

# Structural Holes and Positions in Tourism Innovation Networks: Divide to Conquer?

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**Abstract:** Innovation in tourism has been receiving increased attention in the last decades, especially in what concerns networked innovation processes. This has gained increased relevance in tourism, an industry made of SMEs that resort to networks to obtain competitive advantages when developing new products and services. Thus, it is fundamental to analyse the networks' structure and how it can improve innovation performance. While social capital theories mainly address how it can be used to improve the whole network, other theories focus on how individuals can use social capital to obtain better competitive positions, or how the absence of ties between nodes defines the network structure and the opportunity to build social capital. Structural holes theory analyses the absence of ties between nodes in a network and how they can be connected by a broker, who will gain control over resources and highly increase his social capital. This paper aims at identifying and comparing the different types of brokers in two tourism destinations' innovation networks (Douro and Aveiro, Portugal). In addition, it relates both the network structure and the individual position of tourism organisations, to the innovation performance of those destinations. This is accomplished by applying sociometric analysis to the innovation networks. Results demonstrate that different social structures and patterns of cooperation bring diverse impact on the innovative performance of tourism destinations. Conclusions advance recommendations for tourism organisations to increasingly contribute to tourism regions' innovative performance.

**Keywords:** Innovation networks; tourism; structural holes; innovation performance; Portugal

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## 1. Introduction

Innovation in tourism has been receiving increased attention in the last decades, especially in what concerns networked innovation processes. It is widely acknowledged that, nowadays, innovation emerges mainly within collaborative arrangements, instead of being developed in an atomist way by organisations. If this is relevant for most industries, it gains increased relevance in those made entirely of SMEs that resort to networks to gain resources and competitive advantages when developing new and integrated products and services (Costa et al., 2008, Acs and Audretsch, 1988, Fernandes et al., 2017, Vonortas, 2011).

However, not all network dynamics and structures foster a positive innovation performance. Different configurations will result in distinct tourism innovations, whether in its nature, or impact (Brandão et al., 2018, Scott, 2013). Bearing this in mind, several streams of research have been analysing the most 'innovation-friendly' network structures. Social capital theory (Coleman, 1988, Putnam, 2000) focuses on how it can be used to benefit the entire network. Other lines of thought concern with how individuals can use that social capital to obtain better competitive individual positions, or how the absence of ties between nodes defines the network structure and the opportunity to build social capital. This is the case of structural holes theory (Burt, 1992, Burt et al., 2013), on which this research is based. Structural holes refer to the absence of connections between actors in a network. If these gaps are filled by an actor (broker), in theory, he will have a better and more powerful competitive position, controlling resources, knowledge, and information. Being these the basis of the development of innovation (Lundvall, 1992), it may be concluded that these actors play a significant role in the development of innovative ideas in tourism destinations. This paper aims at identifying and comparing the different types of brokers existing in two tourism networks (Douro and Aveiro, Portugal), and relating both the network structure and the individual position of tourism organisations, to the innovation performance of the destinations. This is accomplished by applying sociometric analysis, namely centrality, structural holes, and brokerage measures, to the networks of tourism organisations. Results demonstrate that different social structures and structural positions bring diverse impact on the innovative performance of tourism regions. This allows to advance recommendations for tourism organisations to increasingly contribute to destinations' innovation and competitiveness.



## 2. Networks in tourism innovation

The evolution of innovation models demonstrate that the practice of innovation in firms started from linear, sequential and atomistic processes developed entirely within the scope of the firm, towards the most recent models in which firms, in order to be successful, develop their innovation in a networked environment, with strong patterns of cooperation not only with other businesses, but also suppliers, customers, universities, research centres, etc. (Rothwell, 1994, Chaminade and Roberts, 2002). Nowadays, “(...) more and more of the innovation process takes place through networking rather than through hierarchies and markets. (...) only a small minority of firms and organisations innovate alone, and that most innovations involve a multitude of organisations” (Lundvall and Borrás, 1997:106). In tourism, both theory and practice acknowledge the same phenomenon. As Sundbo et al. (2007) argue, innovation in tourism “requires networks and co-operative systems” and, in this context, territories assume a paramount role, as tourists arrive to a destination to consume an integrated experience, which makes firms mutually dependant when developing common destination innovations.

