



# An application of network analysis on tourist attractions: The case of Xinjiang, China



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## HIGHLIGHTS

- Presents a Quadratic Assignment Procedure (QAP) application of network analysis.
- Region proximity and tenure proximity are positively related to attraction network by tourist flows.
- Same grade attractions tend to compete with each other for tourists.
- Advances understanding of network relationships among tourist attractions.

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## ABSTRACT

This study constitutes a novel application of network analysis to explore the underlying mechanisms of tourist attraction network informed by tourist flows. Using survey data collected from a sample of 456 tourists visiting Xinjiang, China, the study applies the Quadratic Assignment Procedure (QAP) to test the relationships between *region proximity*, *grade proximity*, and *tenure proximity*, and the *attraction network* determined by tourists' free choice movements. Results show that while region proximity and tenure proximity among major attractions in a destination were positively related to attraction network, grade proximity was negatively related to the attraction network, indicating that same grade attractions were mostly competing with one another for tourists. The study contributes to the methodological development of social network analysis in tourism and advances understanding of demand-driven network relationships among tourist attractions in a destination. Destination management implications are discussed.

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## 1. Introduction

Within a tourist destination, there are many business and non-business networks that direct and co-shape the destination's development (Scott, Cooper, & Baggio, 2008). Network theory has been one of the major theories that have found its utility in different levels and context of tourism research (Johannesson, 2005; Paget, Dimanche, & Mounet, 2010; Rodger, Moore, & Newsome, 2009). Based on a sound theoretical foundation and well developed methodological application and configurations (Borgatti, Everett, & Freeman, 2002; Scott, 2000; Wasserman &

Faust, 1994), network analysis has been increasingly applied to different social sciences disciplines including tourism and hospitality (e.g., Benckendorff, 2009; Hu & Racherla, 2008; Shih, 2006; Leung et al., 2012).

Networking has been recognized as an important strategy for businesses to gain competitive advantage (Porter, 1990). It is deemed that networks can effectively reduce transactions costs and provide the chance for a company to seek external economies of scale and scope in different activities (Tremblay, 1998), and develop complementary resources by pooling strengths and mitigating risk (Kumar & van Dissel, 1996). Networks and network analysis are therefore popular in business and regional development (Borgatti et al., 2002; Enright, 1996, pp. 190–214; Eraydin & Fingleton, 2006). In the tourist destination context, network analysis has been applied from both supply and demand perspectives. From a supply perspective, business and non-business organizations and

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their relationships and interactions with one another have been the focus of the studies (Lemmetynen & Go, 2009; Pavlovich, 2003; Scott, Cooper, & Baggio, 2008; Tinsley & Lynch, 2001). These studies also relate networks to issues like regional development, innovation, knowledge transfer and spillover, and industry clustering (Erkus-Ozturk, 2009; Gibson, Lynch, & Morrison, 2005; Novella, Schmitz, & Spencer, 2006; Scott, Cooper, et al., 2008). From the demand perspective, researchers have mainly attended to tourism movements and flows (e.g., Lew & McKercher, 2006) and the network patterns and characteristics created by natural tourism flows in a destination (Leung et al., 2012; Shih, 2006). So far, the state-of-the-art research in tourism networks has been successful in describing *what* the networks are with their respective characteristics. However, the underlying mechanisms that underpin the formation of such networks are less clear.

Tourism is a complex system that involves tourists as the human element, geographic elements which include tourist generating regions, tourist destinations and the transit region/route, resources, and the industry elements (Leiper, 1979, 1995). In a destination, different types of tourist attractions define the vitality and existence of the destination. Together with other tourist life supporting system elements such as accommodation, infrastructure, transport, and host residents' hospitable attitudes (Weaver & Lawton, 2006), attractions compose one of the indispensable parts of the tourist destination system. As Gunn (1997, p. 43) put it, attractions are the "first power" and important part for destination development. In an established regional tourist destination, tourist movements and flows from one attraction to another connect attractions and form attraction networks geographically (Lew & McKercher, 2006). Multiple facets and levels of factors need to be considered in order to understand such attraction networks. These factors include both supply side issues such as transport network, transport mode, and demand side issues such as tourist origin, tourist budgets, and tourist knowledge and perceptions of the attractions (Fodness, 1990; Lew & McKercher, 2006). Therefore, to understand networks of tourist attractions in a destination due to tourist free choice movements and behavior in the destination, a new approach of investigation combining both supply and demand issues is needed.

