When the growth is driven by technology transfer: different organizational search path in the Italian wine industry

Marco Visentin
Università di Bologna
Department of Management
Via Capo di Lucca, 34
40122 Bologna
Italy
Tel.: +39 051 209 80 59
e-mail: marco.visentin@unibo.it

When the growth is driven by technology transfer: different organizational search path in the Italian wine industry

Abstract

The aim of this work is to provide empirical evidence of a diffusion process of a template across firms within a network of technological experts. The context of the analysis is represented by the population of premium winemakers in Italy. A dramatic crisis in the '80 triggered an industry re-definition involving distinct combinations of exploitation, exploration and replication behaviours. The population of firms evolved with the population of technological experts as a community of experts. In order to capture this coevolution, this study firstly develops a network model representing the diffusion of templates along inter organizational ties; secondly it identifies determinants and outcomes of organizational behaviours. including core/periphery and centrality scores in a Poisson regression If past history of firm has now passed by, this work proposes possible strategic directions for the future.

Introduction

This work analyzes current organizational behaviours and identifies their sources in the different combinations of past search paths, resources allocation and the level of embeddedness within a network of firm and technological experts.

The population of firms considered is represented by a specific group of Italian winemakers: the winners, for at least two times from 2001 to 2005.of a quality rating award, namely *tre bicchieri* by Gambero Rosso, This choice is consistent to the fact that firms in this industry benefit from the association to some aspect related to the product or production process: in this way firms maximize the utility under less restrictive financial and profit claims (Scott Morton & Podolny, 2002). This industry is characterized by a significant convergence of the mental models of decision makers, through typically non-economic legitimating mechanism, along an inter-organizational process of diffusion of a template driven by the mobility of oenologists (Owen-Smith & Powell, 2004; White et al., 2004; Scott Morton & Podolny, 2002; DiMaggio & Powell, 1983). This process has been triggered by an industry crisis during the '80 that acted as a tipping point (White et al., 2004; Gladwell, 2003) and it explains the coevolution of the population of firms and the community of technological experts, namely the oenologists.

The aim of this paper is to identify the mobility of oenologists as one of the key factors allowing information to flow across organizations boundaries (Wezel et al., 2006; Song et al., 2003; Almeida & Kogut, 1999). The connection processes among firms developed following the network evolution (Powell et al., 2007; White et al., 2004; Ahuja, 2000). This process has allowed the adoption of a process innovation, overcoming local resistances of cognitive and emotional nature, involving a prevalence of experience learning (Baum & Ingram, 2002; Winter & Szulanski, 2001; Amburgey & Miner, 1992; DiMaggio & Powell, 1983; Miller & Friesen, 1980). In this way firms were able to resolve the uncertainty associated to the imitation of the only visible action (Baum & Ingram, 2002; Levitt & March, 1988; Levinthal & March, 1993). The diffusion of the innovation occurred through a mechanism of replication of a template that was initially exported from a limited number of knowledge tanks by oenologists through their mobility among firms (Song et al., 2001; Winter & Szulanski, 2001; Almeida & Kogut, 1999; Nelson & Winter, 1982). Contrary to the empirical evidence given by most studies in literature, this study considers a non institutionalized context, providing

evidence of a knowledge diffusion process in the *open market* (Baum & Ingram, 2002; 1998; Ingram & Baum, 1997; Jaffe et al., 1993).

Current organizational behaviours appear to be different conduits of search which combine exploitation, exploration and replication, to the outcome of past search paths. The practice, however, considers current organizational model inadequate to compete in the immediate future as well. So, if it is true that what determined in the past the ability of firms to recover the managerial and cultural gap with the best competitor – namely the French wine sector– is now history (Barney, 1991), this study proposes implications to compete in the future.

The contribution of this study is twofold. It provides empirical evidence of an inter organizational contagion phenomenon leading the diffusion of a template which, through local and global mechanism of tipping point and feedback (White et al., 2004), converged into a shared mental model. Through this approach it is possible to recover the dynamic of the coevolution of the group of firms and of the professional community of oenologists. Secondly the empirical analysis allows us to determine the nature of the search organizational behaviours. These behaviours may be taken back to different combinations of resource endowment, local context and experience or expertise.

In this paper we first review the relevant literature, than a description of the context and available data is given. It follows the empirical analysis performed by estimating a Poisson regression model (Grun & Leisch, 2007; Leisch, 2004). We finally discuss how results provide deeper insight about the diffusion process, the understanding of past strategic paths, and how our analyses lead to managerial implications to compete in the future.

Literature Review

The academic research situates the different organizational behaviours as embedded into a network of economical and non economical relationships (Owen-Smith & Powell, 2004; White et al., 2004; Granovetter, 1992; DiMaggio & Powell, 1983). Consistently, this paper will analyse the literature concerning the adoption of innovations among firms and the diffusion process of templates, in relation to the network in which the organization is placed (Yalcinkaya et al., 2007; Wezel et al., 2006; Mahajan et al., 1995; Nelson & Winter, 1982). The literature does not provide a shared definition of the object of the transfer, talking about knowledge, template, best practices, organizational architectures or forms, and high level routines (Wezel et al., 2006; Reagans & McEvely, 2003; Winter & Szulanski, 2001; Argote & Ingram, 2000; O'Dell et al., 1998; Szulanski, 1996; Rogers, 1995; Kogut & Zander, 1992; Nelson & Winter, 1982). Therefore we will use the corresponding term used by authors in analyzing the scientific contributions but we will refer to the concept of template according to the meaning of Winter & Szulanski (2001) or Nelson & Winter (1982) in developing our analysis. Among the several factors determining the way of knowledge transfer, the paper will analyze geographical and local factors (e.g.: Cattani et al., 2003; Jaffe et al., 1993), initial conditions (e.g.: Song et al., 2003; Baum & Ingram, 2002), the individual mobility and the alliances (e.g.: Rothaermel & Deeds, 2004; Song et al., 2003; Baum & Ingram, 2002; Jaffe et al., 1993). Finally it will analyze the marketing and development of new products literature in order to shape the process and determine its dynamics.

