SOCIAL NETWORK ANALYSIS OF LODGING ESTABLISHMENTS IN TIRADENTES (MG): PROFILE AND EVIDENCE OF RELATIONSHIPS GENESIS

ANÁLISE DE REDES SOCIAIS DE MEIOS DE HOSPEDAGEM DE TIRADENTES (MG): PERFIL E EVIDÊNCIAS DA GÊNESE DOS RELACIONAMENTOS

ANÁLISIS DE REDES SOCIALES DE MEDIOS DE HOSPEDAJE DE TIRADENTES (MG): PERFIL Y EVIDENCIAS DE LA GÉNESIS DE LAS RELACIONES

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ABSTRACT: The analysis of social networks (SNA) constitutes a major advance in tourism research by revealing the characteristics of established relationships, displaying their structures and properties. This work aims to characterize and analyze the cooperation network formed between owners of inns in Tiradentes-MG. In order to explore the context of the survey, the interviews were conducted with seven owners of inns. Subsequently, a questionnaire was submitted to the owners for a data collection. A network of cooperation was created through the 'snow ball' technique. Going forward SNA techniques were used, with the emphasis on descriptive metrics and by generating Exponential Random Graph Models (ERGM). Thus it was possible to characterize the cooperation network and analyze its properties. The network has 54 inns, with a low overall density, because there are only 4.7% of possible relationships. 17 central and 37 peripheral establishments were identified. In the central subgroup the density was 15.4% and in the peripheral subgroup only 2.6%. The observed cooperation network presented homophily by gender and origin of the owners. The results of ERGM modeling allowed probabilistic explanations in terms of shared attributes of owners, such as gender and origin.

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KEYWORDS: Tourism; Social Network Analysis; Cooperation.

RESUMO: A análise de redes sociais (ARS) constitui um grande avanço na pesquisa em turismo ao revelar as características das relações estabelecidas, apresentando suas estruturas e propriedades. Este trabalho objetivou caracterizar e analisar a rede de cooperação formada entre proprietários de pousadas em Tiradentes-MG. Com o objetivo de explorar o contexto da pesquisa, foram realizadas entrevistas junto a sete proprietários de pousadas. Posteriormente, para a coleta dos dados, foi aplicado um questionário aos proprietários. Por meio da técnica da "bola de neve" foi gerada a rede de cooperação. A partir disso, utilizou-se das técnicas da ARS, com ênfase nas métricas descritivas e pela modelagem de grafos aleatórios da família exponencial (ERGM - *Exponential Random Graph Models*). Com isso, foi possível caracterizar a rede de cooperação e analisar suas propriedades. A rede possui 54 pousadas, com uma densidade geral baixa, pois há apenas 4,7% de relações possíveis. Foram identificadas 17 pousadas centrais e 37 periféricas. No subgrupo central, a densidade foi de 15,4% e no subgrupo periférico, de apenas 2,6%. A rede de cooperação observada apresentou homofilia por gênero e por procedência dos proprietários. Os resultados da modelagem ERGM permitiram explicações probabilísticas em termos de atributos endógenos dos proprietários, como gênero e procedência.

PALAVRAS-CHAVE: Turismo; Análise de redes sociais; Cooperação.

RESUMEN: El análisis de redes sociales (ARS) constituye un gran avance en la investigación en turismo al revelar las características de las relaciones establecidas, presentando sus estructuras y propiedades. Este trabajo se centró en la caracterización y el análisis de la red de cooperación entre los propietarios de posadas en Tiradentes-MG. Con el objetivo de explorar el contexto de la investigación, fueron realizadas entrevistas junto a siete propietarios de posadas. Posteriormente, para la recolección de los datos, se aplicó un cuestionario a los propietarios. Por medio de la técnica de la 'bola de nieve' se generó la red de cooperación. Con eso, se utilizó de las técnicas de ARS, con énfasis en las métricas descriptivas y por el modelado de gráficos aleatorios de la familia exponencial (ERGM - Exponential Random Graph Models). Con esto, fue posible caracterizar la red de cooperación y analizar sus propiedades. La red cuenta con 54 posadas, con una densidad general baja, ya que hay sólo 4,7% de relaciones posibles. Se identificaron 17 posadas centrales y 37 periféricas. En el subgrupo central la densidad fue de 15,4% y en el subgrupo periférico de sólo 2,6%. La red de cooperación observada presentó homofilia por género y por procedencia de los propietarios. Los resultados del modelado ERGM permitieron explicaciones probabilísticas en términos de atributos endógenos de los propietarios, como género y procedencia.

PALABRAS CLAVE: Turismo; Análisis de redes sociales; Cooperación.

INTRODUCTION

The reality of the economic activities of the industrial society organized in divided and specialized territories reinforces the uniqueness of individuals and organizations but also increases solidarity among those belonging to local productive arrangements. Local productive arrangements (LPA) and cooperation networks are considered a strategy for organizing territorialized production systems and take on a determining role in new approaches to the local economic development. Economic development and modernization took on new blood with the analysis of the social characteristics of territorialized production systems (Conti, 2005).

The city of Tiradentes (MG) is a recognized Brazilian tourist destination with several economic activities, locally and regionally focused on the historical and cultural attractions of the Campo das Vertentes region. Considering the tourist agglomeration and its relational specificities, the focus of this research is centered on the hotel industry in the city of Tiradentes, the main tourist destination in the region. In this sense, the guiding question of this work is to know the inter-organizational network configuration of inn owners in the city of Tiradentes (MG).

