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Sofia Karampela, Dimitris Kavrouidakis & Thanasis Kizos

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Agritourism networks: empirical evidence from two case studies in Greece

Sofia Karampela*, Dimitris Kavroudakis  and Thanasis Kizos 

Department of Geography, University of the Aegean, University Hill, Mytilene 81100, Greece

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This study investigates the characteristics of informal agritourism-related networks within destinations with the help of social network analysis by measuring macro and meso structural aspects of networks in two tourist destinations in Greece with different geographic characteristics: an island-Lesvos (in North Eastern Aegean) and a continental locality-Plastiras Lake (central part of Greece). The main objective is to illustrate and discuss quantitative and qualitative aspects of these networks with selected actors who are linked (directly or indirectly) with the agritourism sector through personal in-depth and semi-structured interviews. The quantitative aspects include: quantity of links, spatial extent of networks, type of relationship, its “thickness”, the duration of the relationship, issues of seasonality as well as satisfaction of the cooperation. The qualitative aspects include the type of relationship of the actors over the link and who (if anyone) has “control” over this relationship. The main findings indicate that the examined networks are partially affected by the geographic characteristics of the case studies and they are very similar in terms of absolute numbers and network metrics. Although research on networks has been an emerging and promising approach, qualitative characteristics of informal networks seem to be integral for understanding networks and planning tourism policies.

Keywords: agritourism; network analysis; Lesvos Island; Plastiras Lake; Greece

1. Introduction

The concept of networks, with actors connected by links that represent their interactions (Baggio, Scott, & Cooper, 2010), seems to have become a new paradigm in describing a wide variety of complex adaptive systems and their dynamic behaviours (Anderson & Vongpanitlerd, 2006; Carrington, Scott, & Wasserman, 2005; Scott, 2012; Wasserman & Faust, 1994). One of the most important characteristics of such systems that have guided network-oriented research has been that the network, rather than individual nodes, is the unit of analysis, bringing forward features such as density, size or centrality of networks (Scott, Baggio, & Cooper, 2008). The use of networks in enterprises and supply chain analysis highlights the diverse settings encountered: networks involve enterprises of all sizes in various combinations, they can be local or international, they can occur at all stages of the value chain and they range from highly informal relationships to contractual obligations (Hall, Cambourne, Macionis, & Johnson, 1997). Networks can also be formal or informal, with network members engaging or withdrawing from active involvement

*Corresponding author. Email: karampela@env.aegean.gr

(Dredge, 2006b), while members can participate in more than one networks at the same time.

In this paper, we use social network analysis (SNA) in informal agritourism-related networks in two destinations in Greece with different geographic characteristics: an island and a continental locality. We examine functional cooperation networks among actors who are directly or indirectly linked with the agritourism sector, for (a) mapping the existence, density and type of cooperation networks between actors with direct or indirect links to agritourism, including all aspects of the touristic process chain, (b) understanding the nature and distribution of power along these networks and (c) discussing differences at the geographical features of the areas in the types and qualities of the networks.

2. Networks in tourism literature

The use of networks in tourism literature has increased lately with some examples, including networks and food tourism (Boesen, Sundbo, & Sundbo, 2017; Hall & Gössling, 2016), networks and wine tourism (Brás, Costa, & Buhalis, 2010; Hall et al., 1997), networks and geotourism (Fassoulas & Zouros, 2010), networks and leisure (Stokowski, 1994), innovation networking in tourism firms (Booyens & Rogerson, 2016), policy networks and local tourism organizations (Dredge, 2006a), networks and community-based tourism (Iorio & Corsale, 2014), tourism governance networks (Beaumont & Dredge, 2010; Farmaki, 2015) and finally networks for sustainable tourism (Albrecht, 2013; Fadeeva, 2005; Pavlovich, 2001).

The introduction of SNA in tourism research emphasizes the idea that description and analysis of these networks is performed with indicators of a web of stakeholders (nodes) that establish relationships (ties) among themselves, indicators such as density of relationships; centrality of networks and stakeholders; degree of “betweenness” that facilitates connectivity; and the importance of cohesion measured through indicators of cliques or subgroups (Merinero-Rodríguez & Pulido-Fernández, 2016). SNA in tourism typically covers cooperative processes that arise at various levels: between individuals, businesses and non-business organizations, destinations, etc. Some examples include navigation paths of tourists’ trip planning (Li, Yang, & Pan, 2015), network characteristics of drive tourism destinations (Shih, 2006), tourists’ movement networks (Leung et al., 2012), tourist-flows networks (Peng, Zhang, Liu, Lu, & Yang, 2016), networks and innovation in tourism (Novelli, Schmitz, & Spencer, 2006), social innovation network geographies of tourism (Sørensen, 2007) and social networking of virtual communities to support tourism professionals (Chalkiti & Sigala, 2008). The “nature” of networks and their collective operation within a destination is a field with little research, yet it is crucial in terms of the implementation of business support and tourism destination policies (Tinsley & Lynch, 2001). Casanueva, Gallego, and García-Sánchez (2016) provide an analysis of SNA approaches and end up with the following groups: (1) analysis of tourism destinations and clusters that study ties between stakeholders – subgroups centred: (a) more on cooperative ties than on the destination (Romeiro & Costa, 2010), (b) on sustainable tourism (Erkuş-Öztürk, 2009) and (c) on the destination (Baggio, 2011; Baggio et al., 2010; Pavlovich, 2003; Scott et al., 2008); (2) bibliometric works, where relational data are secondary, accessible and easy to collect and process in contrast to primary data where confidentiality or emotional factors may hinder data availability; (3) a geographic destination component (Lee, Choi, Yoo, & Oh, 2013; Leung et al., 2012; Shih, 2006) and (4) leisure studies from a sociological point of view.

