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# Determinants of cooperation among hotels in Venice: A network approach

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## 1. Introduction

Tourism is a vital economic driver, especially in Italy, where it accounted for nearly 13% of the gross domestic product in 2023 (OpenEconomics, 2023). It demands effective governance, defined as a way of coordination or interaction between destination entities operating in the third sector, to be successful and competitive (Czernek-Marszałek, 2021). In tourism destinations, cooperation between the involved stakeholders is necessary to achieve competitiveness and sustainability (Fyall and Garrod, 2020). Czernek (2013, p. 84) states that cooperation in tourism is "a form of voluntary joint actions in which autonomous stakeholders engage in an interactive process, using shared rules, norms and structures, to act and decide on issues related to tourism development in the region".

When viewed through this lens, tourism destinations can be conceived as networked systems where various entities (such as hotels and other accommodations, services, and gastronomy) collaborate and offer comparable or complementary activities. These entities are interdependent as they must work together to provide visitors with a comprehensive product—the "tourism experience". This experience encompasses all aspects of a visitor's journey, from accommodation and dining to sightseeing and entertainment, underscoring each entity's crucial role in shaping the overall experience.

Coordination and cooperation between destination organizations involve information exchange, support, training, and resource sharing. This collaboration offers benefits at both the destination and organizational levels, as highlighted by numerous studies (e.g., Elvekrok et al., 2022; Ledesma González et al., 2021). However, collaboration between very different stakeholders, such as in the tourism industry, which encompasses businesses from the hospitality sector, transportation, food and beverage, culture and creative industries, and many more, is far from being straightforward. Collaboration requires trust, reciprocal understanding, and alignment between different and sometimes conflicting interests (Czernek-Marszałek, 2019; Nunkoo, 2017). This is why, notwithstanding the well-known benefits of building networks of collaboration, they are often scantly present in tourist destinations and still have high rates of failure (Marasco et al., 2018).

In this work, we focus on Venice, a world-famous tourist destination facing the challenge of overtourism (Baldin et al., 2024). In this setting, collaboration is not only beneficial but also a crucial strategy for promoting sustainable development (Moretti et al. 2024). We conceptualize the collaboration system as a network, a system of entities (the hospitality firms in Venice) and the relationships (collaboration) among them. We apply methods typical of network analysis to explore the determinants for cooperation and the specific mechanisms that have led to establishing collaboration ties among hotels in Venice.

## 2. Theory background

The development of inter-firm cooperation and networks has been explored through several analytical lenses within the tourism literature, relying on well-established theories such as the transaction cost economics (Williamson, 1975), the resource-based view (Prahalad and Hamel, 1990), the resource dependency theory (Pfeffer and Salancik, 1978), and the social embeddedness

theory (Granovetter, 1973, 1985). These theories contributed to uncovering some of the explanations of network emergence (Padgett and Powell, 2012), namely why and how firms engage in collaborative relationships and invest in their development and maintenance.

Building upon these theories, reasons for collaborating between tourism firms have been analyzed mainly in terms of their benefits (e.g., in Elvekrok et al., 2022; Tribe and Liburd, 2016) and their determinants ( López-Molina and Pulido-Fernández, 2024; Czernek-Marszałek, 2021).

Understanding what drives tourism firms' cooperation dynamics can be critical for understanding firm's competitiveness and the success of a destination (Baggio, 2020). Focusing on this second stream of research that serves as the main theoretical background for the present paper, we define *cooperation determinants* as those circumstances that determine firms' starting cooperation, development and results.

Determinants have been categorized into four distinct groups: preconditions of cooperation, factors crucial for the successful development of cooperation, key personal capabilities required for managing tourism cooperation, and factors conducive to cooperation effectiveness (Czernek, 2013). Between these categories, several variables have been explored, including those related to the social characteristics of the environment, geographical proximity between firms, the characteristics of the tourism governance structure, the presence of collective actors, and firms' resource endowment as a proxy of competences and experience.

Even though past studies have analyzed the determinants of cooperation, it has been raised that this problem is still insufficiently explored (Beritelli, 2011). Most of these studies adopted a qualitative approach or basic network statistics that describe different aspects of the network structure (e.g., Ledesma González et al., 2021) separately. Since the determinants act simultaneously, it is important to analyze them jointly and control their effects on one another.

In this study, we apply network models to explore the following research question: *Which factors determine the collaboration between hotels in Venice?* The network model approach allows accounting for the dependence among the collaboration ties and offers a quantitative approach which controls the effect of one factor on the tie formation for other factors.

## 3. Data

We gathered information about the collaboration among hospitality firms in Venice using an online questionnaire administered in 2022. The Venice School of Management of the Ca' Foscari University of Venice contacted all the hotels, B&B, hostels, and apartments in Mestre and Venice via email.