Networks may be defined as (...)

*organisational structures whose operating philosophy may be placed between Weber’s bureaucratic model and the neoliberal or market philosophy. Networks are based on two or more (usually administrative independent) organisations which decide, by a formal or informal commitment, to engage in a medium- or long-term cooperation process involving the exchange of products and services (...). A network is, therefore, underpinned by the premises that every organisation depends on the success of others and also that competition must be viewed beyond the region where an organisation is located” (Costa, 1996:148).*

Tourism is fragmented in its nature, comprising distinct, but complementary activities, creating integrated experiences in destinations. It is geographically dispersed, because origin and destination areas are distant, and resources are used jointly as they are ‘free’. In this context, networks provide important benefits, as they compensate this segmentation in bringing together tourism stakeholders and providing tourist with comprehensive experiences. Moreover, tourism business environment is turbulent and very competitive, meaning that growth or even survival of firms might depend on collective action (Scott et al., 2008). This comes in line with the thoughts of Porter (1990), who insists that it is competition associated to cooperation (and not monopoly) that fosters growth and innovation. However, he agrees on the specialisation argument: knowledge spillovers will favour innovation in specialised and geographically concentrated industries, such as tourism. The cluster approach advocated by Porter emphasises market and competition above networking and social interaction as success factors for innovation in clusters. This concept is strongly linked to Porter’s “diamond model” of competitive advantage, which can be used to assess the overall quality of a business cluster. The diamond encompasses the determinants that influence competitive advantage: (i) factor conditions (production), (ii) firm strategy, structure, and rivalry; (iii) demand conditions; (iv) related and supporting industries; (v) government and chance (as additional determinants). The intensity of interaction within the diamond is increased if firms are also clustered or geographically localised (Porter, 1990). Tinsley and Lynch (2001) acknowledge that networks are the frameworks that bind the place and people together, going beyond the destination to regional, national, or even international levels.

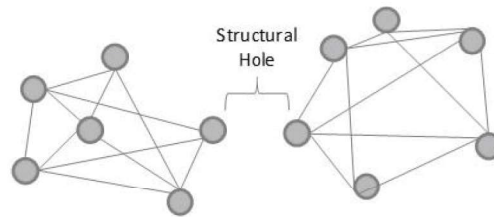
### 2.1 Structural Holes

The social network approach to organisations embraces several concepts and streams of study. *Social capital* is a growing research stream in organisational network studies (Borgatti and Foster, 2003). Popularised by Coleman (1988), it addresses the advantages and benefits that individuals get from the relationships established within a network, improving the entire structure. Burt (1992) concerns with how individuals can use social capital to obtain better competitive positions within the social structure. Kilduff and Tsai (2012) refer that one of the most fascinating streams of research within social networks is that of how the absence of ties between nodes defines the network structure and the opportunity to build social capital. This leads to the analysis of a fundamental concept within social networks: *structural holes*.

Structural holes are gaps in a social structure, or the absence of ties between nodes in a network (figure 1).

These nodes can be connected by a broker, who will gain control over the flow of resources across the gaps.

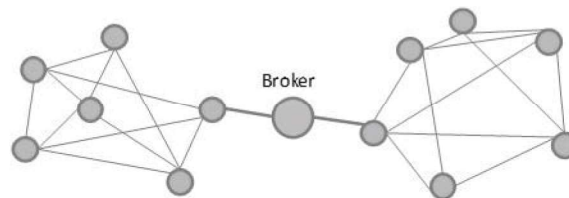
Brokers highly increase their social capital by linking two otherwise disconnected nodes, cliques, or even entire networks. In this line of thought, social capital is created within a network by structural holes, as actors can broker connections between formerly disconnected nodes (figure 2), having privileged access to information and control over the projects that bring together actors from different sides of the hole (Burt, 1992, Burt et. al, 2013).



Source: own elaboration

**Figure 1:** Representation of a Structural Hole

These individuals leverage their investment in social relations by connecting with different groups, achieving a powerful and competitive position (Burt, 1992, 2001). Conversely to Coleman's (1988) understanding on the most fruitful network structure for the creation of social capital (which relies on network closure), Burt considers that it is rather a function of brokerage opportunities that emerge from structural holes. Thus, structural holes are defined as *"the separation between nonredundant contacts. (...) is the relationship of nonredundancy between two contacts. (...) As a result of the hole between them, the two contacts provide network benefits that are in some degree additive rather than overlapping"* (Burt, 1992:18).