Rural tourism and networks have also been the focus of studies (e.g. Lane & Kastenholtz, 2015; Soteriades, Tyrogala, & Varvaressos, 2009) that stress their importance in agritourism, providing ties between the relevant enterprises and other local actors (Ammirato & Felicetti, 2013; Marsat, Menegazzi, Monin, Bonniot, & Bouchaud, 2013; Naidoo & Pearce, 2016; Yang, 2012). The role of such networks in rural development has also been highlighted in the literature (Cawley, Marsat, & Gillmor, 2007; Quaranta, Citro, & Salvia, 2016). Phillip, Hunter, and Blackstock (2010) analyse the definition of agritourism literature and offer a typology, which was adapted by Flanigan, Blackstock, and Hunter (2014, 2015) and eventually by Karampela, Kizos, and Spilanis (2016) with a focus on its local development impacts. Cooperation networks are one of the key issues in this typology, a view shared by Che, Veeck, and Veeck (2005), who examine the role of networks (links among farmers) in agritourism performance, finding that cooperating entrepreneurs who foster connections among several tourism actors develop successful tourism products (Novelli et al., 2006), and perform better than those who opt for a more individual centred operation.

3. Research methodology and case study areas

3.1. Research approach

The assumptions behind the whole rationale are that networks and their features are affected by the geographic characteristics of the case studies. The methodology includes: (a) quantitative aspects: the number of links, the spatial extent of each link, the type of exchange over the link, its “thickness” (i.e. how much is exchanged), the duration of the link, issues of seasonality and satisfaction of the cooperation and (b) qualitative aspects: the type of actor and the type of relationship of the actors over the link and who (if anyone) has “control” over this relationship.

More specifically the research is structured in four stages:

- (a) A first survey of tourism actors and products, in order to record characteristics such as their role in tourism, the number and type of relations with other actors and the supply chains for inputs they use and outputs they produce. The result is an enterprise database with contact details (web-page, e-mail, telephone number, etc.) and characteristics.
- (b) Personal in-depth and semi-structured questionnaires, with selected actors related to agritourism from the first exploratory survey, to record quantitative and qualitative characteristics of links and supply chains. The semi-structured format helped in keeping the interviews relevant, while the in-depth approach allowed the respondents to discuss at length the various aspects of networking and established an informal atmosphere (Tinsley & Lynch, 2001).
- (c) The above database is enriched with new information derived from the respondents using snowball for sampling. In general, snowball technique is used in SNA (Casaneueva et al., 2016), identifying actors-nodes on the basis of an initial set and repeats the process until the sample is saturated and a network has emerged.
- (d) SNA with the use of Gephi software is performed (<https://gephi.org/>). The characteristics of the links were (1) local (within the limits of the locality) and non-local (regional, national and international), (2) formal and informal (in four categories: informal, membership, cooperation contract and capital participation), (3) horizontal, vertical and diagonal relations, (4) duration (for less than 1 year, 1–2 years, 2–3 years, 3–5 years, 5–10 and more than 10 years), (5) seasonality (sporadic with

interruptions, sporadic, often, regularly, permanent and ongoing) and (6) satisfaction of the cooperation (in 5 classes). We consider the entities as nodes, and the relationships between them as ties. The metrics that were calculated include (i) network size (how many nodes are tied with other nodes), (ii) density (the connectedness of a network – the proportion of all possible links present in a network) and (iii) centrality measures, which show a node's structural importance in the network; the ones used here are: (iii1) degree (how well connected a node is and the direct influence of a node), (iii2) “betweenness” (showing how often a node lies along the shortest path between two other nodes) and (iii3) eigenvector (a node has a high score if connected to many nodes that are themselves well connected).

3.1.1. *Metrics in SNA*

More specifically, using Gephi 0.9.1, the structures of networks in each case study area were analysed by measuring their network size, density and average degree centralities. Indexed by counting the number of nodes of a given network, network size is a basic demographic measure for networks. Ranging from 0 (every node is isolated from each other) to 1 (every node is connected to each other), network density measures the connectedness of a network by dividing the number of actual connections between nodes by the number of possible connections (Ying, Jiang, & Zhou, 2015). It refers to the number and characteristics of ties among the members and may be sparse or dense network. Centrality refers to the position that a member obtained through the network structure; so it highlights how resources are managed and how power is displayed (Iorio & Corsale, 2014). Centrality is a measure showing a node's structural importance in the network; it is a composite indicator consisting of four partial indicators: degree, betweenness, closeness and eigenvector (Makri & Koutsouris, 2015). Degree centrality shows how well connected a node is and the direct influence of a node on what is flowing through the network. The higher a node's value the more distinguished the node is. Closeness centrality shows the extent to which a node is close (or far) from all other nodes and represents the expected steps (how far) until arrival for given node of whatever is flowing in the network. Nodes closer to all other nodes (i.e. scoring low) are important as they communicate easier with other nodes in the network. In this way, the closeness is considered to be the inverse of the sum of the shortest distance (sometimes called as geodesic distance, Schramski & Huang, 2016) between each individual and all other available in the network. Betweenness centrality, showing how often a node lies along the shortest path between two other nodes, is an index of potential gatekeeping, brokering, controlling the flow as well as of liaising otherwise separate parts of the network. A node has a high score when it controls the flow of information between other nodes. Finally, eigenvector centrality measures the number and quality of ties and is an indicator of popularity and power; a node has a high score if connected to many nodes that are themselves well connected. Clustering coefficient provides the likelihood that two associates of a node are associates with themselves. A higher clustering coefficient indicates a greater “cliquishness” (Panda, Abraham, Dehuri, & Patra, 2012).

3.2. *Case study areas*

Two destinations in Greece with different geographic characteristics are selected: an island and a continental locality, differing in terms of tourism recognition and accessibility: (a) the island (Lesvos) is a modestly popular international tourism destination for Aegean Islands

standards, with daily sea and air connections to the Greek mainland and (b) the lake area (Plastiras) is a domestic tourism destination located at a continental mountainous area at the central part of Greece.

