# Networks and Tourism: The Effect of Structures and the Issues of Collaboration

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Baggio, R. (2011). Networks and Tourism: the effect of structures and the issues of collaboration. In M. Bachinger, H. Pechlaner & W. Widuckel (Eds.), Regionen und Netzwerke: Kooperationsmodelle zur Förderung von branchenübergreifender Kompetenzentwicklung (pp. 47-62). Wiesbaden: Gabler-Springer.

*Architecture starts when you carefully put two bricks together. There it begins.*

L. Mies van der Rohe

## 1 Introduction

In the million years long history of man, language has been probably the most important technological innovation. It has given substance to a basic genetic instinct of sociality, and this unique ability to communicate led Aristotle to state (Politics, I.2, 1253a2-3): "*Hence it is evident that the state is a creation of nature, and that man is by nature a political animal. And he who by nature and not by mere accident is without a state, is either a bad man or above humanity*", which today we often summarize by saying that *man is a social animal*.

The sociality of man is expressed in many ways, normally as the pleasure to stay together and discuss, exchange ideas, or do some kind of work. Sometimes, however, this sociality assumes the characteristics of a rough confrontation. When it happens in everyday life we tend to condemn this behavior and think that quarrels, fights, or wars are abnormal and insane situations.

But the very same condition has also become an acceptable one. By assuming the name of competition, it has been put at the basis of many theories of economic and industrial development. Even with no much real support from data, logic and good sense, as some maintain (Rosenau 2003), the faith (mostly uncritical) in intense competition has become a paradigm. It is considered to be the indispensable condition driving the behavior of companies and organizations. It is conjectured to guarantee survival on the market and to allow growth by making and increasing profits. But too high levels of national or global competitiveness carry substantial costs. And destructive competition at the societal level is beginning to be associated with increasing inequality.

Our historical period is marked by the dramatic increases in the worldwide exchange of goods and services as well as by unprecedented instantaneous communication. Companies strive to understand this complicated environment, where no past experience seems to offer tools for the recognition of markets or competitors. They often feel like driving a car on a foggy day with a 50 meters visibility. They do not see the road, but they must be able to react and adapt quickly to any possible, and seemingly unpredictable, situation.

In this global business market scenario many assert that survival calls for improved productivity and increased competition. But others have started to dis-

pute these ideas. A positive outlook for this globalization process is reputed to depend on avoiding the breakdowns that might result from the spiral of destructive competition (Rosenau 2003). This is not considered any more the best way to create greater equality, to redistribute income, or to assure the stability required for a sustainable growth at the global level (Solow 2000).

Hardin, in a seminal paper (Hardin 1968), calls the competition dilemma: *the tragedy of the commons*. He refers to a situation in which multiple actors acting independently and solely and rationally on the basis of their own self-interest will ultimately destroy a shared limited resource even when it is clear that it is not in anyone's long term interest for this to happen. The best way for solving the dilemma is, as noted by Ostrom (1990), the formation of collaborative groups that frequently develop sophisticated mechanisms for decision-making and rule enforcement to handle conflicts of interest and thus manage successfully common resources. On the other hand, some economists have long argued that economic growth is caused by the collective growth of knowledge (Potts et al. 2008) and social interaction and trust are the main determinants of that inter-unit resource exchange, which has a significant effect on product innovation (Tsai & Ghoshal 1998). Creative and innovative industries live and develop in markets that today are mainly characterized in both supply and demand as (complex) social networks, the form that traditional markets are rapidly assuming (Möller & Halinen 1999).

Obviously, these considerations do not mean that competition is a negative concept per se. Competition occurs naturally between organisms coexisting in the same environment and may have many beneficial effects. The problem may arise when considering a bounded system, such as a tourism destination. In this case, excessive competitive levels lead to destructive behaviors and, in the end, bring to more shortcomings than returns (Cao 2008). A realistic level of cooperative competition is considered, instead, to be quite beneficial for socio-economic ensembles (Brandenburg & Nalebuff 1997).

