

Public-Private Institutions as Catalysts of Upgrading in Emerging Market Societies

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ABSTRACT

This article argues that the ability of a firm to access a variety of knowledge resources, and in turn upgrade its products, depends on being tied not simply to any or many organizations and institutions but rather to those that act as social and knowledge bridges across previously isolated producer communities. Through a multi-method analysis of the recent transformation of the Argentine wine industry, we highlight how distinct governance rules for new government support institutions can anchor their multiplex, cross-cutting network qualities, which underpin their ability to provide improved collective resources and reshape the ties between firms.

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Since the late 1990s, scholars of international management and economic development have increasingly argued that the competitiveness of emerging market countries depends often on the ability of their firms to upgrade – combine existing resources in new ways to create new higher value products (Giuliani, Pietrobelli & Rabellotti, 2005; Song, 2002). In drawing on evolutionary theories of the firm, this research emphasizes that product upgrading emerges in large part from a firm's access to a variety of knowledge resources (Fleming, 2001; Moran & Ghoshal, 1999). But it is less clear what types of institutions and public policies facilitate such access.

A growing current in the management literature argues that access to knowledge depends often on whether firms are embedded in rich inter-firm networks, which enable them to build collaborative relationships, gain resources, learn, and coordinate experiments (McEvily & Marcus, 2005; Powell, Koput, & Smith-Doerr, 1996). However, scholars also note how the stickiness of past firm practices, social structures, and institutions are slow to change and can constrain one's access to new knowledge resources (Spencer, Murtha & Lenway, 2005; Uzzi, 1996).

This enabling and constraining nature of embeddedness resonates strongly in emerging market countries (Spicer, McDermott & Kogut, 2000), and especially Latin America, where societies are often noted for their weak institutions and social capital (Henisz & Zelner, 2005). But researchers tend to argue that firms fail to learn and adapt because they are trapped in societies with long histories of weak associationalism and low densities of economic and social organizations (Putnam, Leonardi, & Nanetti, 1993; Schmitz, 2004).

In contrast, an often overlooked intersection between research on networks, organizational fields, and historical institutionalism understands the dual nature of embeddedness in terms of the structure and composition of organizational networks (Granovetter, 2002; Knoke, 2001; Campbell, 2004). For instance, both policy and network scholars have noted how the very inter-organizational networks and their attendant norms that can promote cohesion among firms within

a certain community can also thwart broad-based upgrading by restricting firm access to knowledge beyond the community (Lin, 2001; Locke, 1995; Ostrom, 1999; Safford, 2007; Uzzi, 1996). Conversely, researchers have illustrated how particular institutional characteristics of an industry or region can relieve such constraints. For instance, Safford (2007) and Zuckerman & Sgourev (2006) show how certain voluntary civic and industry associations facilitate learning because of their ability to create horizontal or cross-cutting ties between firms from different social and geographic communities. McEvily & Zaheer (1999) and Owen-Smith and Powell (2004) have that government support institutions (GSIs), such as public research institutes and training centers,¹ help firms access new knowledge because their mandates to provide collective resources, broadly disseminate their findings, and collaborate with firms from distinct localities.

We build on this stream of research by arguing that product upgrading depends on a firm being tied not simply to any or many organizations and GSIs, but rather to those that act as social and knowledge bridges across distinct producer communities and in turn offer firms access to a variety of knowledge resources. In particular, we highlight the ways in which governments can alter the trajectory of product upgrading not simply through largess or market liberalization but by constructing a new set of GSIs with a variety of previously isolated, even antagonistic, stakeholder groups. To the extent that GSIs are constituted with rules of inclusion and participatory governance for relevant public and private actors, they can anchor new multiplex, cross-cutting ties between producer communities that underpin their ability to provide firms with a new scale and scope of services and facilitate new problem solving relationships between them. That is,

¹ This article focuses on the heterogeneity of organizations and institutions in a region. For the sake of simplicity, we refer to a GSI as any institution that receives at least partial government funding, has government actors participating in its governance and program evaluation, and provides firms with specific services. This definition follows research on government support of industries (Campbell, 2004; Knoke, 2001; Thelen, 2003). Below we distinguish further between different types of GSIs, schools, and associations.

governments can reshape the structure and composition of organizational fields, and in turn, knowledge flows, by instigating the creation of new public-private institutions that recombine existing social and knowledge resources in new ways and at different levels of society (Campbell, 2004; Stark & Bruszt, 1998; Thelen, 2003).

We advance this argument by analyzing the transformation of the Argentine wine sector in the two neighboring, dominant winemaking provinces of Mendoza and San Juan. On the one hand, Argentina is a country better known for its dysfunctional social capital and institutions, while its wine industry has a long history of backwardness and virtually no international presence. On the other hand, the Argentine wine sector witnessed a dramatic turnaround in the 1990s and now accounts for almost 3 percent of the over \$14 billion global wine market. Mendoza has led this change, pioneering a new constellation of institutions and inter-firm networks that appears to have facilitated wide spread product upgrading. San Juan, in contrast, remained a laggard, despite its numerous firms, high density of associations, and policies that ushered in new investment. In turn, this setting allows us to investigate in detail the types of institutional mechanisms that help firms access a variety of knowledge resources and learn.

Our analysis employs both qualitative and quantitative methods. The first section gives an ethnographic, theory driven comparison of the evolution of policies and industry restructuring in San Juan and Mendoza during the 1990s. Barriers to upgrading appear rooted in the social fragmentation between producer communities. Mendoza overcame such barriers by creating new GSIs with distinct governance principles that helped improve firms' access to a variety of resources by acting as social and knowledge bridges between the communities. The second section begins our quantitative analysis, presenting testable hypotheses about the impact of the composition of a focal firm's network on its level of product upgrading. The third section describes our methods and unique cross-sectional data set based on our 2004-05 field survey of

wineries in the two provinces that allows us to decompose a focal firm's network into different types of organizations.² Although we do not claim to present definitive, linear causality, our research design combines the strengths of comparative qualitative and statistical analyses to capture configurative causation – the plausibility of certain policies reshaping the organizational and institutional factors that significantly impact firm level product upgrading (O'Mahony & Ferraro, 2007; Ragin, 1987; Uzzi, 1996). Finally, we discuss our statistical results. The evidence suggests that firms which have more numerous ties to other firms and particularly Mendoza's new GSIs will have higher levels of product upgrading than those tied to other types of organizations. These mediating firms and GSIs have particular value because of their centrality and bridging qualities, in turn offering focal firms access to a variety of knowledge resources.

NETWORKS, INSTITUTIONS, AND THE CHALLENGE OF UPGRADING

“[Argentina] is one of the biggest wine success stories in the past decade.” *Wine Spectator*, October 31, 2007.

Argentina is historically one of the largest volume producers of wine in the world, and for decades through the 1980s production focused on low-quality wine and grapes for the domestic market. By the end of the 1990s, the industry had undergone a profound transformation, with wine exports growing from a few million dollars in 1990 to over \$480 million in 2004 (Azpaizu & Basualdo, 2003). These gains came especially from consistent advancements in product quality and innovation. Argentine vineyards significantly increased the varieties of high enological value grapes from 20% of vine surface area in 1990 to about 43% by 2001 (Cetrangolo *et al.*, 2002). Wine quality improved, with 85% of wine exports coming from fine wines sold in sophisticated, competitive markets like the United States and the European Union. Argentine wineries were increasingly ranked among the world's elite, particularly for their ability to produce a variety of

² Most research on emerging markets focuses on single cases, fails to capture firm-level upgrading, and relies on inter-personal relationships (Giuliani *et al.*, 2005; Giuliani & Bell, 2005).

new products, such as previously undervalued varietals, “redesigned” varietals from other regions of the world, and distinctive blends.³

Mendoza became the leader of this transformation, charting a path of innovation in the 1990s that was remarkably different from both its own past and its neighbor, San Juan, despite their common, unproductive histories (Centrangolo *et al.*, 2002; Ruiz & Vila, 2003). Mendoza and San Juan account for roughly 60% and 30%, respectively of the country’s wine production. But the former’s share of wine exports is over 90% and the latter’s only 6%. Analyses showed that improvements in product quality and vineyard conversion were both more widespread and advanced among firms in Mendoza than those in San Juan by the late 1990s. Indeed, even a number of firms from zones (sub-regions of Mendoza, like the *Zona Este* and *Zona Sur*) historically viewed as backward and with substandard climates were becoming industry leaders.⁴

But just how Mendoza became a leader in broad based product upgrading is less clear. Following Schumpeterian and evolutionary theories of the firm, we view product upgrading as a particular form of innovation, in which firms focus on the creation of new products for higher value by incrementally and iteratively experimenting with new combinations of existing material and natural inputs (Giuliani *et al.*, 2005; Schmitz, 2004; Moran & Ghoshal, 1999). As Fleming (2001) has argued, this process of recombination is fraught with technological and market uncertainties, demanding that firms gain knowledge and expertise to convert different types of inputs into specific products, to assess the reliability of suppliers, and to learn which types of products can gain traction in different market niches in the short and long run. While firms gain

³ Details on the prominence of Argentine wines in world markets and their unique product innovations can be found in Centrangolo *et al.* (2002); “La amenaza a las viñas chilenas,” *El Mercurio*, Nov. 2, 2005; and the lengthy annual reviews of Argentine wines in *Wine Spectator* (December 15, 1997; March 24, 2003; November 30, 2004; November 30, 2005).

⁴ For instance, by 2002 wineries in the *Zona Este* accounted for a third of the province’s wine exports, and over 55% possessed modern quality control systems. (McDermott, 2007)

experience from their own in-house activities and human capital, they access a variety of raw and applied knowledge through their peers, customers, and suppliers as well as via non-market actors, such as trade associations and government support institutions (GSIs) that provide training or R&D services (Owen-Smith & Powell, 2004; McEvily & Zaheer, 1999).

Such a view of product upgrading is widely embraced in studies of developing countries in general and wine in particular (Aylward, 2003; Giuliani & Bell, 2005; Perez-Aleman, 2005; Roberts & Ingram, 2002; Swaminathan, 2001). Upgrading in wine takes several years, beginning with transforming the middle segments of the value chain: state-of-the-art quality control and product development running from careful vineyard maintenance to flawless harvests to fermentation and blending. Enologists work closely with agronomists and growers to introduce, evaluate, and document experiments with new methods of growing and fermentation for different types of varieties and clones. Because of the variation in climates and soils, experimentation is contextualized and knowledge is often tacit, posing barriers to dissemination and application elsewhere. In turn, to accelerate product upgrading, wineries gain a variety of market and applied technical knowledge from other firms as well as collective resources housed in industry associations, schools, and GSIs.

Such coordination and relational-based upgrading is not necessarily forthcoming, however, especially for firms embedded in volatile environments with limited resources and fragmented industry structures. Developing countries, such as Argentina, are widely known for their lack of collective knowledge resources, weak markets, and limited state capacities (Doner, Ritchie & Slater, 2005; Schmitz, 2004). Moreover, in both provinces there are over 100 micro-climates supporting a wide variety of high value grapes and thousands small producers, which typically supply 30-50% of a winery's needs. Mendoza and San Juan still have over 680 and 170 wineries, respectively, which range from many small and medium family firms to some cooperatives and a

few large diversified corporations. Industry concentration remains low by international standards, with over three hundred wineries now exporting.⁵ Although diversity and a decentralized industry structure can be sources of innovation and rivalry (Porter, 1990), they can also undermine the social relationships that underpin inter-firm experiments, the sustained provision of collective resources, and the wide-spread diffusion of new practices (Jacobs, 1984; Saxenian, 1994).

Explaining Divergent Upgrading Paths – Endowments versus Embeddedness Traps

Given the coordination problems associated with product upgrading, our comparison of the two transformation paths focuses on two related questions that link the mechanisms of upgrading with broader policy problems of development. How were a broad set of firms able to upgrade their products and exploit variety rather than being paralyzed by it? What types of new institutional mechanisms were created to help firms access a variety of knowledge resources and learn?

Two common views of development often rely on the determinate power of different inherited economic and social endowments in enabling or constraining the ability of a region to innovate. The first view argues that innovative capacities emerge in region with superior natural and economic resources once an insulated government imposes on society a new set of rules based on high powered economic incentives, be they based on market liberalization or state intervention (Haggard & Kaufman, 1995). The second view argues that upgrading is likely to occur in societies historically rich in networks and the attendant social capital that are enduring and manifested in

⁵ On the variety and decentralized structure of wine and grape production, see Cetrangolo *et al.* (2002), Ruiz & Vila (2003) and McDermott (2007). As of 2003, there were still over 16,000 vineyards in Mendoza and 6,000 in San Juan; 90% had less than 25 hectares; in Mendoza the largest 18 vineyard owners control only 5% of vineyard surface area, and about 1100 owners control 50%. About 90% of exporting wineries are in Mendoza. As of 2004, the top five firms accounted for 40% of wine export sales and the top 20 for about 70%, far lower concentration than in Australia and Chile. About 45% of the wineries in our own data base have at least 10% of sales coming from exports. Nonetheless, one should not equate export sales with product upgrading, since the former is biased by firm size and volume; the latter is a more fine-tuned indicator of innovation ability, regardless of size and volume.

the relative density of associations and cooperatives as well as pre-existing coherent public policies (Putnam *et al.*, 1993; Schmitz 2004). Given the market liberalization policies launched in Argentina in 1989, both views would assert that variation in upgrading between firms in Mendoza and San Juan is largely the result of different pre-existing stocks of these resources and property rights.