Lesvos Island is part of the North Aegean Region. It is the third largest island in Greece (1,630 km²), with a population that has dropped significantly as a result of economic decline from 1951 to 1991 (−30%, from 126,928 to 88,206) people stabilizing in the next decades (86,436 in 2011). The local economy is based on agriculture with an emphasis on olive oil production, sheep husbandry (for cheese production) while the agri-food industry also includes *ouzo*, an alcoholic drink. Many of the island's inhabitants are also engaged in tourism.

The second research was carried out over the 314 km² Lake Plastiras Area, in the Agra Mountains of the Pindos Mountain Range in Karditsa Prefecture, composed of 14 settlements. The Plastiras Lake is an artificial one, constructed in 1958–1962, to supply drinking and irrigation water for the nearby Karditsa plain and produce electricity (Kokkali, Koutsouris, & Chrysochou, 2009). Administratively, some of the 14 settlements are part of Lake Plastiras Municipality and others belong to Karditsa Municipality. The area's population has declined mostly during the period around the lake construction (1961–1971: −32%, see Koutsouris, 2008), while in 1991–2011 there has been an increase (13.9%). Agriculture is the prime livelihood for residents, with some small-scale family manufacture activities, such as alcohol distillation (for wine and *tsipouro*) and weaving. Tourism developed after the 1980s, when local development projects supported rural tourism enterprises (Kokkali et al., 2009). According to a recent research (Koutsouris, 2009), those involved in tourism can be categorized as “newcomers” with experience from working outside the area in the past and educational/training assets, the rest being locals who “rode the tide” of the tourism development of the area.

Regarding tourism, the differences in magnitude are significant, with average duration of stays in Lesvos more than double than those in Plastiras Lake (Table 1, 4.4 to 2). In both cases, arrivals and nights spent in hotels increase during 2005–2015 (25.6% and 5.2% in Lesvos, and 65.2% and 83.4%, respectively, in Plastiras Lake) but the average duration of stay decreases in Lesvos (−16.3%) and the occupancy rate in both areas (−24.3% in Lesvos and −46.3% in Plastiras). Tourism statistics also demonstrate the importance of

Table 1. Characteristics of case study areas.

	Lesvos Island	Plastiras Lake
Area (km ²)	1,630	314
Population (2011)	86,436	4,929
Beds in hotels (2016)	7,718	686
Beds in secondary houses (2016)	6,294	573
Beds/population (2016)	0.16	0.26
Arrivals in hotels (2015)	131,633	24,055
Change (%) of arrivals in hotels (2015–2005)	25.6%	65.2%
Nights spent in hotels (2015)	584,023	48,548
Change (%) of nights spent in hotels (2015–2005)	5.2%	83.4%
Average duration of stay (2015)	4.4	2.0
Change (%) of average duration of stay (2015–2005)	−16.3%	11.1%
Occupancy rate (2015)	39.8	23.4
Change (%) of occupancy rate (2015–2005)	−24.3%	−46.3%
(%) of total available beds where data referred (2015)	96.2	79.2

Source: Hellenic Statistical Authority and Greek Ministry of Tourism, processed by the authors.

foreign tourists for Lesvos (they cover 80% of total nights spent in hotels) and domestic tourists for Plastiras Lake (covering 97% of total nights spent in hotels in 2015). Recent bibliography underlines Plastiras Lake domestic tourism mainly during the weekends (which is also highlighted in the average duration of stay, two days) and major religious festivities-vacations (Easter, Christmas, Ash Monday, etc.); on the contrary, summertime vacations in Greece are mostly related to seaside tourism (Koutsouris, Gidarakou, Kokkali, & Dimopoulou, 2013). What is more important is that a significant number of tourists visit this case study area during summer period especially for daily tours, for accommodation in rooms to let and tourists with country houses and/or origin from the area who are not recorded in the official statistical data.

Also, in Greece, unlike countries with longer agritourism services establishment such as Italy, France and Germany, an overall legal framework is lacking and this has been considered as a major weakness (Koutsouris et al., 2013). In some so-called less-favoured and mountainous areas, the LEADER Initiative provided the means and the assistance to address this weakness and accommodate local development. According to Kasimis, Koutsouris, Liarikos, and Papadopoulos (2009), Plastiras Lake was a typical case in this sense, where the implementation of Leader II (2000–2006) and Leader+ (2007–2013) helped transform the economic base of the area and shaped its character as a major tourism destination.

3.3. Sample

By using the snowball sampling, research was conducted during the high season to ensure maximum cooperation and participation. Interviews were conducted in Lesvos Island in the period July 2015–November 2015, and in Plastiras Lake in the period June 2016–September 2016. In the final sample enterprises, associations and stakeholders were included that were: (a) related to agritourism and/or played an important role in terms of agritourism development, (b) operating during the research period and (c) willing to participate (although in the end very few denials to participate were recorded). Some of them were outside the “core” case study area, but they were considered as important in agritourism and thus included in the sample. Interviews were also conducted with representatives of key tourism organizations and associations in the destinations, e.g. the Greek National Tourism Organization, Hellenic Agrotourism Federation and local tourist associations. Some of the suggestions of the respondents in the snowball process were not interviewed in the end, either because they were closed or it became clear after an initial contact that they were not relevant to the purposes of the research. The final sample per category of respondents is presented in Table 2 and their location in Figure 1.

4. Results

The total number of links recorded for the 97 respondents from Lesvos were 488 (5.03 of reported links on average) and 244 for the 63 respondents in Plastiras Lake (3.87 on average). This difference partially reflects the initial planning of the interviews, which was to ask respondents for up to six links (they could of course stop at one or two). More than six links indicate more spontaneous mentions from the respondents. The characteristics of these links (Table 3) underline the similarities between the two networks, especially in the degree of verticalization, seasonality and satisfaction of the cooperation. On the other hand, the differences refer to (a) the slightly more informal networks in Plastiras Lake, while the degree of membership partners and cooperation contracts are higher on

Table 2. Categories and frequencies of actors in case study areas.

