Complexity traits and dynamics of tourism destinations

Ruggero Sainaghi [a], Rodolfo Baggio [b], *

[a] Dipartimento di Economia, studi giuridici e aziendali, IULM University, Via Carlo Bo, 1, I - 20143 Milan, Italy
[b] Master in Economics and Tourism, Bocconi University, via Röntgen, 1, 20136 Milan, Italy

HIGHLIGHTS

- The paper focuses on the complex structure of tourism destinations.
- Overnights time series of ten destinations are transformed into networks and examined.
- Findings reveal that the ten destinations examined show complexity characteristics but no chaotic behaviors.
- The analysis of their turning points confirms also that the destinations have different evolution through time.
- The relevance of non-linear models for the analysis of tourism destinations is highlighted.

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ABSTRACT

This paper is rooted in network science and contributes to filling two gaps, developing multiple case studies in order i) to measure the complex structure of tourism destination and ii) to explore its evolution over time, by mapping turning points. The findings put forward ten new analyses, allowing the research team to test two hypotheses: i) concerning the complex structure, the tendency of tourism destinations to remain far from the chaos threshold, ii) concerning turning points, the ability of different destinations to show also different evolution through time. The paper uses the Horizontal Visibility Graph Algorithm and applies it to a sample of ten tourism destinations in the second leading Italian tourism region per size: Trentino-Alto Adige. Findings confirm both hypotheses. Limitations and research implications are drawn.

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1. Introduction

What is a tourism destination? This deceptive question for tourism literature has received many answers over time (Pearce, 2014). In this paper we focus on a supply perspective (Leiper, 1979, 1990), considering the fragmented structure of a tourism destination (Dredge, 1999; Flagestad & Hope, 2001) and the presence of many actors operating as "co-producers" (Sainaghi & De Carlo, 2016). In this sense, the destination can be described as a complex networked system, where local actors (public and private) and organizations are the nodes, and the relationships between them the links (Baggio, Scott, & Cooper, 2010). Both elements are crucial: nodes represent the "scattered" resources and services, the

components of tourism products; relationships make it possible to "mobilize" these resources in order to create the destination's products (Haugland, Ness, Grønseth, & Aarstad, 2011; Pearce, 1989). Nodes are local firms, private and public organizations, profit and non-profit companies, local DMOs; links are relationships between firms necessary to develop the business, but links also include broad personal relationships, such as family, friendship or trust between local actors (Sainaghi & Baggio, 2014). Relationships between local actors, both weak and strong ties (Burt, 1992), represent the source of social capital (Nahapiet and Ghoshal, 1998).

The ability of this network to enlarge, and modify nodes, on the one hand, and to create valuable new links between actors, on the other, makes it possible to build and renew the destination competitive advantage, developing new processes and attracting the interest of some targets (Leiper, 2000; Weaver & Oppermann, 2000). These links are very important to manage seasonality (Bar-On, 1975, 1999; Butler, 2001; Cuccia & Rizzo, 2011; Parrilla, Font, & Nadal, 2007; Sainaghi & Canali, 2011; Sainaghi, 2010b). In fact

local hotels more embedded in the network structure are also more able to increase their occupancy, especially during off-peak seasons (Sainaghi & Baggio, 2014). The social network analysis renews the stream of research describing the destination as a tourism district, or cluster (Dredge, 1999; Sainaghi, 2006). The presence of many local actors (the nodes) generates a population of SMEs typical of an industrial district (Bellandi, 1989; Becattini, 1989, 1990; Marshall, 1919, 1920).

This network representation is a useful way to investigate the structural and dynamic characteristics of a complex system (Baggio et al., 2010, 2011; Baggio, 2011; van der Zee & Vanneste, 2015). More generally, by complex system we mean here a "network made of a number of components that interact with each other, typically in a nonlinear fashion. Complex systems may arise and evolve through self-organization, [so] that they are neither completely regular nor completely random, permitting the development of emergent behavior at macroscopic scales" (Sayama, 2015, p. 3). In fact, the destination cannot be understood by breaking down the system into its constituent elements (Stevenson, Airey, & Miller, 2009), following a linear reductionist approach or a Newtonian perspective (Farrell & Twining-Ward, 2004; Faulkner & Valerio, 1995). As discussed in the literature review, some papers describe the complex structure of tourism destination, mainly using qualitative study or single quantitative case, on the one hand, and only a few of them analyze the network dynamics, on the other. The latter are primarily qualitative and based on single longitudinal case studies, quantitative approach, therefore, depicts a clear gap. This article contributes to filling both gaps, developing multiple case studies in order to measure the complex structure of tourism destination and to explore its evolution over time, by mapping turning points.

