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A multilayer network approach to tourism collaboration

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ABSTRACT

During the last years, tourism studies witnessed an accelerated interest for inquiring stakeholder collaboration by means of Social Network Analysis. However, following a systematic literature review, we identified that little attention has been paid to the different types of relationships that compose a destination's network and especially regarding how these types of relationships interact between themselves. The aim of the current study is to adopt a multilayer network approach in order to decompose stakeholder networks from destinations and analyse the structure of distinct collaboration layers built around different tourism activities, as well as the interdependencies between them. The background of analysis consists of two Romanian case studies, one representative for emerging destinations (Bran) and the other for stagnating ones (Vatra Dornei). Methodologically, Social Network Analysis and nonparametric statistical analysis have been employed in order to uncover general and in-depth aspects of stakeholder collaboration. The main findings point out notable differences in size and structure between the collaboration layers generated by each activity, as well as the fact that particular collaboration layers are significantly interdependent. It has been demonstrated, *inter alia*, that stakeholders who collaborate for products creation will also collaborate for exchange of knowledge, while those who collaborate for designing policies and strategies will also collaborate for accessing funds and developing common projects. The study has implications for theory building and for destination management, pointing out towards the types of relationships that reinforce each other, and that could maximise collaboration's benefits in destinations, if managed properly.

1. Introduction

Collaboration in tourism is of utmost importance since the delivery of the overall product to visitors is dependent on how successfully stakeholders work together (Buhalis, 2000; Fyall, Garrod, & Wang, 2012; Scott et al., 2008). Understanding how stakeholder collaboration works has important implications for destination management (Gajdosik, Gajdosikova, Marakova, & Flagestad, 2017; Pulido-Fernandez & Merinero-Rodriguez, 2018), for tourism strategy implementation (Albrecht, 2017), as well as for fostering innovation (Brandao, Breda, & Costa, 2019; Kofler, Marcher, Volgger, & Pechlaner, 2018). However, tourist destinations are acknowledged to be complex systems (Baggio, 2008), which raises major challenges in the process of grasping the mechanisms of stakeholder collaboration.

One response to these challenges has been to widely employ Social Network Analysis (SNA) to uncover particularities of collaboration in tourism (Casanueva, Gallego, & Garcia-Sanchez, 2016). This tendency has been triggered by the acknowledgment that understanding complex systems is dependent on the thorough understanding of the networks behind them (Barabasi, 2016). Consequently, an increasing number of studies have been published during the last years, focusing on inquiring structural features of overall stakeholder networks. They conclude on the important role of a central organization for the productive management of a destination (Beritelli, Buffa, & Martini, 2015; Kim & Scott, 2018), on the fact that stakeholders do not take advantage of collaboration to its fullest potential (Baggio, 2017), or on the preference to collaborate with geographically close stakeholders instead of creating external connections (Czernek-Marszalek, 2019; Kofler et al., 2018). However, despite the significant advances in the field, analysing interactions between multiple types of relationships in a destination's network is only at an incipient stage of development (Baggio, 2017) and the linkages between various networking behaviours of tourism stakeholders are particularly underexplored (Ying, Jiang, & Zhou, 2015).

In the meantime, decomposing overall networks into separate types of relationships has gained increasing attention in network science developed outside tourism studies, most notably by operationalizing the

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concept of *multilayer networks* (Kivela et al., 2014). In spite of this, only very recently this approach has been indicated (Baggio, 2017) or explored (Baggio & Baggio, 2020) as a fruitful research direction in tourism literature. Some tourism studies have actually had similar aims, although employing different notions and concepts (Brandao, 2014; Czernek-Marszalek, 2018; Del Chiappa & Presenza, 2013; McLeod, Vaughan, & Edwards, 2010; Pulido-Fernandez & Merinero-Rodriguez, 2018; Ying et al., 2015). However, only two of these studies systematically analysed the way in which various types of relationships are interconnected and reinforce each other, by employing both SNA and statistical analysis for correlations between these types (Buffa, Beritelli, & Martini, 2019; Ying et al., 2015). From a policy-making perspective, knowledge resulted from such an analysis could ensure an encompassing destination management, by pointing out towards collaboration types that influence each other and that could be considered simultaneously in strategic approaches (Ying et al., 2015).

The current study aims at delivering one of the first systematic studies of interdependencies between various layers of collaboration. It builds on the very recent and highly promising field of multilayer networks' analysis (Baggio & Baggio, 2020), a stream of research that has much to offer to tourism studies. The purpose of the study is to analyse the specificities of different collaboration layers generated by tourism activities in destinations and, above all, the interdependencies that exist between these layers. Consequently, it aims at answering the following interrelated research questions: (i) Which tourism activities generate most collaboration relationships among stakeholders? (ii) How are the collaboration layers differentiated in terms of size and structure? (iii) To what extent distinct collaboration layers depend on each other inside destinations? Methodologically, a novel approach consisting in mixing Social Network Analysis with nonparametric statistical analysis is adopted, providing an original investigation of prevalence and interdependencies that characterise relationships types in tourism. The analysis is carried out for two Romanian destinations in different stages of development, thus also aiming at preliminary evidences on how the stage of tourism development associates with certain collaboration behaviours. Above all, the findings point out groups of activities that reinforce each other in terms of collaboration and that should be considered together from a strategic point of view. The study has important theoretical and practical implications, and it also contributes empirically and methodologically to the analysis of networks in tourism literature.

This paper is structured in six parts. Following the introduction, the next section reports the results of a systematic literature review on the current state of network analysis in tourism, as well as on the advances towards a multilayer network approach in the field. The third part introduces the study areas and provides details on the methods employed. The fourth part presents the results of the study, while the subsequent fifth part discusses the findings, their implications and concludes with the most important contributions of the paper and potential directions for further research.

2. Literature review

The concepts of *relationships* and *interdependencies* between the various components of a tourism system are central in many definitions of a tourist destination, which refer to the integrated experience it offers (Buhalis, 2000) or to all the connections between the components and phenomena that constitute the destination (Baggio, 2008; Cooper & Hall, 2008). These concepts require proper methods and approaches in order to be fully grasped. SNA provides the integrated techniques necessary for identifying patterns of relationships between stakeholders and all interrelated components of the tourism system (Scott et al., 2008).

While tourism networks received insufficient attention in the past (Casanueva et al., 2016), the last four years witnessed an accelerated increase of studies employing SNA. This has significantly advanced knowledge related to tourism collaboration to the point that there is a need for an updated state-of-the-art on the issue. We thus aim at providing it, while also looking whether stakeholder networks have been approached from a multilayer perspective.

2.1. Network analysis in tourism studies

A systematic literature review has been conducted in order to thoroughly understand current trends in the study of tourism networks. The common stages were followed: identification of research, selection of primary studies, assessment of the quality of studies, data extraction and monitoring, synthesis (Gough, Oliver, & Thomas, 2012; Kitchenham, 2004).

Identification of research papers has been conducted exclusively on Web of Science database. The search procedure followed a combination of two keywords that were chosen such that they capture as much of the relevant literature as possible: *network analysis* and *tourism*. The search returned a number of 327 unique sources that were further screened and sorted based on a number of inclusion criteria which had to be met simultaneously: (1) the paper addresses network analysis techniques to study any topic related to tourism, (2) the paper employs SNA techniques for empirical analyses; (3) the paper is a peer-reviewed scientific article (editorials, conference proceedings and book chapters have been excluded). There was no inclusion criterion based on time period, since a comprehensive overview of the research was intended. Finally, out of the 327 papers, 125 papers have been selected as relevant. An additional number of 16 titles was included in the final list, based on them being frequently cited in the 125 articles selected, and thus being highly relevant for the topic. A final number of 141 articles have been included in the analysis.