Categories/frequencies	Lesvos Island	Plastiras Lake	Total
1. Farm house accommodation units/enterprises	17	16	33
2. Tourism activities units (e.g.: guides for trails, bird watching, horses, donkeys, yoga, meditation)	16	10	25
3. Visited processing facilities (e.g.: ouzo factories, wineries, oil mills, beekeeping workshops, women's cooperatives)	26	14	40
4. Secondary tourism enterprises (e.g.: rent a car, travel agency, tour operator, retailers of regional products, artisans producing tourism relevant regional handicraft)	23	8	32
5. Museums related to the countryside (e.g.: museum of olive oil production, Petrified Forest, botanical garden)	3	2	5
6. Chambers, Tourism Associations	8	7	15
7. Stakeholders (Regions – Tourism Department, Municipalities – Vice Mayor responsible for tourism, Greek National Tourism Organization, local/regional development agencies).	4	6	10
Total	97	63	160

Source: the authors.

Lesvos; (b) the slightly older networks in Plastiras Lake, where 43% of the partners have kept their networks for more than 10 years compared to 24% for Lesvos. The most important difference though refers to the locality of the partners. On Lesvos, local networks (within the case study area) are much more important than they are in Plastiras Lake, where regional (in Thessaly Region) and national networks are important. The geographical

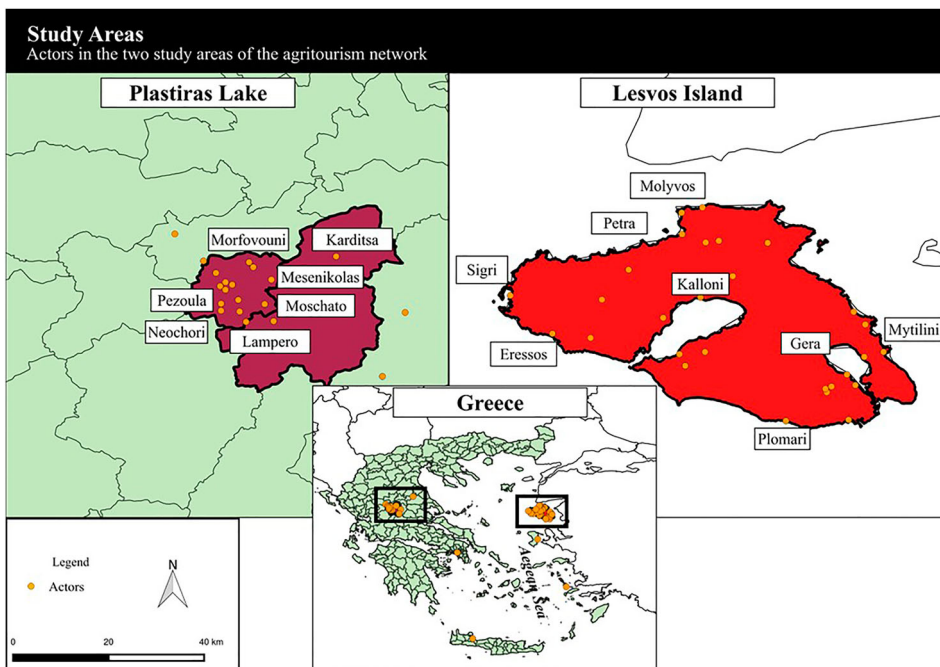


Figure 1. Location of the study area and the 160 actors-nodes. Source: The authors.

Table 3. Agritourism networking activity in Lesvos Island and Plastiras Lake.

		Lesvos island		Plastiras Lake	
		<i>N</i>	%	<i>N</i>	%
Locality	Local	345	71	116	48
	Regional	6	1	63	26
	National	53	11	58	24
	International	84	17	7	3
	Total	488	100	244	100
Formality	Informal	334	71	196	82
	Membership	34	7	3	1
	Cooperation contract	96	21	38	16
	Capital participation	4	1	1	0
	Total	468	100	238	100
Direction	Horizontal	69	14	40	16
	Vertical	325	67	169	69
	Diagonal	94	19	35	14
	Total	488	100	244	100
Duration	Less than 1 year	83	18	26	11
	1 to less than 2 years	38	8	12	5
	2 to less than 3 years	68	14	34	14
	3 to less than 5 years	92	20	27	11
	5 to less than 10 years	75	16	39	16
	More than 10 years	115	24	102	43
	Total	471	100	240	100
Seasonality	Sporadic but with long interruptions	71	15	23	10
	Sporadic a few times	97	21	41	17
	Often	80	17	53	22
	Regularly several times	56	12	27	11
	Permanent and ongoing	156	34	94	39
	Total	460	100	238	100
Satisfaction	Very satisfied	312	67	166	69
	Satisfied	118	25	51	21
	Neither satisfied nor disappointed	27	6	20	8
	Disappointed	4	1	3	1
	Very disappointed	6	1	2	1
	Total	467	100	242	100

Source: The authors.

locations of these links are also interesting (Figure 2), indicating the existence of strong ties to the national capital, Athens, but also the presence of many international links from Lesvos to many European countries where tourists come from.

The SNA metrics (Tables 4 and 5, Figures 3 and 4) display macro (structural) perspectives of agritourism networks and meso characteristics of nodes (key players). The overall picture of the nodes and links (Figure 3) highlights the larger number of nodes per actor of the network in Lesvos, compared to the smaller and more regional network of the Plastiras Lake (the number of nodes and links is double on Lesvos, Table 4). Four nodes in the middle are common in two case studies: a (Greek) network of rural accommodation (ID 85), an (international) travel platform (ID215), a (Greek) supplier (ID220) and “friends” (ID356, not the same persons). The percentage of nodes without connections is very low (1.4% in total, 0.5% in Lesvos Island and 3.2% in Plastiras Lake). Modularity for our networks exceeded 0.6, indicating high level of clustering and suggesting that communication

