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Research paper

Identifying the spatial structure of the tourist attraction system in South Korea using GIS and network analysis: An application of anchor-point theory

Sanghoon Kang[a,1], Gyehee Lee[b,1], Jinwon Kim[c], Deukhee Park[d,*]

[a] Tourism Research Institute, Kyonggi University, Suwon, Republic of Korea
[b] Department of Tourism Management, Kyung Hee University, Seoul, Republic of Korea
[c] Department of Tourism, Recreation & Sport Management, University of Florida, FL, USA
[d] International Center for Hospitality Research & Development, Florida State University, FL, USA

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ABSTRACT

While social network analysis techniques have increasingly been applied in tourism research, limited effort has been devoted to attractions networks within a tourism destination. This study identified the spatial structure of the tourist attraction system in Seoul, South Korea. Based on anchor-point theory, social network analysis techniques with spatial statistics, such as local indicator of spatial autocorrelation (LISA), using Geographic Information Systems (GIS), were employed. Chinese Free Independent Tourist (FIT) data were used to compute the centrality measures from the 2015 International Visitor Survey. Results indicate that multiple anchor-points (i.e. attractions) can exist within a tourism destination. In addition, the spatial distribution patterns of the centralities were hierarchically structured and differentiated depending on the length of stay. These findings highlight the importance of examining the spatial structure of tourist attraction networks to better establish competitive tourism destination planning, development, and management strategies.

1. Introduction

According to Debbage (1991), since the spatial behavior of tourists is about exploring the wide geographic area of a destination during their trip, tourists' spatial behavior can be differentiated by tourists' typologies and travel preferences. For this reason, investigating tourists' movement patterns between/among multiple attractions could be essential to better understand tourists' spatial behavior (Caldeira & Kastenholz, 2017).

Tourists' spatial behavior within a destination is more complex than between/among destinations, since they tend to visit diverse attractions located within the destination during their trip (Lew & McKercher, 2006). Different tourist attractions are likely to have different degrees of significance, depending on the motivation of tourists (Leiper, 1990). Those differences may be hierarchically structured as a result of differences in the visitation frequency.

While defining 'tourist attraction' is difficult, Pearce (1991, p. 46) outlined "a tourist attraction is a named site with a specific human or natural feature which is the focus of visitor and management attention". Edelheim (2015) defines a tourist attraction as contribing to the narratives of place identity so that it relates to constructing the meaning of visitor experience. As a result, this study uses the definition of a tourist attraction by a hybrid of Pearce (1991) and Edelheim (2015).

Tourists' spatial behavior in urban destinations tends to comprise multi-attraction travel, involving a sequence of tourist attractions visited (Caldeira & Kastenholz, 2017). Because of the complex composition of tourist attractions visited during multi-attraction travel, tourism researchers have struggled to examine the nature of tourists' spatial behavior. However, since a tourist attraction can be counted as a node, and tourists' spatial movement between two attractions can be considered a link, social network analysis (SNA) has been widely used as a data-analysis technique by tourism researchers for analyzing the nature of the connections among attractions made by tourists' spatial movement (e.g. Asero, Gozzo, & Tomaselli, 2016; Hwang, Gretzel, & Fesenmaier, 2006; Jin, Cheng, & Xu, 2017; Lee & Kim, 2018; Leung et al., 2012; Liu, Huang, & Fu, 2017; Peng, Zhang, Liu, Lu, & Yang, 2016; Shih, 2006).

Regarding the significance of examining the nature of linkages between attractions, Lue, Crompton, & Fesenmaier (1993, p. 298) noted the following:

> … investigating the nature of linkages between destinations or attractions may help establish which types of tourism activities or resources should be located close to each other in order to maximize

* Corresponding author.
E-mail addresses: skang@kyonggi.ac.kr (S. Kang), ghlee@khu.ac.kr (G. Lee), jinwonkim@ufl.edu (J. Kim), dpark3@fsu.edu (D. Park).
[1] Co-equal authorship for first two authors (i.e., S. Kang and G. Lee).

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the financial return to both of them.

SNA has proven useful in previous tourist attraction network research. For example, Shih (2006) investigated the network characteristics of 16 drive tourism destinations in Nantou, Taiwan, by applying degree centrality, betweenness centrality, closeness centrality, and structural holes. The study demonstrated the appropriateness of network analysis techniques for examining the structural characteristics of tourism destinations. Similarly, Hwang et al. (2006) analyzed international tourists' trip patterns within the United States by applying network analysis methods such as centrality measures. They found that multi-city travel patterns differed with tourists' origins and varying levels of familiarity with the destination. Leung et al. (2012) visualized international tourists' movement patterns using the social network analysis software NetDraw, and found changes of movement patterns before, during and after the Beijing Olympic Games.

Recently, Asero et al. (2016) defined tourism networks using (social) network analysis methods. They revealed that destinations in Sicily can act as central or peripheral within a network, depending on tourist choice. A novel aspect of their approach, in comparison with previous studies, was that while Asero et al. (2016) also used degree, betweenness, and closeness centralities, they employed structural equivalence and CONvergence of iterated CORelation (CONCOR) procedures for clustering destinations. Peng et al. (2016) studied tourists' flows from a cross-provincial boundary perspective using SNA and Boundary Effect Analysis (BEA) methods, and Liu et al. (2017) examined the relationships among tourist attractions in a destination using the Quadratic Assignment Procedure (QAP) of SNA. Jin et al. (2017) analyzed tourists' movement networks against lengths of trip, and found temporal heterogeneity in the movements.