Organizational search path and the network

The network of people and organizations is an essential component of the market and it can provide an effective interpretative key for identifying and understanding the way in which competitive, economic and social factors combine to determine the growth, survival or fail of firms (Owen-Smith & Powell, 2004; Cattani et al., 2003; Baum & Ingram, 2002; Granovetter, 1992; Polanyi et al., 1971). Networks varies among organizations and involve different levels of organizational behaviours analysis including reciprocal structuring effects of relational

typologies and institutional fields (Rosenkopf & Almeida, 2004; White et al., 2004; Gulati & Gargiulo, 1999; Granovetter, 1992). Organizational behaviours are embedded in non economic institutions and the structure of the networks is determined by the coevolution of behaviours at a micro level and processes of connection (White et al., 2004; Polanyi et al., 1971). Moreover, according to White et al (2004), the evolution can be taken back to the dynamics of feedback and tipping point which make only partially recognizable to the actors of the network the emersion of particular structure. The literature does not provide an univocal outcome about the relationship between the position or the level of embeddedness in a network and the benefits or ties rising from them. From the one hand strong ties, characterized by trust and information exchange, may lead to incremental performances (Larson, 1992; Uzzi, 1997), and a centrality position associated with many connections may be facilitative (Almeida et al., 2003; Reagans & McEvely, 2003; Almeida, 1996). On the other hand weak ties may give access to new information (Hansen, 1999; Burt, 1992; Granovetter, 1992; 1973). In this line, the theory of structural holes (Burt, 1992) states that open social structures can produce efficiency and brokerage advantages, but Coleman theory of network closure (1988), on the contrary, states that benefits can rise from a closed network which produce confidence and cooperation among members. The embeddedness of the firm within a network of relationships was yet analyzed by Valente (1995) in order to understand the dynamics of diffusion and adoption of innovations; the recent literature instead focuses attention on the role of mobility of individuals among firms in an inter organizational learning process (Wezel et al., 2006; Kogut and Zander, 1992), or on the impact of the firm's location on its performance (Ahuja, 2000).

In order to understand the way through which firms select a strategic path and what determines the process of organizational search (Rosenkopf & Almeida, 2003; Baum & Ingram, 2002; March & Olsen, 1976), it is convenient to analyze factors affecting the organizational level. The search process can be shaped by social and political interests within homogeneous groups of firms in which the ties among them can create the organizational equivalent of empathy, confidence and altruism (Uzzi, 1996; 1997). In order to reduce the causal ambiguity and uncertainty of the context, firms may engage social comparisons about the characteristics of other firms and their visible actions (Levitt & March, 1998; Levinthal & March, 1993). The comparison with other firms can provide information about their own identity and competitive attitude as well as their own capability and adequacy of a selected course of actions (DiMaggio & Powell, 1983). In this way, a convergence of context can be reached determining a convergence of common beliefs on how and who to compete with (Porac et al., 1995; Dollinger, 1990; Zucker, 1977). The shared definition of competitors and the market boundaries stabilize and the key competence of firms, strategies and rules of the competitive game become identifiable and decipherable.

At the individual level the literature analyzes the cognitive mechanisms of decision makers to understand the factors that lead to the choice of a given search path. The risk aversion (Kahneman & Tversky, 1975) can determine a preference for exploitation paths instead of exploration ones. Partnering solution choices can be determined by a self-reinforcing bias (Amburgey & Miner, 1992; Miller & Freisen, 1980): the results of a past search path are the natural starting point for new searches (Dosi, 1982; Nelson & Winter, 1982). Furthermore the attention of decision makers, affected by the context, can determine the selection of a specific search process (Almeida et al., 2003; Baum & Ingram, 2002; Jaffe, 1986; March & Olsen, 1976). Finally, organizational search in geographical and technological proximity leads to knowledge acquisition than can be more easily recognized and managed by members and organizational routines (Rosenkopf & Almeida, 2003).

The empirical research provides evidences on the combination of these factors. A tendency to inertia may be limitative, while the exploration of technological and geographical areas may

lead to more impacting innovations (Rosenkopf & Nerkar 2001). Jaffe et al. (1993) analyzed patents citations and showed that firms and university tend to acquire knowledge from other geographically proximate, probably because these organizations establish many relational ties of different nature within these areas (Rothaermel & Deeds, 2004; Almeida & Kogut, 1999; Saxenian, 1990). However the ability of turning to the outside in order to obtain new ideas, insights and experience, is determined by the experience, expertise, technological and geographical factors, location and initial conditions (Cattani et al., 2003; Rosenkopf & Nekar, 2001; Song et al., 2003; Jaffe et al., 1993; Stuart & Podolny, 1996; Kogut & Zander, 1992). The local context has not only a geographical nature, but it is also represented by the embeddedness in a network of relationships (Lomi, 2000; Greve, 1999; Saxenian, 1990).

Diffusion of innovation and knowledge transfer
A key point for the development of this analysis lies in observing that in the replication of a template it is possible to find some aspects analogous to the diffusion of innovation or technologies within populations of organizations or in the transfer of best practices among organizations (Winter & Szulanski, 2001; O'Dell et al., 1998; Cool et al., 1997; Szulanski, 1996; Rogers, 1995; Valente, 1995).
It is important to distinguish two theoretical dimensions for the analysis of the dynamics of information flows across firms boundaries. A first dimension runs form institutionalized to non institutionalized contexts, along a continuum from open-market to the selling point of the same chain. A second dimension considers both firm and individual level factors that are facilitative or not facilitative.
Song et al. (2003) and Almeida & Kogut (1999) register a significant increasing tendency to cite patents by semiconductor firms when they hire an engineer. Wezel et al. (2006) note that the literature often analyzes the transfer of templates or routines without further explaining the outcome and considering a simple and indirect relation between mobility of individuals and knowledge flows. A relevant point, however, lies in the social capital that individuals carry with them when moving from a firm to another. On the same line of reasoning, literature fails to indicate the extent to which an individual by moving to another organization can replicate routines that are only partially dependent on him (e.g.: Nelson & Winter, 1982). Routines, or behavioural templates, should be distinguished in operative and high-order routines to acknowledge that high-order routines have a socially constructed nature that transcends individuals. Routines are embedded in the cognitive, behavioural and social aspects of organizations, and their replication depends on the extent to which individuals are institutionally embedded in the organizations they leave (Wezel et al., 2006; Kogut & Zander, 1992; ; March, 1994; 1991; Levitt & March, 1988; Nelson & Winter, 1982).
Winter & Szulanski (2001) and Baum & Ingram (2002) consider replication processes in institutionalized contexts. However even in institutional contexts a successful replication of a template requires the ability to recreate complex, partially tacit and not perfectly understood processes that are to be implemented by human resources that are different at any replication (Winter & Szulanski, 2001; Nelson & Winter, 1982).
The literature on alliances contributes to our study in evidencing the need of a degree of empathy and familiarity between partners, as a condition for the transfer of mainly tacit practices (Rothaermel & Deeds, 2004; Baum & Ingram, 2002; Gulati & Gargiulo, 1999; Stuart & Podolny, 1996). In general the need of social relation is a precondition for the diffusion of tacit knowledge as knowledge about the governance of new organizational forms or the knowledge about the state of the art. This knowledge tends to be sticky and firms are reluctant to transfer it (Taylor & Greve, 2006; Song et al., 2003; Kogut & Zander, 1992; Szulanski, 1996).

