenness centrality of this tourism network. Destinations 5 and 13, due to their high betweenness centrality, act as highly critical intermediates between pairs of other destinations, and therefore have a strong need for traffic-related facilities and services.

Concerning the destinations whose degree, closeness and betweenness

centralities are low, three peripheral destinations are identified, namely destinations 4 (Shanlinxi Park), 10 (Hehuan Mt.) and 16 (Danda Park). They have few connections with adjacent destinations, are relatively inaccessible, and less act as intermediates between other destinations due to being located near the border between Nantou and other counties. However, the position of the border between two areas provides opportunities to bring tourists from outside of Nantou, and consequently it is appropriate to develop promotion-related facilities and activities in these peripheral destinations.

The three indicators measuring structural holes, i.e. effective size, efficiency and constraint, can indicate which destinations possess the advantages of being structural holes in the tourism network. The destinations having high level of structural holes are destinations 2, 5, 11 and 13, which are situated in non-substitutable locations with connections spanning different sub-groups of destinations and with opportunities to broker the flow of tourists among other destinations. However, the destinations with advantages of structural holes are so non-substitutable that they are likely to cause a severe bottleneck of tourist flows. The critical position of these destinations derived from their advantages of structural holes provides them with competitive advantages in the allocation of tourist resources offered by government and tourism associations.

六、Conclusion

As drive tourism becomes increasingly popular and destination development grows as an alternative development strategy for the economic and social regeneration of rural areas, it becomes increasingly important to understand what network characteristics of drive tourism destinations in a particular rural area are formed for

planning where to locate new facilities, what type of facilities to locate, and what kind of themed touring routes to promote. This study has offered a case-specific illustration of this investigation with the help of methodologies derived from network analysis. A key contribution of network analysis is that it offers numerous techniques and indicators by measuring nodes' links to demonstrate the structural patterns of connected systems. The properties of each node can be classified within a structural pattern of a larger connected system (Pavlovich, 2003). Differences among nodes can be traced to the constraints and opportunities arising from how they are embedded in their connected networks; on the other hand, the structure and characteristics of connected networks are grounded in and enacted by local interactions among nodes. The approach of network analysis is highly applicable to studying tourism destinations from the multidestination perspective, since each destination possesses development opportunities and constraints resulting from the influence of other destinations in the surrounding area. This study suggested indicators and techniques of network analysis appropriate for investigation into the structural characteristics of destination network, and tested these indicators and techniques by examining a network of 16 drive tourism destinations in Nantou, Taiwan. This application of network analysis in tourism has been successfully applied to demonstrate the usefulness of the proposed methodologies and illustrate the criteria of destination development using the multidestination network perspective.

Network analysis is an appropriate tool for the investigation of structural characteristic of tourist destinations. Network analysis employs graphs and matrices to show tourist routes among destinations. Graphs are extremely useful ways of presenting visual and immediate

structure on a network. However, when a large number of destinations exist, graphs may become visually complex to the point that pattern discernment becomes difficult. On the other hand, the matrices method is good at treating large networks through the application of mathematical and computer tools to locate and summarize patterns. The results of both graphs and matrices could be integrated into Geographic Information Systems for tourism planners to visualize the implicit information derived from tourist routes. Strategically, this approach of network analysis would assist the evaluation of the location and type of tourist facilities and activities undertaken by tourism planners in geographic regions in the following ways:

- . Each destination within a particular geographic region possesses development opportunities and constraints resulting from the influence of other destinations in the region. The structural characteristic of destination network could be examined by measuring the structural configuration of each destination depending on the degree, closeness and betweenness centralities and the structural holes of network analysis.

- . Tourist routes decided by travelers depend not only on the connected and convenient roads among destinations but also on the complementarity of available resources and attractions. With the classification of destinations based on the results of network analysis, tourism planners could develop appropriate tourist programs for touring routes at adjacent or distant points of a particular geographic region.

For government planners and tourism service providers, this study illustrates the need to investigate the structural patterns of multiple destinations based on tourist routes before the investment in facilities and activities at each destination. This study points out the need for future research on examining what these structural patterns of multiple

destinations can offer governments and tourism organizations seeking to design favorable multideestination products. On a practical level, increased knowledge regarding the compatibility and complementarity of tourist facilities among multiple destinations can result in more focused marketing of multideestination products. Second, a network composed of tourism facilities and transportation is in the context of both social and physical phenomena. This study collected data from multideestination trips taken by tourists and analyzed the structural characteristics of each destination purely based on social consideration. Future research could add the examination of physical condition of the network so that the research inference could base on both social and physical phenomena.

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