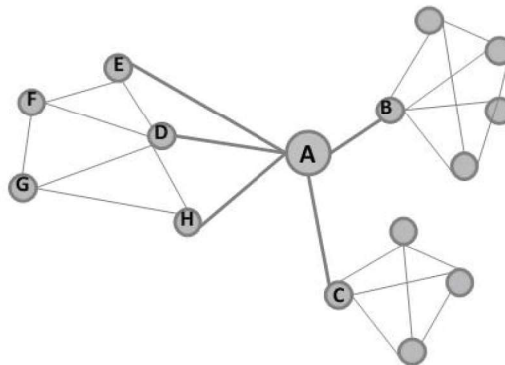


Source: own elaboration

**Figure 2:** Representation of a Broker

Brokers bridge structural holes, recognised by the lack of cohesion or of equivalence among actors. Brokers achieve a unique combination of information fostering innovative potential that is difficult to imitate because it emerges from social ties, rather than from training or position.

This theory embraces two categories of benefits that individuals fulfilling structural holes can achieve: information and control benefits. These individuals profit from the disunion of others. Brokers have greater access to information, improved response time to opportunities, access to novel information earlier, control and ability to negotiate the social relations because they are placed between two players who seek for the same information or between two players in two or more relations with conflicting demands (Burt, 1992:30-31).



Source: own elaboration

**Figure 3:** Structural advantage of a node within a network

In Burt's perspective, the more structurally constrained actors (those having small, dense, and closed networks with few or indirect ties) are less likely to attract new partners, as they offer lower returns, have reduced



access to new information and are engaged in a routine behaviour that does not favour innovation. Large, diversified, sparse and open networks stimulate creativity and innovation as they provide the access to varied information and do not constrain members, thus fostering innovative practices. As exemplified in figure 3, node A's bridging role in the social structure provides it with structural advantage over node D, despite it is in the centre of a tightly-knit clique.

Following these ideas, Burt argues that the spanning of structural holes provides the mechanism that relates weak ties to positive outcomes in Granovetter's *Strength of Weak Ties* theory (Granovetter, 1973). The strength of a tie is a function of the "amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterise the tie" (Granovetter, 1973:1361). The underlying argument is that someone's acquaintances (weak ties) are less likely to be socially connected with one another than his close friends (strong ties). The actor's set of acquaintances comprise a low-density network (where many of the possible ties are absent, i.e. presence of structural holes) because it is unlikely that they know each other.

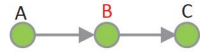
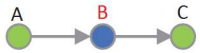
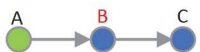

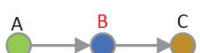
Conversely, the same actor's network of close friends is densely connected. Weak ties between a node and his acquaintances are crucial bridges between two dense cliques of close friends that would otherwise be disconnected. Granovetter's theory asserts that individuals with few weak ties will be deprived of information from distant parts of the social system and are thus confined to marginal information from their strong ties (Granovetter, 1973). This has significant impacts on innovation, as it diverts those nodes away from new knowledge underlying innovation. The geographic location is important to this discussion. Considering that different locations originate cultural differences, the ideas created and shared by a specific group will probably be entirely new for a network located elsewhere (Granovetter, 1983). Bearing this in mind, the author argues that weak ties between networks from different regions or countries perform an important mediating role by providing the necessary channels to knowledge and innovation diffusion, preventing the lock-in effect.

## 2.2 Brokerage

Brokers are bridges that fill in gaps or structural holes in a network, i.e. they connect nodes that would otherwise be disconnected. Thus, they have higher control and power over other nodes, as well as access to several types of resources, information, and knowledge. According to Burt (2004:349), "people who stand near the holes in a social structure are at higher risk of having good ideas" and therefore have a crucial role in the development of regional level innovation.

Individuals that act as brokers may play different roles types. Depending on where the actor lies on the path between two other actors and the type of relations with its neighbourhood, there are five possible combinations that resulting in different types of brokers, as presented in table 1. The existence of structural holes provides the opportunity to access to new and wider sources of knowledge and to control its flow within the network. Brokers are thus in powerful positions, despite having high or low centrality. They have rapid access to resources, fast dissemination of information regarding opportunities and threats, they benefit from cooperation, and are able to identify possible exchange partners and allies (Burt, 1992, Uzzi, 1996).