However, there are two reasons to be cautious about such determinism. First, a narrow focus on past economic and social endowments may not reveal the differences in the ability of regions to restructure their industries (Locke, 1995; Safford, 2007). For instance, in his historical comparison of the wine industry, McDermott (2007) shows that although Mendoza is about twice the size of San Juan in terms of population and GDP, both provinces had similar soils and climates, industry structures, densities of wineries and vineyards, stocks of knowledgeable elites, and access to foreign investors and consultants. They were also subject to the same national systems of property rights and sectoral regulations. Moreover, both provinces had about the same number of civic associations per 1000 inhabitants and San Juan indeed had more agricultural cooperatives.⁶ Through the 1980s, they also had similar structures and histories of business and sectoral associations that battled for access to their respective provincial governments to play a zero-sum game over price supports and subsidies (Paladino & Jauregui, 2001; Rofman, 1999). The governments of both provinces were better known for their lack of coherent policies aimed to prop up thousands of weak grape growers (Azpiazu & Basualdo, 2003). The few training and R&D

⁶ As of 2003, only 4% of Mendoza wineries had foreign investment and about 6% are linked to Argentine business groups. Foreign investors controlled less than half of the 30 top exporters, and FDI accounts for about half of the \$1-1.5 billion invested in the wine industry in Argentina between 1991 and 2003, with most coming after 1996. In the 1990s, Mendoza had about 2.3 NGOs per 1000 inhabitants and San Juan had about 2.2. As of 1989, Mendoza had 64 cooperatives in agro-related industries and San Juan had 79. (McDermott, 2007)

programs in agro related industries typically ossified under bureaucratic ministry offices that were unresponsive to firm needs (Casaburi, 1999).

The second reason builds on Granovetter's (2002) insight that the development of and differences between regions or clusters depends more on the relational structure of socio-economic life than on its density. Management and development scholars echo this view in their analyses of the enabling and constraining nature of embeddedness. The work on strategy and innovation increasingly emphasizes that a firm's ability to access different types of knowledge resources is greatly shaped by the structure and composition of its network (Ahuja, 2000; Fleming, 2001; Owen-Smith & Powell, 2004). As Lin (2001) and Uzzi (1996) have shown, however, one's ego-network can easily restrict access to different resources and blind it from new information. The close relationships in a network may breed a sense of community, but they can also cause the group to grow ever more insular while shielding it from an external flow of information and opportunities. Although a region on aggregate may have a wide variety of resources and experiences that, when combined, could create value, a firm is often embedded in a rather restricted network, be it composed of firms, associations or public agencies (Knoke, 2001).

At a more macro-level of analysis, recent work on public policy shows that although a society may contain a plethora of, e.g., professional associations, the attendant social ties and norms that can promote collaboration and collective learning can also be self limiting and exclusionary. To the extent that these groups and localities have different needs and resources, are relatively isolated, and are not incorporated into more encompassing institutions, a diverse socio-economic environment can easily produce a balkanized society that thwarts broad-based innovation, knowledge diffusion, and concerted action (Locke, 1995; Ostrom, 1999; Safford, 2007; Schneider, 2004; Tandler, 1997). The lack of collective goods and coherent policies is

rooted not in the absence of social ties but the lack of cross cutting ties between different social and producer communities.

Public-Private Institutions as Conduits to New Knowledge Resources

To the extent that upgrading depends on access to a variety of knowledge resources, the isolating effects of a firm's immediate inter-organizational network can be relieved by introducing new alters or nodes into the network that can facilitate such access. The research on networks and innovation has shown that the presence of cross-cutting ties between firms from distinct producer networks or geographical locations can help them overcome these barriers and access new knowledge resources (Uzzi, 1996; Zuckerman & Sgourev, 2006). Policy scholars such as Locke (1995) and Ostrom (1999) suggest that when more encompassing, bridging structures are not historically or organically given, government can find a role to provide them to improve coordination and knowledge diffusion. Network scholars have recently supported such views in showing how some GSIs, in providing new training and R&D programs, can bridge socially and geographically isolated groups of firms, legitimize new standards, and promote new forms of joint action (Knoke, 2001; McEvily & Zaheer, 2004; Owen-Smith & Powell, 2004).

This intersection of research has gained increasing traction in policy work on societies noted for their weak state capacities and fragmented, rent-seeking industry groups. First, when confronted with crises, governments can change existing policy by creating new GSIs in partnership with a broader variety of stakeholder groups than in the past (Campbell, 2004; Schneider, 2004). In acting less as a direct provider and more as a coordinator and empowerer, the government can instigate a process of recombining the resources and information of better placed actors with its own to facilitate the creation of more effective services and programs (Furman & Mac Garvie, 2007; Rodrik, 2004).

Second, to the extent that these new GSIs are governed by a variety of public and private actors, they have the potential of also reshaping the social and knowledge ties among the government and previously isolated, even antagonistic, producer communities (Locke, 1995; Ostrom, 1999; Safford, 2007). The new GSIs are constituted with rules of empowered inclusion and multiparty governance, whereby participants representing the government and a variety of relevant stakeholder groups, such as trade associations, have rights and responsibilities in defining and evaluating the development of certain industry support programs. As such, they offer participants new structures to engage in collective problem solving, improve mutual monitoring, and build broader strategic considerations on top of their past rent-seeking, mutual hold-up instincts (Sabel, 1994; Schneider, 2004; Stark & Bruszt, 1998; Tandler, 1997).

We refer to this sub-group of GSIs as public-private institutions or PPIs (Ostrom, 1999; Tandler, 1997). Our main interest is not their hybrid ownership form per se, but particularly the way their governance principles foster multiplex, cross-cutting ties among previously isolated public and private actors and improve the access firms have to a variety of knowledge resources.

Methods for the Inductive Approach

To explore this argument, we first report our findings from an ethnographic, comparative analysis of the transformation of the wine industries in San Juan and Mendoza during the 1990s. The inductive approach is advantageous for studying network relationships (Uzzi, 1996) and institutional change over time (Knoke, 2001; Thelen, 2003), because it enables the researcher to examine in detail how actors construct new forms of coordination and identify the underlying mechanisms suitable for theory building and testable hypotheses (Edmondson & McManus, 2007). Employing the method of difference, the comparison also allows us to focus on the configuration of factors that appear different (Eisenhardt, 1989; Ragin, 1987) – namely the divergent institutional policies between the provinces in the 1990s.

During four fieldtrips in 2003-2004, the first author interviewed the directors, enologists, and agronomists of thirty-three firms (wineries and independent grape suppliers), the presidents of eight sectoral and peak business associations, policymakers in the relevant provincial government ministries, and select staff members of seven of the GSIs and PPIs discussed below. Using a directory of wineries and grape suppliers in the two provinces, industry experts helped select firms that were located in different sub-regions or zones of the provinces and that varied in terms of their size, ownership, age, and production sophistication. The first authors also interviewed key collaborators, suppliers, and customers of this first set of firms.

Data collection and analysis followed Strauss & Corbin (1998). Interviews were conducted in Spanish, lasted approximately two hours, and were transcribed to both notebooks and computer files the same day. Visits also yielded documentation and secondary sources about industry trends, government policies, and relevant support programs, such as in R&D and extension services, during the 1980s and 1990s. Although largely open-ended, the interviews had specific lines of inquiry to capture the interaction between the different levels of analysis. Interviews with firms focused on the process of creating new or altering existing wine and grapes, the factors that appeared to constrain or enable such changes, and the types of organizations and institutions that were useful for acquiring new knowledge. Interviews with non-firm actors focused on identifying the causes of previous stagnation and current innovation in the industry, the roles of non-firm organizations and institutions that supported the industry, and the related public policies. Data gathering from GSIs paid special attention to the content, organization, and governance of specific support programs for firms.

This ethnographic analysis consisted of systematically travelling back and forth between data collection and the construction of the above framework (Strauss & Corbin, 1998). In considering the different types of economic, social, and institutional factors shaping firm

adaptation, the first author triangulated interview and archival data as well as observations from interviewees at different levels of analysis and in different locations. As the roles of different actors and different types of organizational ties became clearer with each field trip, he conducted follow-up interviews with selected actors that participated in the programs discussed below. For instance, as firms identified new and old sources of knowledge, he then turned to these sources for more detailed examination of the transmission mechanisms. By repeating such a process in different locations, he could distinguish the institutional and network constellations between provinces as well as inquire further about their emergence and governance.

Analysis and Results of the Inductive Approach

We present results of our qualitative data first to show how the structural embeddedness of economic activity can hinder access to new knowledge resources. We then examine how different public policies in the two provinces exacerbated or resolved this problem, with special attention to the knowledge transmission mechanisms created via the new GSIs in Mendoza.

Social fragmentation between communities. Our interviews revealed how existing inter-organizational networks both facilitated joint-learning between firms and created barriers for them to access a variety of knowledge resources from other communities, in turn limiting broad-based upgrading. On the one hand, our interlocutors continually emphasized that close social relationships with other firms underpinned joint experiments and learning about how to apply new techniques in vineyard management to local climate conditions and grape varieties. Past local and professional ties could also be the basis of new forms of concerted, collective action. For instance, many of the first initiatives to upgrade products and processes in the broader region came from firms in Mendoza's *Primera Zona* that were led by Argentines with foreign education and contacts. In 1990-91, these elite firms began organizing two main forms of collective learning – voluntary learning groups and wine evaluation competitions, in which the participating firms

benchmarked their products and processes and shared practices to resolve common problems in grape growing and winemaking (Paladino & Jauregui, 2001; Walters, 1999).

On the other hand, these prior relationships demonstrated their insulating qualities and limitations in bridging the existing social and economic gaps between the zones of Mendoza, and thus in diffusing new knowledge. The learning groups and competitions included only the most elite wineries of the *Primera Zona* that viewed firms in the other zones of Mendoza and San Juan as incapable of producing fine wines because of their apparent substandard economic, educational, and climate conditions. At the same time, winemakers of these “lesser” *Zonas* confirmed to us Walters’ (1999: 120-123) observation that in the early 1990s firms in different zones rarely learned from one another’s ongoing field and wine experiments because of historical animosities and pre-conceptions of one another’s skills and capacities. As one leading oenologist in the *Zona Este* recalled:

“The winemakers of the *Primera Zona* had no interest in what I was doing, except to tell me I was wrong. Moreover, I could not learn anything from them about how to improve the wine I was making or how adapt the grapes, pruning and watering conditions I had to deal with.”

This legacy of socio-economic fragmentation was reinforced by the aforementioned zero-sum game of industry policy, as it fostered weak horizontal ties between sectoral and zonal associations and ad hoc vertical ties between just a few associations and the government (Paladino & Jauregui, 2001; Rofman, 1999).

The need for more specific applied knowledge and skills, coupled with regional prejudices and resource inequalities, can create barriers to the processes of aggregation and joint action vital for a sustainable base of innovation. Public policy can remedy this problem by initiating a process in which public and private actors create new institutions with governance principles that

anchor new horizontal ties between previously isolated producer communities. Such a view shifts the comparative lens of upgrading paths away from the existing economic and social endowments of regions and toward the institution-building processes.

The emergence of public-private institutions in Mendoza. A fruitful comparative analysis, in turn, would focus on how the contrasting policies toward resolving a common crisis in the late 1980s in Mendoza and San Juan led to the formation of different organizational and institutional arrangements in the 1990s. With the Argentine economy stagnating and the wine industry collapsing, the focal points of the crisis were both provinces' respective state-owned, perennial loss-making wineries, Cavic in San Juan and Giol in Mendoza, whose purchasing contracts and inflated prices effectively promoted the production of large volumes of low-quality wine (Azpiazu & Basualdo, 2003). San Juan's government sought to insulate itself and rapidly impose high-powered, arm's-length economic incentives on society to induce change. It first chose to rapidly privatize the Cavic to local interests, brushing off the protests of dependent small grape growers and wineries. The firm soon failed again, causing the government to intervene and liquidate it. Then through the 1990s, the government focused on attracting new investment through a federally subsidized tax incentive. By most accounts this policy did bring in record levels of investment to the wine industry but failed to encourage broad based upgrading. The economic benefits remained concentrated among a few large firms that had little interest in incorporating and diffusing new practices along the value chain. The top down approach also exacerbated the fragmentation and animosities among relevant sectoral associations and the state, and perpetuated the old strategies of divide and rule cum rent-seeking.⁷ For instance, on several occasions during the 1990s, different sectoral associations proposed new institutions to support training and export promotion.

⁷ Gago & De La Torre (1996) and Rofman (1999) give details of San Juan policy. They also show that between 1990 and 1998, 424 firms invested over \$1 billion in San Juan agriculture. About 193 of these firms invested into wine and grape production.

Each attempt failed, with the state and the associations accusing each other of free-riding and attempting to gain control of state resources. Suspicion became so endemic that as late as 1997 San Juan's largest grape-producer association declared that the incorporation of new technologies and vineyard management techniques proposed by some of larger wineries were simply attempts to cut labor costs and undermine the stability of smaller producers (Rofman, 1999: Ch. 4).

In contrast, Mendoza gradually built a new set of GSIs to provide a variety of new support services and resources in agriculture and especially the winemaking value chain (e.g., hazard insurance, training, R&D, export promotion, etc.). The first experiment came in 1987-88, when the newly elected provincial administration chose to transform Giol into Fecovita, a federation of cooperatives, which were created from the previously dependent thousands of small grape growers and wineries. This experience not only revitalized the cooperative sector, but also initiated a broader effort by the Mendoza government to create PPIs de novo and then later reform existing GSIs with socio-economic partners over ten years (McDermott, 2007).