Even if geographical and local characteristics, initial conditions, may be facilitative, the mobility of individuals or more in general the mediating role of typically non economic variables in the process of knowledge transfer represent a crucial dimension in the understanding of imitation and replication processes (White et al., 2004; Cattani et al., 2003; Song et al., 2003; Baum & Ingram, 2002; Beverland & Lindgree, 2002; Scott Morton & Podolny, 2002; Almeida & Kogut, 1999; Baptista & Swann, 1998; Jaffe et al., 1993).

At firm level, the dimension of the firm may be informative. Small firms can use local experience to take better decision on the useful knowledge (Baum & Ingram, 2002) and large firms may suffer bureaucratic rules and apply acquired knowledge even where it could be improper (Greve, 1999; Baum & Ingram, 1998).

Relevant for our work is the analysis of the diverse combinations of exploitation and exploration that characterize organizational search paths. Kyriakopulos & Moorman (2004) note that these two paths are intended by the literature as competing strategies. Too much emphasis on exploitation can lead to the adoption of sub optimal routines, while too much emphasis on exploration may determine high developing costs without the opportunity to benefit of new routines. The one strategy may be limitative for the other one (March, 1991), and firms that are engaged in pursuing both of them are viewed as lacking of focus or internal fit (Benner & Tushman, 2003; Miller & Friesen, 1980). However firms tend to find an equilibrium between exploration and exploitation (Ozsomer & Genturk, 2003; Brown & Eisenhardt, 1997; Levinthal & March, 1993; March, 1991).

Firms can rapidly grow through a strategy based on a sequence of exploration and exploitation following a process that evolves through each replication (Winter & Szulanski, 2001; Bradach, 1998; Love, 1995; Schultz & Yang, 1997). It is important to analyze the perspective that takes back the development of the central idea to the reduction of causal ambiguity (Lippman & Rummelt, 1982) in a process of interaction with the empirical evidence that converges, along the replications, to a template (Nelson & Winter, 1982). Even if the literature is characterized by a certain degree of deliberation and institutionalization of the knowledge diffusion, the idiosyncratic characteristic of locations, the specificity of knowledge of individuals involved in the replication, and the causal ambiguity related to the success of replicates, it is possible to establish an analogy with the diffusion of innovation or transfer of best practices among firms (Giuliani and Bell, 2004; Dalitz, 2004; O'Dell et al., 1998; Cool et al., 1997; Szulanski, 1996; Rogers, 1995). From this perspective a relevant contribution is given by the literature on the development of new products (Taylor & Greve, 2006; Rothaermel & Deeds, 2004; Garcia et al., 2003; Hansen, 1999) that explicitly takes under consideration the extent to which new product or marketing programmes take place within the repertoire of past activities to determine success.

The empirical context and the structure of replication

The empirical context of this study is given by the population of firms defined by those winemakers that won the *tre bicchieri* award for at least two times between 2001 and 2005. To define this sampling rule we used information from the two most authoritative wine guides in Italy, namely *I Vini d'Italia* by *Gambero Rosso* and *I Vini di Veronelli* (Negro et al., 2007; Odorici & Corrado, 2004). This rule allows us to take into account two specific aspects of the industry. First, as Scott Morton & Podolny (2002) point out, in many markets, including professional sport teams, newspaper, art gallery and wineries, firms may benefit from a form of identification with some aspects of the product or the production processes and, in case, accepting lower profits. For example quality-oriented firms may maximize the utility coming from the association with the product under weaker financial claims on the firm constraints. Moreover, in this industry decision-makers mental models converged through typically non-economic mechanisms of legitimization (Owen-Smith & Powell, 2004; White et al., 2004;

Rosenkopf & Almeida, 2003; Scott Morton & Podolny, 2002;). Coherently, the correct perspective to analyze performances is to consider wine guides rating. Second, the wine industry in Italy is fragmented (source: ISTAT data on 1990 and 2000 census) and, as we will verify through the analysis organizational and production dimensions are not over-dispersed. Our sampling rule allows us to overcome fragmentation biases and to select a relatively stable population of firms representing the superior and most recognized Italian winemakers.

In the early '80 the wine industry in Italy was typically based on a commodity business model. The *methanol crisis* in 1986 determined the instant fall of production, internal consumption and export (source: FAOSTAT data) and it determined the urgency for a deep change in organizational and production processes starting form managerial competences. The industry crisis started off a re-definition of the industry and institutional context through an initial appearance of competitive dynamics and social structures not easily recognized by actors (White et al., 2004; Gladwell, 2003; Lippman & Rumelt, 1982; Pfeffer & Salancik, 1978). It is the opinion of professional experts in the wine sector (source: personal interviews) that the evolution of the Italian wine industry is the outcome of a casual process triggered by the methanol crisis of the 1986. From a recent work by Negro et al. (2007), is possible to recover the opinion of key winemakers of the *Langhe* region in the north-west of Italy. These *Barolo* and *Barbaresco* producers explicitly take back the forces that determined the industry re-definition to the great amount of uncertainty that followed the crisis. The complexity of production processes and the ample margins of discretion allowed by *disciplinary di produzione* (Negro et al., 2007) precluded to firms the possibility to confront uncertainty and causal ambiguity by the sole imitation of visible actions of competition (Levinthal & March, 1993; Levitt & March, 1988).

From our perspective therefore, the understanding of the industry development should analyze how the public policies modifications, including the receipt of European Union prescriptions, the cultural debate around the identity of wines and winemakers (Negro et al., 2007; Scott Morton & Podolny, 2002), the concomitant development of the professional community of oenologists, determined a process of continuous reorganization of the field involving economic and non-economic organizations in the industry (Polany et al., 1971).

Before the crisis, in some region as for example *Piemonte, Friuli* and *Alto Adige*, there existed some superior winemaker. In these regions we observed a minor mobility of oenologists. This effect may be taken back to local resistances due to rooted and proud identities (White et al., 2004; Owen-Smith & Powell, 2004; Scott Morton & Podolny, 2002; Winter & Szulanski, 2002). In other region the typical production up to early '90 was mainly based on a commodity production characterized by un-bottled and low-quality wines. In these contexts there not existed a successful business model and the causal ambiguity and uncertainty of current business model was amplified by the crisis. Identity, core capabilities and information about how to choose among possible course of actions, have been obtained from social comparisons (Negro et al., 2007; Baum & Ingram, 2002; DiMaggio & Powell, 1983; Haunschild & Miner, 1977).