**Table 1:** Types of Brokers

Type of Broker	Characteristics	Graphic
<b>Coordinator</b>	Connects actors from the same group.	
<b>Consultant</b>	Connects members of the same group, but he does not belong to that group.	
<b>Gatekeeper</b>	Member of a group who is at its boundary and controls access of outsiders to the group.	
<b>Representative</b>	Controls access of his group to outside actors. He is the contact point of his group to outsiders.	
<b>Liaison</b>	Mediates the relation between two groups and does not belong to either of them.	

Source: Burt (1992)

### 3. Research Methods

This research aims to unveil the structure underlying tourism innovation networks, specifically the dynamics related to structural roles and brokerage positions occupied by tourism organisations, within tourism networked innovation processes. To achieve this, an empirical study was conducted, directed at regional organisations that are on the interface of tourism innovation.

The study was conducted in two destinations (Aveiro and Douro, Portugal), so that a comparative analysis can be made. The selected destinations are in different development stages, offer distinct tourism products, and attract different markets. Resorting to Malerba's (2005) definition of regional innovation systems and the legal composition of Portuguese Regional Tourism Boards, fifteen organisations were identified in each destination.

Data was collected by a questionnaire with the objective of gathering relational information, i.e., which organisations establish mutual ties within tourism innovation processes.

A set of metrics developed by Burt (1992) allows to understand how and why an actor's connections affect his constraints and opportunities, namely: i) the *effective size* of the network, or the number of non-redundant contacts.; ii) the *efficiency*, or the effective size divided by the number of alters in ego's network, informing whether the proportion of ego's ties to its neighbourhood is "non-redundant"; and iii) the *constraint*, which measures the extent to which ego has invested in people who have invested in other of ego's alters (Hanneman and Riddle, 2005). These metrics were computed using the software UCINET 6.

### 4. Results

In order to fulfil the research objectives, it was important to know the innovation performance of both regions.

In a complementary study, the number and type of innovations introduced by tourism firms was surveyed.

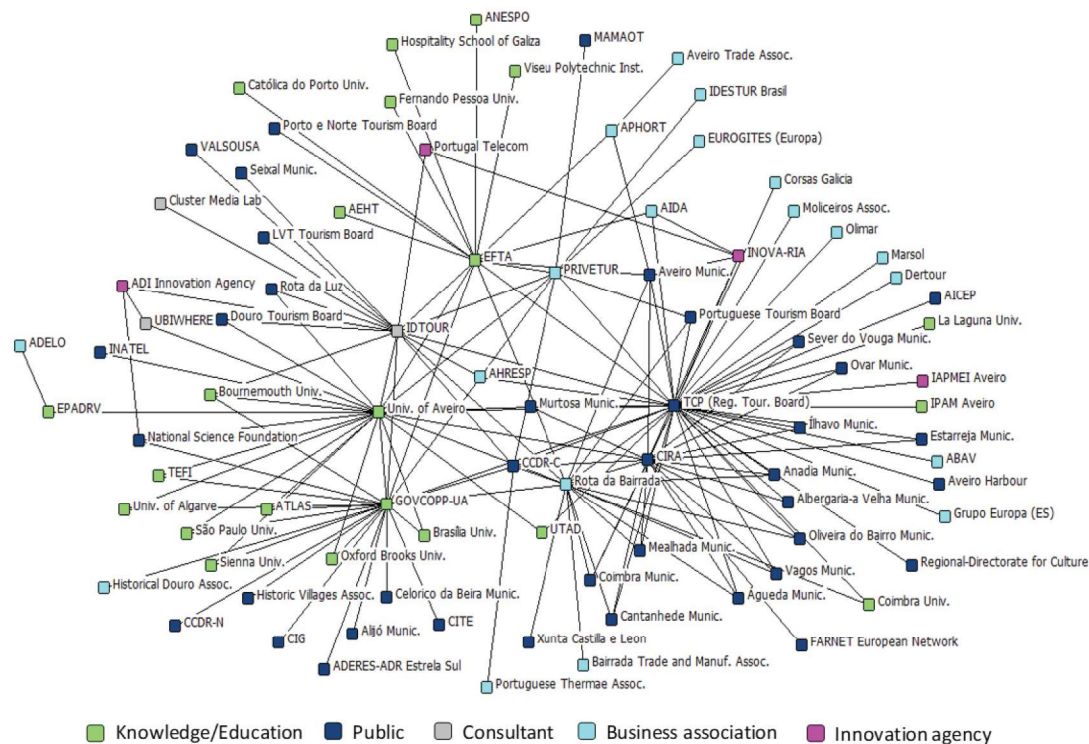
Results demonstrate that Aveiro presents a higher innovation performance, as 84.4% of the firms are innovative, against 77% in Douro. Aveiro has also a higher rate of firms developing tourism products that are entirely new to the market (56% in Aveiro; 43.7% in Douro). In the light of these findings, further conclusions regarding the structural roles and positions can be drawn.