Table 1 gives an abridged description of the most prominent PPIs, their different support activities, and shared governance traits. They are public-private in their legal form, governance structures, resources, and membership, which includes representatives from the government and associations of a variety of zones and sub-sectors. As a sub-group of GSIs, they too received at least partial public funding, had state representatives on their boards, and had a public mandate. But the aforementioned characteristics made the PPIs distinct from the pre-existing GSIs, since the latter were state/bureaucratic centered in their governance and had only ad hoc contact with a few elite groups instead of having governance and resource ties to a variety of associations. They were also distinct from the pre-existing sectoral and zonal associations, since the latter were voluntary organizations with no government representation or resources, were narrow in membership and mission, and had few services other than lobby the government as mentioned above.

 Insert Table 1 about here

Our particular interest is how the distinct governance rules of PPIs anchored their ability to act as multiplex bridges (Padgett & Ansell, 1993; Burt, 1992) between the public and private domains as well as between the relevant producer communities, and in turn create mechanisms to improve firm access to a variety of knowledge resources. At the meso-level, the rules of inclusion allowed each PPI to become more embedded with one another, the pre-existing GSIs (such as the regulator of the wine industry, the center for small business support, and the agency for phytosanitary control), and the associations of Mendoza. The bridging quality of PPIs, such as those in Table 1, was institutionalized in their statutes, which explicitly mentioned certain government agencies and relevant sectoral and zonal associations as members of governing and advisory boards (McDermott, 2007: 123-124). Deliberations about the formation and performance of the PPIs opened up new cross-cutting lines of communication between these associations. To illustrate this structural trait further, we collected membership and board data of the PPIs, associations, schools, and GSIs relevant to the wine industry. Figure 1 shows the resulting network via a UCINET analysis (Borgatti *et al.*, 2002). Notice that PPIs are neither domineering nor isolated, but appear almost as brokers between different constituencies. This point is reinforced by the “betweenness” scores of the leading entities, which indicate that the PPIs were key hubs of diverse membership and potentially diverse information (Borgatti, 2005). Although not conclusive, the data suggest that by 2001, the PPIs (as well as some of the reformed GSIs) tied the different associations and communities together.

 Insert Figure 1 and Table 2 about here

The multiplex quality of the ties between the PPIs and different producer communities emerged from the rules that gave participants both joint decision making rights and resource

responsibilities for programs and services. As a participant in regular performance evaluations, the representative of each association was transmitting the interests of his or her constituents. In meeting their material responsibilities to the PPIs and in trying to ensure that the relevant programs attend to the needs of their constituents, the participants also opened up two-way channels for the transmission of knowledge and resources. For instance, although the government often provided the bulk of initial financing, participating associations provided personnel, facilities and financing as well as the experience and information from their constituent firms. As the associations incrementally and jointly helped develop services, they increased their confidence in the PPIs and encouraged firms to utilize the new resources.

New access to a variety of knowledge resources. The combination of these governance rules and network qualities in PPIs fostered three mechanisms to transmit a new variety of applied knowledge to firms (McDermott, 2007: 121-126). First, in combining the material and informational contributions of the public and private participants, the PPIs gradually built up knowledge resources at a scale, scope and cost that the government and the associations could not have provided individually and did not exist before or in other provinces. For instance, INTA Mendoza, IDR, and ProMendoza pioneered new detailed mappings of the micro-climates for grapes and other agricultural products; data bases on best practices (internationally and sub-regionally), harvests, and product markets; benchmarking and training programs for different sectors and zones; and teams of experienced consultants. The staff acquired such contextualized knowledge from the input of the associations themselves, their own research, and the various service contracts with constituent firms. Similar to the technology centers described by McEvily & Zaheer (2004), these PPIs became public repositories of diverse practices and standards and also of repackaged knowledge to be adapted to particular settings.

Second, PPIs produced services that integrated the needs of their different constituencies with international standards. The leverage of each participant came from its ability to provide or withhold resources as well as its ability to voice proposals and grievances through the board. Even if consensus could not be reached in one moment, the iterative nature of joint evaluations and the government's interest in maintaining a broad coalition allowed the minority to look to further rounds of deliberation and other GSIs to attend to their needs. For instance, our interviews revealed that the few generic extension programs in INTA and IDR were initially criticized by firms and the representatives of their associations that sat on the governing councils. Such pressure gradually forced these PPIs to build programs that tailored vineyard maintenance practices and grape fermenting techniques to the distinct climates and firm capabilities that characterized the different zones. It also led them and the FTC to establish satellite offices in the different zones. Similarly, firms and associations from both elite and backward zones strongly protested that the new export promotion programs of ProMendoza for favoring one group over the other. ProMendoza altered its practices to support the different sets of firms. As one board member recalled:

“ProMendoza was hit from all sides. The team responded, but it took time. First, it realized that it could not just take any firm to an international trade fair. So, it created a diagnostic, and those that failed were excluded. Then after we heard more complaints, the team created some training programs on international markets to help the weak firms, or sent them to INTA and IDR for one of their programs on new standards. Later, the associations from different zones pushed the team to make sure the foreign journalists visited their firms and not just the big boys. That wasn't so difficult, so we did that too.”

Third, the PPIs built programs to help firms learn from one another and create new relationships. Both firm managers and directors of these institutions repeatedly told us that one of

the most valued qualities of services was the way they helped to diffuse standards, practices, and experiences from one zone or sector to another. A typical example of an indirect method was the use of INTA Mendoza's testing labs and viticulture consultants by a variety of firms, from the most elite to the fragile cooperatives. With this diverse experience, INTA Mendoza began documenting, benchmarking, and teaching practices from the most advanced form of computer monitored drip-watering to new applications of the more traditional orthogonal vine training systems. The most common examples of a more direct method of knowledge transmission and relationship building was the use by INTA, IDR, and ProMendoza of multi-firm training and research programs based on collective problem-solving techniques. A key component of all these programs was having managers, enologists, or agronomists from different zones jointly resolve particular fermentation, blending and viticulture problems on site in the different firms. An important by-product of these programs was creating new professional relationships between firms. As one winemaker told us:

“My buddy down the road participated in one of these programs. He thought their people and the new techniques were pretty interesting, especially what they were doing in the other zones. I did not think much of it, but I went to one, and my son went to another. The best parts of INTA's and IDR's programs were the group discussions and visiting one another's vineyards. We hardly new any of these other guys from the different zones. That was about six years ago, and we still talk regularly about all the issues – new clones, new blends, pruning, technology. I learn more from these guys than any book or consultant.”

INTA and the Fondo Vitivinicola also collaborated with associations to establish annual wine evaluation competitions in the late 1990s in the more backward zones, *Zona Sur* and *Zona Este*, as well as in San Juan, where both institutions had satellite offices. By including oenologists from different zones on the evaluation committees, firms with little previous contact were directly

learning from one another about their product development methods. In turn, the PPIs were becoming “network facilitators,” a vital role McEvily & Zaheer (2004) identified in public-private technology centers in the US, which used support programs to help firms share practices and tighten relationships between loosely linked networks.

By the end of the 1990s, the overlapping ties and demonstration effects of the new institutions channeled spillovers across policy domains and provinces. Within Mendoza, the older, more archaic institutions and GSIs, such as the regional university and the national regulating agency for wine, began to change their programs, standards, and governance structures largely due to their participation in new advisory councils. The Mendoza government and associations also spearheaded the replication of the institutional model at a national level that was signed into law in late 2004. Beginning in 2002, the San Juan government openly criticized the old approach of tax incentives and advocated the creation of new public-private institutional resources for training, R&D, and export promotion (Gobierno de San Juan, 2004).

In sum, Mendoza’s approach to building new GSIs appeared to induce upgrading by improving the access firms had to a variety of knowledge resources and functioning akin to the “network facilitator” role discussed by McEvily & Zaheer (2004). The rules of inclusion and multi-party governance helped representatives of previously isolated producer communities gradually forge common strategies and a coherent, dynamic set of support policies with the state. Consequently, the programs and services of the relevant institutions helped firms learn how to apply new knowledge with existing natural inputs and build new relationships with one another. With statistical techniques, we now explore the degree to which this new constellation of organizational and institutional ties, once it had taken root, improved a firm’s product upgrading.

DEDUCTIVE ANALYSIS: NETWORK COMPOSITION AND PRODUCT UPGRADING

The cross-sectional nature of our quantitative data impedes us from statistically tracking the changes in a firm's network and product upgrading. It does however allow us to evaluate how the composition and structure of a firm's ego-network impact its product upgrading, and the plausibility of our key claim that Mendoza's policy approach facilitated firm access to a new variety of knowledge resources by creating new institutions with multiplex bridging qualities that fostered cross-cutting ties between producer communities.

The baseline view in the network literature is that a firm's access to a variety of knowledge resources depends on being highly embedded in an inter-organizational network, as indicated by the degree centrality of one's ego-network (Uzzi, 1996; Wasserman & Faust, 1994). The more ties a firm has to all types of organizations, the more likely it is able to access a greater volume, and potentially variety, of information.

Although this claim may in general be valid, it can blur the way Mendoza's approach created new actors and mechanisms for transferring knowledge. That is, it assumes a certain level of homogeneity about the members of an organizational field and the types of information and resources they can afford one another. The recent work on networks and innovation has increasingly sought to differentiate a firm's network composition, emphasizing that only certain types of alters, be they firms or non-firm organizations lend valuable information and resources for the task at hand (Ahuja, 2000; Borgatti, 2005; Fleming & Waguespack, 2007; Lin, 2001; McDermott & Corredoira, 2009).

Our previous theoretical and empirical discussions argued that the alters, which appeared most valuable to firms, were those offering a new variety of applied knowledge resources and cross-cutting channels of information and professional contacts between different producer communities, especially the different zones. Mendoza's approach appeared to improve access for firms to a variety of knowledge resources by creating a new set of GSIs, the PPIs, and then

reforming the old GSIs to offer new services directly to firms and fostered new types of relationships between them. Our qualitative analysis further suggested that wineries benefited most from their interactions with other firms and the GSIs, because these alters, as opposed to the other types, offered the combination of new knowledge resources and inter-active relationships for solving ongoing problems of product development. In contrast, pre-existing organizations, such as schools, banks, associations, and cooperatives were not the repeated recipients of policies of new knowledge resources and continued to focus their membership, clientele, and orientation toward their locality or zone.⁸ In turn, the broader claim is that firms will benefit from ties to organizations and institutions whose activities and governance principles underpin access to different applied knowledge and cross-cutting professional relationships. But firms will not necessarily benefit from ties to organizations that offer limited knowledge resources and rather local professional relationships. We operationalize this view in the following hypotheses.

Hypothesis 1a. The greater number of ties the focal firm has to other firms the higher will be its level of product upgrading.

Hypothesis 1b. The greater number of ties the focal firm has to GSIs the higher will be its level of product upgrading.

Hypothesis 2. The greater number ties a focal firm has to associations, banks, cooperatives, and schools, the lower will be its level of product upgrading.

We can further distinguish the impact of different types of GSIs on product upgrading.

Although we suggested that the overlapping ties between the PPIs and the old GSIs facilitated

⁸As previously mentioned, GSIs are those institutions that receive government funding, have at least one government representative on the board, and provide support services to firms, such as training, R&D, sales promotion, etc. PPIs are a sub-group of GSIs with the governance principles discussed above. Schools are a separate category because although some may receive public funds, the government is not represented on the board and the schools do not provide services (training or R&D) to firms. Associations are voluntary trade or civic organizations with no government funding and governed purely by their non-government members. Following the literature on development and governance, we also classify banks and cooperatives as distinct from private, commercial firms engaged in the industry (Spencer *et al.*, 2005; Tandler, 1997).

recent changes in the mission and programs of the latter, one would likely expect that firms would find greater relative value in the former. First, the PPIs were *created* with distinct governance rules and network qualities, while the old GSIs were not. Our qualitative analysis emphasized that the rules of inclusion and participatory governance fostered multiplex, bridging qualities in the PPIs, which in turn anchored their ability to deliver a new variety of applied knowledge resources to firms in different zones and facilitate the development of new inter-firm relationships. Recent research has shown that the institutionalization of cross-cutting ties between previously isolated groups of firms can greatly improve support services, the diffusion of standards, and the access to diverse sources of information (McEvily & Zaheer, 2004; Zuckerman & Sgourev, 2006). Second, research in economic sociology and historical institutionalism notes that older institutions and their attendant stakeholders are often slower to change than newer ones, especially if they have longer histories of being unresponsive or were built for particular aims in one period but of lesser value in subsequent periods (DiMaggio & Powell, 1983; Knoke, 2001; Thelen, 2003). The policy of Mendoza emphasized first the construction of new institutions, not reforming the existing ones, and then spinning off new operations as demands from a greater variety of programs grew. For instance, IDR and ProMendoza grew out of initiatives within INTA Mendoza and the Fondo Vitivinicola.

The broader claim, in turn, is that firms will gain access to variety of knowledge resources, and thus relatively high levels of product upgrading, to the extent that they have many ties to GSIs that were created *de novo* with rules of inclusion and participatory governance.

Hypothesis 3. The greater number of ties the focal firm has to the PPIs, the higher will be its level of product upgrading.