Results show an accelerated increase in the number of studies employing SNA in tourism, with almost 43% of the total number of articles having been published during the last two years (2018–2019) and 71% during the last four years (2016–2019). However, questions should be raised regarding their purpose, content and outcomes. To answer these questions, the 141 studies have been classified in four main categories, based on their content and the subject inquired: interorganizational relations, attractions and destinations networks, virtual networks and bibliometric analysis (Table 1).

The study of Interorganizational Relationships (IORs) represents the most prevalent approach in the field, including 41,8% of the total number of articles. The systematic search of literature allowed for the identification of most recurrent concerns in IORs tourism literature. The

Table 1
Classification of tourism studies that employed SNA (until June 2020).

Topic	% of total	Aims
Interorganizational relations (IORs)	41.8	Analyse intra-destination stakeholder networks, from their structure to the role they have in tourism development.
Networks of attractions and destinations	33.0	Identify patterns of local and global tourist attractions or destinations networks, generally through the analysis of tourists flows and behaviour.
Virtual networks	12.1	Analyse virtual tourism connections and networks, with focus on the influence of particular users or stakeholders in social media.
Bibliometric analysis	14.2	Explore trends in research on particular topics and identify most central and influential authors, journals or papers, and the connections between them.
Other	8.5	Analyse networks of residents and their participation in tourism management; define the image of events or destinations through tourists' perceptions etc

Source: own elaboration

majority of the studies analysed the structure of stakeholder networks inside destinations (Romeiro & Costa, 2010; Schaffer & Lawley, 2012; Scott et al., 2008; Tran, Jeeva, & Pourabedin, 2016) or dynamics of power, inquiring for central stakeholders inside destinations (Beritelli et al., 2015; Cooper, Scott, & Baggio, 2009; Kim & Scott, 2018; Timur & Getz, 2008). Most of these analyses focused on overall networks, which are regarded as the entirety of stakeholders encompassed in a destination, connected by tourism-related interactions. However, little attention has been given to a recent fruitful direction of research, that of multidimensional tourism networks analysis (Baggio, 2017). Out of the 59 papers centred on studying IORs in tourism through SNA, only 10 looked separately at sub-networks in tourist destinations. Even less, precisely 2 papers, employed a statistical approach to analyse the manner in which these sub-networks interact and influence each other.

Consequently, this identified gap in the literature indicates that network analysis in tourism demands more in-depth analyses, focused on understanding the interactions between separate types of relationships in destinations. A multilayer network approach could represent a solution towards this purpose, due to the in-depth knowledge of networking mechanisms it provides, both for practical aims and for theory building purposes.

2.2. Towards a multilayer approach of tourism interorganizational relationships

All systems are complex and defined by various characteristics and types of relationships. Therefore, analysing different types of relationships and the interaction between them is necessary for understanding the entire system (Baggio & Baggio, 2020). Network science regards these types of relationships as layers inside a system. A layer is a feature specific to the nodes or links that constitute that layer (Aleta & Moreno, 2019). Thus, the layers are defined by different types of relationships, when the links are the ones labelled, or by different characteristics of the nodes, when these are classified into categories. Due to the growing interest for studying networks from a multidimensional perspective, two concepts have been introduced and operationalised in network science during the last decades, respectively *network of networks* and *multilayer networks* (Kivela et al., 2014). The essence of studying a network from a multilayer perspective is to decompose it into multiple separate sub-networks (layers), and analyse them both individually and in relation with one another.

The decomposition of overall networks represents a solution for a thorough understanding of their functioning mechanisms. While in network science this approach has gradually gained significant attention, in tourism literature networks inside destinations have rarely been decomposed. In general, network approaches in tourism either include overall analysis of a destination (Scott et al., 2008; Timur & Getz, 2008) or focus on particularities of networking regarding only one purpose of collaboration or one tourism activity (Beritelli et al., 2015; Brandao et al., 2019; Hristov, Minocha, & Ramkissoon, 2018; Kofler et al., 2018; Sallent, Palau, & Guia, 2011).

The 10 identified studies which do decompose destinations into sub-networks are not labelled by their authors as corresponding to a multilayer approach, and do not employ such concepts as *layers* and *multilayer networks*. Nonetheless, they constitute multilayer approaches, as they examine various sub-networks of destinations, as a main or secondary purpose. Sub-networks are generally operationalised in these studies as types of interactions between stakeholders or as particular activities for which stakeholders collaborate. Some findings emphasize how collaboration differs in density of ties and involvement of stakeholders depending on the type of activity performed (Brandao, 2014; Farsani, Coehlo, & Costa, 2014). Others showed how collaboration initiatives for different fields of activity vary between destinations depending on the stage of tourism development (Pulido-Fernandez & Merinero-Rodriguez, 2018). These findings underline the necessity of prioritizing collaboration in relation with the destinations' interests in particular stages of development. Furthermore, some studies found similar collaboration patterns (low levels of collaboration, presence of same central stakeholders) irrespective of the type of activity (Del Chiappa & Presenza, 2013; Presenza & Cipollina, 2010), while others, on the contrary, identified structural differences, as it is the case between formal and informal knowledge networks (Sanz-Ibanez et al., 2019).

Only a reduced number of these studies, respectively three of them, analysed the interactions between collaboration layers. Buffa et al. (2019) discussed the influence that separate project networks have on the reputation network in a destination, while the other two studies (Czernek-Marszalek, 2018; Ying et al., 2015) emphasised the strong relationships between different types of interactions or tourism activities, and therefore point out towards the areas that have the potential to influence each other. However, even less studies developed a statistical approach of these interactions, by employing statistical correlations (Ying et al., 2015) or multiple regressions (Buffa et al., 2019), but none of them aimed to systematically analyse the interdependencies between the layers in the network of tourist destinations.

Overall, noteworthy progress has been achieved in the field of IORs in tourism, and approaches on the multiple dimensions of networking in destinations began to appear in the field. Still, the manner in which various types of networks interact between themselves is rather understudied in tourism, despite this approach currently being an emerging subject in network science (Baggio, 2017). Consequently, in order to address this knowledge gap, we propose a systematic analysis of the interdependencies between the layers that build the network of a tourist destination. The novelty resides in the complementarity between the decomposition of tourism networks into layers defined by purposes of collaboration and the thorough statistical analysis that captures the most interdependent layers.

3. Methodology

3.1. Study area

Two Romanian destinations have been chosen as case studies for answering the research questions. Both are located in mountainous areas with high regional concentration of tourism activity and both are among the most representative destinations in their region. However, they differentiate from each other by being in different stages of tourism development in Butler's model (Butler, 1980). Bran is an emerging destination, which started from barely offering tourism services two decades ago, but had an almost continuous growth during 2001–2018, while Vatra Dornei was a mature and well-established destination for most of the last century, but has been stagnating during the last two decades (Fig. 1). Comparing destinations that find themselves in different stages of development could also allow for preliminary insights on particularities regarding collaboration behaviour specific to each stage.