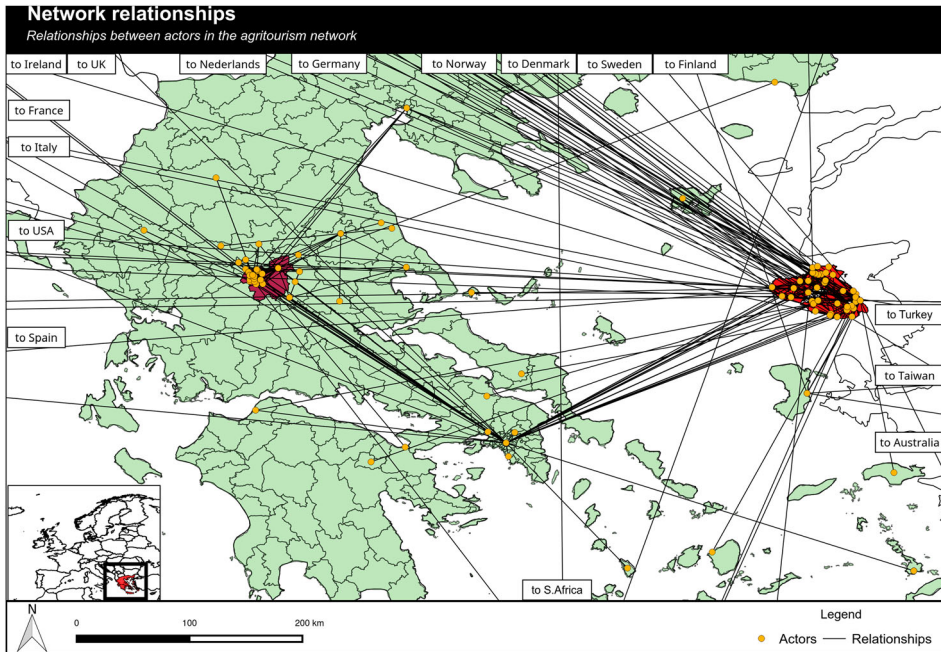


Figure 2. Map of networking linkages in the study area. Source: The authors.

Table 4. Agritourism SNA metrics in the case study areas.

Metric	Lesvos Island	Lesvos Island normalized	Plastiras Lake	Plastiras Lake normalized	Total	Total normalized
No. of nodes	370	–	189	–	555	–
No. of links – ties	488	–	244	–	732	–
Diameter	12	–	6	–	12	–
Average path length	4.55	–	2.36	–	4.33	–
Density	0.004	–	0.007	–	0.002	–
Disconnected nodes	2	–	6	–	8	–
In degree	1.319	0.014	1.291	0.020	1.319	0.008
Out degree	1.319	0.014	1.291	0.020	1.319	0.008
Degree	2.638	0.027	2.582	0.041	2.638	0.016
Eccentricity	1.154	0.012	0.608	0.094	0.977	0.006
Closeness centrality	0.132	0.001	0.210	0.020	0.160	0.001
Betweenness centrality	72.005	0.742	5.947	0.041	50.094	0.313
Eigenvector centrality	0.079	0.001	0.114	0.002	0.062	0
Clustering coefficient	0.017	0	0.017	0	0.017	0
Modularity	0.716	–	0.682	–	0.771	–
Communities	25	–	20	–	32	–

Source: Processed by the authors.

Table 5. Agritourism network centrality measures in Lesvos Island and Plastiras Lake.

Area	Degree (category)		Betweenness centrality		Eigenvector centrality	
Lesvos Island	ID64 (Cat: 6)	18	ID51	1972.07	ID14	1
	ID14 (Cat: 4)	15	ID14	1757.29	ID64	0.94
	ID51 (Cat: 4)	13	ID23	1412.38	ID290	0.81
	ID84 (Cat: 4)	9	ID84	1143.00	ID51	0.54
	ID23 (Cat: 1)	10	ID64	1059.57	ID84	0.39
Plastiras Lake	ID290 (Cat: 6)	4	ID290	0	ID23	0.20
	ID101 (Cat: 1)	12	ID101	275.33	ID101	1
	ID135 (Cat: 1)	12	ID98	144.83	ID149	0.94
	ID103 (Cat: 2)	12	ID135	99.17	ID135	0.81
	ID98 (Cat: 2)	10	ID103	77.33	ID98	0.54
	ID149 (Cat: 1)	9	ID149	71.00	ID103	0.39

Source: Processed by the authors.

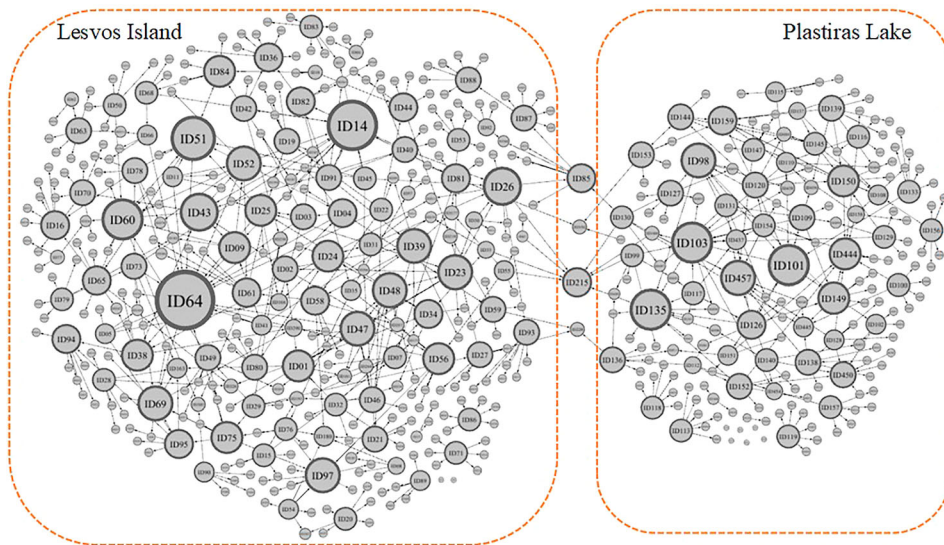


Figure 3. Agritourism network in Lesvos Island and Plastiras Lake, according to degree centrality. Source: The authors.

within the communities is higher than communication with the rest of the network. The Geodesic distance is smaller in Lesvos Island, indicating that members of the network require fewer information connections to contact a given node. This seems to contradict what typically happens when a network is bigger in size. The low values of the clustering coefficient for both cases indicate a rather limited degree of collaboration.