The foregoing makes indirect inferences about the mechanisms for knowledge transfer from the Mendoza policies and the governance histories of GSIs. Given our previous claims about

the importance ties to other firms and GSIs being positively associated with higher levels of product upgrading, we focus here directly on cross-cutting qualities of these alters in facilitating access to a variety of knowledge resources. A key aspect of Mendoza's approach was to infuse GSIs with governance principles that helped overcome prior problems of socio-economic fragmentation by being *both* more encompassing than existing associations *and* gradually functioning as social bridges between producer communities. Moreover, one could infer that certain firms developed these network qualities because of their participation in training, R&D, and export programs that fostered new professional relationships between firms from different zones. According to recent research on networks, those mediators with diverse knowledge resources are particularly those that are the most central or those that act as the most important bridges (Burt, 2000; Fleming & Waguespack, 2007). The two traits are not necessarily exclusive, and both serve as key tests about one's access to diversity.

Firms might learn more rapidly when they are linked with organizations and institutions that are the most central or encompassing in the region, because they would have access to a great number of other associated firms and in turn variety of information and resources (Borgatti, 2005; Safford, 2007). Being linked to a highly central organization or institution can also convey on the firm a particular level of legitimacy, which can act as a positive signal for its products and practices to other potential collaborators (Benjamin & Podolny, 1999; Knoke, 2001; Provan & Milward 1995). In contrast, being linked to less central mediators would not provide access to a variety of knowledge resources.

Hypothesis 4a. The greater number of ties a focal firm has to firms with high levels of network centrality, the higher will be its level of product upgrading.

Hypothesis 4b. The greater number of ties a focal firm has to GSIs with high levels of network centrality, the higher will be its level of product upgrading.

One can also emphasize the ability of Mendoza's GSIs to act as social and knowledge bridges among the distinct, previously isolated communities, particularly those bounded by the aforementioned zones. Centrality may reflect simply the most dominant organizations and offer redundant knowledge (Burt, 1992; Romanelli & Khessina, 2005). That is, to the extent that variety is key for developing new product upgrading capabilities, then the relative importance in intermediating organizations and institutions is the geographical diversity, not the quantity, of actors associated with them. The importance of bridging roles has been noted in research on entrepreneurship (Burt, 1992, 2000) and on regional development (Safford, 2004). Obstfeld's (2005) theory of "tertius iungens" and Zuckerman & Sgourev's (2006) notion of "peer capitalism" highlight the importance of structures bringing previously unconnected actors together. McEvily & Zaheer (1999) also find that government technology centers improved firm performance by giving firms access to a variety of information from different geographic locations. In contrast, having numerous ties to mediators that have relatively few bridging qualities would not give a firm access to a variety of knowledge resources. Given the limitations of our data, we can not estimate which firms and institutions bridge structural holes in the conventional manner. However, given the literature on localities creating search costs for the pursuit of variety (Romanelli & Khessina, 2005) and our previous discussion about the ways in which social fragmentation occurred in the provinces according to sub-regional zones, a reasonable proxy for an intermediating organization's bridging role is the geographic diversity of the firms associated with it. We operationalize the relative value for a firm being tied to intermediaries with strong bridging qualities in the following hypothesis.

Hypothesis 5a. The greater number of ties a focal firm has to firms with high geographic diversity, the higher will be its level of product upgrading.

Hypothesis 5b: The greater number of ties a focal firm has to GSIs with high geographic diversity, the higher will be its level of product upgrading.

DEDUCTIVE ANALYSIS: DATA AND METHODOLOGY

The design of the sample and survey was based largely on the aforementioned field interviews in Mendoza and San Juan. We developed and administered our survey instrument during 2004-05. Our survey captured a focal firm's level of product upgrading, demographics, location, as well as its ties to firms, publicly support institutions and other organizations.

A simple random sample (SRS) of 115 firms was selected from a roster of the wineries in Mendoza and San Juan. We undertook several measures to increase participation and response rates, including gaining the enthusiastic approval of the project by the relevant sectoral associations, inviting firm owners/directors by mail and telephone to participate in the survey (Buse, 1973; Hansen & Robinson, 1980), and replacing 15 firms that declined to participate with 15 similar firms randomly selected. 112 firms completed our surveys (97% response rate).⁹ We compared with data of wineries from relevant government source and found no significant differences between them in geographic distribution, age, size, and FDI. For instance, about 60% of the firms are less than 20 years old, about 70% have less than 25 employees, and 50% have less than \$330,000 in sales. Roughly 10% have foreign investment.

We divided the questionnaires in two parts. The owner or general manager filled out the part covering firm demographics and general strategies. The chief enologist filled out the part covering production, product development and ego-networks. We designed and implemented the survey in collaboration with a leading agro-extension center in the region, whose field consultants interviewed each informant in person for about one hour, using the questionnaire.

Dependent Variable

⁹ Of the 112 wineries, 22 are from San Juan and 90 are from Mendoza, of which 26 are from Gran Mendoza, 32 from the East Zone, 15 from Valle de Uco, and 17 from the South Zone. Due to missing variables, our models include data from 97 firms (an effective response rate of 84%).

As discussed above, our dependent variable, *Product Upgrading*, is a particular form of innovation, in which firms focus on the creation of new products for higher value by incrementally experimenting with new combinations of knowledge, materials, and natural resources (Fleming, 2001; Ghoshal & Moran, 1999; Giuliani *et al.*, 2005). Following a well established research stream in the strategy and organizations literatures, we measured it by asking respondents to assess the extent to which the firm implemented the relevant practices associated with product upgrading in this particular context using a 5-point Likert scale (MacDuffie, 1995; Zollo & Winter 2002). The list of these practices come from our interviews with winemakers and then confirmed by a team of experts from our collaborating center and five well-known wine consultants in Argentina. Such practices are the regular introduction of new and higher value wines, emphasis of quality over cost, experimentation with new blends, varieties and clones, and monitoring domestic and overseas markets.

In order to assess the validity of our instrument we conducted an exploratory factor analysis with oblimin rotation (PROC FACTOR, SAS v.9) on 22 questions that extracted five factors. Questions that loaded in more than one factor were dropped. Two of the five factors are associated with distinct aspects of product upgrading and each contains four items. (Details on the questions and loading scores are available from the authors upon request.) The items in each of these two factors, respectively, address directly the extent to which the firm overcomes technological and market uncertainties, which, as discussed earlier, are present in product upgrading for the wine industry. Our dependent variable is created by adding the responses to the eight questions loading in the factors associated to product upgrading (the index has a Cronbach's alpha of 0.78). A third factor is associated with *Upgrading Intent*, which we use as a control for the underlying motivation of the focal firm to engage in product upgrading (see below).

Explanatory variables

To collect network data, our survey asked enologists to identify firms (up to seven) and non-firm entities (up to five) with which they regularly interact, collaborate, or exchange information regarding specific strategic areas, such as product development, production methods, technology acquisition, training, marketing, and exports.¹⁰ Following our terminology in the preceding sections, we validated and classified these firm and non-firm *alters* into six categories: associations (trade, peak level, etc.), banks, cooperatives, firms (wineries, independent grape growers, technology suppliers, etc.), GSIs (such as those discussed above), and schools (universities, technical schools, etc.). As noted above, most GSIs are provincial and, hence, firms have access to them mainly within their own respective jurisdictions. Following the preceding discussions, we also decomposed GSIs into two sub-categories – PPIs and Old GSIs.¹¹

We constructed a two-mode network consisting, on the one hand, of focal firms, and, on the other hand, of *alters* (firm and non-firm). Ties were defined as any relationship between the focal firm and the alter. All the measures based on ties are generated from the total count of mentions to the alter, which include repeated counts of the same alter if they were identified by the focal firm as providing useful information or services in multiple operational areas of firm management and winemaking. By doing so, we are generating variables that combine the structural aspects of the network with the strength of the relationship in a manner consistent with Cross, Borgatti and Parker's (2001) view about the importance of studying the role of multiplex network ties. A firm that interacts with the same alter in several areas engages in a stronger relationship than one that participates in a relationship limited to a few areas (Burt, 1983). In particular, when the underlying mechanism is access to diverse, tacit knowledge in order to

¹⁰ Respondents were provided with a roster of non-firm entities developed with local experts but were also allowed to report entities not on the roster.

¹¹ PPIs include: Fondo de Vitivincola, Fondo para la Transformacion y Crecimiento, IDR, Promendoza, INTA Mendoza, INTA San Juan, and ITU. Old GSIs include all other GSIs, which pre-date PPIs and differ in terms of the governance rules discussed above.

generate innovations, multiplex relationships provide the repeated interactions that generate mutual understanding and facilitate the transfer of knowledge (Hansen, 1999). As opposed to equating single and multiple mentions of an alter, this relatively high threshold to identify alters eliminates irrelevant ties in the context of information flow, and the multidimensionality of the relationship provides a window into the value of the strength of the tie.

Ties to All Alters and *Ties to Different Types of Alters* measure the degree centrality (Freeman, 1979) that captures a focal firm's exposure to the knowledge and immediate influence of others (alters) (Borgatti, 2005) by counting the focal firm's total number of ties to other organizations and institutions. It is based on the ego network and lacks any dyadic characteristic. The variable, *Ties to All Alters*, is the total count of ties a focal firm has to all types organizations and institutions mentioned above, capturing the overall embeddedness of the firm assuming homogeneity across alter types in terms of their knowledge resources afforded to focal firms. We relax this assumption and emphasize heterogeneity by decomposing this variable, following standard methods (Ahuja, 2000; Lin, 2001; Owen-Smith & Powell, 2004), into six variables that capture the composition and structure of the focal firm's ego-network. The variables, *Ties to Firms*, *Ties to Associations*, *Ties to Banks*, *Ties to Cooperatives*, *Ties to Schools*, and *Ties to GSIs*, are each constructed by counting the number of ties between the focal firm and the given type of alter, as classified above. We follow the same method, when decomposing *Ties to GSIs* and constructing *Ties to PPIs* and *Ties to Old GSIs*. We discuss our second method of decomposition and aggregation of network ties below.

Ties to TopCentralFirms and *Ties to TopCentralGSIs* capture the benefits that a firm can obtain indirectly from being connected to alters with high centrality, and therefore, exposure to influence and resources of a large number of actors in the network (Burt, 1983). We first identified all the firm and GSI alters and ranked them separately by the total number of ties from the focal

firms (Frank, 2005). Firms and GSIs with in-degree centrality in the top decile were considered to be highly central alters.¹² Then, for each focal firm, we calculated the total number of ties to these high network centrality alters.

Ties to Top Geo Div Firms and *Ties to Top Geo Div GSIs* capture the diversity of knowledge accessed through network ties by considering geographic zones as proxies of different knowledge. High network heterogeneity is associated to increased opportunities to innovate (Burt, 1983). We calculated the geographic diversity of network ties by examining the alter's direct ties to firms in different zones of the region. Even lacking information about the complete network, our random sample of firms provides the information to generate unbiased estimations of such a measure (Frank, 2005). We calculated the total number of ties for each alter and assigned the ties to zones based on the geographic location of the surveyed firms that identified the relationship. These zone counts were then used to derive a Herfindahl Index score for each alter based on the number of ties in each zone. Alters were ranked from highest to lowest based on their diversity score and the top decile was selected.¹³ We generated the variables by counting the number of ties that the focal firm has to these most geographically diversified alter firms and GSIs.

Control variables

The location variables are dichotomous, associated to different zones that experts identified (Grand Mendoza, East, Valle Uco, South, San Juan). In addition to the usual location fixed-effects (e.g., local resources or natural endowments), this variable absorbs systematic error in the measurement of our dependent variable (due to its perceptual nature). Since respondents may use

¹² An analysis of number of ties of each alter shows a skewed distribution with an inflection point at around 10%. For this reason, we selected those firms in the top decile as being the most central. In addition we ran robustness checks by defining the most central alters as those in the top 5% and 20%. Models utilizing all three versions produced similar results.

¹³ We subtracted this Herfindahl Index from one so that a higher score represented greater geographic diversity in the ties of the organization. In selecting the 10% threshold, we used a methodology described in Footnote 12.

the performance of their neighbors as anchors, we cannot infer upgrading differences between regions by comparing the coefficients of different zones.

We control for superior resources with *Foreign Ownership*, a dummy variable taking the value of a 1 for firms with foreign investment greater than 10% of equity and a 0 otherwise, and *Total Sales*, an interval variable with five levels. Using sales instead of employment provides a measure of resources that is consistent across technologies and scale.¹⁴ To control for differences in absorptive capacity (Cohen & Levinthal, 1990) and learning capabilities, we introduced *Education* and *Enologist*.¹⁵ The former is measured as an index based on the education levels of general managers and oenologists. The latter is a dummy variable that takes a value of one when the firm has at least one full-time enologist. Both are common indicators in emerging markets and winemaking of a firm's capabilities to incorporate new practices (Giuliani & Bell, 2005).

Finally, in order to control for the effects of a firm's demand structure and positioning choice, we introduce *Upgrading Intent*, a perceptual variable derived from the factor analysis that captures the firm's unobserved intention to upgrading by its commitment to activities and assets that support upgrading (i.e., technology agreements, wine research and development agreements, and investment in micro-fermentation). As Kaplan (2008) shows, firm actions are motivated by cognition, capabilities and incentives. Although we control for capabilities, the inclusion of *Upgrading Intent* adds an additional control for unobserved differences in cognition (e.g., managers ability to understand the benefits of upgrading) and incentives (e.g., market demand faced by the firm) by inferring them from the firm's actions. Given the small size of our wineries,

¹⁴ We also generated a firm age variable. Missing answers reduced the number of observations to 80. Model estimations including this control did not change significantly except for increased standard errors and lower significance levels. For this reason, and in order to improve the statistical power, we excluded age from the reported models.