Bran is a rural destination of 1492 inhabitants (2011). Lately, it started to build on its potential as a sustainable rural destination. It has an advantage in the proximity to the capital city, Bucharest, but also in its position along the route that connects two historical regions of Romania: Transylvania and Wallachia. Although rich in natural assets, the area owns its success almost entirely to a famous attraction, Bran Castle, popularly known as Dracula's home, despite the lack of any real connection with the dark character (Reijnders, 2011). The appeal of the myth of Dracula for visitors, related to Bram Stoker's novel, transformed this destination in one of the most dynamic in Romania, especially in terms of foreign visitors (Cândea, Stăncioiu, Mazilu, & Marinescu, 2009). During the communist regime, Dracula's name was rather controversial, and it was not exploited for tourism, despite the economic advantages it could have brought (Light, 2007). Only after 2000, the image of Dracula started to be gradually embraced both by government and private tourism stakeholders as an element of attractiveness

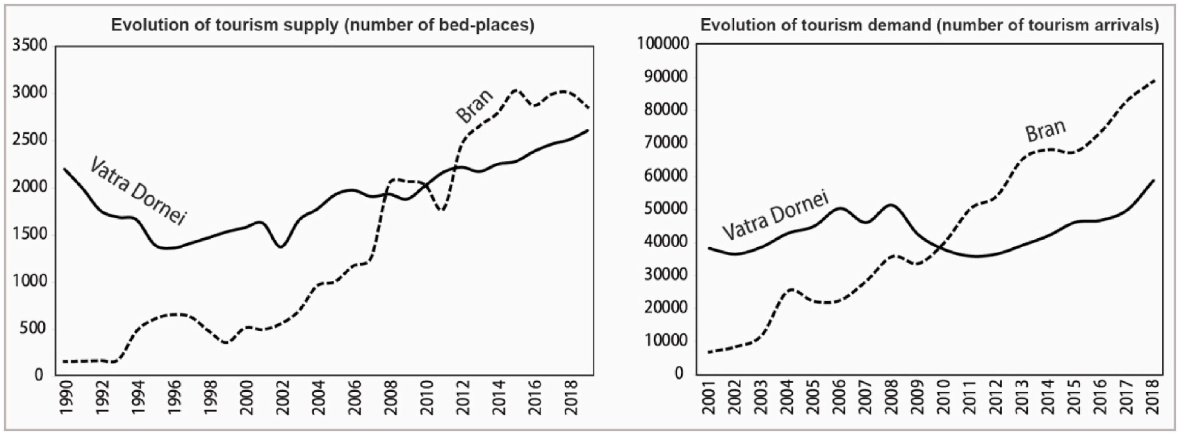

Fig. 1. Evolution of tourism in the two destinations. Data source: National Institute of Statistics (www.insse.ro).

(Huebner, 2011; Light, 2007), which determined the rather late emergence of Bran among the top Romanian destinations.

Vatra Dornei, on the other hand, is a town (14,429 inhabitants in 2011) with a long tourism tradition, declared a spa resort in the XIXth century, due to early discovery of mineral waters, which are one of the main assets of the destination (Cehan et al., 2020). Later on, it epitomised the most developed and promoted type of destinations during the communist period: a spa resort destined to ensure relaxation and health cure for the country's labour force (Erdeli, Dincă, Gheorghilaș, & Surugiu, 2011). Following the fall of communism, most spa resorts, including Vatra Dornei, faced a continuous decline because of the lack of investment and of a deficient management of its resources (Erdeli et al., 2011). Consequently, the destination followed a descendant path, leading to a chaotic development without a unitary vision. Nowadays, the destination is advantaged by being part of the historical region of Bukovina, a brand with European appeal. However, its peripheral position and the emergence of neighbouring destinations that do not carry the burden of post-communist tourism downfall, led to a rather stagnating profile at present.

3.2. Data collection

Semi-structured interviews were carried out with public and private stakeholders during February–April 2019, for Vatra Dornei, and October–November 2019, for Bran. The first step in identifying the relevant stakeholders was the creation of preliminary lists of stakeholders, based on the official tourism website of Vatra Dornei (www.visitvatradornei.ro), on TripAdvisor travel platform for both destinations and on the official list of accommodation establishments (Ministry of Tourism, 2019). Starting from these lists, the snowball sampling technique was employed to identify more stakeholders for each destination, a widely employed technique for identifying key stakeholders (Waayers, Lee, & Newsome, 2012). Consequently, 23 stakeholders, managers or owners, have been interviewed from Bran and 24 from Vatra Dornei, belonging to various fields of activity related to tourism (Table 2). Due to the preference of most of the respondents to not be recorded, the data was collected through interview scripts written down during the interviews. Consequently, a highly structured interview, including pre-defined grids for collecting data, has been implemented to allow for a rigorous and accurate data collection.

The respondents were inquired about the purposes for which they collaborate, in order to understand the dynamics of collaboration inside networks. All respondents' answers were grouped according to the activities indicated into seven categories, conceptualised as separate collaboration layers within the overall network (Table 3). These categories were built based on the similarities between the purposes mentioned, starting from previously defined "spheres of action" in tourism (Pulido-Fernandez & Merinero-Rodriguez, 2018), to which new categories were added depending on the mentioned activities by respondents. Each pair of stakeholders that compose the overall network can collaborate for zero, one or several activities.

Relational data thus collected has been further employed i) for uncovering networks' and layers' structural features, and ii) for inquiring interdependencies between collaboration layers.

Table 2
Categories of stakeholders interviewed.

	Bran	Vatra Dornei
Public institutions	1	3
Tourist Attractions	3	6
Accommodation	15	14
Travel Agencies	1	1
Associations	1	–
Restaurants	2	–
Total number of interviews	**23**	**24**

Source: own elaboration

Table 3
Conceptualization of collaboration layers and corresponding tourism activities.

Layer of collaboration	Activities
Products creation	-designing tourism products -organizing events (festivals, cultural manifestations, exhibitions etc.)
Strategies and policy design	-initiatives for tourism planning and development
Marketing and promotion	-mutual promotion between two stakeholders (usually between accommodation units, tourist attractions) -media channels promoting events, tourism initiatives, private businesses -marketing activities for promoting the destination -promotion through online reservation platforms
Supply of goods and services	-providing necessary goods for carrying out particular tourism activities -providing complementary services between stakeholders
Knowledge exchange and research	-ensuring an environment for students' practical work -exchange of experience in various fields
Accessing funds/ Common projects	-developing projects -applying for funds destined to tourism development
Sponsorship	-providing financial support for certain events

Source: own elaboration

3.3. Data analysis methods for uncovering network structural features

Social Network Analysis through UCINET 6 for Windows (Borgatti, Everett, & Freeman, 2002) has been employed for the analysis of layers. SNA is based on a central, yet simple principle that states that structure matters (Borgatti, Mehra, Brass, & Labianca, 2009). Consequently, through the use of structural or relational information, which is a definitory characteristic of this type of analysis (Casanueva et al., 2016), SNA provides the techniques and metrics to explore the structures created through the interactions between various components of a system, that cannot be explained only through the individual behaviour of each component (Baggio, 2020).

SNA is a set of methods through which relationships in a networked structure are mapped and measured. Since a network is composed by nodes and by the relationships that connect these nodes, SNA is dependent on the availability of relational data (Scott, 2000). Consequently, SNA relies on an adjacency matrix in which the presence or absence of relationships between any pair of nodes is indicated (Borgatti, Everett, & Johnson, 2013). Such a matrix is further utilized for the visualization of all relationships observed among stakeholders through sociograms (Knoke & Kulinski, 1982) or for calculating various measures of nodes or of the network. In this paper, the nodes are represented by stakeholders involved in tourism activities, while the relationship between any two nodes represents any tourism-related connection that an interviewed stakeholder established with another stakeholder.