Table 5 shows the most central actors, considering three basic measures of centrality (Figure 4). One of these is degree centrality, which reveals the two nodes/actors holding distinguished positions in the agritourism network (in terms of connectivity and influence) and thus, they can be considered as key players. In Lesvos Island the first one is the Molyvos Tourism Association (ID64 with degree centrality of 18), a formal network of tourism enterprises. It has been formed quite recently and works as a non-profit

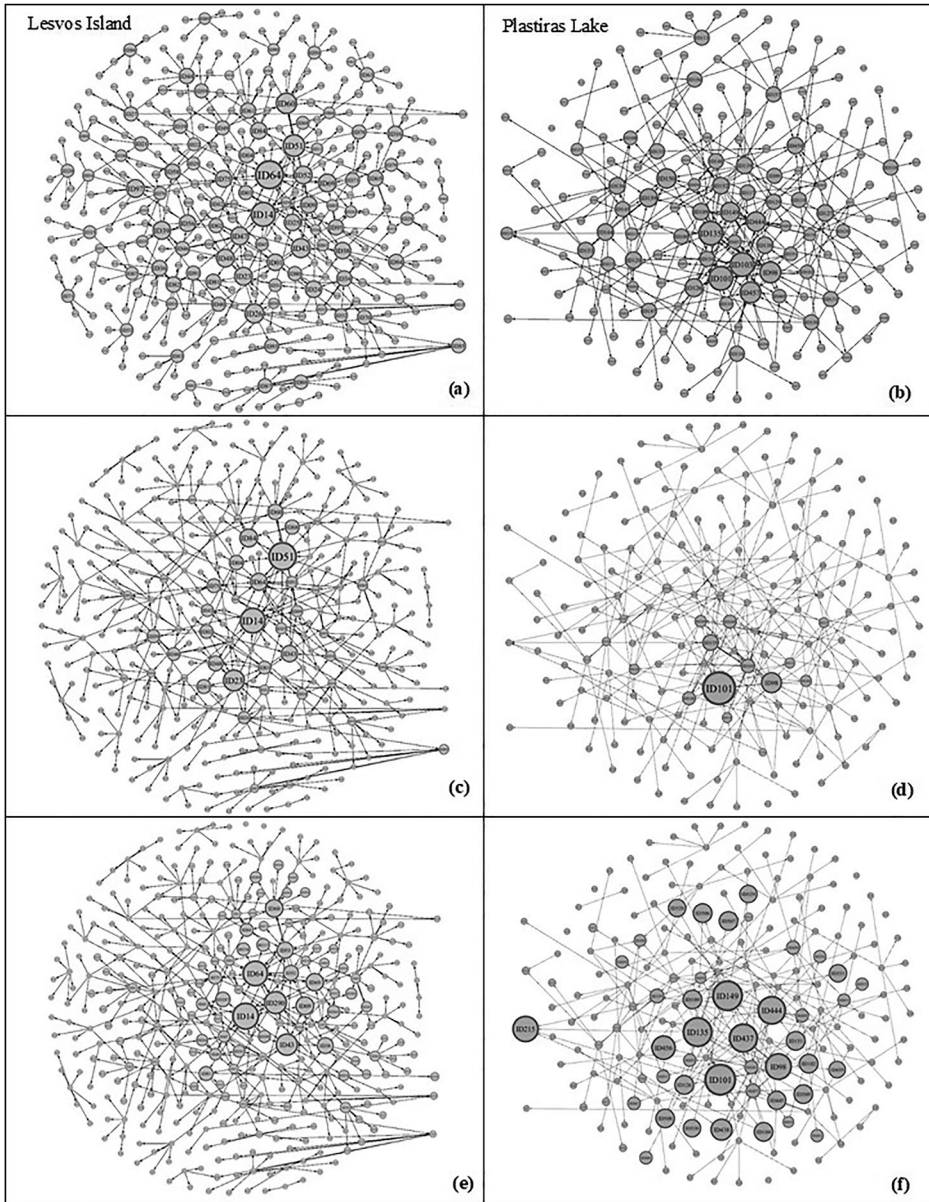


Figure 4. Agritourism network in Lesvos Island and Plastiras Lake, according to degree centrality (a–b), betweenness centrality (c–d) and eigenvector centrality (e–f). Source: The authors.

organization with a collective decision structure. Its main objective is to advertise and promote Molyvos and the whole island as a tourist destination, improve existing tourism infrastructures, highlight environmental and cultural resources and utilize comparative advantages. Its members tend to have the view that the Association can do everything that “the public administration”, in their opinions, is not doing. The second central actor in Lesvos Island is a travel agency (ID14) with tailor-made tours (degree centrality: 15). Even from its website the information provided is from different kind of tourism

enterprises/partners and the logic of cooperation is evident. Some of nodes' intermediate positions are clearly observable in [Figure 4](#).

For betweenness centrality, the results are similar to those of degree centrality. The most central actors are a secondary tourism enterprise (rent a car, ID51) and the above-mentioned travel agency (ID14). Additionally, the exploration of the quality of ties shows that this travel agency (ID14, eigenvector: 1) and Molyvos Tourism Association (ID64 with eigenvector centrality of 0.94) display the best results. The third important actor with this measure is University of the Aegean (ID290 with eigenvector centrality of 0.81) but it has very low results in two other measures of centrality, especially in "betweenness" (zero score). Those with the nearest distance, implying, in turn, the easiness and (high) speed of communication (closeness centrality = 0), are many (259 nodes out of 373 in total, while 30 nodes have the maximum value of 1 and are isolated); so this measure is excluded from our analysis of key player (see Borgatti, 2006 approach for key players in a social network).