The questionnaire, designed with a recall method and a name generator, asked hospitality firms about their past collaborations and how they rated the importance of these collaborations on a scale from 1 (not important at all) to 5 (very important). Using a snowball design, we enhanced this information by conducting interviews with the hotels that did not or partially fill in the survey. We considered the hotels with four and five stars as seeds. The final sample comprises 122 hotels that declared 177 collaborations, with an average importance rating of 3.8 (ranging from 1 to 4). Most of these collaborations (41.9 %) focus on innovation and the creation of new products and services, and overbooking management (33.1 %), while smaller percentages are observed for marketing (19.8%) and training (5.2%).

We also collected information on the characteristics of the hotels. The Open Data website of the Veneto region (https://www.regione.veneto.it/web/informatica-e-e-government/open-data) provides an exhaustive data set of all the hospitality firms in Veneto with details on the facilities (e.g., private parking, restaurants, swimming pool), the quality and standards, as measured by the number of stars and "leoni" (lions: a local measure of firms' quality), and the location of the hotels (address). Starting from this data, we computed the hotel similarity with respect to the facilities using the Jaccard similarity index and the geographical distance between the hotels. Other information concerning formal relationships defined as common membership to local business associations was collected through interviews. Table 1 reports the basic descriptive statistics of the

hospitality firms' characteristics.

**Table 1** – Descriptive statistics of the characteristics of the hospitality firms considered.

| Stars/Leoni | n | % |
|---|---|---|
| 1 o 2 | 7 | 0.06 |
| 3 | 26 | 21.31 |
| 4 o 5 | 89 | 72.95 |

| | min | mean | max |
|---|---|---|---|
| Geographical distance (km) | 0.4 | 6.5 | 24.95 |
| Facility similarity | 0.15 | 0.65 | 1 |

## 4. Methods

We applied valued exponential random graphs models (ERGMs) to investigate the determinants of collaboration among the hotels in Venice, with a focus on resource endowment, geographical location, and management variables.

ERGMs (Robins et al., 2010; Lusher et al. 2013) are statistical models for the analysis of cross-sectional network data, i.e., one single observation of a network. Originally developed for the analysis of binary networks, a recent extension allows the modelling of valued networks, where ties are characterized by a value indicating the intensity of the relationship (Krivitsky, 2012).

In the following, we use the convention that random variables are denoted by uppercase letters and realizations of random variables or fixed quantities are denoted by lowercase letters. We also use bold characters to indicate matrices.

We denote the observed network represented as an adjacency matrix by $\boldsymbol{X}$, where the rows and the columns are the entities, and the generic cell $\boldsymbol{x}_{ij}$ reports the intensity of the relationships between the entities *i* and *j*. We also denote the monadic and dyadic covariates by *v* and *w*, encoding the characteristics of the entities and pairs of entities, respectively. The model belongs to the family of exponential distribution and assumes that the observed network $\boldsymbol{x}$ is the outcome of the probability distribution taking the form:

$$P(\boldsymbol{X} = \boldsymbol{x}) = h(\boldsymbol{x}) \frac{exp\{\sum_k \vartheta_k s_k(\boldsymbol{x}, v, w)\}}{\kappa(\vartheta)}$$

with $h(\boldsymbol{x})$ the reference distribution, $s_k(\boldsymbol{x},v,w)$ the statistics playing the role of explanatory variables, $\vartheta_k$ parameters expressing the importance of the statistics in explaining the structure of the observed network, and $\kappa(\vartheta)$ a normalizing constant.

The statistics $s_k(\boldsymbol{x},v,w)$ are the counts of local configurations of ties representing the outcome of network mechanisms that have generated the observed network. Their choice is theory-driven, i.e. guided by substantive theories and hypotheses concerning the analyzed phenomenon.

The model specification for analyzing collaboration among the hotels in Venice includes several statistics. The first set of statistics accounts for the endogenous mechanisms describing the dependence of ties on other ties. Those statistics are *ties and intensity* defined as the number of collaboration ties and the sum of the importance values in the observed network. They capture the baseline tendency of establishing collaborations and their importance and are equivalent to the intercept in regular statistical models; *transitivity* is computed as the sum of transitive triads where ties are weighted according to their value and measures the tendency of hotels to collaborate with the collaborators of their collaborators, or in other words, the tendency for two hotels to be connected if they share a common collaborator.

The second set of statistics relates to the exogenous mechanisms describing the dependence of ties on the hotel attributes. Those statistics are the *similarity* defined as the sum of the values of ties between hotels having a similar characteristic and modelling the tendency of hotels to collaborate with hotels that have similar characteristics; the *activity* defined as the sum of the values of ties weighted by the attribute of the hotel and modelling how the hotel characteristics influence the establishing of collaboration ties.