Density is one of the simplest measures of cohesion, that refers to the number of ties in a network as a proportion of the total potential ties that could be established, indicating the extent to which the analysed nodes are interconnected (Borgatti et al., 2013). Network centralisation indicates the extent to which a particular graph presents a centralised structure, reflecting whether the power inside the network is equally or unequally distributed (Scott, 2000). Another cohesion measure is the clustering coefficient, which captures whether a network has areas of low or high density, pointing out the extent to which each node creates ties in its close neighbourhood (Borgatti et al., 2013).

The current study integrates all the above-mentioned metrics to better grasp the collaboration behaviours associated with each tourism activity and to compare them. Since not all metrics can be compared when networks differ in dimensions, because network properties change with size (Butts, 2009), in this study, the metrics of layers for each network were compared only inside each separate destination and only by including both the connected and the isolated nodes each time. These metrics were also calculated separately only for the connected nodes to better underline the structural characteristics of each individual sub-network.

3.4. Data analysis methods for determining interdependencies between collaboration layers

The interdependencies have been assessed by employing Fisher's Exact Test, which is a nonparametric statistical test for the assessment of the association between two dichotomic variables. It is thus an exact test for a single 2×2 contingency table (Mehta & Patel, 2012). It serves the main function as the better-known Chi-square, with the difference that it is more precise, and it can be employed in situations where the number of observations is extremely high.

In the case of this study, the analysis has been conducted as follows. Fisher's exact test has been initially carried out for a pair of two variables. The two variables have been defined as in the following example: the first variable reflects the existence (YES/NO) of a relationship between two given actors with the purpose A ('Products creation'), while the second variable reflects the existence (YES/NO) of a relationship between the same couple of actors with the collaboration purpose B ('Strategy and policy design'). The Null Hypothesis states that the existence of relationships aiming at 'Products creation' is independent of the existence of relationships aiming at 'Strategy and policy design' (or vice-versa). When the Null hypothesis is rejected, the Fisher's exact test indicates that collaboration ties aiming at 'Strategy and policy design' are not independent from collaboration ties aiming at 'Product creation'. Therefore, the test shows that there is an association between the two variables, thus suggesting that the collaboration relationships that are built around the two purposes might reinforce each other. In order to have as accurate as possible an image of the interdependencies between all various layers of collaboration, Fisher's exact test had been conducted for each pair of collaboration purposes (A – B, A – C, etc.). Furthermore, the test has been conducted separately for the two destinations to look for significant similarities/differences between them.

However, the Fisher's exact test only detects the existence (or not) of a statistically significant association. It does not indicate the size effect of that association (*i.e.* the strength of the association). The strength of the association is relevant because it shows which tourism collaboration purposes associate/reinforce each other the most/the least. For this research purpose, Phi contingency coefficient has been computed.

Finally, as a consequence of surprising results generated by Fisher's exact test and by Phi coefficients, a multiple correspondence analysis has been conducted for determining various dimensions of collaboration that exist, as well as their subsequent nature. Multiple correspondence analysis allows the researcher to 'analyse the pattern of relationships of several categorical dependent variables' (Abdi & Valentin, 2007).

4. Results

4.1. General features of the overall networks

Inquiring layers of collaboration and their interdependencies requires to first look at the general features of the overall network for each destination. The overall networks of the destinations are characterised by low-density, with 1.4% of the total possible relationships being established (Bran), and 1.2% respectively (Vatra Dornei), indicating a reduced predisposition towards collaboration. Furthermore, the average degree (i.e. the average number of links for each node in a network) of 1.5 for Bran and 1.7 for Vatra Dornei confirm the low levels of collaboration. The overall network centralisation has low values, which indicates there are no particular influential stakeholders to hold most of the power inside the network. The sparse overall networks for both destinations are indicated by the low values of the clustering coefficient, which illustrate low densities around the neighbourhood of each node (Table 4).

It is also important to note that the collaboration network in Bran presents a higher level of internationalization, with 10.2% of the ties involving one international stakeholder, compared to Vatra Dornei where the share of international ties is of 3.9% of the total number (with consequent very low External-Internal Indexes). This is important to keep in mind as background for our research, as it shows that the results which will be further reported mostly reflect infra-national collaboration patterns.

Table 4
Metrics for overall networks.

	Bran	Vatra Dornei
Ties	166	231
Nodes	110	137
Density	0.014	0.012
Average degree	1.509	1.699
Network Centralisation (Degree)	0.141	0.17
Clustering Coefficient	0.061	0.136
External-Internal Index	−0.795	−0.922
Internal ties	149 (89.8%)	222 (96.1%)
External ties	17 (10.2%)	9 (3.9%)

4.2. Prevalence of tourism activities and dimensions of subsequent collaboration layers

Results show that 'Marketing and promotion' is the most prevalent activity in both destinations (Table 5). From the total number of stakeholder pairs that collaborate for at least one purpose, 54.6% (Bran) and 78.4% (Vatra Dornei) do collaborate for 'Marketing and promotion' (either as their only purpose of collaboration, or as one of more purposes). The second most prevalent tourism activity is 'Supply of goods and services', with comparable shares between the two destinations: 30.7% in Bran, 35.1% in Vatra Dornei. Further, the 'Products creation' is an important determinant of collaboration in the emerging destination, with 22.3% of the total connections, but not so important in the stagnating one, where it sums only 7.8% of the relationships. Interestingly, the situation is reversed in terms of involvement in 'Strategies and policy design', where Vatra Dornei has a more developed network than Bran, although not significant either.

A direct consequence of different prevalence values of relationships for each activity can be noticed in the varying sizes of each collaboration layer (Fig. 2). The sizes of layers vary from 4 to 68 nodes for Bran (Table 6), and from 8 to 113 for Vatra Dornei (Table 7). The largest networks are generated by 'Marketing and promotion' activities, with the highest number of stakeholders from each destination. At the other extreme, the collaboration for 'Accessing funds/Common projects' and 'Sponsorship' includes less than 10 stakeholders, with less than 10 corresponding ties in each destination. Bran, however, displays two more such small-sized networks: 'Strategies and policy design' and 'Knowledge exchange and research'.

4.3. Different collaboration layers, different structural characteristics

The differences in absolute size between collaboration layers inside the same destination does not allow to compare all their structural features. However, they can be compared, when relative metrics are calculated by taking into consideration all the nodes for each subnetwork (110 nodes for Bran, 137 nodes for Vatra Dornei). Results indicate three main facts: 1) 'Marketing and promotion' layer stands out with the highest values in terms of size and density; 2) the values for network centralisation and clustering coefficient are rather low and 3) the less prevalent activities barely generate networks, which therefore display peculiar structures, with a segmented pattern of the layers and a reduced number of nodes and ties (Fig. 2, Tables 6 and 7).

The particular cases of the layers with a segmented pattern indicate that a more pertinent approach is to regard them as ego-networks or simple ties inside the destination. In Bran, four activities create such structures (Table 6), while in Vatra Dornei two cases stand out (Table 7). In these layers, collaboration is represented through simple dyadic relationships and star-shaped ego-networks built around a single stakeholder. Naturally, these cases present a higher network centralisation, when calculated only for the active nodes. The larger networks present a core-periphery structure, with a reduced number of central stakeholders, which have the capacity to connect the numerous peripheral ones.

Table 5
Prevalence of relationships for each tourism activity.

Bran	Vatra Dornei
Marketing and promotion (54.6%)	Marketing and promotion (78.4%)
Supply of goods and services (30.7%)	Supply of goods and services (35.1%)
Products creation (22.3%)	Strategies and policy design (9.5%)
Knowledge exchange and research (3.6%)	Knowledge exchange and research (9.1%)
Accessing funds/Common projects (3%)	Products creation (7.8%)
Strategies and policy design (2.4%)	Accessing funds/Common projects (3%)
Sponsorship (1.2%)	Sponsorship (3%)

Source: own elaboration.