In this context the social network determined by the mobility of oenologists was crucial to shape and to direct information flows among firms and individuals (Owen-Smith & Powell, 2004; Lee et al., 2003). Up to the early '90 there were in Italy few professional oenologists. They operated as individual, they where internationally recognized and their professional activity was not institutionalized (Consorte, 2007). The oenologists as a professional community developed from the '90 along a institutionalization process that gave rise to professional schools, organizations and standards determined by the Italian law.

It is possible to identify some organizations that were involved in exploration paths before the crisis. These organizations played the role of knowledge tanks or repository (Conner & Prahalad, 1996; March, 1994; Conner, 1991) from which, in our model, the diffusion of the

template started off. The high level of legitimacy of these firms allowed the acceptance of the new technology and practices to the other organizations as long as it determined the perception of the new business model as an adequate solution to the uncertainty of the context (Lippman & Rumelt, 1982; Haunschild & Miner, 1977).

Some firm initially tried to adapt the products to comply with the taste of American buyers and importers. Moreover in the '80 some winemaker explored the use of the French oak *barrique* to refine and age wines in the cellars. Other producers independently explored diverse growing techniques for grapes, as Elio Altare a notable Barolo producer that started to thin grape bunches provoking astonishment and misunderstanding among the other producers in his region (Cernilli, 2007). Finally some other winemaker, as Angelo Gaja did, introduced continuous innovation in production processes, drastic prune of grapes or vintages not realized due to scarce quality of grape (Steinberg, 1996).

The other producers, at the beginning of this process, faced various difficulties to find ideas, insights from the outside. For these winemakers the oenologists played a role similar to the one of *agriculture extension agents* in US in the '50 (Giuliani and Bell, 2004; Dalitz, 2004). Oenologists allowed the transfer of new production models in a context characterized by a lack of social legitimacy of practices and in which decision makers were not able to evaluate their adequacy. Oenologists created the organizational equivalent of trust, empathy and altruism bonds (Uzzi, 1996; 1997): the task to stop producing low quality and high quantity wines and to start a quality oriented production of wine was too complex to be accepted and implemented by the majority of Italian winemakers of the '80.

We hypothesize that scarce cognitive or emotive resistances within firms determined a mere replication of the business model involving little adaptation to the local context. Similarly, when stronger individual resistances were acting against the change, the role of the oenologist was of a local tipping point that activated exploration search paths of diverse nature and with diverse outcomes. It is possible to find an analogy with the model proposed by Winter & Szulanski (2001), and extend it to an open market, i.e. not institutionalized, context. In this context a continuous tension between exploration and exploitation involved individuals and organizations in the field in shaping the evolution and diffusion of the business model.

The first analysis of this study is given by the representation of the business model evolution and diffusion process through a network model. The population of winemakers and the community of oenologists coevolved along 20 years of industry growth following a co-structuring process (Owen-Smith & Powell, 2004; White et al., 2004). In this dynamic it is possible to recognize some aspect conceptually analogous to the diffusion of innovation or technologies within populations of organizations, or to the transfer of best practices across organizational boundaries (Katona & Zubcseck, 2007; Winter & Szulanski, 2001; Lewin et al., 1999; O'Dell et al., 1998; Cool et al., 1997; Szulanski, 1996; Rogers, 1995): as long as the contagion drives the diffusion of an epidemic, it drives the diffusion of innovations (Cattani et al., 2006).

The industry crisis, namely the methanol scandal, happens in 1986 while systematic data on firms date to 1991 when the standards of collection and filling of wine guides reached the present form.

The high level of initial causal ambiguity related to the correct solution to overtake the crisis and the difficulty to imitate visible action of competitors determined the growth of information flows across organizational boundaries (Lippman & Rumelt, 1982; Haunschild & Miner, 1977). These information flows have been driven by oenologists mobility, and may be appropriately represented by the conceptual model of the network (Katona & Zubsceck, 2007; Shaikh et al., 2006; White et al., 2004; Owen-Smith & Powell, 2004; Moldoveanu & Baum, 2000). The consequent diffusion dynamics from the adoption of the early templates took place in a not institutionalized context showing strong path-dependency.

In our model we use the collaboration of an oenologist of al least one year with a firm as a proxy of the replication of the template in the firm. This allows us to use objective data on mobility to model the process of diffusion. To reduce the arbitrariness of this measure we administered personal semi-structured interviews to key informants of a non systematic subsample of the population of firms under analysis. We experienced a reluctance of firms in delivering information about their business and their history, consistently with idiosyncratic characteristics of this industry (Negro et al., 2007; White et al., 2004; Scott Morton & Podolny, 2002). The first part of the interviews involved control check gathering information comparable with data from wine guides. The semi-open question on the role of the oenologist have been codified using standard multiple blind techniques. This process was integrated with opinion of professional experts in the industry, and converged to indicate the difficulty to imitate visible action from competitor (Levitt & March, 1998; Levinthal & March, 1993) and the prominent role of oenologists in both supporting the change of business model and transferring the knowledge to improve it.

Wine guides systematically register the name of the oenologist that operates within each firm at any year during the analyzed period of time. At any time during this period it is possible to represent the mobility of oenologists using a network $G(V, E)$ in which the vertex set V is defined as the set of 287 firms of our population, and the edge set E corresponds, for two given winemakers $v_1, v_2 \in V$ a not oriented bond $e = \{v_1, v_2\}$ defined by an oenologist that collaborate with both the two firms for at least one year in the past. At the end of the period under analysis the resulting network can be depicted as in Figure 1 below.

--- put Figure 1 about here ---

The sequence of network entries can be represented by the sequence $N_1 \subseteq N_2 \subseteq \cdots N_T \subseteq V$ of subsets of the vertex set. $N_1 \subseteq V$ represents the set of winemakers that at time t_1, corresponding to year 1991 showed a collaboration with a same oenologist. At any time t of the sequence it is defined a set N_t of connected vertex and a set E_t of edges between couples of vertex. At a conceptual level, from a first point of view, at a given instant it is likely that some firms in the population decide to autonomously try and imitate the behaviour of successful competitors. This could satisfy the need of legitimacy (DiMaggio & Powell, 1983). On the other hand, local interaction generates positive feedback and the adoption of a template may be dependent on the frequency of adoption by others (Cattani et al., 2003). Literature distinguishes a frequency-based (DiMaggio & Powell, 1983) and a trait-based imitation process (DiMaggio & Powell, 1983; Haunschild & Miner, 1977). This process determines the convergence of mental models to common beliefs on the meaning and appropriateness of organizational structures, practices, strategies, actions and relational networks (Baum & Ingram, 2002; Levitt & March, 1988; Zucker, 1997). This process facilitates intraorganizational imitation giving decision makers the ability to interpret information about competitors and their behaviour. Furthermore this process legitimates a new organizational form when the associated template or architecture gains social recognition (Scott Morton & Podolny, 2002; Meyer & Rowan, 1977).