The general objective was to characterize and analyze the cooperation networks formed between inn owners. In order to reach this objective, the following steps were specifically taken: i) organizations were characterized; ii) the provenances – whether local or foreign – and the gender of the owners were identified; iii) sociograms of the cooperation network were generated; iv) the existence of subgroups and homophily by origin and gender was analyzed.

The authors of this work could not find works that analyze, specifically, homophily in the formation of hotel chains in the literature researched. In this case, this work seems to be of an important contribution to the understanding of networks in tourist destinations, at least in the case of lodging facilities.

In order to achieve these goals, we have used the techniques of Social Network Analysis (SNA) the sociograms that represent the cooperative relationships of the real network observed were generated. We identified the central and peripheral groups and identified homophily by origin and gender of the inn owners. Subsequently, we used the statistical modeling of social networks through the ERGM – Exponential Random Graph Models, in order to verify whether the homophily by origin and gender of the actual network observed was simply due to chance. The details of the techniques will be presented in the Research method section of this article.

ECONOMIC ACTIVITIES AND SOCIAL RELATIONSHIP NETWORKS

In this work, the assumption is that the actors do not operate in isolation, rather being permanently inserted in their socioeconomic context, interacting with other actors, including non-economic ones (Granovetter, 1985, 1992). This interaction can both facilitate and constrain the actions of the actors (Granovetter, 1973).

The market is influenced by a reality that emerges from the social context, for example, according to Granovetter (1985), through customs, habits or norms. The socioeconomic reality of the market can be observed through actions and interactions to which individuals permanently seek to give meaning (Abramovay, 2009). In addition to the individual, groups, social relationships, and other variables such as taste, knowledge, education, ethnicity and family can influence economic action (Granovetter, 1985, Steiner, 2006). For Abramovay (2004),   economic action has a meaning that is not given beforehand but is built on the relationship between actors and institutions, which are not seen as premises, rather, above all, as results of social interaction. The understanding of rational action and the market must consider that individuals interact with each other and with people outside institutions, whether these actors are directly linked to economic

aspects or, indirectly, through historical, social or cultural aspects.

The market is a social fact that economic sociology seeks to understand specifically from the structure of social networks that influence collective action with and with the cultural context and generation of the market. Economic action is influenced by matters such as rational and political-economic aspects, which define restrictions on scarce resources in social structures. Economy is an integral part of society, which is its base of reference and which can be analyzed from descriptions and explanations made with historical-comparative methods. It is assumed that individual economic action is influenced by institutional standards, structural inducements and social development, which result in institutional indexes that, consequently, influence human rationality and adjust the initial institutional standards (Smelser & Swedberg, 1994).

The analysis of markets as social constructions can be carried out based on the existing relationships between actors and groups. Granovetter (1985) takes up the approach to economic phenomena with discussions that show the influence of social relations on economic action, results and institutions, and promotes studies with fundamental concepts for the analysis of economic life as a network and immersion.

The analysis of relationship networks has the advantage, according to Swedberg (2004), of being a flexible tool through which one can deal with a considerable number of social and economic phenomena in the market. Network analysis has been used, for example, to explore various types of economic interactions that cannot be classified as customs or as some type of economic organization. These intermediary social forms are sometimes referred to as forms of a network organization (Swedberg, 2004).

The market can be analyzed as a social structure and not simply as a rational instrumental process of setting prices or as a physical place of exchange relations, where competition and information are perfect and defined in terms of demand and supply. The market, therefore, for economic sociology, consists of social relationships between individuals (Swedberg, 1994).

Hence, the market does not consist of isolated firms, as in the models of perfect competition in economic science, but of clusters of firms that form a social structure (Swedberg, 1994). According to Granovetter (1994), an important point that distinguishes economic groups from simple financial clusters, such as conglomerates, is the existence of social solidarity and a social structure between the firms that compose them. Such solidarity is immersed in social ties or links, such as family, friendship or ethnic ties. Social networks facilitate the circulation of information and ensure trust by limiting opportunistic behavior since the market has a social structure (Granovetter, 1985).

TOURISM AND SOCIAL RELATION NETWORKS

Destinations are clusters of products and services consumed under the destination's brand (Buhalis, 2000), being a complex economic activity, characterized by the coexistence of a multiplicity of small and medium-sized companies that compete in the same environment, offering complementary products that make up the experience provided to tourists (Maggioni, Marcoz & Mauri, 2014).

Thus, it is stated that the performance of tourist destinations depends on the connections that are formed by the organizations involved in the offer of tourism, and not on their individual characteristics (March & Wilkinson, 2009). These networks are complex and variable entities that evolve in response to environmental changes (March & Wilkinson, 2009).

In this way, a collaboration between the actors of the destination becomes important for their performance. This perspective on tourism analysis began with Gunn's seminal work, published in 1977. This work is recognized for having emphasized the need for public-private collaboration for the sustainable development of tourism (Van Der Zee & Vanneste, 2015, Baggio, 2011).

Later, in the 1990s, several published works started to advance this perspective in networks, arguing about collaboration networks, which offer the mechanism for planning and coordinating actions for the development of tourism (Jamal & Getz, 1995); the economic organization of tourism, i.e., the relationship between firms and their performance (Tremblay, 1998) and analyzing public-private governance relationships (Hall, 1999). These last two works consolidate the perspective of a network in tourism and are the two currents of study of the importance of analysis in inter-organizational networks for economic activities associated with tourism (Del Chiappa & Presenza, 2013, Presenza & Cipollina, 2010, Van Der Zee & Vanneste, 2015).