4.4. Interdependencies between collaboration layers

Fisher's Exact Test shows that layers of collaboration are significantly associated ($p < 0.01$) in 5 out of 21 cases in Bran (an emerging destination – Table 8) and in 17 out of 21 cases in Vatra Dornei (a mature but stagnating destination – Table 9). Furthermore, Phi coefficient pinpoints to strong associations between particular pairs of layers in both destinations, thus showing that collaboration relationships for some particular purposes are significantly (and sometimes strongly) associated with collaboration relationships for other particular purpose.

A surprising result is the fact that we found almost the same main associations in both destinations. As such, the most representative association in both destinations are, by far, registered between 'Strategies and Policy Design' (B) activities and 'Accessing Funds/Common Projects' (F) activities ($\Phi = 0.894$, $p < 0.001$ for Bran, $\Phi = 0.564$, $p < 0.01$ for Vatra Dornei). Even more surprising is the emergence of the same second strong interdependency that is common for both destinations, this time between 'Marketing and Promotion' (C) and 'Supply of Goods and Services' (D). They show a strong effect size in Vatra Dornei ($\Phi = 0.409$, $p < 0.01$), and a weaker but still highly significant one in Bran ($\Phi = 0.157$, $p < 0.01$).

The Multiple Correspondence Analysis complements the previous findings on layers interdependencies (Table 10). It shows that the seven collaboration layers could be reduced to three dimensions (latent variables) of collaboration (that explain around 62% of the variance in each destination), and, interestingly, two of these dimensions are similar for both destinations. First of all, some of the same strong associations are confirmed. 'Strategies and policy design' and 'Accessing funds/Common projects' are strongly associated, such that they mostly form a first dimension of collaboration in both destinations (Table 10). Both destinations are similar in yet another dimension, mainly composed of 'Products creation' and 'Knowledge exchange and research'. Fig. 3 illustrates both the dimensions of each layer in the two destinations and the strength of association between the layers. Once more, a higher density of associations stands out for the stagnating destination.

To conclude on the findings, 'Marketing and promotion' activities generate the largest collaboration layer, with highest densities, thus having the highest potential to engage stakeholders in collaboration. Essential to notice are the significant differences between the collaboration layers, ranging from large core-periphery structure networks, to dyadic and star-shaped networks. These layers present particular interdependencies between themselves which point out activities than can be considered together in the collaboration process. The 'Strategies and Policy design' association with 'Accessing Funds/Common projects', as well as the association between 'Products creation' and 'Knowledge exchange and research' indicate the most interdependent layers of collaboration in both destinations, with another common association, less significant, between 'Marketing and promotion' and 'Supply of goods or services'. These empirical differences and similarities are a matter of further discussion, and although it is difficult to generalize from only two case studies, interesting theoretical and practical implications do emerge.

5. Discussion and conclusions

The novelty brought by this paper resides in the fact that it is one of the first initiatives towards operationalizing the multilayer network approach in tourism literature. While other attempts at decomposing destinations into layers do exist, results in this paper are the only ones that have been generated following a systematic approach that focuses rather on interdependencies between the layers of collaboration, than on simply comparing these layers. Therefore, this paper went beyond the dominating approach of inquiring aggregated and overall collaboration networks, and it systematically studied the layers of collaboration that compose these networks. In addition, it proposes a previously unexplored approach of mixed methods (SNA and statistical analysis) that

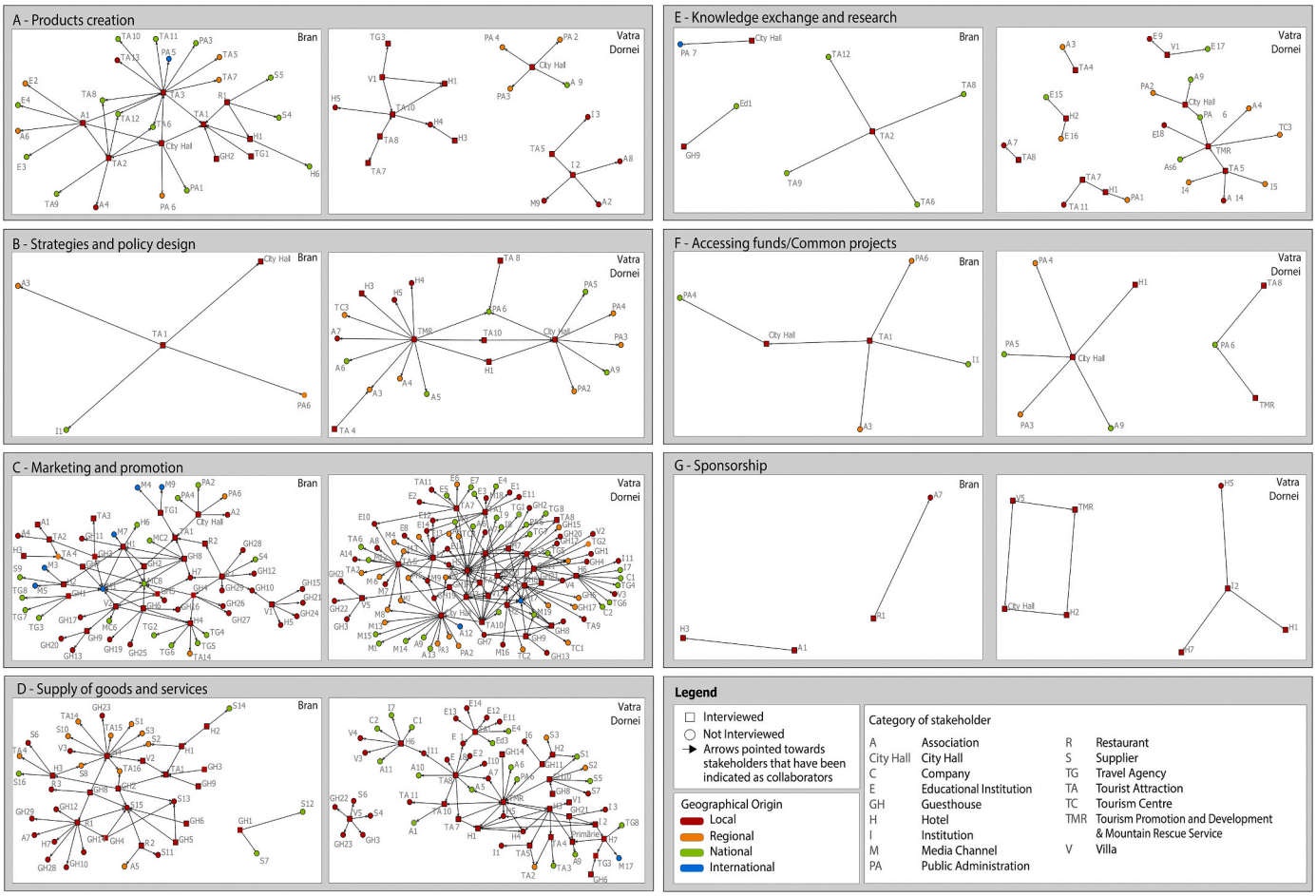

Fig. 2. Collaboration layers defined by different tourism activities. Source: own elaboration.

Table 6
Bran collaboration layers.