While the applicability of SNA methods has clearly been verified by a few empirical tourism studies, some suggestions made by previous studies for future research have not been sufficiently pursued. Specifically, Hwang et al. (2006) and Leung et al. (2012) suggested considering tourists' characteristics, such as socio-economic, demographic, and trip related behavior, when conducting SNA research. In a recent study, Liu et al., (2017, p. 140) also noted that "little attention has been given to the understanding of attractions network in the destination from tourist mobility perspective". As a result, since "attractions provide major symbols and images for the presentation of destinations to the public" (Pearce, 1991, p. 47), investigating which attractions are primary attractions and how the attractions are connected to each other are fundamental research questions to build effective and efficient tourism development, marketing, and management strategies.

From a theoretical perspective, anchor-point theory developed by Golledge (1978) may provide new implications for better understanding the spatial structure of tourist attractions, since the theory was developed to study "hierarchical ordering of locations, paths, and areas within the general spatial environment" (Golledge & Stimson, 1997, p. 167). As Jin et al. (2017) iterated, while the distribution and order of attractions visited by tourists are likely to vary depending on tourists' time availability during a trip, due to such variables as length of travel, little research has examined if attraction networks can be differentiated by length of travel.

To fill the gaps in the current literature, this study has two purposes, 1) to identify the nature of tourist attraction networks in light of tourists' characteristics such as the length of stay; and 2) to demonstrate the application of anchor-point theory to tourist attraction research.

2. Literature review

2.1. Anchor-point theory

The anchor-point theory of spatial cognition pioneered by Golledge (1978) addresses hierarchical linking of places (Golledge & Stimson, 1997), which is conceptually similar to landmarks, spatial hierarchies, and nodes in semantic net theories developed in geography, psychology, and cognitive science (Couclelis, Golledge, Gale, & Tobler, 1987). However, the concepts of anchor-point differ from those of the other theories in explaining the spatial cognition process.

The notion of the anchor in anchor-point theory has a distinctive nature comparable to the notion of landmark, which was popularized by Lynch (1960) 'The Images of the City,' which argued that "landmarks tend to be collectively as well as individually experienced as such, whereas anchors refer to *individual* cognitive maps" (Couclelis et al., 1987, p. 102). In analogy to the concept of spatial hierarchy, Couclelis et al., (1987, p. 103) proposed a cognitive map of the US, anchored by the location of important cities, e.g. "New York, Chicago, San Francisco, Denver or Los Angeles, by linear elements such as the Mississippi River or the Rockies, and by areal elements such as the Great Lakes or the South".

While the tools of both anchor-point and semantic net analyses include a hierarchical network of nodes (i.e. places), linked via a process of spreading activation, Couclelis et al. (1987) pointed out substantial differences between the two concepts. An anchor-point network is based on a configuration of points and lines in actual Euclidean space, while a semantic net represents "a conceptual structure with no direct analog in the observable world" (Couclelis et al., 1987, p. 103). Couclelis et al., (1987, pp. 103–104) further noted that

> ... semantic nets allow for considerable heterogeneity in the type of concepts represented … whereas anchor-point hierarchies consist only of places, and links between places (the latter may correspond to real routes between places or may be more abstract, relational links)

Finally, semantic nets are meant to represent declarative knowledge only, while anchor-point configurations obscure the distinction between the declarative and the procedural/functional and relational aspects of spatial knowledge (Couclelis et al., 1987). As a result, anchor-point theory may reveal new insights to interpret tourism spaces.

Tourism researchers have paid little attention to the potential of anchor-point theory for understanding how tourists travel in unfamiliar environments (Walmsley & Jenkins, 1992). The anchor-points refer to primary attractions. Thus, as anchor-point theory highlights the relative significance of each attraction, the theory can illuminate hierarchical ordering of attractions (Golledge & Stimson, 1997). Identifying anchor-point attractions (i.e. primary attractions) within a destination is crucial to increasing the competitiveness of a destination.

Accordingly, this study is the first to apply the anchor-point theory to find anchor-point attractions within a destination by investigating the connections between attractions. Fig. 1 visualizes anchor-point theory. For example, of 15 tourist attractions, A1 is the anchor-point in Fig. 1, since tourist attractions A2 to A15 are hierarchically ordered under A1. For example, if a tourist visited multiple attractions during his/her trip, a few attractions may be must-see attractions, while other attractions may be visited depending on tourists' motivations, preferences, etc. These travel patterns may be best explained by anchor-point theory.

2.2. Tourist attraction research from a spatial perspective

Lew (1987) classified tourist attraction studies on a basis of three perspectives: ideographic listing, organization, and tourist cognition of attractions. Leiper (1990) proposed a model of tourist attraction systems consisting of tourist, nucleus (i.e. attraction), and marker (i.e. information). He suggested that tourist attractions can be hierarchically classified into primary, secondary, and tertiary categories. Shoval and Raveh (2004) categorized tourist attractions into four distinct groups: (1) main tourist sights, (2) tourist attractions in the '*Holy Basin*,' (3) tourist attractions in the new part of the city, and (4) shopping and entertainment areas. They found a tendency for spatial concentration