No single organization is reputed to be able to possess all the resources needed to be successful by itself. There is a limit, almost a theorem that can be demonstrated, on the size an organization can attain before reaching the impossibility to be optimal and realizable in finite time (De Vany 1998). Information sharing has indisputable advantages for a community of actors, whether they are multicellular organisms, individuals or socio-economic entities (Lachmann et al. 2000). Moreover, collaborative groups of firms are much more effective and efficient than oversized companies. Therefore, social structures have a signifi-

cant impact on considering economic outcomes such as the productivity of the single or the group, the generation and diffusion of innovative products or of effective governance practices, the exploitation of resources, or the spread of implicit or explicit knowledge (Dyer & Singh 1998; Granovetter 2005). Even at an individual level, the ability to establish and develop successful relationships with other companies is thought to be an important success factor. Managing a good set of relationships is a critical factor for the achievement of economic development objectives and, as Ritter et al. write (2004:181):

> "The challenge for managers is to develop a networking ability that enables them to connect their resources to those of other actors. This development is hindered by the lack of understanding of the construct, but this does not mean that networking cannot be developed or is unimportant. We see the major challenge in cross-relational task development and in organizational development towards an open, networked firm".

## 2 Collaboration in tourism

In tourism, the value of collaboration has been stated in countless works. Coordination of cooperative activities in tourism business networks have been shown to be a prerequisite for enhancing the value creation process and building the brand identity process across the network (Perry-Smith & Shalley 2003). The known critical factors are the ability to develop and implement informational, interpersonal or decisional roles, the capacity of orchestrating and visioning the network in a way that strengthens the actors' commitment to the brand ideology, and the capability to create joint knowledge and improve the absorptive capacity in a way that facilitates high-level learning, reciprocity, receptive attitudes, and dialogic transparency. Nordin (2003) has stressed the need to develop collaboration and cooperation strategies to gain a sustainable competitive advantage and Hjalager (Hjalager 2000) has shown that a flourishing tourism destination is based, among others, on the trust in sustained collaboration and a 'community culture' with supportive public policies. These interorganizational networks, which can also be seen as composite groups of independent suppliers who link together to deliver the final product or service, are the essence of a tourism destination. Cooperative and competitive linkages in a destination are shaped by both their internal capabilities and by the effects of the external environment (Tremblay 1998).

If we agree with this vision, then a new perspective is needed. Existing notions of operative and distributive channels should be revisited through a more explicit articulation in network terms. Consequently, this requires an operationalization of the network approach to tourism by identifying the focal actors, considering the form of the network and the structural dimensions to be analyzed and by developing typologies and exploring network relationships (Pearce 2009). New models and theories are required.

Although it may look far from a practical perspective, analyzing real world phenomena, deriving models and building theories is a crucial endeavor. Only with sound theoretical frameworks, in fact, it is possible to abstract from a single case events and develop an attitude that allows caring of similar but different situations with a guarantee (for what is possible) of being able to face new conditions and to make effective decisions on how to behave.

Social and economic settings such as a region, a district or a tourism destination are archetypical complex systems. This means, essentially, that in examining these systems we expect to find a number of different components (the stakeholders), of different size and functions, connected between them in many possible ways which are typically dynamic and of nonlinear nature. The overall result is a system whose behavior is almost unpredictable and unmanageable (at least in traditional terms). It can show properties which cannot derived by simply composing the behaviors and the characteristics of its components. In some cases it is able to resist huge external shocks (e.g. natural disasters, or financial crises) without altering too much its evolutionary path, in some other cases a similar system can be completely disrupted by the consequences of some apparently insignificant event. Some stakeholder can be catalyst for incredible socio-economic growths, while in other situations similar behaviors do not have any recognizable effects (Baggio 2008; Bar-Yam 1997).