Collaboration, whether it is formal or informal, between the actors, has indicated the importance of inter-organizational relationships for organizations (Scott, Cooper & Baggio, 2008), while being a condition for sustainable development and planning (Beritelli, 2011). It is argued that tourist destinations should adopt a network approach, including several actors (Wäsche, Dickson, & Woll, 2013), thus being able to become more flexible and able to adapt to environmental changes, as demand is subject to a variety of factors that can change tourists' preferences; new destinations can become attractive, or, as the tourist destination is very dependent on a broader context, it becomes unpredictable and uncontrollable (Van Der Zee, & Vanneste, 2015).

It is claimed that, when relating to the other actors in the destination, organizations can obtain relevant information, learning, strategic changes to increase competitiveness, organizational change and innovation, business opportunities, and confidence-building (Wang & Fesenmaier, 2007, Novelli, Schmitz, & Spencer, 2006, Maggioni et. al, 2014). This collaboration can even lead to an improvement in the performance of firms (Ingram & Roberts, 2000, Vieira & Hoffmann, 2018, Vieira, Hoffmann, & Reyes Junior, 2017). When entering into relationships, new businesses that are established in the tourist destination can obtain advantages due to new contacts for the company and/or innovative opportunities for products and services (Novelli et al., 2006).

However, it is asserted that the approach of inter-organizational networks for the development of tourist destinations is still in its youth in terms of presenting evidence, especially if we consider that the literature is ambiguous (Van Der Zee & Vanneste, 2015).

For example, among the questions that still need to be answered, there is a need for proof that the approach of inter-organizational networks provides, for destination management, a competitive advantage both in the territory and in collaborating firms

(Van Der Zee & Vanneste, 2015) and that only horizontal relationships, i.e., with other hosting companies, have a positive effect, with competition having a negative effect on performance and the formation of relationships and with support organizations (Vieira et al., 2017). Other aspects that deserve further understanding, for instance, refer to vertical relationships with other companies in the sector and with support institutions and their influence on performance, or even to whether network approaches can be used in an unrestricted way to analyze relationships in tourist destinations. In summary, those authors point to evidence that relationships with support organizations can influence the development of horizontal relationships.

Additionally, it is emphasized that recent empirical studies on organizations involved in the tourism economy or on tourist destinations (Baggio, Scott, & Cooper, 2010, Costa & Albuquerque, 2013, Costa, Gonçalves, & Hoffmann, 2014), even indicating the presence of relationships between organizations and characteristic behaviors of companies in territorial agglomerations, do not identify cooperation as a widely disseminated strategy.

From the perspective of the analysis that considers the relationship between firms, it is asserted that the analysis of network structures that are formed at a destination has fundamental and measurable characteristics and can affect their functioning (Baggio, 2011) and that the SNA provides a means of understanding of the tourist destination (Baggio, 2011).

The SNA has represented a great advance in the analysis of tourism (Merinero-Rodríguez & Pulido-Fernandez, 2016). The analysis of relationships, the interaction between the different components of tourism activity, is the central element for understanding the phenomenon of tourism. In addition, it is stated that the SNA plays an important role in defining the research agenda on relationships and tourism, having a greater capacity to build new analytical proposals (Merinero-Rodríguez & Pulido-Fernandez, 2016).

This approach represents an advance in tourism analysis, as it favors a better understanding of such phenomenon, revealing new characteristics of the relationships by highlighting the structure of the networks – density of relationships, centrality, betweenness, etc. (Merinero-Rodríguez & Pulido-Fernandez, 2016). By examining the elements and structural properties of local networks, their conformation can be identified, providing information for the action of the actors, when assessing the implications for their capabilities (Delgado, 2014).

With the SNA, it is possible to identify the actors that interact in these territories and participate in the governance of tourist activities, as well as to diagnose the needs to strengthen the participation of the various actors in tourism activities that have an impact on local development (Delgado, 2014, Baggio, 2011, Beritelli, 2011).

In addition, the SNA allows visualization through sociograms, which is particularly attractive, as it presents the relevant actors and how they relate to the others, which clusters are formed, as well as other structures. It also allows us to understand whether aspects such as homophily– a tendency to relate to their peers – influence the relational structure (Scott et al., 2008).

The SNA has been used in tourism studies since at least 1991. Selin and Beason (1991) analyzed relationships between entities in a tourist destination. Up to 2010, few studies had analyzed tourist destinations from the perspective of social networks (Baggio et al., 2010). On the other hand, the SNA has been becoming an important topic in the tourism literature (Scott et al. 2008, Baggio et al., 2010), and has been able to clearly demonstrate cooperative relationships at a destination (Gajdošík, 2015). The increase in publications has been turning the SNA into an important topic in the scientific literature on tourism (Merinero-Rodríguez & Pulido-Fernandez, 2016).

Specifically, in relation to the analysis of lodging relationships, several works have been published (Cerqueira, Sacramento & Teixeira, 2010, Curtis & Hoffmann, 2009, Ingram & Roberts, 2000, Jesus & Franco, 2016, Miranda Júnior, Costa & Hoffmann, 2016, Teixeira, 2011, Vieira et al, 2017, Vieira & Hoffmann, 2018, Maggioni, Marcoz & Mauri, 2014, Costa, Gonçalves & Hoffmann, 2014). Such works use both the SNA and other research techniques, be they quantitative or qualitative, to analyze the relationships of national and international lodging facilities. Of those using the SNA, low cooperation and low network density are perceived, whether in the relationship analysis of the means of accommodation or in the destination network, which includes other actors (Baggio et al., 2010, Baggio, 2011, Gajdošík, 2015, Del Chiappa and Presenza, 2013, Scott et al., 2008).