Determinants and outcomes of organizational search paths
In this section we model the behaviour of the 287 firms through a Poisson analysis. We use network position coefficients with relation to the series $G(V_t, E_t)$ of networks defined in the previous section. This allows us to recover the evolution of the network of oenologist and firms, and to use this data in explaining heterogeneity in performances. Due to our model, heterogeneity can be taken back to behavioural sequences.

Available data refers to quality rating awards, geographical location, dimensions, and network position, centrality and embeddedness along the period from 1991 to 2005. As previously noted, industry characteristics suggest to use quality rating awards as dependent variable. To recover the temporal dynamic of the process we define, for any firm i its performance $y_{i,t}$ at time $t = 2001,...2005$ as the number of quality award obtained between 2001 and time t. Consequently we decided to use a Poisson model, and to estimate the model with an Expectation and Maximization algorithm (Leish, 2004; Wedel & DeSarbo, 1995). Formally, if X_i is the vector of covariates for firm i and c is the vector of coefficients, the Poisson model can be defined as in equation (1) below:

$$P(Y_i = y_i) = \frac{(e^{-\gamma_i} \gamma_i^{z_i})}{z_i!} \text{ with } \gamma_i = \exp(\underline{c} \cdot \underline{X}_i) \tag{1}$$

If firm i exhibited the series of performances $\{y_{i,t}\}$ where $y_{i,2}$ is, as an example, the number of awards gained up to 2002, than the *history* $H(\{y_{i,t}\}, \underline{X}_{i,t})$ of firm i is defined by the join likelihood associated to equation (1), that is:

$$H(\{y_{i,t}\}, \underline{X}_{i,t}) = \prod_{t=1}^{5} P(\underline{c} \mid \{y_{i,t}\}, \underline{X}_{i,t}) \tag{2}$$

Equation (2) is well defined because $\{y_{i,t}\}$ are independent over i and t because of the blind tests that produced the quality awards.

The complete likelihood, i.e. equation (2) jointly over i is defined by equation (3):

$$L(\underline{c}, \underline{\pi} \mid X, Y) = \prod_{i=1}^{287} H(\{y_{i,t}\}, \underline{X}_i) \tag{3}$$

Analysis of results
We estimated the following models:
- *model 1*: it is an intercept model. This is the base model for the analysis;
- *model 2*: in *model 2* we consider the variable *bicchieri_o* accounting for past performances (Rosenkopf & Almeida, 2003; Dosi, 1982). *bicchieri_o* records therefore the performance along the 5 years preceding the analysis;
- *model 3*: *model 3* is obtained from *model 2* by accounting for experience and expertise (Song et al., 2003; Rosenkopf & Almeida, 2001; Jaffe et al., 1993; Stuart & Podolny, 1996; Saxenian, 1994; Nelson & Winter, 1982). A first dummy variable *barrique* reports the use of *barrique* (Negro et al., 2007) as indicated in wine guides. This variable assumes value 1 the first time guides report the use of barrique for the considered firm. Variable *docNO_DOC* is a dummy variable indicating the use of a certification for the origin of grapes. Variables *when* and *age* respectively rappresent the time the firm accessed the network and the age of the firm (Gielens & Dekimpe, 2007);
- *model 4*: it is obtained from *model 3* adding degree, indegree and betwennes (e.g. Houston et al., 2004; Wasserman & Faust, 1994; Freeman, 1979; Lin, 1976). Indices appear with a linear and with a quadratic term to test a possible U- or inverse U-shaped effect of the network. Each indices refer to the network $G(V_t, E_t)$ at time t. A

further variable takes measures if at any time the firm is isolated or connected to some other firm;

- *model 5*: is obtained from *model 4* by adding a variable accounting the geographical location. Due to its relevance for the business (Torres, 2004; Beverland & Lindgree, 2002) this variables has been defined as the administrative region of the firm and, when defined, the administrative region has been replaced with the peculiar production location as indicated by institutional certification. The variable resulted in 54 factors.

We also tested on available data the effect of organizational and production dimension (Baum & Ingram, 2002; Baum & Ingram, 1998; Greve, 1999) finding no significant effect. Due to the margins given by *disciplinari di produzione* (see Negro et al., 2007 for details) we didn't consider the harvested dedicated to a given wine as indicative. Consequently we used the whole dimension as reported by wine guides. The non significant effect of dimensions (and ratios considering the number of bottles over the harvested hectares) was expected because, as explained by Scott Morton and Podolny (2002), in this context firms benefit from other effects than financial constraints.

The estimate of models 1-5 is reported in Table 1:

-- put Table 1 about here --

The exploration of table (1) allows us to assess *model 4* as best combination of variables. Model 5 indeed reports better fit indexes but to reach a little gain in likelihood maximum it uses 54 variables (53 degree of freedom) corresponding to the variable related to geographical location. Therefore we chose model 4 as it is the most performing and parsimonious. Estimated coefficients of model 4 are presented in Table 2:

-- put Table 2 about here --

In Table 2 estimates are all significant. As expected previous performance of firms has a positive and significant impact on current performance. Experience and expertise coefficients positively impact on performance (variable *docNO_DOC* is 1 when the certification of origin is not used). The impact of *age* has a magnitude near to the age of permanence in the network (as measured by variable *when*) but is scarcely significant. This is consistent to the observed entry of young firm into the population. During the period under analysis, some notable new firm began to produce wine and, in virtue of their entrance in the network, it gained a successful position in the industry. In short, there is over dispersion in the age of firms, and the relation with performance is weak.

From table 1 is clear that the use of network indexes is able to explain a relevant quota of variance in performances. In detail the variable *is.isolate* indicates weather or not a firm is isolate in the network and the estimated coefficient is significant and relevant in terms of magnitude when compared to other indexes in table 2. Betweennes relation to performance is significantly negative linear from table 2. This means that the control of resources and knowledge flows does not leads to superior performance. Prestige and Degree centrality scores show a significant U-shaped relation with performance indicating a polarization of the effect of the position in the network.