	No. of ties	Connected nodes	Density	Network Centralisation	Clustering Coefficient	Network Centralisation (connected nodes)
Products creation	37	30	0.003	0.115	0.053	0.392
Strategies & policy design	4	5	0.000	0.037	0	1
Marketing & promotion	91	68	0.008	0.079	0.031	0.115
Supply of goods & services	51	44	0.004	0.104	0.018	0.237
Knowledge exchange & research	6	9	0.001	0.036	0	0.429
Accessing funds/Common projects	5	6	0.000	0.037	0	0.700
Sponsorship	2	4	0.000	0.009	0	0

Source: own elaboration

Table 7
Vatra Dornei collaboration layers.

	No. of ties	Connected nodes	Density	Network Centralisation	Clustering Coefficient	Network Centralisation (connected nodes)
Products creation	18	20	0.001	0.035	0.090	0.135
Strategies & policy design	22	21	0.001	0.087	0	0.547
Marketing & promotion	181	113	0.01	0.145	0.102	0.172
Supply of goods & services	81	67	0.004	0.096	0.059	0.182
Knowledge exchange & research	21	27	0.001	0.042	0	0.185
Accessing funds/Common projects	7	9	0.000	0.037	0	0.554
Sponsorship	7	8	0.000	0.022	0	0.238

Source: own elaboration

can be replicated to further advance empirical knowledge on multilayer networks in tourism.

Results concerning the seven identified layers reflect the distinct behaviours of collaboration that stakeholders have, depending on the activity they collaborate for. More precisely, while initiatives for marketing or for supply of goods and services determine larger and denser networks, other purposes of collaboration generate rather sparse, segmented networks. Furthermore, results showed significant

Table 8
Bran – associations between tourism activities (based on Phi coefficient).

	A	B	C	D	E	F	G
A		−0.001	0.134***	0.043	0.268***	−0.001	−0.001
B			−0.002	−0.001	0.000	0.894***	0.000
C				0.157***	−0.002	0.045	−0.001
D					−0.001	−0.001	0.098***
E						0.000	0.000
F							0.000
G							

Statistical significance for Fisher Exact Test: ***p < 0.01.
Source: own elaboration

Table 9
Vatra Dornei – associations between tourism activities (based on Phi coefficient).

	A	B	C	D	E	F	G
A		0.200***	0.208***	0.103***	0.102***	0.267***	−0.001
B			0.299***	0.235***	0.371***	0.564***	−0.001
C				0.409***	0.192***	0.139***	0.083***
D					0.119***	0.083***	0.125***
E						0.164***	−0.001
F							0.000
G							

Statistical significance for Fisher Exact Test: ***p < 0.01.
Source: own elaboration

Table 10
Dimensions of tourism collaboration in Vatra Dornei and Bran.

	Vatra Dornei			Bran		
	Dimensions			Dimensions		
	1	2	3	1	2	3
A - Products creation	.222	.021	**.387**	.000	**.570**	.073
B - Strategies and policy design	**.635**	.070	.014	**.945**	.001	.001
C - Marketing and promotion	.381	.213	.004	.002	.236	.203
D - Supply of goods and services	.261	**.371**	.011	.000	.130	**.451**
E – Knowledge exchange and research	.273	.017	**.340**	.000	**.379**	**.236**
F - Accessing funds/ Common projects	**.427**	.210	.065	**.948**	.000	.000
G - Sponsorship	.009	**.305**	.118	.000	.009	.188
Active Total	2.207	1.208	.939	1.895	1.325	1.153
% of Variance	31.53	17.26	13.41	27.07	18.92	16.47

*Most important two factors for each dimension of collaboration are shown in bold.
Source: own elaboration

association between many of these layers, which indicate those interdependent activities that should be strategically considered together when stakeholders collaborate. These empirical results have both potential theoretical implications, and important practical ones.

5.1. Theoretical implications

First, empirical results reported in this paper call for enriching collaboration theory (Gray, 1989) by integrating the emerging issue of interdependencies between collaboration layers. As such, our findings indicate that the interactive process that defines stakeholders' collaboration relies on strong associations between various purposes of collaboration. These associations support and reinforce previously discussed matters that are important for the collaboration theory applied to tourism. As such, the strong association in both destinations between relationships for designing strategies and policies and those for accessing funds/common projects reinforces the ideas that the success of any policy and strategy implementation is dependent on the adequate public or private funding (Akehurst, Bland, & Nevin, 1993; Bramwell & Sharman, 1999). Furthermore, the strong connection between the relationships built for products creation and those for knowledge exchange and research is in line with the idea that knowledge and information have to be transformed into innovative products (Dwyer & Edwards, 2009).

Secondly, empirical evidences brought by the two case studies analysed in this paper partially support the conceptual model of Merinero Rodríguez and Pulido-Fernandez (2009) and Pulido-Fernandez and Merinero-Rodriguez (2018), which states that stakeholders' collaboration in tourism varies across destinations depending on destinations' level of development. As such, the identified predominance of relationships oriented towards marketing and promotion in the emerging destination (Bran) are in line with this model, while same tendency in the stagnating destination (Vatra Dornei) might surprise. More broadly, this paper can have theoretical implications for building an integrative framework of destinations. Pearce (2014) proposes such a framework and emphasises the interdependence between tourism firms and their complementarity as essential notions for destination management. However, not only the interdependence and complementarity between stakeholders should be regarded in such a framework, but also the ones between the types of activities for which these stakeholders establish relationships.

Last but not least, this study provides initial empirical evidences for the utility of a multidimensional approach for network theory applied to tourism, confirming that a multidimensional approach has a great potential to improve knowledge on complex systems (Baggio, 2017). Much of the work done until now in tourism, in regard to such interdependencies, was mainly methodological development (e.g. Baggio & Baggio, 2020), inspired by results obtained in other scientific fields. Very little empirical evidence on interdependencies between tourism collaboration layers has been brought until now, and even less theoretical discussion of their implications has been initiated.

5.2. Practical implications

The current study has important practical contributions as it provides potential directions of intervention for destination managers and policy makers. First, the study suggests the necessity for each destination