RESEARCH METHOD

In order to achieve the objectives proposed and to answer the guiding question of this work - "what is the configuration of the inter-organizational network of inn owners in the city of Tiradentes (MG)?" -, qualitative and quantitative methods are designated.

The qualitative method, based on interviews, was first used only with the purpose of exploring the object of research and having a first contact with the universe to be researched. In this way, in-depth interviews about the destination Tiradentes-MG and the collaboration/relationship between firms were carried out, by theoretical sample and for convenience, with seven owners who managed the inns. The interviewees were asked about the general aspects of the hospitality sector in Tiradentes, about the number of rooms, the number of inns/hotels in the city, and about cooperation and relationships with other companies in the sector and for what purpose.

The activities of local associations (Associação Empresarial de Tiradentes - ASSET and Tiradentes Mais) were discussed as well, seeking to identify points such as cooperative activities carried out by the Associations, cooperative actions through them, number of members, whether they were members, and whether they participated in meetings, etc. The interviewees informed that they were either not members, or had stopped being members, or had no interest in participating, or that they were members, but did not participate in meetings or yet that participating in them was not "worth it". In addition to these questions, the interviewees were asked about issues and general information regarding the tourism sector in Tiradentes.

In this qualitative phase, general information was also obtained on the characteristics and profile of the owners and lodging facilities in the city. This procedure

was adopted so that the research questionnaire of the next phase, quantitative (SNA), could be developed. At this stage, the existence of an interesting number of female owners and of "outsiders" became known, among other characteristics.

According to information from the Tourism Secretariat of the Municipality of Tiradentes, in 2018, 150 (one hundred and fifty) inns and hotels were registered with the Secretariat. Due to this number, it seemed appropriate, for data collection, the use of the "snowball" technique, described below.

The "snowball" technique for data collection is the most frequent in the SNA (Hanneman & Riddle, 2005). By this method, a small initial sample is defined to survey the data related to the network. From the indication of the actors related to the initial group, the survey starts with those mentioned and so on, until the names of the actors start to be repeated. This procedure is justified since obtaining data from the entire network of relationships can become an extremely costly and difficult task (Hanneman & Riddle, 2005).

The following questions were included in the first part of the data collection instrument: whether the inn was leased or not; gender of the owner, their age and previous occupation; classification of the company according to the Ministry of Tourism (hotel, resort, farm hotel, bed, café, historic hotel, inn, flat); category of the establishment from the interviewee's point of view (simple, economical, touristic, superior, luxury, superior/super lux); the number of housing units; the number of beds; the year of the foundation of the inn (if the inn is leased, the years in which the inn was managed by the current owner were considered); the number of employees; the average daily rate and the names of the inns/hotels with which they developed cooperative relationships (second part).

As "place of origin" and "how long one has lived in the region" can determine personal contacts (Czernek, 2013, Czernek & Czakon, 2016), the interviewee's indication of their origin was inserted in the questionnaire: (a) Tiradentes or region, (b) other locations in Minas Gerais or (c) other states, as previously presented. It is claimed that people from the city and region or long-term residents have a more extensive network (Czernek, 2013). For the author, these people are more likely to cooperate because of their personal knowledge with other people in the locality. These attributes/characteristics were used for the SNA because the actors are embedded in a network and the attributes can help us to understand the social processes that generated this structure of ties (Hanneman & Ridle, 2005).

For quantitative analysis, UCINET 6.0 software was used (Borgatti, Everett & Freeman, 2002). This software, widely utilized by researchers in the SNA, allows not only the analysis of network variables but also the design of cooperation networks (sociogram). The network was formed considering the hostels of the tourist destination as nodes (vertices of the graphs) and the cooperative relations as ties (edges of the graphs). Cooperative relationships with the competitors in this work are understood as those in which companies share information about business and the market, participate in joint actions (marketing, sales, etc.) and indicate customers and suppliers, purchase of goods and services, among others (Oliveira & Gonçalves, 2014). When asking interviewees which companies have cooperative professional relationships, the focus was on the quantity and existence (or not) of the relationship (Kelman et al., 2016). As the objective of the work concerns only

the SNA, the reasons that lead to cooperation, the levels of trust present in relationships, among others, which are normally analyzed in works on cooperation in tourist destinations, were not researched or analyzed (see, e.g., Curtis & Hoffmann, 2009, Kelliher et al, 2018). As it will be mentioned in the section "Discussions, Conclusions and Final Considerations", it is recommendable to use, simultaneously, analyses of social networks and forming ties, via the SNA, and qualitative research, seeking to understand the reasons that lead, or not, to the configuration network and the formation of ties.

With the indication of actors that may be important, there is a previous or current indicator of formal/informal cooperation and it is assumed that naming other actors implies a particular relationship (Beritelli, 2011).

The metrics considered in the SNA were the following:

i. **Network density** – the proportion of the number of existing nodes in relation to the total possible nodes.

ii. **Clustering coefficient** – Watts and Strogatz (1998) introduced this concept that indicates cohesion in networks. The clustering coefficient of a vertex is the ratio between the number of links between its neighbors and the maximum number of possible links between these neighbors. The general clustering coefficient is given by the average of the clustering coefficient of all nodes; it measures the degree to which the nodes tend to group together.

iii. **Geodesic distance** – Length of the shortest path connecting two nodes in a network, given in the number of nodes.

iv. **Network diameter** – It is measured by the longest among the shortest paths that connect the nodes of a network; the longest of the shortest paths, that is, the longest geodesic distance in a graph.

v. **Degree centrality** – Total number of relationships (ties) of an actor in the network. In an oriented network, we can have the degrees of the entry (arrows in) and degrees of exit (arrows out) of the nodes.

vi. **E-I Index Algorithm** – Compares the numbers of nodes inside and outside the partitions (Hanneman; Riddle, 2005) and has a range that goes from -1 to 1. The E-I Index is calculated by the number of external nodes (links between actors with different attributes) minus the number of internal nodes (links between actors with equal attributes), divided by the total number of observed nodes. Values closer to 1 indicate a greater tendency for relationships between actors from different partitions (heterogeneity), while values closer to -1 reveal the tendency of actors to relate internally to the partition itself (homogeneity).