Discussion and Conclusions

The analysis of coefficients in Table 2 confirms a prominent role of the network effects on performances. It should be noted that the performances are indeed sequences of performances, what in this work we call behaviours. Furthermore network indexes and performance

measures are synchronous in order to capture the dynamic of the network evolution resulting in the network of Figure 1. The explained variance gained by using the network indexes in the model coherently with the significance and magnitude of the variables indicating the used technology and the scarce value of the age of firms, may be interpreted as a strong effect of social legitimacy on behaviours. This means that the concept of *good wine* has not been determined on the basis of a deliberate marketing campaign, but emerged as social construction. This proves that our model indicates a strong convergence of mental models of actors, economic and non economic, to a shared idea on products, production processes, and legitimacy. This process, by definition of the model of our paper, is represented by the coevolution of the community of oenologist and the population of firms in the industry. Moreover the structure of network indexes shows that the knowledge necessary to compete can be acquired entering the network.

Finally, the strong effect of the location, showed by the gain in explained variance of behaviours in table 2, enforces the results of the study of Scott Morton and Podolny (2002) indicating major benefit of firms in the industry from the identification with product attributes rather than the brand. This result is consistent with the label strategy of products that privileges the indication of the grape and of the location. This could be a problem in competing in an international context because Italian wine has to find a way to communicate to the market the value of regional brands, with some notably exception as, for instance, *Sassicaia* or *Barolo* or *Chianti*. The lack of brand distinctiveness could be a problem for the domestic market too, given the problematic nature of product characteristics for consumers. Moreover the knowledge that originates the competitive advantage of firms in the population of this study, is now shared among a large number of oenologists and firms. This could be problematic for sustaining competitive advantage in an industry that counts more than 2000 producers of good wine, as indicated by wine guides. Firms should now dedicate a significant effort to exploration as a strategy rather than just try to replicate the current model and locally exploit it.

Tables and Figures

	Model 1	Model 2	Model 3	Model 4	Model 5
logLikelihood	-2622,4	-2445,7	-2429,4	-2285,1	-2230,7
AIC	5246,8	4895,4	4870,8	4596,1	4593,5
Gained Variance	0	6,7	7,4	12,9	14,9

Table 1: goodness of fit index for equation (3)

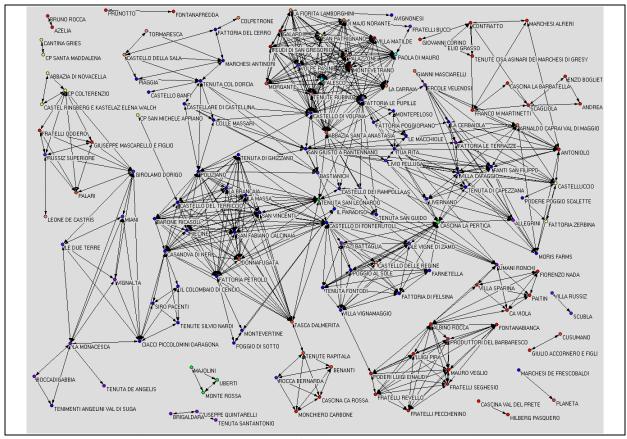|	Estimate	Std, Error	z value	Pr(>|z|)	
(Intercept)	-0,14082	0,08427	-1,67110	0,09471	.
bicchieri_o	0,13626	0,00421	32,37830	0,00000	***
barrique	0,21046	0,03110	6,76680	0,00000	***
docNO_DOC	-0,19604	0,03604	-5,43990	0,00000	***
when	0,02616	0,00431	6,07120	0,00000	***
age	0,02325	0,01314	1,77020	0,07669	.
bet	-0,00019	0,00007	-2,77270	0,00556	**
I(bet^2)	0,00000	0,00000	1,94730	0,05150	.
pres	-0,02546	0,00176	-14,49310	0,00000	***
I(pres^2)	0,00023	0,00001	18,33860	0,00000	***
degree	-0,01332	0,00514	-2,59470	0,00947	**
I(degree^2)	0,00048	0,00012	3,96470	0,00007	***
is.isolate	-0,21369	0,05587	-3,82500	0,00013	***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1					

Table 2: Estimation of model 4

Figure 1: The network of winemakers and oenologists

References

Ahuja, G. (2000) *Collaboration Networks, Structural Holes, and Innovation: A Longitudinal Study*, Administrative Science Quarterly, 45, 425-455

Almeida, P. (1996) *Knowledge sourcing by foreign multinationals: Patent citation analysis in the U.S. semiconductor industry,* Strategic Management Journal, 7, 155-165

Almeida, P., Dokko, G., Rosenkopt, L. (2003) *Startup Size and the Mechanism of External Learning: Increasing Opportunity but Declining Usefulness?,* Research Policy, 32, 302-315

Almeida, P. & Kogut, B. (1999) *Localization of Knowledge and the Mobility of Engineers in Regional Networks*, Management Science, 45(7), 905-917

Amburgey T.L. & Miner A.S. (1992) *Strategic Momentum: The Effect of Repetitive, Positional and Contextual Momentum on Merger Activity*, Strategic Management Journal, 13, 335-348

Argote, L. & Ingram P. (2000) *Knowledge transfer: A basis for competitive advantage in firms*, Organizational Behaviour Human Decision Processes, 82, 150-169

Baptista, R. & Swann P. (1998) *Do firms in clusters innovate more?*, Research Policy, 27, 525-540

Barney J.B. (1991) *Firm resources and Sustained Competitive Advantage*, Journal of Management, 17, 99-120

Baum J.A.C. & Ingram P. (1998) *Survival-enhancing learning in the Manhattan hotel industry, 1898-1990*, Management Science, 996-1016

Baum J.A.C. & Ingram P. (2002), *Interorganizational Learning and Network Organization: Toward a Behavioural Theory of the Interfirm*, in March J. G. & Augier M. (Eds.) *The Economics of Choice, Change, and Organization. Essays in the memory of Richard M. Cyert*, Cheltenham UK: Edward Elgar

Benner M.J. & Tushman M.L. (2003) *Exploitation, Exploration and Process Management: The Productivity Dilemma Revisited*, Academy of Management Review, 28(2), 238-256

Beverland, M. & Lindgreen, A. (2002) *Using Country of Origin in Strategy: The important of Context and Strategic Action*, Journal of Brand Management, 10(2), 147-167

Bradach J.L. (1998) *Franchise Organizations*, Boston MA: Harvard Business School Press

Brown S.L. & Eisenhardt K.M. (1998) *Competing on the Edge: Strategy as Structure Chaos*, Boston: Harvard Business School Press

Burt R.S. (1992) *Structural Holes. The Social Structure of Competition*, Cambridge MA; Harvard University Press

Cattani G., Pennings J. M., Wezel F.C. (2003) *Spatial and Temporal Heterogeneity in Founding Patterns*, Organization Science, 14, 6, 670-685

Cernilli D. (2007) *20anni di Vini. I migliori d'Italia*, Roma: Gambero Rosso

Coleman J.S. (1988) *Social Capital in the Creation of Human Capital,* American Journal of Sociology, 94, 95-120