Many scholars believe this approach is able to overcome the difficulties of describing *complex* systems and to give better representations and better tools to handle the issues involved. This approach argues that the reductionist hypothesis born with the origin of modern science is limiting much of our ability to describe the real world. The methods conceived by Galileo, Descartes, Newton, and many others, are not sufficient to provide reasonable explanations for a wide number of phenomena. These ideas have contributed to set a new perspective in our view of Nature, a new view which today is known as *complexity science* (Waldrop 1992). One of the immediate consequences of this understanding is the realization that governing a complex system requires an adaptive atti-

tude, rather than a rigid deterministic, authoritarian style. It may call for the adoption of strong and well defined rules, but it definitely needs the capability to change them dynamically, reacting in short times to all the changes that may occur within the system and in the external environment (Folke et al. 2002).

If the perspective must be changed, also the tools used to analyze or predict and to control structure and behaviors of a complex system must be different from what used to be. As it is conceivable, analytic methods are quite ineffective. Methods and techniques need then to rely on model building and numerical simulations. In this way, by testing the system's reactions to different values for the model's parameters, it is possible to build evolutionary scenarios to be studied in order to derive effective ways to govern the system (Bankes 2002).

## 3 Tourism destinations as complex networks

Among the many different possible modeling methodologies, one has become, in the last years, very popular and has shown its power and trustworthiness. Based on the idea that the most relevant characteristics of a system are its components and the relationships between them, a large number of scientists, have devised a set of tools, methods and theories able to analyze and model a networked system, so that a new discipline is now active: network science (Watts 2004).

The main theoretical framework in which these investigations are embedded is the set of theories known as statistical physics (or statistical mechanics). This is one of the fundamental fields of physics, and uses statistical methods for addressing many body physical systems. A wide variety of issues, with an intrinsic stochastic nature, are treated with these methods. It provides a framework for relating the microscopic properties of individual atoms and molecules to the macroscopic properties of materials observed in every day life. Thermodynamics, and thermodynamic properties, for example, can be explained as a natural result of these methods.

The main result, and power, of this approach is in the recognition that many systems exhibit universal properties that are independent of the specific *form* (topology) of their constituents. This may suggest the hypothesis that certain universal laws may show up in many types of complex systems, whether they be social, economic or biological (Amaral & Ottino 2004). In other words, these assumptions give us the basis to justify an approach by analogy. When a simi-

larity between different phenomena may be established, it can be assumed that there exists some common underlying principle. This may be especially true where such a similarity exists between the functions of elements in different systems or between their structures. If structural relations can be reproduced in a simple form in a known environment, a mathematical model can be assembled and its results extended to a similar (unknown) system (Daniel 1955; Gentner 1983; Wigner 1960).

Using the laws and methods of physics applied to social systems can be questioned, and indeed it has been. However, it must be considered here that in studying a socio-economic system as such, we are mainly interested in its global behavior and in the possibility of making predictions at this level rather than guessing the conduct of every single element (individual actors). The objective is to understand how regularities may emerge (when they do) out of the apparently erratic behavior of single individuals (Majorana 1942). Therefore, as it happens when using traditional statistical methods, we can disregard single individuals and concentrate on the aggregate properties of the whole ensemble. A further justification can be given by making sure that these quantitative techniques rely strongly on a sound and accepted qualitative interpretation of the phenomena described.

As stated, the techniques belonging to network science are probably the most promising series of methods that can be used to study a complex system. The topology (its structural characteristics) of a network (a tourism destination network, in our case) has been found to be not just a curiosity, but a fundamental systemic property that may greatly influence the overall dynamic behavior of the system and explain and control a number of processes from the diffusion of ideas to the robustness to external or internal shocks, to the optimization of the relationships among the network components. Many complex systems can be described in terms of networks of interacting elements as nodes connected by links. A number of researchers have shed light on the topological aspects of many kinds of networks (Albert & Barabási 2002; da Fontoura Costa et al. 2007; Watts 2004). As a result, we know that the topology of a network is a knowable property and that the dynamic behavior of a networked system strongly depends on it. These investigative techniques can be considered a diagnostic method for collecting and analyzing data about the patterns of relationships among people in groups or among organizations. In the field of tourism, they provide a view into the network of relationships that may give tourism organization managers means to improve the flow of information and to target

opportunities where this flow may have a crucial impact on regulatory or business activities.