The E-I Index algorithm allows us to identify, in the observed network, whether there is homophily according to the attributes selected for the analysis (origin and

gender). However, we could question whether the detected homophily was due to simple chance. For this purpose, it was necessary to use statistical methods. Then we used the modeling of random graphs of the exponential family (ERGM - Exponential Random Graph Models).

In order to verify the influence of the gender and origin attributes of the owners in the generation of cooperation ties, the ERGM modeling was used. Through this technique, the inserted terms (gender and origin) made it possible to estimate the most appropriate parameters for each term, aiming to define, with a greater or lesser trust rating, the individualized contribution of each term to the generation of a set of graphs with characteristics similar to those of the empirically obtained network (observed real network) (Fernandes et al., 2017).

After several tests, through ERGM modeling, with the surveyed attributes (of the inns and their owners), it was found that the ones that had the greatest relevance for the purpose of forming the network were gender and origin of the owner. For example, we tested, via ERGM, whether the size of the inns (e.g. number of beds) could explain the conformation of the network (see Vieira & Hoffmann, 2018, Van Der Zee & Vanneste, 2015). This attribute was not relevant. Thus, the attributes mentioned in the final work were used.

In this study, we used the Statnet package on the R platform to do the ERGM modeling. To answer the first question asked, we use the term "edges", which allows the exploration of the structural aspect related to the ability of the nodes to weave ties with each other. For the second question, we use the term nodematch (attrname) which allows us to estimate the probability of establishing links between two nodes based on the similarity of an attribute of these nodes. We inserted in the model the attributes gender (male and female) and origin (tiradentino or foreign) for the nodes.

RESULTS

This section presents the results of the research. First, the statistics that describe the characteristics of the companies surveyed are presented. Subsequently, the characteristics of the inns' relationship network are analyzed.

CHARACTERIZATION OF PARTICIPATING COMPANIES

Table 1 shows the number of inn owners who are male and female.

Table 1: Gender of the owners

GENDER	N.	%
Male	21	37,50
Female	35	62,50

Source: Research data

The data in Table 2 below refer to the naturalness of the inn owners. In the total of 56 hostels surveyed, 28 owners were from Tiradentes, 18 from other locations in Minas Gerais

and 10 came from other states to reside and exercise economic activity in Tiradentes.

Table 2: Origin of the owners

ORIGIN OF THE OWNER	N.	%
Tiradentes and region	28	50,00
Other locations in Minas Gerais	18	32,14
Other states	10	17,86

Source: Research data

Table 3 contains data related to the prices per night. As the inns practice different charges for each type of room, the average price per night was adopted. Of the 56 inns surveyed, seven charge an average value lower than R$ 170.00. Most, with a total of 34 inns, charge between R$ 170.00 and R$ 350.00. Eleven inns have an average night between R$ 350.00 and R$ 530.00 and three inns have an average price between R$ 530.00 and R$ 710.00. Only one hostel among the surveyed charges more than R$ 710.00 per night.

Table 3: Average price per night

AVERAGE PRICE PER NIGHT	N.	%
Less than R$ 170,00	7	12,50
R$ 170 to R$ 350	34	60,71
R$ 350 to R$ 530	11	19,64
R$ 530 to R$ 710	3	5,36
More than R$ 710	1	1,79

Source: Research data

Table 4 below corresponds to the results obtained regarding the number of housing units in each inn. It is noted that, in the majority, the inns are small, having up to 20 housing units; only six inns have more than 30 units.

Table 4: Number of housing units

NUMBER OF HOUSING UNITS	N.	%
Up to 10 units	21	37,50
11 to 20 units	24	42,86
21 to 30 units	5	8,93
More than 30 units	6	10,71

Source: Research data

Table 5 shows the age of the inns. Practically one third consists of new inns and another third consists of older inns.

Table 5: Years since inn foundation

YEARS SINCE INN FOUNDATION	N.	%
Up to 5 years	19	33,93
5 to 10 years	10	17,86
11 to 15 years	9	16,07
More than 15 years	18	32,14

Source: Research data

SOCIAL NETWORK ANALYSIS

In this subsection, the analyses that were carried out of the network of relationships identified in the tourist destination Tiradentes are presented.

Table 6 summarizes the descriptive statistics of the network structure. Fifty-four (54) inns had some cooperation tie according to the survey from the interviews. The average number of ties, that is, the number of times the inn was mentioned or received was 2.481. The network density was low, only 4.7% of the possible ratios. The low clustering coefficient shows that the network is not very clearly divided into subgroups. The longest geodesic distance (longest among the shortest distances between two nodes) was 12 steps. Thus, there is a considerable separation between the inns, but, on average, they are separated by four steps. The large diameter of the network shows that some inns benefit less from cooperation because they stand farther from others. This is the case of the inns located at the ends of the chain.