The rest of the paper is organized as follows. The next section contains an introduction of the main concepts of complexity and system evolution and the used model is presented. The methods and the data used in the empirical study are examined in section 3. Then a discussion of the outcomes and the implications along with the limitations and possible future developments is presented. The contribution proposes an application to multiple case studies represented by some leading Italian destinations in the Trentino-Alto Adige Region.

2. Destination as complex networked system

As suggested by some authors, articles should clarify their theoretical background (Morgan, 1997). This paper is rooted in network science and, following a growing research field, it describes the tourism destination as a network. Both concepts are discussed in this paragraph. A network is a set of interconnected nodes (Burt, 1992; Knoke & Kuklinski, 1982). In a tourism destination, nodes are usually represented by local actors, such as local firms, non-profit organizations, associations, DMOs, people (Sainaghi & Baggio, 2014). The network is viewed as a multi-actor structure, where different organizations have their own specific interests (Barrutia & Echebarria, 2015; Dredge, 2006). This broad set of actors is strongly connected, with the prime purpose of creating the entire tourism product, that is a basket of services (Murphy, Pritchard, & Smith, 2000), especially in the community model (Flagestad & Hope, 2001), where the destination supply is fragmented in hundreds of firms (d'Angella, De Carlo, & Sainaghi, 2010; Murphy, 2013). These connections are vital and, as demonstrated in some studies, are able to increase the social capital of local actors both in tourism (Campopiano, Minola & Sainaghi, 2016; von Friedrichs Grängsjö and Gummesson, 2006) and in non-tourism network (Coviello, 2006). Usually leading companies, DMOs, local associations play a central role in the destination

network, showing high centrality (Bornhorst, Ritchie, & Sheehan, 2010). Links between actors can be represented by business relationships (institutional, commercial, ownership) or by a personal link (family, friendship, trust) (Sainaghi & Baggio, 2014). The latter are very important, considering the limited geographical scope of a tourism destination (Pearce, 2014). Furthermore, the high involvement of local actors and people in destination planning and development increases the relationship between stakeholders (Beritelli, 2011; d; 'Angella & Go, 2009).

Given the relevance of destination as a network, this section proposes four aspects: i) the theoretical stream underling this paper, represented by social network analysis, ii) the non-linear relationships that link the destination actors, creating a complex system, iii) the evolution of the system over time (dynamicity) and iv) the method used in this paper to analyze the destination network.

2.1. Network science

As indicated in some studies, tourism networks represent a popular research stream in the last 20 years (Albrecht, 2013). Morrison, Lynch and Johns state in 2004: "tourism networks have been a relatively neglected area of academic study […] While there is growing interest in networks and partnerships, relatively little has been published with a specific tourism focus, and most of which does exist is of recent origin" (p. 197). Appendix 1 lists some papers appearing since 2000, reporting the descriptive variables later analyzed. The present work is not a literature review; the appendix has the goal to position this contribution in a wide and rising research stream, clarifying the theoretical background, the pros and cons of network approach, the main applications of network theory and the underlying concept of network.

The table reports 47 papers; more than half of them have been published since 2010. This wide corpus is unified by the use of social network analysis (SNA), sometimes combined with other theoretical approaches (i.e. cluster analysis, marketing, governance, sustainable tourism, etc.). In order to define what SNA is, some works cite Wasserman and Galaskiewicz (1994): SNA, instead of analyzing individual behaviors, attitudes and beliefs, focuses its attention on how these interactions constitute a framework or structure that can be studied and analyzed in its own right. Bhat and Milne explain that the focus of SNA "is not on a single person or organization nor is it on dyadic relationships but on the overall pattern of relationships which form the context in which all organizations function" (2008, p. 1131).

The growing attention to SNA is related to some advantages that networks depict; reading the evidences reported in the appendix the main pros refer to: i) the destination view, ii) relationships between actors, iii) knowledge management, iv) performance. At the *destination level*, the SNA is able to represent the "total tourism product", offering a whole-of-destination view, considering relationships between destinations, coordinating policies and related actions, favoring local development (Albrecht, 2013; Bregoli, Hingley, Del Chiappa, & Sodano, 2016; Del Chiappa & Presenza, 2013; Novelli, Schmitz, & Spencer, 2006; Shih, 2006; Sørensen & Fuglsang, 2014; van der Zee & Vanneste, 2015). Focusing on *actors*, networks are useful in managing stakeholders and collaboration, especially in the field of sustainable tourism, in building community capacity, coordinating policies and related actions, developing a collective vision, creating conformity, inclusion, cohesion, entrepreneurship, focusing on long-term relationships, creating social capital, favoring conflict management and resource sharing (Arnaboldi & Spiller, 2011; Bhat & Milne, 2008; Dredge, 2006; Paget, Dimanche, & Mounet, 2010; Presenza & Cipollina, 2010; Russell & Faulkner, 2004; Sainaghi & Baggio, 2014; Saxena