#### 4.1 Structural holes

The analysed networks present very different structures. Aveiro's network comprises 87 actors connected by 314 ties. It has a density of 4.2% and a centralisation degree of 44.5%. It is characterised by the diversity of its actors, regarding both their geographical scope, and the type of organisations. The most central actors (those with a higher number of ties) are public organisations: the Central Portugal Regional Tourism Board (RTB), the Association of Municipalities of Aveiro (AMA), and knowledge organisations, namely the University, its Research Centre (RC), and IDTOUR (tourism spin-off), as represented in figure 4. Being the most central nodes, these actors are the most prominent in regional tourism innovation. The network of Douro includes 55 actors and 127 ties, resulting in a density of 9.2% and a centralisation of 69.2%, meaning that power is more concentrated in a few actors (those with higher centrality), which are public organisations, namely the Douro Tourism Board (DTB), the Association of Municipalities of Douro (AMD) and the North Coordination and Development Commission (decentralised body of central government for regional planning), as depicted in figure 5.



Figure 4: Sociogram of Aveiro's Tourism Innovation Network



In the innovation network of Aveiro, ten actors stand out due to their higher number of nonredundant contacts (table 2 and figure 4). The RTB, the RC and the University of Aveiro are simultaneously the most central, and the most efficient actors, which means that the impact that they are getting for each unit invested in using ties is high. Efficiency is large to the extent that an actor's alters are connected to different third parties. The efficiency of RTB is of 93%, followed by the RC with 91% and the University of Aveiro with 89%.

These ten organisations are also the less constrained actors, that is, they are endowed with a higher freedom of action within the network and lower dependence on their alters. This metric ranges from zero when the node has numerous disconnected, readily replaceable links, to one when the actor has only one effective link and hence is highly constrained. Results demonstrate that the RTB, the vocational school, RC, IDTOUR and the University of Aveiro are the less constrained actors in the network. It is also worth highlighting that there are actors that, despite not being central, have a significant role in filling structural holes and thus have important roles in the generation of regional level innovation in tourism, which are the Bairrada Wine Route, Privetur, the CCDD-C and INOVA-RIA.

In Douro, there are fewer actors presenting relevant structural holes measures when compared to Aveiro (table 3 and figure 5). Eight organisations stand out for their effectiveness. The first one is CCDD-N, with 37.2 nonredundant contacts. This actor's counterpart in Aveiro's network (CCDD-C) has a significantly lower value, with only 4.1 nonredundant contacts. These results confirm the importance of this public agency in the development of Douro as a tourism destination, especially in what relates to the support of tourism innovation based on collaboration patterns. DTB has an effective size of 34.5. However, it is more efficient than CCDD-N (0.93 against 0.91) and less constrained (0.10 for the DTB and 0.13 for CCDD-N). In the third place, with an efficiency of 0.9 and 21.7 nonredundant contacts, appears the Association of Municipalities of Douro, followed by Douro Hospitality School (effective size of 11.9 and efficiency of 0.8).