Table 6: Descriptive statistics of the cooperation network

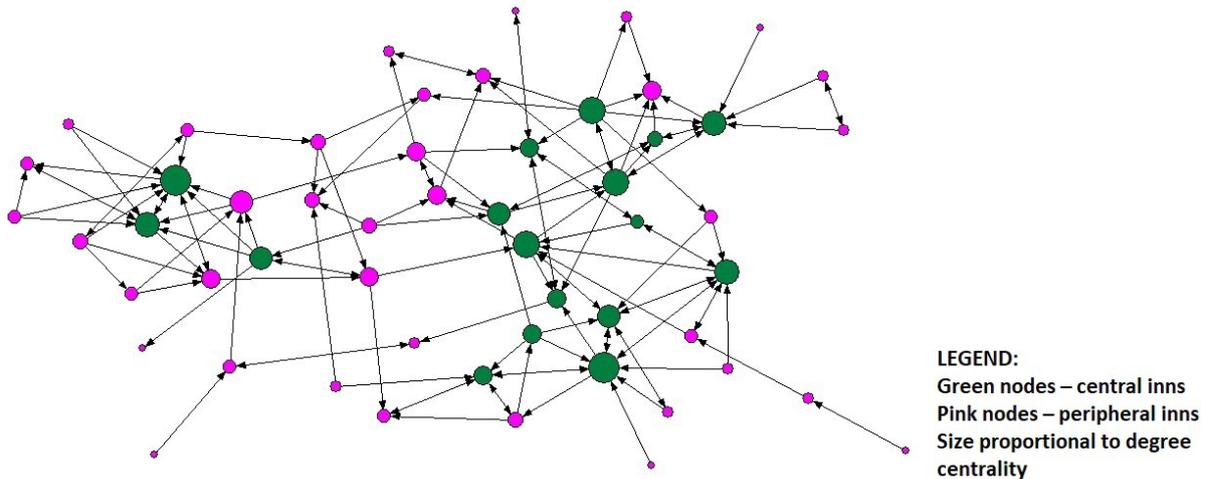| Description	N.
Number of connected organizations (nodes)	54
Cooperation ties (ties)	134
Average loops per vertex	2,481
Network density	0,047
Overall clustering coefficient	0,26
Average geodesic distance (degrees of separation)	4,388
Network diameter	12

Source: Research data

In this research, we chose to work with the targeted type of network. This means that the relationships are not necessarily reciprocal. This choice was justified by the fact that some interviewees said that they cooperated with others, but the latter did not necessarily say that they cooperated with the former. The network between the inns in Tiradentes can be seen in Figure 1.

Social networks can present a center-periphery type stratification pattern (McPhearson, Smith-Lovin, & Cook, 2001). Conceptual intuition, in this case, consists of

the proposition that the actors of the network are divided into two distinct groups – center and periphery. In the center, the actors are densely connected with each other, while the actors in the periphery are more connected with the actors in the center than with their peripheral peers (Borgatti & Everett, 1999).

Figure 1: Cooperation network of Tiradentes inns

LEGEND:
Green nodes – central inns
Pink nodes – peripheral inns
Size proportional to degree centrality

Source: Research data

The chain had 17 central inns (31.48%) and 37 peripheral ones (68.52%). The internal density of the central subgroup was 15.4%, while the internal density of the peripheral subgroup was 2.6%.

GENERATIVE PROPERTIES: EVIDENCE OF HOMOPHILY

Regarding the origin and gender of the owners, the relationships between the inns were analyzed using the E-I Index test according to these attributes.

Considering the origin, the general E-I Index was -0.315. This demonstrates that the relations are endogenous, that is, there is a greater density in the relations between the owners from Tiradentes among themselves and those from other cities among themselves. In other words, the inns whose owners are from Tiradentes cooperate more with their peers. The same occurs with the inns whose owners are from outside the city. Those from Tiradentes cooperate with each other more than the sub-group outside the city.

The network of the hostel market surveyed indicates, using Granovetter (1985), Abramovay (2004), and Smelser and Swedberg (1994), that it emerges from broader social groups. For example, in this case in which economic action is immersed in the social ties of the owners, developed, according to the results of this work, by the origin and gender of the owners.

Among the inns surveyed, 28 have Tiradentino owners and 26 have owners from other cities; however, while the general density of the network was 4.7%, the internal density of the subgroup of inns whose owners were from Tiradentes was 11.6% and the

internal density of the subgroup of outsiders was 8.3%. Therefore, there is nearly a balance between the number of natives and outsiders (28 and 26, respectively), but there is a large discrepancy in the intensity of intra-group relationships.

Of the 54 inns in the chain, 16 had only internal ties, that is, 29.63% only cooperated with their peers, natural or outsider; and of these, 10 were from Tiradentes. This shows that social closure is greater in the subgroup of Tiradentinos.

As for the gender of the owners, the overall E-I Index was -0.185, which also reveals that the relationships are endogenous in this attribute. Twenty (20) owners are male and 34 female. The internal density of the male subgroup was 7.4%, while that of the female subgroup was 8.9%.

In Figure 2, one can observe the network by the attributes of origin and gender of the inn owners.