In Plastiras Lake, the most central actor is a farm house accommodation enterprise, member of the Regional Agritourism Union in Thessaly, which lists among its objectives cooperation with enterprises, maintain high quality and create a promotion programme that will provide the opportunity to visitors to find and meet local products and producers. Those with the nearest distance (with closeness centrality of 0) are 136 nodes of 191 in total; so, as also referred in the previous case, this measure is excluded from our analysis of key player with 28 nodes being entirely isolated (with closeness centrality of 1). Betweenness centrality measures have completely different scores in two cases ([Table 4](#)), both key nodes ([Table 5](#)). Unlike Lesvos, where the most important gatekeepers are secondary tourism enterprises, in Plastiras Lake they are agritourism accommodation and tourism activities units.

5. Discussion

5.1. *Relevance of the approach*

In this paper, we compare quantitative and qualitative characteristics of agritourism networks from two different areas, in a macro and meso network approach (Williams, Inversini, Ferdinand, & Buhalis, 2017). This approach has revealed similarities and differences between the two networks, but has also provided an overall picture of some features of agritourism networks in Greece. Given the importance of networks in agritourism activities (Galluzzo, 2016; Li, Barbieri, & Smith, 2016; Sznajder, Przeborska, & Scrimgeour, 2009), this investigation highlights aspects of the sector's operation.

5.2. *Quantitative network characteristics*

The first issue that is of importance for our networks is the differences between the total number of links recorded. It seems that in the case of Lesvos, one of the possible explanations for the denser network observed is related to the less seasonal tourism activities on the island and the higher number of "conventional" tourists that visit Lesvos. This appears to create more opportunities even for the so-called "alternative" and/or agritourism enterprises that are in our sample. On the contrary, the domestic tourists who stay only for a few days in the Plastiras Lake area provide a more "dedicated" market, but also a more limited one. It is no surprise that the partners mentioned are those with good cooperation with few exceptions (around 2%). They are suppliers, members of associations and

cooperatives, friends, family, “repeaters” from Greek and/or abroad, agritourism or tourism stakeholders, and from other different sectors.

The characteristics of these networks seem to reflect the geographic differences of the two areas: the fact that Lesbos is an island, with limited accessibility and cooperation with the rest of the North Aegean Region islands (their tourism markets are also completely separate with very little or no “island hopping” due to the size and distance between the islands), explains the high frequency of local networks (within the island) and the lack of regional links (which, according to Booyens & Rogerson, 2016, point to the underdevelopment of local and regional innovation networks or systems), compared to the more balanced distribution in space for the Plastiras Lake, where regional and national networks are more important.

The numbers of Greek and foreign tourists in the case study areas are related to the localization of relations. For the case of Lesbos Island, international tourism means more international relationships, cooperation contracts, international webpages and signs in different languages. Such international networks are of particular importance for the tourism sector in general, as they build relations with global supplier enterprises to attract international demand (Erkuş-Öztürk, 2009). On the other hand, domestic tourism in Plastiras Lake means more local or regional/national relationships, webpages, brochures, advertisements and signs only in Greek.

Notwithstanding this fact, the rest of the characteristics of the networks are similar, as would be expected due to the similar patterns of agritourism development in Greece compared to other agritourism destinations in Europe. Kizos and Iosifides (2007) discuss these differences and the particularities of agritourism in Greece, which seems to be a more “top-down” policy development that was thought it could “revitalize” rural areas (Koutsouris, 2009), rather than a “bottom-up” and demand-driven activity in most of Europe. The case of Plastiras Lake is a typical example of such a “top-down” agritourism and “alternative” tourism approach, driven by external stakeholders and actors, later taken up to a degree by locals (Koutsouris, 2008, describe the process in detail).

Taking into account network metrics, the density of links is quite low, considering that the values found in the literature for the social networks studied are typically of the order of 10^{-1} – 10^{-2} (Baggio et al., 2010). Moreover, the percentage of nodes without connections is low (1.4%). This results in sparse networks, confirmed by the low values of the clustering coefficients. For diameter and average path length, despite the similarities, the structure of our networks differs from those exhibited by other complex systems mainly in its high degree of sparseness and very low degree of local clustering. In tourism terms, this means that local stakeholders exhibit low degrees of collaboration or cooperation. This apparent lack of collaboration has proved to be unhelpful when considering innovation capacity, necessary to help them face the challenges in a highly competitive and globalized market. Geodesic distance is smaller in Lesbos Island, another surprising finding, as it is the opposite of what typically happens when a network is bigger in size comparing to Plastiras Lake (Williams et al., 2017).

According to centrality measures (especially the “degree centrality”, Schramski & Huang, 2016), the key players are related to tourism. Especially, in Lesbos, the Molyvos Tourism Association has synergies with all other tourism associations on the island, sharing knowledge and good practices. Also, the University of the Aegean is recorded as an important player, although its partners expect more from this cooperation. Concerning this research, the existence of the University of the Aegean on the island helped compared to the Plastiras Lake, where the stakeholders were not familiar with researches and mis-trusted us at first. Another difference was the inexistence of cooperatives in Plastiras

Lake, where the few cooperation schemes (associations related to activities) are located in Karditsa and operate in the lake.

Lagos and Courtis (2008) distinguish network clusters with two criteria: (a) the degree of verticalization (for which Buhalis, 1998 demonstrates the role of vertical networking to increase access to international tourist markets) and (b) the maturity stage of networks. With this approach, Lesvos can be characterized as “developing”, mostly through the operation of the Molyvos Tourism Association, in line with what Boesen et al. (2017) suggest about successful collaboration in networks that emphasizes a “community” over selfish gain. Plastiras Lake network can be characterized as “emerging”, since the idea of an “official” network (“The Lake of four seasons”) failed its objective and there are now new attempts to establish a new one.