¹⁵ R&D intensity is not a reliable measure in this setting. Because of size, technology, and historical imprinting, wineries often lack formal R&D departments and related expense records. This is also a problem for firm level data in developing countries (Meyer, 2004; Song, 2000)

the questions in this measure reveal the firm's allocation of limited resources consistent with acting on a perceived demand for upgrading. We further discuss the utilization of this variable below.

Methodological issues and statistical inference

In order to test our hypotheses, we estimated two sets of linear regression models that regressed product upgrading on control variables and three groups of explanatory network variables with the firm as the unit of analysis. To correct skewness of our network variables we applied the Box-Cox transformation (Box & Cox, 1964) to each one of our network measures.¹⁶ To address the problem of outliers, we report the results from robust regression (proc robustreg, SAS v.9) with Least Trimmed Squared (LTS) estimation (Rousseeuw, 1984), which generates OLS estimates robust to the presence of outliers.¹⁷

The first set of models explores the relative impact of being tied to distinct types of alters on the firm's level of product upgrading (see Table 4a). Model 1 is the baseline, which includes only the control variables. Model 2 introduces our overall measure of embeddedness, *Ties to All Alters*. Model 3 decomposes this variable into the degree centrality for each one of the six networks based on the type of alter (*Ties to Associations, Banks, Cooperative, Schools, Firms, and GSIs*, respectively). Model 4 decomposes *Ties to GSIs* into *Ties to PPIs* and *Ties to Old GSIs*.

The second set of models explores the relative impact on product upgrading of being tied to alters that are, respectively, the most central and most geographically diversified, in terms of their own connections (see Table 4b). We limit this analysis to firms and GSIs – the only types of alters that show significant impact on *Product Upgrading* in the first series of models. To provide

¹⁶ Box-Cox transformation yields the transformed variable most proximate to a normal distribution. Log transformation is a particular case of Box Cox ($\lambda = 0$) (Greene, 2000).

¹⁷ We also ran robust regressions with M-estimation. Results from robust M- and OLS estimations are similar to the ones reported and available from authors.

consistency between the two sets of models and to account for our limited degrees of freedom, we modify our method of decomposition and aggregation in three systematic ways. First, in Models 5-8, we continue to include the ties to associations, banks, cooperatives, and schools by collapsing them into the variable *Ties to All Alters Except Firms and GSIs*. Second, Model 7 explores Hypotheses 4a & 4b by decomposing *Ties to Firms* and *Ties to GSIs* into, respectively, *Ties to Most Central Firms* and *Ties to All Firms Except Most Central Firms*, and *Ties to Most Central GSIs* and *Ties to All GSIs Except Most Central GSIs*. Third, Model 8 explores Hypotheses 5a & 5b by decomposing *Ties to Firm* and *Ties to GSIs* into, respectively, *Ties to Most Geo Div Firms* and *Ties to All Firms Except Most Geo Div Firms*, and *Ties to Most GeoDivGSIs* and *Ties to All GSIs Except Most Geo Div GSIs*.

The differences between models reflect decomposing the variable *Ties to All Alters* in different ways rather than adding new variables. In every case the sum of the decomposing variables is equal to the decomposed variable. In this way, we are able to show the distinct impact of *alters* that possess the characteristic of interest and those that do not.

Multicollinearity problems were limited to our measures of ties to the most central and geographically diversified alters, which had Variance Inflation Factors between 3.2 and 4 and correlations ranging from 0.78 to 0.85 (see Table 3). For this reason, and for lack of better solutions (Wooldridge, 2002), we only report models introducing those variables one group at a time instead of combining them. Moreover, as noted above, to test our claims about accessing diverse knowledge sources, our main interest is comparing the relative effects of the most central and geographically diversified mediating firms and institutions with the others.

The cross-sectional nature of our data constrains our ability to address reverse causality issues. One issue of concern is that ties to GSIs and upgrading may be associated through a third omitted variable. The decomposition of our GSI variable between PPIs and Old GSIs reduces this

concern due to their respective timing of inception and governance characteristics, as revealed in our qualitative study. Self-selection into cultivating ties with firms and GSIs associated with upgrading does not appear as a serious issue, and the introduction of the *Upgrading Intent* control should help to reduce this concern.

Another issue is the probability that firms may not engage in upgrading because of cognition, capabilities, or incentives (Kaplan, 2008). One could argue that firms estimate larger benefits by producing the same old products instead of engaging in product upgrading. While *Total Sales*, *Foreign Investment*, *Education* and *Enologist* control for different aspects of capabilities, *Upgrading Intent* controls for unobserved differences in cognition (e.g., a manager's ability to understand the benefits of upgrading, which may drive strategic positioning) and in incentives (e.g., the perceived market demand).

One could also argue that the variable *Upgrading Intent* is actually driven by an unobserved upgrading motivation, and as such, would be an endogenous variable in our models.¹⁸ We believe that this is not the case. First, our Oblimin factor analysis measures the unobserved construct driving the responses to questions loading in a factor and, in our case, yield an actual measure of *Upgrading Intent*. The questions from which this variable is derived focus on the firm's actions driven by its motivation to upgrade and not necessarily the ability to execute the recombination of inputs or the experimental processes that underpin product upgrading. Factors utilized to generate our *Product Upgrading* variable are clearly associated to different aspects of product innovation (i.e., technological and market uncertainty reduction).

Second, as a robustness check, we also performed a 2SLS with an instrument that treats our *Upgrading Intent* as an endogenous variable. We estimate the models with PROC SYSLIN,

¹⁸ We thank an anonymous reviewer for pointing us in this direction.

SAS v.9. We do not find major differences between the analysis reported below and the 2SLS one. Results are available from the authors.¹⁹

DEDUCTIVE ANALYSIS: RESULTS AND DISCUSSION

 Insert Tables 3, 4a & 4b about here

Table 3 presents descriptive and correlation statistics. Tables 4a and 4b present the results.

Regarding firm demographic control variables, the most consistently significant variable was *Upgrading Intent*, which was positive, followed by *Education*, which was also positive but less frequently significant and only at the 0.10 level. Given the limitations of our survey data and its relatively small size, the lack of significance of the other demographic control variables should not be construed as firm level factors not influencing upgrading. Indeed, the relative significance of both *Upgrading Intent* and *Education* supports the increasingly well-established work in strategy that knowledge stock and perceived demand impact the likelihood firms with upgrade products (Cohen & Levinthal, 1990; Kaplan, 2008). Given the strength of our results below, the significance of these variables support calls by Giuliani & Bell (2005) for further research on their interaction with network variables. We discuss the implications of the location controls below.

With regard to the network variables, Model 2 shows that there is a positive and significant effect from *Ties to All Alters* ($\beta = 0.20$). This serves as an additional baseline model in two ways. It supports the increasingly held argument in both the network and development literatures that a firm's overall embeddedness is strongly associated with product upgrading, as the multiplicity of inter-active relationships to organizations and institutions can increase its access to knowledge

¹⁹ The best instrument we have is the answer to the question: "What percentage of your sales was utilized to adopt the latest technology for the fermentation process?" This question should be associated to *Upgrading Intent*, but not to *Product Upgrading*, since it refers mainly to the firm's investment in state-of-the-art equipment to improve processes but it is not necessarily to create new products with greater value.

resources. It also serves as a point of comparison as we decompose the networks. Following Fleming (2001), Lin (2001), and Owen-Smith & Powell (2004), we have argued that Mendoza's approach helped improve product upgrading because it offered wineries access to new knowledge resources via specific types of organizations and institutions. This view gains support from the increase in the R^2 values for the subsequent models, and it is magnified when we consider the effects of the different network variables, to which we now turn.

As discussed in the previous section, we created two sets of models to allow for consistency in the way we decompose the network variables. We found support for our Hypotheses 1a and 1b in Model 3 (Table 4a) and Model 5 (Table 4b). Model 3 shows that higher levels of product upgrading are positively and very significantly associated with the number of ties a focal firm has to other firms ($\beta = 0.41$) and to GSIs ($\beta = 1.12$), both with significance at the 0.01 level. Model 5 shows similar results. We found support for Hypothesis 2 in Models 3 and 4 of Table 4a. In both models, the variables for the number of ties a focal firm has to associations, schools, banks, cooperatives, and schools were either negative or insignificant. These types of organizations could be beneficial to the extent that they promote support services and cross-cutting ties that provide access to a variety of knowledge resources (Safford, 2007; Zuckerman & Sgourev, 2006). Rather, the results suggest that in this context these organizations do not have such traits, while wineries access new applied knowledge mainly through ties to other firms and to GSIs. Our qualitative analysis showed that Mendoza's policy approach helped firms gain such access because of the new scale and scope of resources available in GSI and the way that their programs helped firms learn from one another.²⁰

²⁰ Given the cross-sectional nature of our data, we can not exclude, however, the supposition that the inter-firm ties were formed prior to these policies or via unobserved third parties.

The effect of GSIs is further clarified from the supporting evidence for Hypothesis 3 found in Model 4 (Table 4a) and Model 6 (Table 4b), which decompose the GSI variable into two parts – *Ties to PPIs* and *Ties to Old GSIs*, while holding all other variables the same. Both models show that higher levels of product upgrading are positively and significantly (at the 0.05 level) associated with the number of ties the focal firm has to PPIs, but not significantly associated with the ties to the old GSIs. These results support our qualitative analysis that wineries found value mostly in the PPIs, because they were the initiators of the new participatory governance mechanism that anchored their ability to create and deliver a new variety of knowledge resources to firms. In contrast, the old GSIs appeared less able to do so as they were not created with governance structures that institutionalized ties to sectoral and zonal associations and were slow to adapt their roles.

Hypotheses 4-5 sought to explore further the different mechanisms through which mediating firms and GSIs provide access to a variety of knowledge resources. As discussed in the previous section, to test these hypotheses we decomposed *Ties to Firms* and *Ties to GSIs* by isolating the ties to the most central firms and GSIs, respectively, (Model 7) and the ties to the firms and GSIs, respectively, with the most geographically diverse networks (Model 8).

Model 7 (Table 4b) does not lend support to Hypothesis 4a, as the number of ties to the most central firms was not significant. It does support Hypothesis 4b, showing that higher levels of product upgrading are positively and significantly associated with the number of ties a focal firm has to the most central GSIs ($\beta = 3.59$, at the 0.05 level). We also found support for Hypotheses 5a and 5b in Model 8 (Table 4b). Higher levels of product upgrading are positively and significantly associated with the number of ties a focal firm has to other firms and GSIs with the most geographically diverse pattern of connections ($\beta = 1.53$ and 5.44 , respectively, both at the 0.05 level). Models 7&8 also reveal that the effects of the other network variables are negative

or not significant, with the exception of *Ties to Firms Except Top Central Firms*, which was positive and marginally significant.

The motivation behind these hypotheses is twofold. If access to diverse knowledge is key, then higher levels of upgrading should be associated with ties to alters that have the highest centrality and bridging traits but not with ties to alters that lack these traits. The results appear to broadly confirm our claim, but more so for GSIs than for firms. Although our data prevented us from testing which of these traits appeared more dominant, as noted above, the combination of these quantitative results and our qualitative analysis suggest that a firm's access to diverse knowledge resources depends on it being tied not just to any or many organizations and institutions but particularly on its being tied to those that excel in centrality and bridging qualities.

Indeed, our qualitative analysis suggested that both mechanisms could be at work. For instance, the Mendoza's PPIs appeared to foster flows of information, resources and contacts across the distinct producer communities because of both their encompassing and bridging characteristics. Moreover, given the context, one would expect that there would be relatively few GSIs (e.g., compared to the number of different firms). To the extent that the Mendoza reforms and the institutions are providing validated benefits to firms, then ever more firms would be associated with them. That is, centrality and bridging are not necessarily mutually exclusive traits for an organization (Borgatti, 2005). One could also argue that an unexpected benefit of Mendoza policy is that the complementarities of the traits allow GSIs to be vital sources of sustainable value creation for firms (Burt, 2000; Safford, 2007). Their multiplex, bridging nature limits the ability of GSIs to promote a single upgrading strategy or become any single interest group's gate keeper, risks often associated with a central, powerful actor (Romanelli & Khessina, 2005). At the same time, their encompassing nature helps consolidate programs and services focused on collaboration and the pursuit of innovation.

Public-Private Institutions and Product Upgrading

As discussed in the previous section, the statistical analysis alone can suffer from problems of endogeneity because of its cross-sectional nature. For instance, given the lack of longitudinal statistical evidence, one could still argue that upgrading is driven by old inter-firm relationships or that the institutions of Mendoza mainly work with firms with superior capabilities. Our research design and the combination of qualitative and quantitative the analyses have tried to overcome these limitations, revealing less a definitive theory of upgrading and more a plausible role for public policy in improving firm access to a variety of knowledge resources (Edmondson & McManus, 2007; O'Mahony & Ferraro, 2007; Uzzi, 1996).