The current study aims to explore how the network was formed using relationship as a mechanism by applying network analysis onto tourist attractions in a regional tourism destination in China. Acknowledging the descriptive nature of existing network analysis literature in tourism and its limitation in revealing the underlying mechanisms and complexities of tourism networks formation, we adopted a new approach in our examination and intended to explore the relationships behind the network relationships that may offer a fuller explanation of why the networks are formed as they are. As such, this study presents a case of analysis that not only identifies existing attraction networks due to tourist movements, but also attempts to understand the attraction networks through drawing causal links between relevant relationships among the attractions and the attraction network pattern due to tourist flows. The systems rationale recognizing the supply-demand dynamism, information exchange, and mutual influences provides the guidelines for design and analysis of this research.

## 2. Literature review and research propositions

### 2.1. Network analysis in tourism

Research on networks has attracted substantial attention in different social sciences disciplines and fields including organizational sociology, political science, and organization theory (Scott, Baggio, et al., 2008; Zaheer, Gozubuyuk, & Milanov, 2010).

Tourism involves a large number of networked firms in the service sector and networks prevail in the tourism industry (Bickerdyke, 1996). Scott, Baggio, et al. (2008) argue that networks in tourism may be more important than in other sectors of the economy for many countries. As the key concept in the network analysis literature, a network refers to set of elements and the ties and relations among the elements. In organizational studies, Gamm (1981) defines a network as a system or a field comprised of organizations and inter-organizational relationships.

Network analysis in the tourism literature has witnessed an increasing number of studies in recent years. Three research streams could be identified with studies applying network analysis in the tourism contexts: network analysis on tourism research collaboration and knowledge creation; network analysis on the tourism supply, destination, and policy systems; and network analysis based on tourist movements and behavioral patterns. Network analysis has been commonly used by tourism researchers to study research collaborations and identify knowledge linkages (e.g., Racherla & Hu, 2010; Wu, Xiao, Dong, Wang, & Xue, 2012; Ye, Li, & Law, 2013; Ying & Xiao, 2012).

From the tourism supply and destination management perspective, research applying network analysis has focused on tourism businesses and stakeholders' collaborations and partnerships in a destination (cf. Baggio, 2011; Baggio, Scott, & Cooper, 2010; Lemmetynen & Go, 2009; Scott, Cooper, et al., 2008; Tinsley & Lynch, 2001); Extended to this focus are studies on the evolution of collaborative networks (Pavlovich, 2003; Schaffer & Lawley, 2012), collaborative marketing (Wang & Xiang, 2007), and stakeholders and sustainable tourism (Albrecht, 2013; Timur & Getz, 2008).

In the specific context of destination management, Scott, Cooper, et al. (2008) studied four regional destination cases (i.e., The Gold Coast, the Southern Downs region in Queensland, the Legends, Wine and High country in Victoria, and the Great Ocean Road region in Victoria) in Australia using network analysis. Their work demonstrated the utility and contribution of network analysis to understanding the structure and cohesiveness of destinations. The study highlighted the differences in the collaborative structure and inter-organizational cohesion at different destinations. The network analysis also underscores the importance of collaborations among competitive destinations, as in most cases, relationships among competing destinations are around a value-creation system. Therefore, a whole-of-destination approach is needed in analyzing the networks within a destination.

In her study on the evolution and transformation of the destination network at the Waitomo Caves, New Zealand, Pavlovich (2003) illustrated how collective inter-organizational relationships and partnerships are formed and evolve over time. With the transformation of the destination network, the proliferation of business relational ties contributed to a more integrated information exchange system that enabled better knowledge dissemination in the network. Focused on two tourism networks cases in Finland, Lemmetynen and Go (2009) identified coordination of cooperative activities in tourism business networks as a prerequisite condition for enhancing the value-creation process and building the brand-identity in the networks. Lee, Choi, Yoo, and Oh (2013) applied both geographic information systems (GIS) and network analysis in evaluating the spatial centrality of 43 villages in Korea in a rural tourism setting. They found the centrality indices generated from network analysis are useful in tourism planning and management. Thus far, existing studies on destination networks are mostly case studies in different countries and specific regions. The study findings generally confirmed the dynamic, complex, and discursive nature of such networks in tourist destinations. Despite a great number of network analysis studies in the destination contexts,

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