Table 2: Structural holes' measures for the tourism innovation network of Aveiro

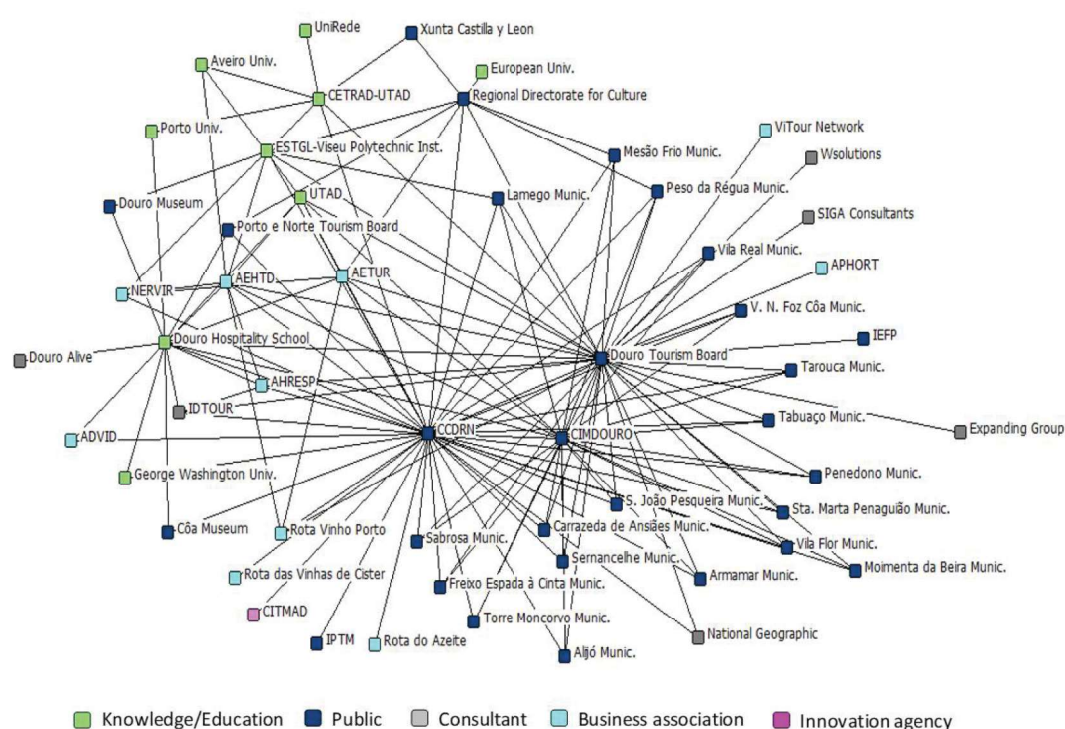
Actors	Degree	Effective size	Efficiency	Constraint
Centre Regional Tourism Board (RTB)	41	38,3	0,93	0,08
Research Centre (GOVCOPP-UA)	24	21,9	0,91	0,10
University of Aveiro	23	20,4	0,89	0,12

Association of Municipalities of Aveiro (AMA)	20	17	0,85	0,20
<b>Actors</b>	<b>Degree</b>	<b>Effective size</b>	<b>Efficiency</b>	<b>Constraint</b>
Bairrada Wine Route	19	15,3	0,80	0,16
IDTOUR (spin-off)	17	14,2	0,83	0,11
Vocational School	16	13,9	0,87	0,09
PRIVETUR (Rural Tourism Association)	10	7,8	0,78	0,15
Centre Coordination and Development Commission (CCDR-C)	7	4,1	0,59	0,19
INOVA-RIA (Innovation agency)	5	3,4	0,68	0,29
<i>Whole network</i>	<i>87</i>	<i>245</i>	<i>0,79</i>	<i>0,69</i>

The remaining organisations present inferior values, especially when compared to the actors placed at the lower places of Aveiro's ranking. The knowledge organisations do not stand out in Douro. The exception is the research unit that, despite not being very effective is, in fact, efficient, reaching 0.92 (it is important to note that an actor can be efficient without being effective, and the opposite is also true). In Aveiro, knowledge producers are within the most relevant organisations bridging structural holes.

Another interesting conclusion relates to the fact that two private business associations, namely AEHTD and AETUR seem to perform an important role at this level. Despite their lower effective size due to the reduced number of nonredundant contacts, they present an acceptable level of efficiency (respectively, 0.64 and 0.63) and of constraint (0.20 and 0.22).