The qualitative analysis sought to illuminate the institutional mechanisms that could reshape network ties and knowledge diffusion between firms by examining how the policy divergences between San Juan and Mendoza could account for differences product upgrading. The evidence suggested that while pre-existing socio-economic relationships could impede broad based collective action and knowledge diffusion, Mendoza's approach to constructing PPIs helped firms improve their access to new knowledge resources by providing a new scale and scope of services and by facilitating new relationships between firms themselves. In particular, the resulting PPIs had governance rules that allowed them to develop multiplex, bridging relationships between different producer communities as well as to facilitate collective problem-solving among their representatives that governed the PPIs. The combination of these rules and network qualities helped the PPIs, and later some older GSIs, to solve two major barriers to product upgrading and learning for firms in emerging markets – weak institutional resources and socio-economic fragmentation.

The statistical analysis then tested the relationship between product upgrading and a focal firm's ties to other firms, GSIs, and PPIs as well as explored more fully the mechanisms that

facilitate one's access to a variety of knowledge resources via these intermediating firms and institutions. The statistical evidence appeared to support our claims about the role of Mendoza's approach improving access for firms to a variety of new applied knowledge resources, in turn their product upgrading, particularly given the positive and significant impact of such variables as the ones capturing ties to the PPIs and those capturing ties to the alters that have the highest centrality and bridging traits. This reinforces the view that access to a variety of knowledge resources depends not simply on whether the alters are public or private per se but whether the alters are constituted in ways that provide cross-cutting ties between producer communities (Fleming & Waguespack, 2007; Safford, 2004; Zuckerman & Sgourev, 2006). Indeed, if we limit analysis to only market and non-state actors, we might miss two key ways in which the institutional qualities of regional clusters and government policy can improve innovative capacities in general.

First, to the extent that access to a variety of knowledge resources is vital for firm upgrading, the qualitative and quantitative evidence reframes our notion about which types of alters may facilitate such access. Prior research on innovation has emphasized the importance of firms and associations providing cross-cutting relationships between previously isolated groups of firms (Fleming, 2001; Safford, 2004; Zuckerman & Sgourev, 2006) and the role of GSIs helping diffuse knowledge in providing collective resources and having a public mission to share new knowledge (Breznitz, 2007; Owen-Smith & Powell, 2004). The evidence here supports a blending of the two views in that the effectiveness of government programs are rooted in the institutionalization of their network qualities. The innovation in Mendoza's approach was constructing a new set of GSIs, the PPIs, with rules of inclusion and participatory governance. These rules anchored the multiplex bridging qualities of PPIs that underpinned their ability to provide a new scale and scope of knowledge resources to firms and mold new relationships between them. Hence, this research suggests that firms can improve their access to a variety of

knowledge resources and their attendant “combinatory capacities” (Moran & Ghoshal, 1999: 409) if they participate in structures that are constituted with the aforementioned institutional and network qualities.

Second, the evidence in its entirety suggests that organizational fields can be reshaped in different ways, primarily because one component – GSIs – is highly responsive to government policy. This is consistent with growing work on issues ranging from technology diffusion to health care to emerging market corporate governance that shows the impact of government policy in structuring inter-organizational networks (Knoke, 2001; Owen-Smith & Powell, 2004; Provan & Milward, 1995; Stark & Vedres, 2006). Hence, a long term consequence of Mendoza’s policy has been to reshape the organizational field in ways that differed significantly from the province’s past and from San Juan. For instance, Figure 2 offers a UCINET (Borgatti et al. 2002) depiction of the ties between focal firms and the entities we coded as GSIs, comparing the two provinces. An immediate observation is that firms in Mendoza now live in a much richer institutional environment than those in San Juan. Such a view coincides with the increasingly growing argument that locational variables, some of which were significant in our models, should be viewed not simply as proxies for geography and natural resources but as indicators of the different constellations of organizations and institutions, in which a firm is embedded (Granovetter, 2002; Locke, 2005; Owen-Smith & Powell, 2004; Saxenian 1994).

 Insert Figure 2 about here

CONCLUDING REMARKS

This article has sought to explain how firms upgrade products in a society seemingly trapped in a history of dysfunctional institutions and social capital. In building on research emphasizing how the composition of networks can impede and facilitate knowledge transfer, we have argued that a

firm's access to a variety of knowledge resources depends on its ties not simply to any or many organizations or institutions but especially to those that excel in their centrality and bridging qualities. In particular, we have highlighted the distinct governance principles that can anchor multiplex bridging traits in government support institutions (GSIs) and, in turn, underpin their ability to provide to firms a new scale and scope of diverse services and foster new learning relationships between firms from previously isolated producer communities. Rules of inclusion and participatory governance for relevant public and private actors institutionalize mechanisms that can facilitate a recombination of knowledge resources and create new cross-cutting professional ties between actors engaged in public policy and firm strategy. Our inter-disciplinary approach suggests two related directions for further research at the intersection of institutional and network theory.

First, the results suggest further research on the ways in which firms can access a variety of knowledge resources via intermediaries with different institutional and network qualities. While much of the research on knowledge transfer and innovation has focused on the types of relationships between firms and individuals (Sorenson, Rivkin, & Fleming, 2006; Bell & Zaheer 2007), students of public policy tend to focus on the stock of collective knowledge resources provided by non-market actors, such as GSIs and associations (Breznitz, 2007; Spencer *et al.*, 2005). In contrast to both, this article supports an increasingly salient stream of research, which emphasizes how public and private actors can construct new institutions that improve firm access to a variety of knowledge resources because of the underlying network properties of these non-market intermediaries (McEvily & Zaheer, 1999; Zuckerman & Sgourev, 2006).

Second, our research calls for further analysis about the relationship between the governance principles of intermediating organizations, namely GSIs, and their ability to alter the flow of knowledge in industries. While such scholars as Owen-Smith & Powell (2004) have

studied how the institutional demography of networks shapes the content of information, they have stressed how GSIs and non-profit organizations are distinct because of their rules guiding the dissemination of proprietary information. We do not deny the importance of this institutional trait. But our research also emphasizes that the governance principles of GSIs can help institutionalize distinct network qualities, such as the multiplex bridging qualities of the PPIs in Mendoza. Such principles as empowered inclusion and participatory governance for a diverse set of relevant public and private actors can enable GSIs to provide more effective knowledge resources to firms as well as to reshape the relationships between firms themselves. Naturally, we have not exhausted the relevant governance principles or the types of institutions. Rather, this research is but one contribution to a growing effort in management and policy studies to identify how the construction of institutions in a variety of industries can recast or reify the diffusion of information and resources between firms (Campbell, 2004; Knoke, 2001; Lounsbury, 2001).

As societies debate ways to improve their industries, their governments have alternatives to pure state or market coordination by constructing new institutions that are governed by a wider variety of public and private actors than previously considered. Inclusive, participatory governance can institutionalize problem-solving mechanisms that help such actors build new horizontal professional ties and graft broader strategic considerations onto their past mutual hold-up instincts. In turn, such an institutional approach, be it for new regulatory bodies or agencies that provide R&D and training, has the opportunity to facilitate a recombination of different knowledge resources and aid constituent firms to learn from one another.

TABLE 1. Public-Private Institutions in Mendoza Created in the 1990s

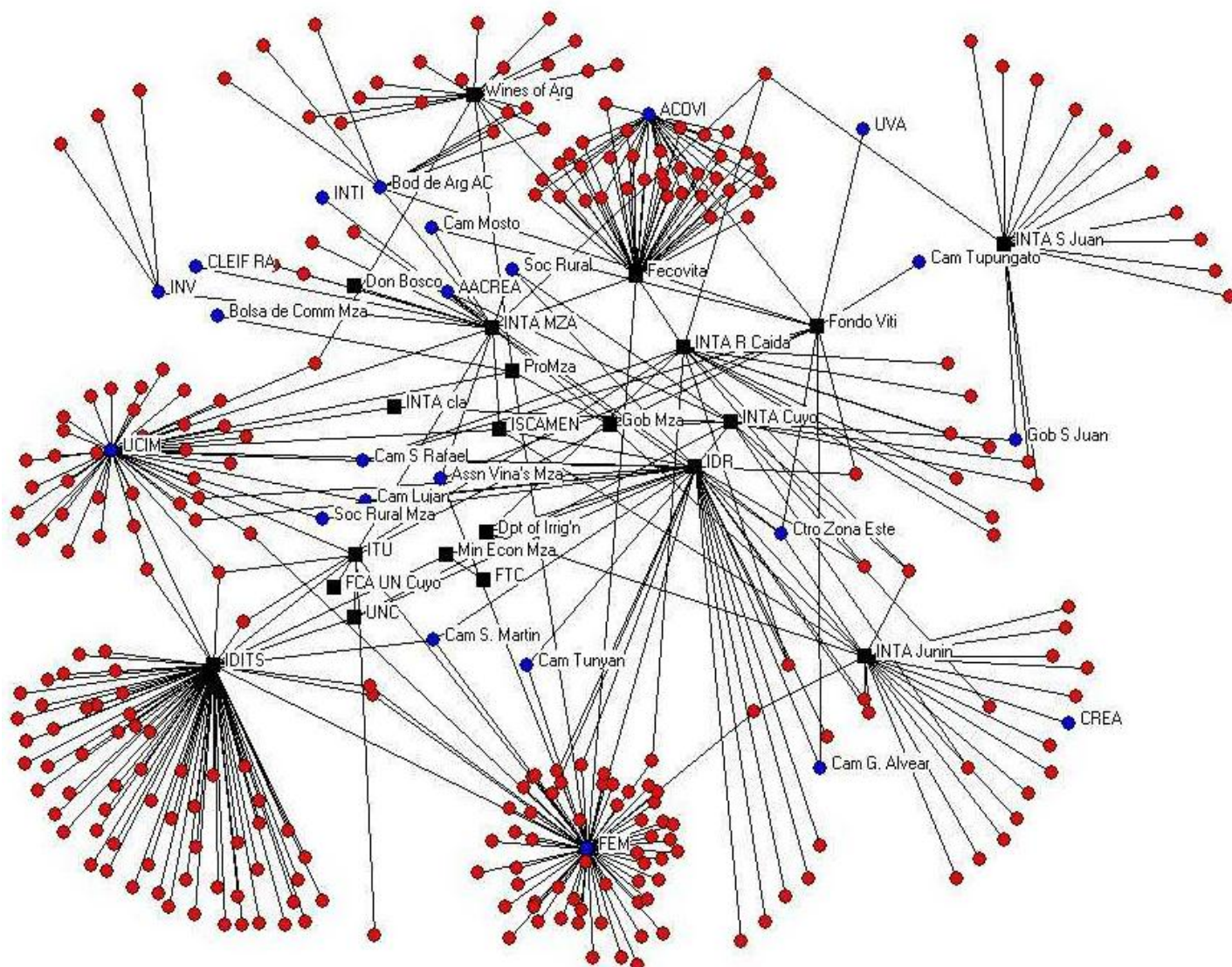
Institution	Year of creation or restructuring	Governing Members	Activities	Resources	Legal Form
INTA EEAs	1991; INTA San Juan reformed in 1996	Gov't of Mza, 15 Agro Ass'ns, Nat'l and Prov'l Institutes and Univ's	R&D (inputs, plants, tech), extension training, consulting	50% – Govt budget (salaries & overhead); 50% – services, alliances, cooperadoras	Part of INTA Cuyo; 4 in Mza, 1 in SJ; Public, Non-state, non-profit entity.
Fondo Vitivinicola	1993-94	Gov't Mza, 11 wine/grape Ass'ns	Oversees new wine regulations, promotes wine industry/marketing	Tax on firms from over produc'n of wine	Public, non-state, non-profit entity.
Fondo para la Transformacion y el Crecimiento (FTC)	1993-94	Gov't Mza, Regional advisory councils, ass'ns	Subsidized loans and credit guarantees to SMEs for tech. against extreme weather & for grape conversion	Self-financing; initial capital from gov't.	Independent legal entity under authority of governor.
Instituto Desarrollo Rural (IDR)	1994-95	36 founders – INTA Cuyo, Govt Mza, 2 peak ass'ns, various agro sectoral ass'ns	Technical info collection & dissemination; Data base mgmt; R&D, training, consulting	Mza Gov't; services; gradual increase of fees from member ass'ns	Non-profit Foundation; with oversight by Min of Economy
Instituto Tecnológico Universitario (ITU)	1994	Founders -- Gov't Mza, Univ Nacional Cuyo, UTN, 2 peak ass'ns	Continuing education for managers and some R&D in mgmt and technology	Founders; fees for services	Non-profit Foundation
Pro Mendoza	1995-96	Gov't Mza, 3 peak business associations	Export promotion – organize fairs, delegations, strategic information, training	Gov't Mza; Peak ass'ns; services	Non-profit Foundation

Abbreviations: INTA – Instituto Nacional de Tecnología Agropecuaria; EEA – Estaciones Experimentales (Sub-regional centers); Mza – Mendoza; Cooperadoras – Non-profit NGOs.

Source: Adapted from McDermott (2007: 123)

FIGURE 1. Mendoza Policymaking Network in the Wine Industry, 2001

NB. Circles are agro-industry associations; wine/grape associations are labeled. Black squares are GSIs. PPIs are INTA offices, ProMza, IDR, IDITS, Fondo Viti, ITU, FTC, Wines of Arg. Source: Publicly available board data collected by authors.