Moreover, research in other areas has maintained that a dynamic and open network can greatly influences the capabilities of a socio-economic system to express a good level of creativity and innovation, so important for its development (Schilling & Phelps 2007; Uzzi & Spiro 2005). It also provides a good resilience, the capability to resist external shocks, and improves the reaction times towards environmental modifications making it able to adapt better and more quickly. This, in a period where speed has become a paradigm, is a real big advantage, which may make the difference for the system, but also its components, between surviving and becoming extinct. As Jack Welch, former CEO of General Electric, states (GE 2001: 4): "*…when the rate of change inside an institution becomes slower than the rate of change outside, the end is in sight. The only question is when.*" The accelerating extinction of many species due to the fast modifications of their ecosystems is a lesson that needs to be learned and pondered (IUCN 2009).

## 4 The study of tourism networks: some results

The application of network science to the study of tourism destinations is relatively young. The first works have had the main objective of assessing the possibility to use these methods and to tune a methodological path which could provide both theoretical and practical outcomes. A few case studies have shown the feasibility of this approach and the interest and usefulness of the outcomes.

First of all the main topological characteristics of a tourism destination network have been measured. It has been found that a scale-free topology exist. This means that there are a few nodes with many connections, acting as hubs, and many nodes with a limited number of links. This is common to many other systems. The destinations examined have also a very low density of connections and low clusterization, that is not many communities (groups of nodes with more links between them than to other nodes of the network) can be identified (Baggio et al. 2008; da Fontoura Costa & Baggio 2009; Scott et al. 2008a). This is an important result, because weaknesses in the cohesiveness of the destination can be independently identified (Scott et al. 2008b). There is also a significant managerial implication. As discussed previously, the network approach emphasizes the need for a destination to be a collaborative environment. This can now

have a natural measure in the metrics of the destination network (Baggio 2007; da Fontoura Costa & Baggio 2009).

Network analysis methods have been applied also to the virtual network of the websites present in a destination. The results have allowed to gauge the level of utilization of advanced communication technologies and measure the usage (or the waste) of important resources, universally considered crucial in a globalized market (Baggio 2007; Baggio & Antonioli Corigliano 2009; Baggio et al. 2007). By comparing the networks of destinations considered to be at different development stages (Butler 1980) it has also been possible to correlate, although only at a qualitative level, the structural evolution of a destination with its evolutionary phase.

Important or critical stakeholders in a destination have been identified. They are located in the core of the network and form an influential assembly controlling the governance of the system. When these groups show good cohesiveness the whole system achieves better outcomes. A further confirmation for the necessity of creating interconnected communities for the production of integrated tourism experiences (Cooper et al. 2009). As expected, public stakeholders are the most important elements (Presenza & Cipollina 2009). They own the critical resources, have the highest centrality and hold the greatest legitimate authority over others (Timur & Getz 2008).

One of the advantages of a network representation is that numerical simulations can be performed with reasonable ease. They allow to conduct experiments when it would not otherwise be feasible for theoretical or practical reasons. Different configurations can be designed and several dynamic processes simulated. This allows to better understand how these configurations affect the behavior of the whole destination system.

Information and knowledge flows are relevant determinants of the system's wellbeing. Overall efficiency, innovation and development are strongly influenced by them, and the way in which the spread occurs shape the speed by which individual actors perform and plan their future (Argote & Ingram 2000). A used way to study this problem is based on an analogy with the diffusion of a disease (Hethcote 2000). Yet, differently from standard epidemiological models, it has been demonstrated that the structure of the network is highly influential in determining the basic unfolding of the process (López-Pintado 2008).

A series of simulations run on a real destination network shows, as expected, that the speed of the process varies in accordance with the capacities of the

single actors to acquire and share information. They also show, however, that the increase in speed is much higher when the modularity of the network is increased by reconfiguring the linkages (Baggio & Cooper 2010). This can be a very important suggestion for possible actions. Some more modeling coupled with qualitative estimations of the possible returns might help building of scenarios to be analyzed and discussed. The making decisions on which approach, or which mixture of approaches, to adopt might therefore be much better supported.