Conner K.R. (1991), *A historical comparison of resource-based theory and five schools of thought within industrial organization economics: Do we have a new theory of the firm?*, Journal of Management, 17: 121-154

Conner K.R & Prahalad C.K. (1996), *A resource-based theory of the firm: Knowledge versus Opportuninsm,* Organization Science, 7, 5, 477-501

Consorte M. (2007, ed.) *Annuario dell'associazione enologi enotecnici italiani,* Milano: Assoenologi

Cool K.O., Dierickx I. & Szulanski G. (1997) *Diffusion of innovations within organizations: Electronic switching in the Bell System, 1971-1982,* Organization Science, 8, 543-559

Dalitz, R. (2004) *System and extended absorptive capacity in the Australian wine industry,* actKM Online Journal of Knowledge Management, 1, 1

DiMaggio P.J. & Powell W.W. (1983) *The Iron Cage Revised: Institutional Isomorphism and Collective Rationality in Organizational Fields*, American Sociological Review, 48, 148-160

Dollinger, M. J. (1990) *The evolution of collective strategies in fragmented industries*, Academy of Management Review, 15, 266-285

Dosi, G. (1982) *Technological paradigms and technological trajectories: A suggested interpretation of the determinants and directions of technical change*, Research Policy, 11, 147-162

Dyer, J. H. (1996) *Specialized supplier networks as a source of competitive advantage: evidence from the auto industry*, Strategic Management Journal, 17, 271-291

FAOSTAT, http://faostat.fao.org

Freeman, L.C. (1979) *Centrality in Social Networks I: Conceptual Clarification*, Social Networks, 1, 215-239

Garcia R., Calantone R.J. & Levine R. (2003) *The Role of Knowledge Allocation to Exploration Versus Exploitation in Technologically Oriented Organizations*, Decision Sciences, 34(2), 323-350

Gielens K. & Dekimpe M.G. (2007) *The Entry Strategy of Retail Firms into Transition Economies*, Journal of Marketing, 71(April), 196-212

Giuliani, E. & Bell, M. (2004) *When micro shapes the meso: Learning networks in a Chilean wine cluster*, SPRU Electronic Working Paper Series, 115

Gladwell M. (2003) *The Tipping Point: How Little Things Can Make a Big Difference*, Back Bay

Granovetter M.S. (1973) *The Strength of Weak Ties*, American Journal of Sociology, 78, 1360-1380

Granovetter M.S. (1992) *Economic Institutions as Social Constructions: A Framework for Analysis*, Acta Sociologica, 35(1), 3-11

Greve H.R. (1999) *Branch System and Nonlocal Learning in Organizational Populations* in Miner A.S. & Anderson P.C. (Eds.) *Advance in Strategic Management*, 16, 57-80

Grün B. & Leisch F. (2007) *Fitting Finite Mixtures of Generalized Linear Regressions in R,* Computational Statistics and Data Analysis, 51(11), 5247-5252

Gulati R. & Gargiulo M. (1999) *Where do Interorganizational networks come from?*, American Journal of Sociology, 104, 1439-1493

Hansen M.T. (1999) *The search-transfer problem: The role of weak ties in sharing knowledge across organizational subunits*, Administrative Science Quarterly, 44, 82-111

Haunschild P.R. & Miner A.S. (1977) *Models of interorganizational imitation: the effects of outcome salience and uncertainty*, Administrative Science Quarterly, 42, 472-500

Holz, G. (2004) *An Individual level diffusion model carefully derived from the Bass model*, working paper, University of Osnabrueck

Huston M., Hutt M., Moorman C., Reingen P.H., Rindfleisch A., Swaminathan V. &Walker B. (2004) *A network perspective on marketing strategy performance* in Moorman C. & Lehmann D. (Eds.) *Assessing Marketing Strategy Performance*, Cambridge, MA: Marketing Science Institute, 247-268

Ingram P. & Baum J. (1997) *Chain Affiliation and the Failure of Manhattan Hotels*, *1898-1980*, Administrative Science Quarterly, 42(1), 68-102

ISTAT, http://www.istat.it

Jaffe, A. B. (1986) *Technological opportunity and spillovers of R&D: Evidence from firms' patents, profits and market value,* American Economical Review, 76, 984-1001

Jaffe, A. B., Trajtenberg, M., Henderson, R. (1993) *Geographic Location of Knowledge Spillovers as Evidence by Patent Citations*, The Quarterly Journal of Economics, 108(3), 577-598

Jindal, R. P., Reinartz, W., Krafft, M., Hoyer, W. D. (2007) *Determinants of the variety of routes to market*, International Journal of Marketing Research, 24(1), 17-29

Kahneman D. & Tversky A. (1975) *Prospect Theory: an analysis of decision under risk*, Econometrica, 263-291

Kyriakopulos K. & Moorman C. (2004) *Tradeoffs in marketing exploitation and exploration strategies: The overlooked role of market orientation*, International Journal of Research in Marketing, 21, 219-240

Katona, Z. & Zubcsek, P. P. (2007) *Joining the Network: Personal Influences as Determinants of Diffusion*, Working Paper

Kogut, B. & Zander, U. (1992) *Knowledge of the firm, combinative capabilities, and the replication of technology*, Organization Science, 3(3), 383-397

Larson (1992) *Network dyads in entrepreneurial settings: A study of governance of exchange relationships*, Administrative Science Quarterly, 37, 76-104

Lee J., LeeJ, & Lee H (2003) *Exploration and Exploitation in the Presence of Network Externalities*, Management Science, 49(4), 553-570

Leisch F. (2004), *FlexMix: A General Framework for Finite Mixture Models and Latent Class Regression in R*, Journal of Statistical Software, 11(8)

Levinthal D.A. & March J.G. (1993) *The myopia of Learning*, Stategic Management Journal, 14, 94-112

Levitt B. & March J.G. (1988) *Organizational Learning*, Annual Review of Sociology, 319-340

Lewin A.Y., Long C.P. & Caroll T.N. (1999) *The evolution of new organizational forms*, Organization Science, 10(5), 535-550

Lin, N. (1976). *Foundations of Social Research*. New York: McGraw Hill

Lippman S. & Rumelt R. (1982) *Uncertainty imitability: An analysis of interfirm differences in efficiency under competition*, Bell Journal of Economics, 13, 418-438

Lomi A. (2000) *Density Dependence and Spatial Duality in Organizational Founding Rates: Danish Commercial Banks, 1846-1989*, Organization Studies, 21(2), 433-461

Love J.F. (1995) *McDonald's: Behind the Arches* (Rev. ed.), New York: Bantam Books