Figure 2: Cooperation network by origin and gender of the owners

LEGEND:
Circle – tiradentino
Square – outsider
Green – male
Red – female
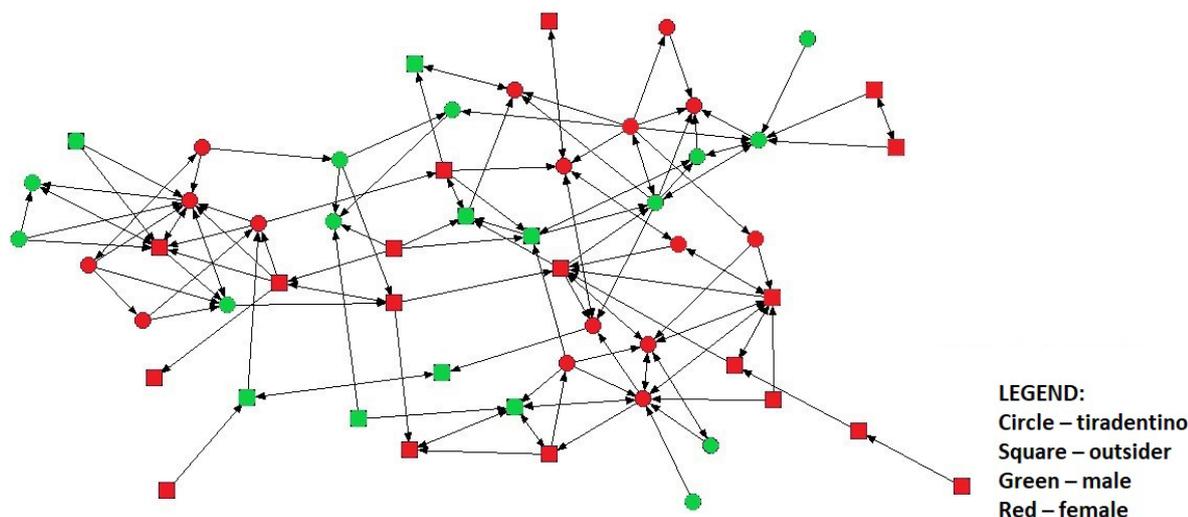
Source: Research data

The real network observed had 54 nodes and 134 ties and the correspondence by gender was 81 loops, while by origin it was 87 ties. But what would be the chance of preferential binding for these attributes in similarly sized networks? Through the ERGM, we arrived at the model shown in Table 7 that shows the goodness of fit (Goodness-of-fit) for this statistical model.

Table 7: Goodness-of-fit for model statistics

Parameter	obs	min	mean	max	p-value
Edges	134	107	135,7	164	0,90
nodematch. Genero	81	62	82,7	104	0,78
nodematch. Proced	87	69	88,7	108	0,78

Source: Research data

The most suitable model for the network was obtained through the formula below:

Formula: nw() ~ edges + nodematch("Genero") + nodematch("Proced")

The estimated parameters are shown in Table 8. If the value of the error of each estimate is less than half the absolute value of the estimate, it can be used in analyzes. The edges (loops) and Proced (origin) parameters were satisfactory, the Gender parameter was not.

Table 8: Monte Carlo MLE Results

Parameter	Estimate	MCMC Error	p-value
Edges	-3,597	0,185	< 1e-04 ***
nodematch. Genero	0,346	0,181	0,05645
nodematch. Proced	0,684	0,185	0,00022 ***

Fonte: Dados da pesquisa

The value of -3.597 for the term *edges* indicates that the chance that two owners will develop cooperation between them is about 2.7%. The chance of a cooperative relationship between owners of the same gender is 58.6% (but the result of the modeling is not reliable for this parameter). The chance of an endogenous cooperative relationship between owners from Tiradentes or other cities is 66.5%.

Finally, ERGM modeling allowed us to get to the following answers: (1) the propensity to establish cooperative relations between any two owners is small; (2) however, the chance of cooperation between two owners with the same origin and gender becomes higher. Therefore, the results indicate that the market analysis can be carried out, as in this case of tourist reception services, according to Granovetter (1985), through existing relationships between actors and groups. The analysis of social networks makes it possible, according to Swedberg (2004), to consider social and economic phenomena that influence the social structure of markets.

DISCUSSIONS, CONCLUSIONS AND FINAL CONSIDERATIONS

This research analyzed the cooperative relationships between 56 inns in the city of Tiradentes. As presented in the previous section, it can be said that the level of cooperation between the hostels surveyed is relatively low, with an average of 2.48. This low cooperation is found in several destinations (Costa et al., 2014, Teixeira, 2011).

In other locations, however, it is possible to observe the formation of networks for the dissemination of tourist destinations, with the participation of hotels, inns, restaurants and government entities, with information sharing and learning by the actors. This fact is explained by the perception that cooperative action seeks common goals (Cerqueira, Sacramento & Teixeira, 2010, Pereira & Lopes, 2013). The authors, however, do not present indicators regarding the results of the actions, such as an increase in the number of tourists or an increase in the occupancy rate of lodging facilities, for example.

In others, there is cooperation in more specific actions, which can be explained by seasonality (Curtis & Hoffmann, 2009) or there is limited cooperation, however, there is an interest in establishing cooperative relationships (Selin & Beason, 1991).

It is said that there may be some measure of rationality and search for efficiency that can influence the relationships of hosting companies (Vieira & Hoffmann, 2018).

In contrast, Beritelli (2011) states that there is no rational behavior in joint actions, since the actors first consider the people, and then the institutions they represent, since cooperative behavior in tourist destinations is an interpersonal business. Thus, as shown in the results in the previous section, it was evident that origin and gender enable the formation of denser social networks and such characteristics can influence the rationality of the enterprises through the criteria immersed in the social relationships of the owners.

Non-cooperation can also be explained by the lack of confidence and loyalty of the actors, whether by the fact that there is individualism or great competitiveness in the sector. There is also low participation in associations in the sector, not recognizing the benefits of such participation (Teixeira, 2011).

It is also considered that the determining factors of collaboration should be seen in a broader context, considering social aspects, rules of conduct, power relations, culture, history, social capital, the life cycle of companies, relational norms and trust, as well as aspects related to the actors' education, religion and age (Czernek, 2013, Presenza & Cipollina, 2010). It is also considered that informal networks, based on cultural, economic and social proximity, allow the production of positive results in the network (Zach & Racherla, 2011). As we have identified in this work, there is evidence of homophily in social networks among owners based on their origin and gender.