When pushing for more collaborative attitudes, some knowledge of the self-organization tendencies of the destination system is crucial. As known, in fact, a forced evolution, when dealing with a complex adaptive system is destined to fail in the long term. The self-organization characteristics will tend to prevail and the system will go back to its original, natural evolutionary path (Kauffman 1995; Nicolis & Prigogine 1977). It is like forcing a river into a different artificially created path. We know, and in many cases for having experienced devastating events, that sooner or later the river will go back to its original track.

A modularity analysis can help understanding these issues. A module, or community, in a network is a group of nodes having denser links between them than towards other parts of the network. This effect can be measured with a specific measurement (the modularity coefficient). It can be calculated for a predetermined partition of the network into modules, or by using a stochastic algorithm which will find the network subdivision which maximizes it for the given network (Clauset et al. 2004; Girvan & Newman 2002).

In a destination, traditionally, we divide the stakeholders into communities by type of business (hotels, restaurants, attractions, intermediaries etc.) of by geographic location. Q has been measured in this way for a sample destination and compared with the value obtained after having used a stochastic algorithm (Baggio et al. 2009; da Fontoura Costa & Baggio 2009). The results tell us that the modularity of the network is very low, which was expected, and that Q calculated from the algorithm is significantly higher than the others. In other words, the system has, although not extensive or significant, a distinct modular structure. The topology generated by its degree distribution produces a certain level of self-organization which, however, goes beyond pre-set differentiations (by geography or type) of the stakeholders.

Again, putting all these results together more reliable scenarios can be designed and the policy setting activities of those governing the destination can quite improve the probability to achieve the desired results.

## 5 A concluding remark

In this contribution two main themes have been discussed. Both strongly related. The first one concerns our view of a socio-economic system such as a tourism destination (but the considerations made can easily be extended to other systems). It has been argued that a systemic view, based on complexity science, is more effective than the traditional approaches when studying the system in order to gather the knowledge needed to intervene on it with governance purposes.

This has been done, in the recent past, by starting a research path aimed at adapting and tuning network scientific methods to the analysis of tourism destinations. Beyond any obvious intellectual appeal, these have proved, even in an initial exploratory phase and in a limited number of cases, to be powerful tools also for practitioners, and specifically for those in charge of some kind of governance responsibilities.

The second issue discussed regards an important aspect of building a destination. The need to improve collaborative attitudes among the different stakeholders. Much has been said on this topic and innumerable studies have been conducted discussing all the possible aspects and eventually showing the advantages of collaboration or cooperation.

As a final comment it may be useful to cite the work by Ingram & Roberts (2000). They analyze a group of hotels, probably the most harshly competitive environment existing today. The authors describe their informal collaborative atmosphere and state (p.387):

> "Friendships with competitors can improve the performance of organizations through the mechanisms of enhanced collaboration, mitigated competition, and better information exchange. Moreover, these benefits are best achieved when competing managers are embedded in a cohesive network of friendships (i.e., one with many friendships among competitors), since cohesion facilitates the verification of information culled from the network, eliminates the structural holes faced by customers, and facilitates the normative control of competitors."

The conclusion that the performance effects of friendship are substantial might look just as one more addition to the wide collection of studies of the kind. This time, however, the authors go a little further and give a *monetary value* to this effort (p. 471):

> We also calculated the magnitude of the effect of cohesion among a hotel's competitors. […] In total, the observed friendship network augmented the annual revenue of the 40 hotels we studied by roughly $70 million. Assuming friendships had the same effect for the 11 hotels not included in our analysis, the total annual benefit to the international segment of the Sydney hotel industry approximates $90 million, or roughly 15% of total revenue. These striking figures give new concreteness to the concept of social capital by confirming that friendships add substantially to the bottom line of business organizations.

A quite convincing argument, beyond any 'ethical' consideration.

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