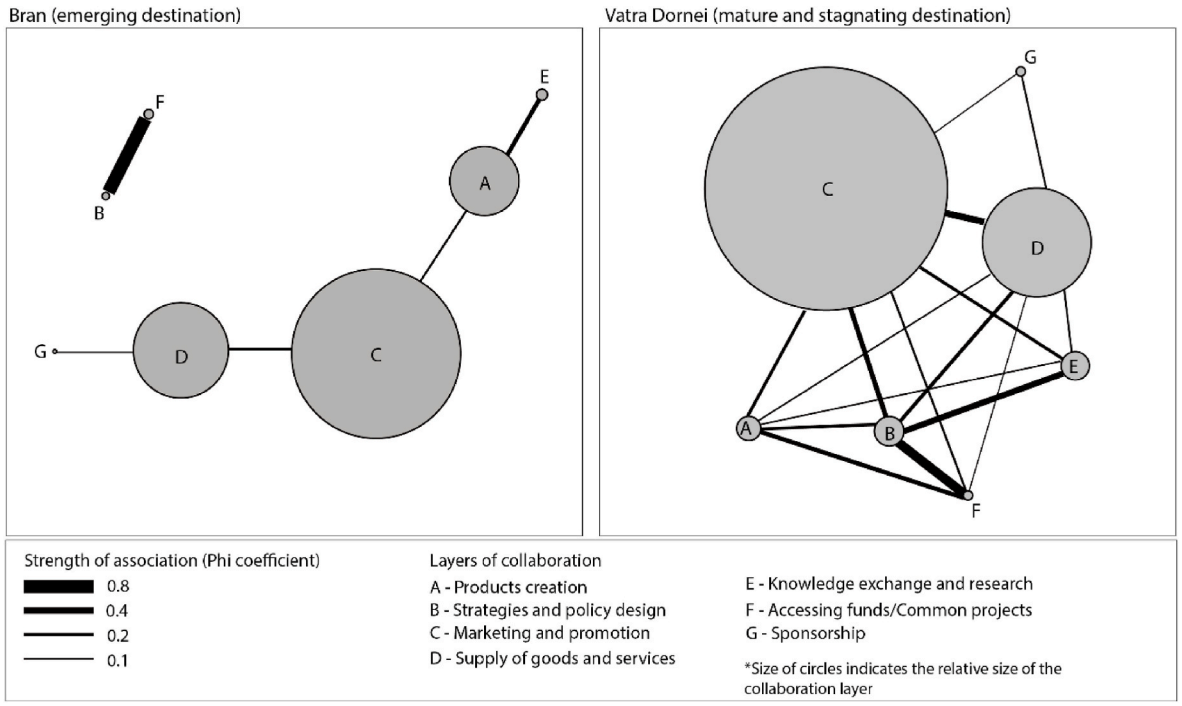

Fig. 3. Interdependencies between the layers of collaboration. Source: own elaboration.

to prioritize the activities on which to focus the most depending on their stage of development at a certain moment. The products creation activities are a priority in the emerging destination (Bran), which might explain part of its current success, as the primary tourism products are considered the essential pull factors that motivate tourists to visit a destination (Benur & Bramwell, 2015). Conversely, the lower interest for this activity in the stagnating destination could point out towards potential deficiencies in the management of the destination. This could be a first step to be addressed by managers, since the lack of new, attractive products is indicated as a potential factor of declining interest of tourists for a destination, while the revival of old products or creation of new ones favours the rejuvenation of a destination (Butler, 2011; Faulkner, 2002).

A second contribution and with most significant practical implications, is the identification of the same associations between layers of collaboration for both destinations. This strengthens the validity of the findings and their potential for generalization and, implicitly, their implications for destination management. The two most significant associations, between (1) 'strategies and policy design' and 'accessing funds/common projects' and (2) 'products creation' and 'knowledge exchange and research' point out the most interdependent groups of activities for which stakeholders collaborate. Acknowledging the fact that stakeholders who collaborate for certain activities will in most cases naturally work together for other particular purposes, gives directions towards most efficient ways to maximise the strategic approaches on destination management.

In light of all the findings, this study has significant practical contributions for policy makers. It provides insights into particularities of collaboration behaviours related to each type of tourism activity and specific to different stages of destination development. It is noticeable how stakeholders in the two destinations prioritize differently the type and nature of their relationships, which impacts greatly the management of destination. In the emergent destination, the collaboration behaviour of stakeholders is characterised by a significant predisposition towards internationalization of tourism and a strong involvement towards products creation. This behaviour determines a growing number of tourist arrivals and a strong position among the Romanian destinations with a European appeal. On the other hand, the stagnating destination requires an adjustment in terms of collaboration behaviour from the part of stakeholders, in order to better respond to the current needs for a better management of the destination. Although stakeholders concentrate their effort for strategy and policy design, they do not capitalize the results of these relationships into further developing new ways of development that could rejuvenate the destination.

5.3. *Limitations and further research*

The low number of case studies represents a limitation of this analysis. Evidences from more territories could bring valuable insights and emphasize particular patterns that could allow the generalization of the results, both in terms of interdependencies between the types of relationships and regarding the way these correlate with different stages of tourism development. Moreover, further research could inquire for the determinants of the identified behaviours of collaboration, through in-depth interviews with the stakeholders, providing a more qualitative analysis.

Our study is the first study that systematically and precisely aimed at decomposing tourism multilayer networks with the aim of finding patterns of interdependencies and discusses their practical and theoretical implications. Acknowledging the existence of such patterns and understanding them could indicate directions for unlocking the potential for collaboration and for maximising its benefits. However, much remains to be understood in terms of interdependencies between collaboration layers, their relationship with the stage of development of the destination, and of tourism stakeholder versatility since this avenue of research is in its early infancy.

Declarations of competing interest

The authors have no conflict of interest.

References

Abdi, H., & Valentin, D. (2007). Multiple correspondence analysis. *Encyclopedia of Measurement and Statistics, 2*, 651–666.