Trust can be considered as one of the reasons for success (or not) (Gardiner & Scott, 2014). Weidenfeld, Butler, and Williams (2011) consider trust as the “glue” underpinning social relationships, networking, knowledge transfer, and business collaboration between organizations and people. The strength of trust-based relationships is described as the level of “embeddedness” of the social network. Embeddedness expresses also the fact that besides formal material and immaterial flows such as information, technology and customer organizations; social and emotional flows circulate as well, such as friendship, social relations, legitimacy and reputation (Gurrieri, Lorizio, & Stramaglia, 2013). These relations among the actors of networks are many times the key to their performance, since they determine the economic, technological and power flows that underlie the network dynamic. Relations among these vary greatly: formal, rational and even informal can be of great importance (Alfonso-Gil & Vazquez-Barquero, 2010). Verbole (2000) through a study of tourism development in rural Slovenia puts the case even stronger stating: “*local social groups, such as family clans, networks and cliques were very important in obtaining and controlling access to the decision-making process*” (p. 488). Especially in Plastiras Lake, where tourism entrepreneurs are mostly family-run small companies who value their “independence”, they do not see the necessity of extensive levels of formal cooperation or collaboration.

Lynch and Morrison (2007) suggest that “networks can be structured in different ways with different degrees of formality in their arrangements, and as a consequence, each type of network will engage in a different networking process”. The evolution of informal networks and the consequent strengthening of social capital and trust are seen as the basis for potential formal networks and cluster formation. Also, their different cases show how networks can operate as trust-building mechanisms.

5.3. *Qualitative network characteristics*

During the preliminary survey of tourism actors in the case study areas, Plastiras Lake seemed to emerge as an agritourism destination with strong partners and partnerships and a formal enterprises’ network. After the in-depth interviews though, some of our respondents did not consider many of their networks as important not even the type of tourism existing at all. This was true for Lesvos in a smaller degree, with many partners placing less importance nominally to partners with no economic transaction, but then, considering them important in the discussion that followed in ways that sometimes even themselves did not fully realize. This was true for “friends”, family and “repeaters” and is something that is not fully accounted for in the quantitative metrics of SNA.

Another issue that could not appear in the quantitative part of the survey is related to the “image” that the respondents have for themselves. Some of the people that for us were

examples of “alternative” activities did not have the same idea, as a Lesvos respondent comments:

“We do not regard ourselves as a tourist company and not an “alternative” one either ... People come here with one intension: to follow a four, usually two, week course with daily classes and there is little time left for tourism ... we ourselves are just teachers ... So these classes are not even coming under the heading of “alternative tourism”.

6. Conclusion

Research on networks has been an emerging and promising approach for analysing and understanding tourism and has been considered as essential for fostering innovations, especially among small- and medium-sized enterprises (Hjalager, 2010). At a practical level, the knowledge arising from SNA may also be used for interventions at the level of people, organizations, destinations and tourism policy makers.

Our findings suggest that networks are important, especially the informal ones. They last long and seem to build significant amounts of social capital even in cases where no real economic transactions take place. Tourism policies should acknowledge this and seek to take advantage out at these bonds that all the nodes stand for. New kind of tourism policies that can use such informal networks, strengthen (but not necessarily formalize them into rigid bureaucratic institutions) and empower control actors in them to use their position to enhance cooperation and synergies seem to be the way forward.

Agritourism seems to be a paradigmatic case for such informal networks, due to the need to connect vertically and even horizontally due to the relatively small space of rural communities and the actors involved. Also, in such networks, many times the links are weak because relations between enterprises are articulated through family ties, the enterprises use traditional technologies and low-skilled human resources, and they sell their products in local markets. In the long term, however, the network needs to be strengthened by involving other actors, above all local authorities. They are needed to assure the basis for long-term empowerment, participation in decision-making and progressive diversification of economic activities. McGehee, Knollenberg, and Komorowski (2015) point out that given the wide vertical reach that begins with local enterprises and extends to the national or even international level, the broad range of tourism sector entities, and preponderance of public–private partnerships involved to agritourism development, there is a strong need to expand beyond a business-focused approach toward a more inclusive governance framework. Several examples of regional networking provide evidence that even as competition and economic activity globalize, competitive advantage can be localized.

Finally, the different geographic characteristics of our case studies seem to affect only up to a point the networks that have been established. Despite the regional lack of accessibility to possible partners and the geographical isolation, Lesvos has been “compensated or rewarded” with more international links. There is no way to know if this for “better” or “worse” for Lesvos, or for Plastiras Lake, that has the geographical setting to use all regional actors as partners, but at the same time, this openness of geography is also openness to competition and it is debatable if the low-quality accommodation units and overall unremarkable enterprises in the area can really compete with other regional actors. The most important characteristic in our minds though is the parallel existence of agritourism, particularly on Lesvos, next to more “conventional” tourism. Given that Lesvos cannot be a weekend destination for Greeks or foreigners due to its accessibility and the travel costs, the “symbiosis” with conventional tourism seems to be the factors that have driven its actors into the cooperation patterns recorded. This creates interesting new aspects to re-think

the role of “alternative” and “conventional” tourism forms and the networks of their actors. So, what might look as a “disadvantage” for a case study area can equally well be an “advantage” for the same case study and for another with different geographic characteristics.

6.1. Implications and recommendations

The absence of an enabling institutional system and the passive participation of local stakeholders have often been blamed to encourage opportunistic behaviour by private actors in local development (Kasimis et al., 2009) and tourism networks. Our findings indicate that qualitatively enriched research can shed more light to the formulation and application of policies at the local, regional and national levels. The understanding of the boundaries of stakeholder involvement, current and desired levels of participation, and preferences on interaction within the networks with other actors (Markantonatou, Noguera-Méndez, Semitiel-García, Hogg, & Sano, 2016) can also be valuable outputs of such a research. Finally, SNA results can provide understanding of the content of information flows between actors, enabling more sophisticated categorizations and providing information about who may be important “knowledge brokers” to prioritize involvement in participatory processes (Reed et al., 2009).

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ORCID

Dimitris Kavroudakis  <http://orcid.org/0000-0001-5782-3049>

Thanasis Kizos  <http://orcid.org/0000-0002-1526-0919>

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