March J.G. (1991) *Exploration and Exploitation in Organizational Learning*, Organization Science, 2, 71-87

March J.G (1994), *A Primer on Decision Making*, The Free Press, New York

March J.G. & Olsen J.P. (1976) *Ambiguity and Choice in Organizations*, Bergen Norway: Universitesforlaget

Miller D. & Friesen P.H. (1980) *Momentum and Revolution in Organizational Adaptation*, Academy of Management Journal, 4, 591-614

Moldoveanu M.C. & Baum J.A.C. (2000) *An inter-temporal computational model of firm network dynamics*, Academy of Management national meeting, Toronto, Ontario

Negro G., Hannan M.T., Rao H. & Leung M.D. (2007) *No* Barrique*, no* Berlusconi*: Collective Identity, Contention, and Authenticity on the making of Barolo and Barbaresco Wines*, draft

Nelson, R. R. & Winter S. G. (1982) *An evolutionary theory of economic change,* Belknap Press of Harvard University Press, Cambridge, MA

O'Dell C.S., Grayson C.J. & Essaides N. (1998) *If Only We Knew What We Know: The Transfer of Internal Knowledge and Best Practices*, New York: Free Press

Odorici V. & Corrado, R. (2004) *Between Supply and Demand: Intermediaries, Social Network and the Construction of Quality in the Italian Wine Industry*, Journal of Management and Governance, 8(2), 149-171

Ozsomer A. & Genturk E. (2003) *A resource-based Model of Market Learning in the Subsidiary: The Capabilities of Exploration and Exploitation*, Journal of International Marketing, 11(2), 1-29

Owen-Smith J. & Powell W.W. (2004) *Knowledge Networks as Channels and Conduits: The Effects of Spillovers in the Boston Biotechnology Community*, Organization Science, 15(1), 5-21

Payan, J. M. & McFarland, R. G. (2005) *Decomposing Influenc Strategies: Argument Structure and Dependence as Determinants of the Effectiveness of Influence Strategies in Gaining Channel Member Acceptance*, Journal of Marketing, 69(2), 66-79

Pfeffer J. & Salancik G.R. (1978) *The External Control of Organizations*, New York: Harper & Row

Polanyi K.C., Arensberg C & Pearson H. (1971, Eds) *Trade and Market in the Early Empires; Economies in History and Theory*, Chicago, Henry Regnery Company

Porac J.F., Thomas H., Wilson F., Paton D. & Kanfer A. (1995) *Rivarly and the Industry Model of Scottish Knitwear Producers*, Administrative Science Quarterly, 40, 203-227

Powell, W. W., White, D. R., Koput, K. W., Owen-Smith, J. (2007) *Network Dynamics and Field Evolution: The Growth of Interorganizational Collaboration in the Life Sciences*, Journal of Sociology (forthcoming)

Reagans, R. & McEvely, B. (2003) *Network Structure and knowledge transfer: the effects of cohesion and range*, Administrative Science Quarterly, 48, 240-267

Rogers E. (1995) *The Diffusion of Innovation*, 4th ed. New York: The Free Press

Rosenkopf L. & Almeida P. (2003) *Overcoming Local Search Through Alliances and Mobility,* Management Science, 49(6), 751-766

Rosenkopf L. & Nerkar A. (2001) *Beyond Local Search: Boundary-spanning, Exploration, and Impact in the Optical Disc Industry,* Strategic Management Journal, 22, 287-306

Rothaermel F.T. & Deeds D.L. (2004) *Exploration and Exploitation Alliances in Biotechnology: A System of New Product Development*, Strategic Management Journal, 25(3), 201-221

Saxenian A. (1990) *Regional networks and the resurgence of Silicon Valley,* California Management Review, 33(1): 89–111

Schultz H. & Yang D.J. (1997) *Pour your heart into it: How Starbucks Built a Company One Cup at a Time*, New York: Hyperion

Scott Morton F.M. & Podolny J.M. (2002) *Love or Money? The effects of owner motivation in the California Wine Industry*, The Journal of Industrial Economics, L(4), 431-456

Shaikh N. I., Rangaswamy A., Balakrishnan A. (2006) *Modeling the diffusion of innovations through small-world networks*, working paper

Song, J., Almeida, P., Wu, G. (2003) *Learning-by-Hiring: When Is Mobility More Likely to Facilitate Interfirm Knowledge Transfer*, Management Science, 49(4), 351-365

Steinberg E. (1996) *The Making of A Great Wine: Gaja and Sorì San Lorenzo*, Pbk Ed Editions

Stern L. & El-Ansary A. (1988) *Marketing Channels*, Englewood Cliffs NJ: Prentice-Hall

Stuart, T. E. & Podolny J. M. (1996) *Local Search and the evolution of technological capabilities*. Strategic Management Journal, 17, 17-38

Szulanski, G. (1996) *Exploring internal stickiness: Impediments to the transfer of best practice within the firm*, Strategic Management Journal, 17, 27-43

Taylor, A. & Greve, H. R. (2006) *Superman or the Fantastic Four? Knowledge Combination and Experience in Innovative Teams*, Academy of Management Journal, 49(4), 723-740

Torres, O. (2006) *The Wine Wars*, Palgrave

Uzzi B. (1996) *The Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network* Effect, American Sociological Review, 61, 674-698l

Uzzi B. (1997) *Social Structure and Competition in Interfirm Networks: The Paradox of embeddedness*, Administrative Science Quarterly*, 42, 35-67*

Valente T.W. (1995) *Network Models of the Diffusion of Innovation*, Cresskill NJ: Hampton Press

Wasserman, S., & Faust, K. (1994). *Social Network Analysis: Methods and Applications.* Cambridge: Cambridge University Press

Wedel M. & DeSarbo W.S. (1995) *A mixture likelihood approach for generalized linear models*, Journal of Classification, 12, 21-55

Wezel F.C., Cattani G. & Pennings J.M. (2006) *Competitive Implications of Interfirm Mobility*, Organization Science, 17(6), 691-709

White D.R., Owen-Smith J., Moody J. & Powell W.W. (2004) *Network, Fields and Organizations: Mycro-Dynamics, Scale and Cohesive Embedding*, Computational & Mathematical Organization Theory, 10, 95-117

Winter S.G & Szulanski G. (2001) *Replication as Strategy*, Organization Science, 12(6), 730-743

Yalcinkaya G., Calantone R.J. & Griffith D.A. (2007) *An Examination of Exploration and Exploitation Capabilities: Implications for Product Innovation and Market Performance*, Journal of International Marketing, 15(4), 63-93

Zucker L.G. (1977) *The role of institutionalization in cultural persistence*, American Sociological Review, 42, 726-742