The parameters are estimated using algorithms based on Monte Carlo Markov chains. A positive (or negative) value implies that a larger (or smaller) number of configurations of type $k$ is observed in $\boldsymbol{x}$ than expected by chance, thereby providing evidence for (or against) the corresponding mechanism.

## 5. Results

Table 2 presents the estimate of the valued ERGMs, with all parameters showing significant results at a 5% level but the activity parameters.

**Table 2** – Valued ERGMs for the importance of collaboration among hotels. Parameters estimates (Est.), standard errors (s.e.), and significance (Sign.)

| Statistic | Est. | s.e. | Sign. |
|---|---|---|---|
| *Endogenous effects* | | | |
| Ties | -6.16 | 0.3 | *** |
| Intensity | -0.61 | 0.31 | * |
| Transitivity | 0.52 | 0.09 | *** |
| | | | |
| *Exogenous effects* | | | |
| Stars activity | 0.11 | 0.18 | |
| Stars similarity (absolute difference) | -0.19 | 0.09 | * |
| Facility activity | 0.14 | 0.16 | |
| Facility similarity | 0.16 | 0.07 | * |
| Same business association | 0.49 | 0.13 | *** |
| Geographical distance (logarithm) | -0.07 | 0.03 | * |

***p < 0.001; **p < 0.01; *p < 0.05.

We start by commenting on the endogenous effects. The negative coefficients of the *ties* and *intensity* statistics indicate that the network is sparse, with only a few collaboration links. This finding aligns with the network's low density (observing only 3% of all possible collaboration ties). The positive value of the *transitivity* statistic suggests that collaboration ties tend to cluster and that hotels sharing a common collaborator are more likely to cooperate.

Now, we consider the exogenous effects. The positive coefficient of the *stars activity* is not significant, and thus, hotels with high and low quality show the same tendency to entertain collaboration. The negative parameter of the *stars similarity*, measured by the absolute difference between the stars of the hotels, indicates that hotels tend to collaborate with those of similar quality. Similarly, the positive parameter of the *activity* related to the number of offered facilities is not significant, suggesting that there is no difference in the collaboration tendency of hotels with high and low numbers of provided services. The positive coefficient of the facility *similarity* indicates a tendency for hotels to collaborate with hotels that offer the same services.

Finally, the positive coefficient related to being a member of the same business association underscores the significant influence of formal relationships on collaboration. In contrast, the negative coefficient of the geographical distance suggests that nearby hotels are more likely to collaborate, further emphasizing the influence of proximity on collaboration.

## 5. Conclusions and discussions

In this work, we investigated the determinants of collaboration between hospitality firms in Venice while accounting for the importance assigned to these relationships. The analysis indicates that transitivity plays a crucial role in shaping collaboration patterns in the hotel industry. Specifically, hotels tend to collaborate in small groups, as suggested by the positive and significant parameter related to the transitivity mechanism.

Homophily, that is the tendency of entities to associate and bond with similar others, is also an essential driver of collaboration. The model provides evidence for the tendency of hotels to cooperate with hotels with the same quality and similar services, a manifestation of homophily in the context of the hotel industry. This result might be justified, in part, by the fact that cooperation might take place to deal with overbooking, namely the mechanism that hotels overbooked use to redirect their guests to alternative accommodation solutions — that must be of the same quality level. From another point of view, hotels similar to each other often share the same business approach (e.g., managerial *vs.* family business), and thus, they share a common "language" that facilitates trust, development and collaboration (Nunkoo, 2017).

Membership in business associations, which often provide a platform for networking and collaboration, is also a determinant of collaboration. This finding might highlight the importance of these associations in fostering collaboration in the hotel industry, as they can facilitate the formation of collaborative ties among member hotels, as discussed by previous work (Moretti et al., 2024).

Finally, the urban and territorial morphology of Venice explains the significant role of the geographical distance in shaping the collaboration network. Venice has a very small historical center, geographically separated from the mainland by a bridge. Its structure, articulated on over a hundred islands, emphasizes the relevance of being "neighbors" only when the geographical proximity is very high: a distance that in other cities could be considered negligible, in Venice, can be relevant. Overbooking mechanisms, as described above, can reinforce relationships only between firms located very close to each other.

This work is a first attempt to analyze the collaboration of hotels in Venice and serves as a pilot study for more extensive data collection and analysis. It is important to note that the study has some limitations. The first is the representativeness of our sample: hotels with one or two stars are underrepresented due to the sampling design and the response rate during the data collection. The second is the presence of missing data. A non-response generates missing ties that could modify the structure of the network and impact on inference. Thus, the results have only a descriptive value and our findings cannot be generalized.

While this work analyzes only a small piece of the collaboration puzzle between hospitality firms in Venice, it paves the way for future research on determinants of network collaboration and provides a framework that can be applied to any other context to understand collaboration between hospitality firms.

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