**Figure 5:** Sociogram of Douro's Tourism Innovation Network



In addition to the organisations ranked as the most significant, one should highlight the role of the University of Aveiro also in the Douro network since it presents an efficiency of 0.78, which places it at the fifth position of the efficiency ranking, although it comprises a different network and plays a central role in the innovation network of a different region. Even though the analysis is not made to both networks together, it may be concluded that the University of Aveiro is at a privileged position as a broker, as it connects both networks.



**Table 3:** Structural holes measures for the Douro tourism innovation network

Actors	Degree	Effective size	Efficiency	Constraint
CCDR-N	41	37.2	0.91	0.13
Douro Tourism Board (DTB)	37	34.5	0.93	0.10
Association of Municipalities of Douro (AMD)	24	21.7	0.90	0.14
Douro Hospitality School	15	11.9	0.80	0.16
Regional Directorate for Culture	9	6.8	0.75	0.19
CETRAD-UTAD (research unit)	7	6.4	0.92	0.16
AEHTD (Association of Hotels)	10	6.4	0.64	0.20
AETUR (Tourism Firms Association)	8	4.5	0.63	0.22
<i>Whole network</i>	55	202	0.70	0.49

If the whole network structure is considered, the average results demonstrate that Aveiro is more efficient than Douro, with 79%, against 70%, respectively. This also occurs due to the effective size of both networks: Aveiro has a total of 245 nonredundant contacts, while Douro presents only 202. However, Douro is less constrained (0.49) than Aveiro (0.69), endowed with a higher freedom of action and less dependent on other actors (tables 2 and 3).

When highly connected actors present a significant effective size, they will have privileged access to new and diverse knowledge and information, which may improve innovation performance at destination level.

Subsequently, their efficiency will also reflect these conclusions, as they are probably the most efficient actors.

It is demonstrated that they are also the less constrained. These organisations have an important position and thus should play an important role in the network's innovation performance: they should assume the responsibility of disseminating the information, knowledge, and resources that they receive throughout the network, or at least assure that it flows through the proper channels until reaching the adequate receivers. For that to happen, there should be a strong internal cohesion and collaboration towards the development of innovative tourism products and services.

#### 4.2 Brokerage roles

To analyse the brokerage roles, actors should first be classified into different groups. For the purpose of this work, and considering the relevance of the territory and the embeddedness of relationships in tourism innovation, brokerage among actors from different geographical levels is analysed. Therefore, actors were classified as local; regional; national/other Portuguese regions; and international.

The local actors of the Aveiro network comprise mainly municipalities, which have a minor importance as brokers, except for the municipality of Aveiro which acts 14 times as consultant (connecting members of the same group, other than the one it belongs to). However, the most important local broker is IDTOUR (spin-off), not only for the total number of times it performs this role (224), but also because it acts as a liaison (122 times), mediating the relations between two groups and not belonging to either one of them, as a consultant (66 times), as a representative, and as gatekeeper (16 times for each). This performance places the firm as the 6<sup>th</sup> most important broker in the network.

Regional organisations comprise the most dynamic group and the most important brokers. The RTB is the most relevant, playing the five different types of brokerage, 1530 times, mainly as a liaison (428 times). Despite presenting a high value as coordinator (linking regional members), it is where it is less relevant (128 times).

The research unit and the University of Aveiro stand at second and third places acting, respectively, 502 times and 446 times as brokers. They are brokers at all five levels, being the liaison role the most relevant for both. It is, however, worth to observe that being both knowledge producers, the research unit assumes a higher importance as consultant, and the university both as gatekeeper and as representative, with 102 times for each role. Despite creating new knowledge, it is also a vehicle for the access of local and regional actors to



knowledge from outside the system. When analysing the brokerage roles of actors at national level or from other Portuguese regions, one may conclude that the majority is irrelevant. The only one that stands out is PRIVETUR, acting as liaison. Finally, international actors do not perform any role as brokers

Even though the innovation network of Aveiro includes less brokers than Douro. Douro has three or four actors that are the most relevant brokers, while in Aveiro there at least seven nodes with high importance in linking otherwise disconnected actors. Concerning the connection of actors from different geographical locations, the Central Portugal Regional Tourism Board is especially relevant in establishing relationships among local organisations and between local and regional, and local and international ones. It may be considered as the main gateway for providing new links for local tourism organisations. The research unit mainly brokers the relations among national actors and between national and international tourism organisations. On the other hand, the University of Aveiro mediates important links of regional to international actors and it also links international nodes among themselves, which places it as a very important element of access to new international knowledge and resources. AMA and the Bairrada wine route, due to their nature of association of local municipalities and firms, intermediate the relations among these actors. The spin off performs its brokerage role by connecting regional with national actors and national among themselves. The proportion of brokers in the tourism innovation network of Aveiro is lower than Douro's, as only 23% of its actors perform this role (20 nodes out of 87).