**TABLE 2. Largest Betweenness Scores, Mendoza 2001**

	Betweenness	nBetweenness		Betweenness	nBetweenness
<i>FEM-peak ass'n</i>	20718	39.59	<i>INTA S. Juan</i>	3429	6.55
<i>IDITS</i>	18107	34.60	<i>ProMza</i>	2962	5.66
<i>UCIM-peak ass'n</i>	13556	25.91	<i>INTA Cuyo</i>	2805	5.36
<i>Fecovita-Coop Fed</i>	12894	24.64	<i>South Zone Ass'n</i>	2498	4.78
<i>INTA Mza</i>	8431	16.11	<i>Fondo Viti</i>	1363	2.61
<i>IDR</i>	8041	15.37	<i>Bod. Arg (elite ass'n)</i>	1353	2.59
<i>Wines of Arg</i>	5469	10.45	<i>Univ Natl Cuyo</i>	1205	2.30
<i>INTA Junin (EEA)</i>	4148	7.93	<i>Govt Mza</i>	969	1.85
<i>INTA Rama Caida (EEA)</i>	3734	7.14	<i>Assn Vinas Mza</i>	943	1.80

NB. Bold entities are PPIs. Fecovita is the Federation of Cooperative created in 1987-88 by Mendoza gov't.

TABLE 3. Descriptive statistics and correlation table

	OBS	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Product Upgrading	97	19.20	0.68	1.00												
2 Total Sales	97	3.06	0.19	0.12	1.00											
3 Foreign Ownership	97	0.09	0.03	0.24 *	0.23 *	1.00										
4 Education	97	4.14	0.25	0.24 *	0.17	0.34 *	1.00									
5 Enologist	97	0.71	0.04	0.18	0.17	0.03	0.09	1.00								
6 Upgrading Intent	97	4.76	0.32	0.39 *	0.12	0.25 *	0.38 *	0.05	1.00							
7 East	97	0.31	0.04	-0.06	0.01	-0.21 *	-0.18	0.15	-0.26 *	1.00						
8 South	97	0.15	0.03	-0.21 *	0.20 *	-0.05	-0.05	-0.03	-0.09	-0.31 *	1.00					
9 Valle Uco	97	0.13	0.03	0.05	-0.16	0.16	0.31 *	-0.26 *	0.49 *	-0.29 *	-0.20	1.00				
10 San Juan	97	0.20	0.04	0.01	-0.15	-0.15	-0.07	0.10	-0.07	-0.31 *	-0.21 *	-0.20	1.00			
11 Ties to All Alters	97	21.28	1.32	0.20	0.19	-0.08	0.21 *	-0.08	0.24 *	0.04	-0.10	0.52 *	-0.35 *	1.00		
12 Ties to All Alters Except Firms & GSIs	97	4.42	0.43	0.07	0.18	-0.01	0.31 *	-0.05	0.31 *	-0.23 *	0.08	0.41 *	-0.12	0.63 *	1.00	
13 Ties to Associations	97	1.39	0.19	0.26 *	0.23 *	0.28 *	0.57 *	0.12	0.43 *	-0.26 *	-0.03	0.37 *	-0.04	0.52 *	0.59 *	1.00
14 Ties to Banks	97	1.08	0.12	-0.03	0.18	-0.09	0.19	-0.31 *	0.20	-0.29 *	0.25 *	0.41 *	-0.12	0.53 *	0.64 *	0.29 *
15 Ties to Cooperatives	97	0.84	0.16	-0.05	0.11	-0.06	0.04	-0.07	0.20	0.00	-0.02	0.44 *	-0.21	0.48 *	0.48 *	0.17
16 Ties to Firms	97	12.02	0.76	0.19 *	0.25 *	-0.11	-0.04	0.06	-0.04	0.37 *	-0.15	0.06	-0.36	0.77 *	0.20	0.17
17 Ties to GSIs	97	4.84	0.51	0.19	0.03	0.06	0.32 *	-0.11	0.42 *	-0.29 *	0.01	0.60 *	-0.21	0.59 *	0.54 *	0.50 *
18 Ties to Schools	97	1.11	0.15	0.30 *	0.21 *	-0.03	0.09	-0.03	0.25 *	-0.19	-0.10	0.15	0.03	0.46	0.56 *	0.32 *
19 Ties to Old GSIs	97	2.11	0.26	0.02	-0.08	-0.09	0.19	0.00	0.25 *	-0.19	-0.01	0.39 *	0.09	0.36	0.48 *	0.39 *
20 Ties to PPIs	97	2.72	0.31	0.20 *	0.10	0.11	0.24 *	-0.15	0.37 *	-0.21 *	0.08	0.56 *	-0.51	0.62 *	0.43 *	0.38 *
21 Ties to All Firms Except Top Geo Div Firms	97	8.62	0.57	0.09	0.25 *	-0.19	-0.09	0.04	-0.14	0.38 *	-0.08	0.01	-0.29	0.68 *	0.14	0.07
22 Ties to All GSIs Except Top Geo Div GSIs	97	3.29	0.39	0.15	0.00	-0.09	0.22 *	-0.02	0.36 *	-0.17	-0.08	0.43 *	0.00	0.45	0.48 *	0.40 *
23 Ties to All Firms Except Top Central Firms	97	6.09	0.42	0.20 *	0.32 *	-0.12	-0.10	0.17	-0.14	0.21 *	0.04	-0.23 *	-0.16	0.49	0.05	0.01
24 Ties to All GSIs Except Top Central GSIs	97	2.25	0.28	0.11	-0.07	0.03	0.21 *	-0.15	0.32 *	-0.34 *	-0.15	0.45 *	0.15	0.37	0.46 *	0.44 *
25 Ties to Top Central Firms	97	5.93	0.44	0.06	0.14	-0.07	-0.01	-0.03	0.00	0.39 *	-0.24 *	0.25 *	-0.42	0.72 *	0.24 *	0.22 *
26 Ties to Top Central GSIs	97	2.59	0.28	0.17	0.13	0.07	0.22 *	-0.05	0.32 *	-0.11	0.20 *	0.41 *	-0.57	0.57 *	0.39 *	0.33 *
27 Ties to Top Geo Div Firms	97	3.40	0.28	0.26 *	0.14	0.05	0.02	0.10	0.09	0.22 *	-0.14	0.09	-0.32	0.58 *	0.28 *	0.28 *
28 Ties to Top Geo Div GSIs	97	1.54	0.16	0.17	0.05	0.17	0.12	-0.13	0.28 *	-0.22 *	0.17	0.42 *	-0.53	0.51 *	0.35 *	0.29 *
		14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
15		0.49 *	1.00													
16		0.14	0.19	1.00												
17		0.46 *	0.36 *	0.09	1.00											
18		0.37 *	0.25 *	0.19	0.35 *	1.00										
19		0.29 *	0.26 *	-0.07	0.72 *	0.21 *	1.00									
20		0.42 *	0.34 *	0.25 *	0.85 *	0.31 *	0.38 *	1.00								
21		0.13	0.20	0.93 *	0.00	0.15	-0.09	0.17	1.00							
22		0.31 *	0.24 *	0.05	0.82 *	0.30 *	0.87 *	0.54 *	-0.02	1.00						
23		0.02	0.06	0.82 *	-0.12	0.13	-0.18	0.07	0.86 *	-0.10	1.00					
24		0.36 *	0.21 *	-0.09	0.72 *	0.37 *	0.72 *	0.45 *	-0.16	0.73 *	-0.21 *	1.00				
25		0.15	0.22 *	0.80 *	0.25 *	0.16	0.08	0.35 *	0.66 *	0.19	0.40 *	0.05	1.00			
26		0.34 *	0.31 *	0.28 *	0.78 *	0.22 *	0.39 *	0.89 *	0.21 *	0.55 *	0.11	0.25 *	0.38 *	1.00		
27		0.10	0.16	0.68 *	0.18	0.19	0.04	0.24 *	0.42 *	0.14	0.41 *	0.06	0.71 *	0.26 *	1.00	
28		0.35	0.29 *	0.22 *	0.74 *	0.24 *	0.31 *	0.88 *	0.14	0.39 *	0.08	0.41 *	0.29 *	0.81 *	0.23 *	1.00

NOTES:

Descriptive statistics are based on nominal values.

Network variables are transformed in correlation table.

* Significant at p -value < 0.05

TABLE 4a. Regression Results with Product Upgrading as Dependent Variable

	MODEL 1		MODEL 2		MODEL 3		MODEL 4	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Intercept	14.30	2.15	11.84	2.49	9.25	2.43 ***	9.24	2.32
Total Sales	0.33	0.36	-0.13	0.40	-0.04	0.37	-0.12	0.34
Foreign Ownership	1.80	2.32	4.26	2.57 †	4.20	2.28 †	2.26	2.23
Education	0.34	0.28	0.20	0.29	0.45	0.27	0.44	0.25 †
Enologist	1.93	1.46	1.09	1.50	-0.46	1.43	0.98	1.36
Upgrading Intent	0.74	0.23 **	0.83	0.23 ***	0.54	0.22 *	0.53	0.20 **
East	-2.74	1.86	-2.04	1.93	-0.76	1.85	-1.57	1.84
South	-7.05	2.09 ***	-5.36	2.17 *	-3.70	2.14 †	-4.90	2.07 *
Valle Uco	-4.59	2.29 *	-8.42	2.71 **	-3.30	2.73	-2.11	2.51
San Juan	-1.79	2.05	-0.19	2.22	2.60	2.16	4.98	2.39 *
Ties to All Alters			0.20	0.07 **				
Ties to Associations					-9.68	5.16 †	1.32	5.12
Ties to Banks					-11.85	7.53	-19.33	7.00 **
Ties to Cooperatives					-64.25	32.86 †	-27.86	30.61
Ties to Schools					13.14	9.47	12.39	8.76
Ties to Firms					0.41	0.12 ***	0.36	0.12 **
Ties to GSIs					1.11	0.40 **		
Ties to Old GSIs							-2.04	2.11
Ties to PPIs							3.03	1.28 *
N		97		97		97		97
R-Squared		0.53		0.59		0.63		0.62

NB: The Grand Mendoza Zone is the omitted location.

† p-value < 0.10; * p-value < 0.05; ** p-value < 0.01; *** p-value < 0.001

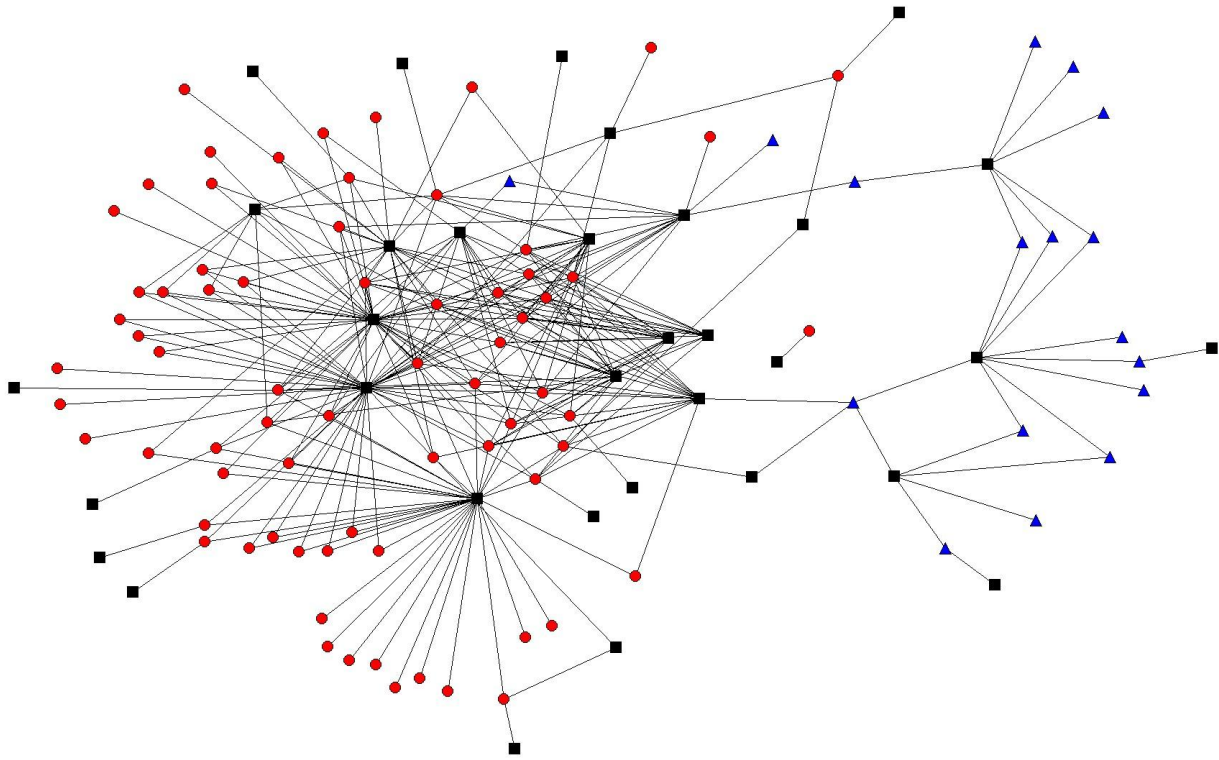
TABLE 4b. Regression Results with Product Upgrading as Dependent Variable

	MODEL 5		MODEL 6		MODEL 7		MODEL 8	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Intercept	11.12	2.48 ***	10.55	2.54 ***	12.45	2.50 ***	11.26	2.53 ***
Total Sales	-0.01	0.38	-0.06	0.38	-0.01	0.39	0.16	0.39
Foreign Ownership	3.86	2.43	3.90	2.44	3.83	2.47	2.56	2.52
Education	0.37	0.28	0.41	0.28	0.40	0.29	0.53	0.29 †
Enologist	0.60	1.44	0.71	1.45	0.29	1.48	0.39	1.45
Upgrading Intent	0.70	0.23 **	0.70	0.23 **	0.68	0.24 **	0.66	0.24 **
East	-1.98	1.91	-1.11	2.03	-1.24	2.02	-1.17	2.06
South	-5.73	2.13 **	-5.41	2.16 *	-6.54	2.21 **	-5.70	2.14 **
Valle Uco	-6.89	2.52 **	-6.59	2.53 **	-5.23	2.61 *	-5.31	2.50 *
San Juan	0.92	2.17	3.23	2.61	2.58	2.59	2.90	2.62
Ties to All Alters								
Ties to All Alters Except Firms & GSIs	-0.71	0.45	-0.53	0.46	-0.50	0.46	-0.77	0.46 †
Ties to Firms	0.34	0.12 **	0.29	0.13 *				
Ties to GSIs	0.97	0.41 *						
Ties to Old GSIs			-0.21	2.34				
Ties to PPIs			3.53	1.46 *				
Ties to all Firms Except Top Central Firms					0.42	0.24 †		
Ties to All GSIs Except Top Central GSIs					0.55	2.45		
Ties to Top Central Firms					0.22	0.43		
Ties to Top Central GSIs					3.59	1.59 *		
Ties to All Firms Except Top Geo Div Firms							0.18	0.19
Ties to All GSIs Except Top Geo Div GSIs							0.72	1.22
Ties to Top Geo Div Firms							1.53	0.73 *
Ties to Top Geo Div GSIs							5.44	2.75 *
N		97		97		97		97
R-Squared		0.61		0.63		0.62		0.62

NB: The Grand Mendoza Zone is the omitted location.