In addition to these factors, it is also found that the resources obtained by contacts maintained at the destination, information, for example, may not lead to cooperation (Beritelli, 2011); the lack of skills and social capital, matters of time and budget, or even a preponderant position of large companies can influence the low participation of small and medium-sized companies (Van Der Zee & Vanneste, 2015).

It may also happen that network relationships are not strengthened by the lack of continuous dialogue between organizations, due to the fact that there is a cultural, economic or geographical distance, not allowing common goals to be distinguished (Van Der Zee & Vanneste, 2015).

There are also, as reasons alleged by actors from other destinations, for not establishing collaborative actions, the ignorance of the benefits of cooperation and lack of interest of other organizations in cooperating (Miranda Júnior et al, 2016); people's personal attitudes, behavior and characteristics, in addition to their previous experience (Della Corte & Aria, 2014).

Taking the arguments presented into account, it seems to be appropriate to state that the indication of low cooperation, by the ARS, would not be "exclusive" to the destination Tiradentes. As it was presented, there are several factors that can influence the possibility of cooperation between actors in tourist destinations.

Considering the low density (0.047), the clustering coefficient (0.26) and the number of peripheral actors (37) presented in this work, it can be assumed, again, that these characteristics of Tiradentes are not exclusive. For example, Baggio et al. (2010) found a low density of the tourism actors' network in their research, with 39% of the actors not being connected. The dispersion of nodes and the low degree of clustering may mean that tourism actors exhibit a low degree of collaboration or cooperation.

Several other studies have found a low density of the analyzed networks (Baggio, 2011, Gajdošík, 2015, Del Chiappa & Presenza, 2013, Scott et al., 2008).

In addition, considering the concept of density, it is proposed that denser networks generate a greater degree of trust between the actors (Coleman, 1988), which may have an influence on the conduct of business and, consequently, on the development of a given sector.

On the other hand, according to Burt (2004), lower density may be important for new information to circulate among the actors, with new business opportunities, as long as the network is configured in subgroups with relative social cohesion and linked by brokers.

According to Coleman (1988), a more cloistered relational structure, consequently with greater density, would favor the emergence of norms and social control. Considering this, we can assume that the most closed structure of the natives constitutes a stronger subgroup, with greater power of decision in the economic segment of the city. Thus, the subgroup of foreigners is in a less powerful position in the relational structure.

Still in regard to the foreign group, perhaps the cultural difference, the level of trust between the actors and other factors may explain the low relationship with Tiradentino owners, according to Czernek (2013) and Sant'anna, Nelson and Oliveira (2011).

This work, however, has some limitations. Perhaps one can argue about the number of participating inns. The "snowball" technique used in this research has its limitations as well. It is said that disconnected actors may not be identified, and these isolated actors may contain some characteristics of the network (Hanneman & Riddle, 2005). Furthermore, according to these authors, the subgroups of actors who have not been nominated can be lost.

Another limitation concerns the variety of actors included in this work. As the research was carried out only with inns, it did not include support institutions, vertical relationships (suppliers, e.g.) and other actors. It is argued that support institutions can influence horizontal ties (Vieira et al., 2017).

As future research, it would be worth investigating the role of trust in tourism relations, which is a critical factor in relations between actors and in exchanges, as the role of trust is rarely addressed (Kelliher et al., 2018). In addition, there are several claims regarding low density and low cooperation in tourist location networks. It seems to be important to investigate the various factors presented above that lead to these characteristics.

The inclusion of support and public bodies is also suggested, not limited to private companies (Brás, Costa & Buhalis, 2010), as several studies emphasize the importance

of these organizations in enabling a destination to compete with others (Denicolai et al., 2010, Zee; Vanneste, 2015); as well as the inclusion of a wide variety of actors and their interdependencies since the general configuration of the network is what leads to competitive advantage (Wäsche et al., 2013).

It is also suggested to carry out longitudinal studies, to observe particularities such as trust, understanding and communication, which may lead to the description of the behaviors that do or do not lead to cooperative behavior. (Beritelli, 2011).

Future research could also use both the structural and relational perspectives of networks to analyze relationships in tourism (Del Chiappa & Presenza, 2013). In addition, it is argued that studies often choose a qualitative approach or a quantitative approach, rather than combining qualitative and quantitative methods (Kelman et al. 2016, Beritelli, 2011). Thus, it may be important, after the SNA, to conduct qualitative interviews, leading to the validation of quantitative data, at the same time seeking explanations for its results (Luthe & Wyss, 2014, 2016, Merinero-Rodríguez & Pulido-Fernandez, 2016).

The use of both qualitative and quantitative methods is also suggested as an integration, complementing with qualitative interviews in order to examine specific restrictions for effective governance and to understand the characteristics of the business network (Beritelli, 2011, Kelman et al., 2016). Qualitative research can also offer validation of quantitative data (Luthe & Wyss, 2014, 2016, Merinero-Rodríguez & Pulido-Fernandez, 2016). Besides, Luthe and Wyss (2014) claim that qualitative knowledge about tourism systems has not been used to complement quantitative research.

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Contribution of each author in the construction of the article

Geraldo Magela Rodrigues de Vasconcelos: Conception of the research, theoretical framework, conclusions, proofreading of the manuscript.

Gustavo Melo-Silva: Analysis and interpretation of data, preparation and proofreading of the manuscript for submission.

Velcimiro Inácio Maia: Analysis of Social Networks, creation of sociograms, ERGM modeling, text editing.