In Douro, local actors do not perform significant roles as brokers. The local group mainly comprises municipalities, which act exclusively as consultants. This means that they connect actors from regional, national, or international levels. They are in advantageous positions, as they can access new knowledge and resources from different locations, which may increase innovation levels. However, the number of connections is very low for all actors, as each one only acts as broker 2 times, except for a few municipalities that have a significant importance as tourism destinations in Douro, when compared to the overall region.

The most relevant dynamics in terms of brokerage occurs within the regional group. CCDR-N plays the five different types of brokerage 1484 times, especially as gatekeeper (368), representative (368) and consultant (346). This public agency can connect members from other geographical levels, controls the access of "foreigner" actors to regional actors and acts as the contact point of regional actors to local, national, and international actors. This organisation is, thus, at an extremely powerful position within the tourism innovation dynamics of Douro. The DTB presents a similar position by performing all five types of brokerage 1238 times. Although, the consultant role is the one that stands out (428 times), followed by the gatekeeper (260) and representative (260). It is also worth referring, at regional level, that the AMD acts as broker 496 times, mainly as consultant. The Regional Directorate for Culture, AEHTD, CETRAD, AETUR, the Polytechnic Institute and the University are also relevant brokers within the regional group.

Considering the actors that play the most relevant roles as brokers, it is interesting to understand at which geographical levels their action is more significant. DTB is especially important for the connection among local actors, between local and regional actors and between local and regional actors with international ones. CCRDN presents a very similar pattern, though it has a higher intervention in connecting regional actors among themselves. AMD acts mostly at local and regional levels, and Douro-Lamego Hospitality and Tourism Training School stands out for acting as a broker among regional actors, and of these with national and international ones.

Out of the total of 55 nodes that comprise the tourism innovation network of Douro, 37 (67, 3%) are brokers.

The brokerage type that is more played in Douro is the consultant (1178 times). It is also interesting to analyse this from a geographical perspective. Despite the lower importance of national and international nodes, they should not be despised, as they may introduce novelty and fresh knowledge in the network which, when considering the internal cohesion and density of this region, will rapidly and efficiently spread throughout the entire social structure and promote tourism innovation processes developed in cooperation.



## 5. Conclusion

The purpose of this paper was to analyse structural holes in tourism innovation networks, to identify and compare the different types of brokers, and to relate both the network structure and the individual position of tourism organisations, to the innovation performance of the destinations.

In order to do so, two distinct Portuguese destinations were studied (Aveiro and Douro). The main findings reveal that, in general, the most central actors, i.e., those assuming higher prominence in regional tourism innovation processes, are also those who perform the most significant brokerage roles. They have access to more information, knowledge, resources and exert more control and influence over other actors, as they can reach a larger number of individuals. They are also less dependent on a few specific actors. Therefore, they are in an advantageous position for knowledge acquisition and sharing and to promote collective learning, which are fundamental processes underlying innovation. It may be thus concluded that in Douro, regional tourism innovation is mainly supported by public organisations, while in Aveiro, beyond them, knowledge producers play an equally significant part.

Results also demonstrate that Aveiro is a more efficient social network as it is endowed with less redundant contacts. The investment of time and energy in creating and nurturing relations is thus well directed. This type of structure creates space for the emergence of structural holes that are occupied by brokers that inject new and fresh knowledge in the network, which reveals to be more advantageous for the development of innovation. Considering that Aveiro has a higher performance in terms of tourism innovation, it may be concluded that a larger number of non-redundant contacts and the existence of different types of brokers mediating the knowledge and information has a positive impact on the innovation performance of the destination, but also on the prominent role of these brokers that are simultaneously the most central actors. In addition, the brokerage with a significant number of international actors also brings a positive impact to networked innovation, a scenario that is particularly relevant in Aveiro when compared to Douro.

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