Akehurst, G., Bland, N., & Nevin, M. (1993). Tourism policies in the European community member states. *International Journal of Hospitality Management, 12*(1), 33–66.
Albrecht, J. N. (2017). Challenges in national-level tourism strategy implementation – a long-term perspective on the New Zealand tourism strategy 2015. *International Journal of Tourism Research, 19*(3), 329–338.
Aleta, A., & Moreno, Y. (2019). Multilayer networks in a nutshell. *Annual Review of Condensed Matter Physics, 10*, 45–62.
Baggio, R. (2008). Symptoms of complexity in a tourism system. *Tourism Analysis, 13*, 1–20.
Baggio, R. (2017). Network science and tourism – the state of the art. *Tourism Review, 72*(1), 120–131.
Baggio, R. (2020). Tourism destinations: A universality conjecture based on network science. *Annals of Tourism Research, 82*.
Baggio, R., & Baggio, J. A. (2020). *Modelling and simulations for tourism and hospitality: An introduction*. Channel View Publications.
Barabasi, A.-L. (2016). *Network science*. Cambridge University Press.
Benur, A. M., & Bramwell, B. (2015). Tourism product development and product diversification in destinations. *Tourism Management, 50*, 213–224.
Beritelli, P., Buffa, F., & Martini, U. (2015). The coordinating DMO or coordinators in the DMO? – an alternative perspective with the help of network analysis. *Tourism Review, 70*(1), 24–42.
Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). *Ucinet 6 for Windows: Software for social network analysis*.
Borgatti, S. P., Everett, M. G., & Johnson, J. C. (2013). *Analyzing social network*. Sage Publications.
Borgatti, S. P., Mehra, A., Brass, D. J., & Labianca, G. (2009). Network analysis in the social sciences. *Science, 323*, 892–895.
Bramwell, B., & Sharman, A. (1999). Collaboration in local tourism policymaking. *Annals of Tourism Research, 26*(2), 392–415.
Brandao, F. (2014). *Innovation in tourism: The role of regional innovation systems*. PhD Thesis in tourism. University of Aveiro.
Brandao, F., Breda, Z., & Costa, C. (2019). Innovation and internationalization as development strategies for coastal tourism destinations: The role of organizational networks. *Journal of Hospitality and Tourism Management, 41*, 219–230.
Buffa, F., Beritelli, P., & Martini, U. (2019). Project networks and the reputation network in a community destination: Proof of the missing link. *Journal of Destination Marketing & Management, 11*, 251–259.
Buhalis, D. (2000). Marketing the competitive destination of the future. *Tourism Management, 21*, 97–116.
Butler, R. (1980). The concept of a tourist area cycle of evolution: Implications for management of resources. *Canadian Geographer, 24*, 5–12.
Butler, R. (2011). The evolution of tourism products in St Andrews, Scotland: From religious relics to Golfing Mecca. In Y. Wang, & A. Pizam (Eds.), *Destination marketing and management. Theories and applications* (pp. 149–164). London: CAB International.
Butts, C. T. (2009). Revisiting the foundations of network analysis. *Science, 325*(5939), 414–416.
Cândea, M., Stăncioiu, F.-A., Mazilu, M., & Marinescu, R. C. (2009). The competitivenss of the tourist destination on the future tourism market. *WSEAS Transactions on Business and Economics, 6*(7), 374–384.
Casanueva, C., Gallego, A., & Garcia-Sanchez, M.-R. (2016). Social network analysis in tourism. *Current Issues in Tourism, 19*(12), 1190–1209.
Cehan, A., Eva, M., Iațu, C., & Costa, C. (2020). Inquiring structure and forms of collaboration in tourism through social network analysis. *Sustainability, 12*. https://doi.org/10.3390/su12198161.
Cooper, C., & Hall, M. C. (2008). *Contemporary tourism: An international approach*. Oxford: Butterworth-Heinemann.
Cooper, C., Scott, N., & Baggio, R. (2009). Network position and perceptions of destination stakeholder importance. *Anatolia. An International Journal of Tourism and Hospitality Research, 20*(1), 33–45.
Czernek-Marszalek, K. (2018). Cooperation evaluation with the use of network analysis. *Annals of Tourism Research, 72*, 126–139.
Czernek-Marszalek, K. (2019). Applying mixed methods in social network research – the case of cooperation in a Polish tourist destination. *Journal of Destination Marketing & Management, 11*, 40–52.
Del Chiappa, G., & Presenza, A. (2013). The use of network analysis to assess relationships among stakeholders within a tourism destination: An empirical investigation on Costa Smeralda-gallura, Italy. *Tourism Analysis, 18*(1), 1–13.
Dwyer, L., & Edwards, D. (2009). Tourism product and service innovation to avoid 'strategic Drift'. *International Journal of Tourism Research, 11*, 321–335.
Erdeli, G., Dincă, A. I., Gheorghilaș, A., & Surugiu, C. (2011). Romanian spa tourism: A communist paradigm in a post communist era. *Human Geographies – Journal of Studies and Research in Human Geography, 5*(2), 41–56.
Farsani, N. T., Coelho, C. O., & Costa, C. M. (2014). Analysis of network activities in geoparks as geotourism destinations. *International Journal of Tourism Research, 16*(1), 1–10.
Faulkner, B. (2002). Rejuvenating a maturing tourist destination: The case of the Gold coast. *Current Issues in Tourism, 5*(6), 472–520.
Fyall, A., Garrod, B., & Wang, Y. (2012). Destination collaboration: A critical review of theoretical approaches to a multi-dimensional phenomenon. *Journal of Destination Marketing & Management, 1*(1–2), 10–26.
Gajdosik, T., Gajdosikova, Z., Marakova, V., & Flagestad, A. (2017). Destination structure revisited in view of the community and corporate model. *Tourism Management Perspective, 24*, 54–63.
Gough, D., Oliver, S., & Thomas, J. (2012). Introducing systematic reviews. In D. Gough, S. Oliver, & J. Thomas (Eds.), *An introduction to systematic reviews* (pp. 1–17). London: SAGE Publications Ltd.
Gray, B. (1989). *Collaborating: Finding common ground for multiparty problems*. San Francisco: Jossey-Bass.
Hristov, D., Minocha, S., & Ramkissoon, H. (2018). Transformation of destination leadership networks. *Tourism Management Perspectives, 28*, 239–250.
Huebner, A. (2010). Who came first – Dracula or the tourist? New perspectives on Dracula tourism at bran Castle. *European Journal of Tourism Research, 4*(1), 55–65.
Kim, Y.-R., & Scott, N. (2018). Network dynamics of tourism development in South Korea. *Current Issues in Tourism, 21*(11), 1239–1259.
Kitchenham, B. A. (2004). *Procedures for undertaking systematic reviews. Joint technical report*. Computer Science Department, Keele University (TR/SE0401) and National ICT Australia Ltd.
Kivela, M., Arenas, A., Barthelemy, M., Gleeson, J. P., Moreno, Y., & Porter, M. A. (2014). Multilayer networks. *Journal of Complex Networks, 2*, 203–271.
Knoke, D., & Kulinski, J. H. (1982). *Network analysis*. London: Sage.
Kofler, I., Marcher, A., Volgger, M., & Pechlaner, H. (2018). The special characteristics of tourism innovation networks: The case of the Regional Innovation System in South Tyrol. *Journal of Hospitality and Tourism Management, 37*, 68–75.
Light, D. (2007). Dracula tourism in Romania. Cultural identity and the state. *Annals of Tourism Research, 34*(3), 746–765.
McLeod, M. T., Vaughan, D. R., & Edwards, J. (2010). Knowledge networks in the tourism sector of the Bournemouth, Poole, and Christchurch conurbation: Preliminary analysis. *Service Industries Journal, 30*(10), 1651–1667.
Mehta, C. R., & Patel, N. R. (2012). *IBM SPSS exact tests*. IBM Corporation, 2012.
Merinero Rodríguez, R., & Pulido-Fernandez, J. I. (2009). Desarrollo turístico y dinámica relacional. Metodología de análisis para la gestión activa de destinos turísticos. *Cuadernos de Turismo*, (23), 173–194.
Ministry of Tourism. (2019). The authorized tourism establishments list. http://turism.gov.ro/web/autorizare-turism/ Accessed 20th of January 2020.
Pearce, D. G. (2014). Toward an integrative conceptual framework of destinations. *Journal of Travel Research, 53*(2), 141–153.
Presenza, A., & Cipollina, M. (2010). Analysing tourism stakeholders networks. *Tourism Review, 65*(4), 17–30.
Pulido-Fernandez, J. I., & Merinero-Rodriguez, R. (2018). Destinations' relational dynamic and tourism development. *Journal of Destination Marketing & Management, 7*, 140–152.
Reijnders, S. (2011). Stalking the count. Dracula, fandom and tourism. *Annals of Tourism Research, 38*(1), 231–248.
Romeiro, P., & Costa, C. (2010). The potential of management networks in the innovation and competitiveness of rural tourism: A case study on the Valle del Jerte (Spain). *Current Issues in Tourism, 13*(1), 75–91.
Sallent, O., Palau, R., & Guia, J. (2011). Exploring the legacy of sport events on sport tourism networks. *European Sport Management Quarterly, 11*(4), 397–421.
Sanz-Ibanez, C., Lozano, S., & Clave, S. A. (2019). Brokers in a destination's knowledge networks. *Journal of Destination Marketing & Management, 11*, 120–129.
Schaffer, V., & Lawley, M. (2012). An analysis of the networks evolving from an artificial reef development. *Current Issues in Tourism, 15*(5), 497–503.
Scott, N., Cooper, C., & Baggio, R. (2008). Destination networks: Four Australian cases. *Annals of Tourism Research, 35*(1), 169–188.
Scott, J. (2000). *Social network analysis: A handbook*. London: Sage.
Scott, N., Baggio, R., & Cooper, C. (2008). *Network Analysis and tourism: From Theory to practice. Series: Aspects of tourism*. Channel View Publications.
Timur, S., & Getz, D. (2008). A network perspective on managing stakeholders for sustainable urban tourism. *International Journal of Contemporary Hospitality Management, 20*(4), 445–461.
Tran, M. T. T., Jeeva, A. S., & Pourabedin, Z. (2016). Social network analysis in tourism services distribution channels. *Tourism Management Perspectives, 18*, 59–67.
Waayers, D., Lee, D., & Newsome, D. (2012). Exploring the nature of stakeholder collaboration: A case study of marine turtle tourism in the ningaloo region, Western Australia. *Current Issues in Tourism, 15*(7), 673–692.
Ying, T., Jiang, J., & Zhou, Y. (2015). Networks, citizenship behaviours and destination effectiveness: A comparative study of two Chinese rural tourism destinations. *Journal of Sustainable Tourism, 23*(8–9), 1318–1340.

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