† p-value < 0.10; * p-value < 0.05; ** p-value < 0.01; *** p-value < 0.001

FIGURE 2. Ties Between Focal Firms and GSIs in Mendoza & San Juan



Note: The circles on the left denote wineries in Mendoza. The triangles on the right denote wineries in San Juan. The squares denote GSIs. Source: Authors' survey data, 2004-05.

REFERENCES

- Ahuja, G. 2000. Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly*, 45(3): 425-455.
- Azpiazu, D. & Basualdo, E. 2003. Industria vitivinicola. *Estudios sectorials: Estudio 1.EG.33.6* . Buenos Aires: CEPAL.
- Benjamin, B.A.; & Podolny, J. 1999. Status, quality, and social order in the California wine industry, 1981-1991. *Administrative Science Quarterly*, 44(3): 563-589.
- Borgatti S.P. 2005. Centrality and network flow. *Social Networks* , 27(1): 55-71.
- Borgatti, S. P., Everett, M. G., & Freeman, L. C. 2002. *Ucinet for Windows: Software for social network analysis*. Harvard, MA: Analytic Technologies.
- Box, G. E. P. & Cox, D. R. 1964. An analysis of transformations. *Journal of the Royal Statistical Society. Series B (Methodological)*, 26(2): 211-252.
- Breznitz, D. 2007. *Innovation and the state: political choice and strategies for growth in Israel, Taiwan, and Ireland*. New Haven: Yale University Press.
- Burt, R. S. 1983. Range. In R. S. Burt, & M. J. Minor, (Eds.), *Applied network analysis*: 176-194. Beverly Hills, CA: Sage Publications.
- Burt, R. 1992. *Structural holes: The social structure of competition*. Cambridge: Harvard University Press.
- Burt, R. S. 2000. The network structure of social capital. In R. Sutton & B. Staw (Eds.), *Research in organizational behavior*, 22: 345-423. Greenwich, CT: JAI Press.
- Buse, R.C. 1973. Increasing response rates in mailed questionnaires. *American Journal of Agricultural Economics*, 55(3): 503-508
- Campbell, J. L. 2004. *Institutional change and globalization*. Princeton: Princeton University Press.
- Casaburi, G. 1999. *Dynamic agroindustrial clusters: The political economy of competitive sectors in Argentina and Chile*. New York: St. Martin's Press.
- Cetrangolo, H., Fernandez, S., Quagliano, J., Zelenay, V., Muratore, N., & Lettier, F. 2002. *El negocio de los vinos en la Argentina*. Buenos Aires: FAUBA.
- Cohen, W. M., & Levinthal, D. A. 1990. Absorptive capacity: A new perspective on learning and innovation, *Administrative Science Quarterly*, Vol. 35(1): 128-152.

Cross R, Borgatti, S. P., & Parker, A. 2001. Beyond answers: dimensions of the advice network. *Social Networks*, 23(3): 215-235

DiMaggio, P. & Powell, W. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48: 147-160.

Doner, R. F., Ritchie, B. K., & Slater, D. 2005. Systemic vulnerability and the origins of developmental states: Northeast and Southeast Asia in comparative perspective. *International Organization*, 59(2): 321-361.

Edmondson, A. & McManus, S. E. 2007. Methodological fit in management field research. *Academy of Management Review*, 32(4):1155-1179.

Eisenhardt, K. M. 1989. Building theories from case study research. *Academy of Management Review*, 14(4): 532-550.

Fleming, L. 2001. Recombinant uncertainty in technological search. *Management Science*, 47(1): 117-132

Fleming, L. & Waguespack, D. M. 2007. Brokerage, boundary spanning, and leadership in open innovation communities. *Organization Science*, 18(2): 165-180.

Frank, O. 2005. Network Sampling and Model Fitting. In P. J. Carrington, J. Scott & S. Wasserman (Eds.), *Models and Methods in Social Network Analysis*. Cambridge: Cambridge University Press.

Freeman, L. C. 1979. Centrality in social networks: Conceptual clarification. *Social Networks*, 1: 215-239.

Furman, J. & MacGarvie, M. 2006. Academic science and the birth of industrial research laboratories in the U.S. pharmaceutical industry. *Journal of Economic Behavior & Organization*, 63: 756-776.

Gago, E. & De La Torre, M. 1996. Las nuevas tendencias de desigualdad, polarización y exclusión. Working Paper, La Rabida, Espana, septiembre.

Giuliani, E., & Bell, M. 2005. The Micro-determinants of meso-level learning and innovation: Evidence from a Chilean wine cluster. *Research Policy*, 34(1): 47-68.

Giuliani, E., Pietrobelli, C., & Rabellotti, R. 2005. Upgrading in global value chains: Lessons from Latin American clusters. *World Development*, 33(4): 549-573.

Gobierno de San Juan. 2004. Proyecto de fortalecimiento institucional para el desarrollo rural: Provincia de San Juan.

- Granovetter, M. 2002. A theoretical agenda for economic sociology. In Guillen, M.F.; Collins, R.; England, P.; Meyer, M.(Eds). *The new economic sociology*: 35-60. New York: Russell Sage Foundation.
- Greene, W. H. 2000. *Econometric analysis*. Upper Saddle River, N.J.: Prentice Hall.
- Haggard, S. & Kaufman, R. 1995. *The political economy of democratic transitions*. Princeton, NJ: Princeton University Press.
- Hansen, M.T. 1999. The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits, *Administrative Science Quarterly*, 44: 82-111.
- Hansen, R.A, Robinson LM. 1980. Testing the effectiveness of alternative foot-in-the-door manipulations. *Journal of Marketing Research* 17(3): 359-364
- Henisz, W. J., & Zelner, B. A. 2005. Legitimacy, Interest Group Pressures, And Change In Emergent Institutions. *Academy of Management Review*, 30(2): 361-379.
- Kaplan, S. 2008. Cognition, capabilities and incentives: Assessing firm response to the fiber-optic revolution. *Academy of Management Journal*, 51(4): 672-695.
- Knoke, D. 2001. *Changing organizations: Business networks in the new political economy*. Boulder, Colo.: Westview Press.
- Lin, N. 2001. *Social capital*. New York: Cambridge University Press.
- Locke, R. M. 1995. *Remaking the Italian economy: Local politics and industrial change in contemporary Italy*. Ithaca, NY: Cornell University Press.
- Lounsbury, M. 2002. Institutional transformation and status mobility: The professionalization of the field of finance. *Academy of Management Journal*, 45(1): 255-266.
- MacDuffie, J. P. 1995. Human resources bundles and manufacturing performance: Organizational logic and flexible production systems in the world auto industry. *Industrial and Labor Relations Review*, 48(2): 197-221.
- McDermott, G. A. 2007. The politics of institutional renovation and economic upgrading: Recombining the vines that bind in Argentina. *Politics & Society*, 35(1): 103-143.
- McDermott, G. A. & Corredoira, R. A. 2009. Network Composition, Collaborative Ties, and Upgrading in Emerging Market Firms: Lessons from the Argentine Autoparts Sector. *Journal of International Business Studies*. Forthcoming.
- McEvily, B. & A. Marcus. 2005. Embedded ties and the acquisition of competitive capabilities. *Strategic Management Journal*, 26(11): 1033-1055.

- McEvily, B. & Zaheer, A. 1999. Bridging ties: A source of firm heterogeneity in competitive capabilities. *Strategic Management Journal*, 20(12): 1133-1156.
- McEvily, B. & Zaheer, A. 2004. Architects of trust: The role of network facilitators in geographical clusters. In R. Kramer & K. Cook, (Eds.), *Trust and distrust in organizations*: 189-213. New York: Russell Sage.
- Meyer, K. E. 2004. Perspectives on multinational enterprises in emerging economies. *Journal of International Business Studies*, 35(4): 259-79.
- Moran, P., & Ghoshal, S. 1999. Markets, firms, and the process of economic development. *Academy of Management Review*, 24(3): 390-408.
- Obstfeld, D. 2005. Social networks, the tertius iungens orientation, and involvement in innovation. *Administrative Science Quarterly*, 50(1): 100-119.
- O'Mahony, S. & Ferraro, F. 2007. The emergence of governance in an open source community. *Academy of Management Journal*, 50(5): 1079-1106.
- Ostrom, E. 1999. Coping with tragedies of the commons. *Annual Review of Political Science*, 2: 493-535.
- 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
- Padgett, J. F., & Ansell, C. K. 1993. Robust action and the rise of the Medici, 1400-1434. *American Journal of Sociology*, 98(6): 1259-1320.
- Paladino, M., & Jauregui, J. M. 2001. *La transformacion del sector vitivinicola Argentino*. Argentina: IAE, Universidad Austral.
- Perez-Aleman, P. 2005. Cluster formation, institutions and learning: The emergence of clusters and development in Chile. *Industrial and Corporate Change*, 14(4): 651-677.
- Porter, M. E. 1990. *The competitive advantage of nations*. New York: Free Press
- Powell, W. W., Koput, K. W., & Smith-Doerr, L. 1996. Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology, *Administrative Science Quarterly*, 41(1): 116-145.
- Provan, K. G., & Milward, H. B. 1995. A preliminary theory of interorganizational network effectiveness: A comparative study of four community mental health systems, *Administrative Science Quarterly*, 40(1): 1-33.
- Putnam, R.D., Leonardi, R., & Nanetti, R.Y. 1993. *Making democracy work*. Princeton, NJ: Princeton University Press.

Ragin, C. C. 1987. *The comparative method: Moving beyond qualitative and quantitative strategies*. Berkeley: University of California Press.

Roberts, P., & Ingram, P. 2002. Vertical linkages, knowledge transfer and export performance: The Australian and New Zealand wine industries, 1987-1999. Unpublished manuscript, Emory University.

Rodrik, D. 2004. Industrial policy for the twenty-First century, *Working paper prepared for UNIDO*.

Rofman, A. B. 1999. *Desarrollo regional y exclusión social: transformaciones y crisis en la Argentina contemporánea*. Buenos Aires: Amorrortu Editores.

Romanelli, E., & Khessina, O. M. 2005. Regional industrial identity: Cluster configurations and economic development. *Organization Science*, 16(4): 344-358.

Rousseuw, P. J. 1984. Least median of squares regression. *Journal of the American Statistical Association*, 79(388): 871-880.

Ruiz, A. M.; & Vila, H. 2003. Structural changes and strategies of the Argentinean wine chain actors. In S. Gatti, E. Giraud-Heraud, & S. Mili (Eds.), *Wine in the old world: New risks and opportunities*: 215-228. Milano: FrancoAngeli.

Sabel, C. 1994. Learning by Monitoring: The Institutions of Economic Development. In N. J. Smelser, & R. Swedberg (Eds.), *The handbook of economic sociology*: 137-165. Princeton: Princeton University Press.

Safford, S. 2007. *Why the garden club couldn't save Youngstown: Civic infrastructure and mobilization in economic crises paper*. Cambridge: Harvard University Press.

Saxenian, A. 1994. *Regional advantage: Culture and competition in Silicon Valley and Route 128*. Cambridge: Harvard University Press.

Schmitz, H. (Ed.). 2004. *Local enterprises in the global economy: Issues of governance and upgrading*. Northampton, MA: Edward Elger.

Schneider, B. 2004. *Business politics and the state in twentieth-century Latin America*. Cambridge; New York: Cambridge University Press.

Song, J. 2002. Firm capabilities and technology ladders: Sequential foreign direct investments of Japanese electronic firms in East Asia. *Strategic Management Journal*, 23(3): 191.

Sorenson, O., Rivkin, J. W., & Fleming, L. 2006. Complexity, networks and knowledge flow. *Research Policy*, 35(7): 994-1017.

- Spencer, J. W., Murtha, T. P., & Lenway, S. A. 2005. How governments matter to new industry creation. *Academy of Management Review*, 30(2): 321.
- Spicer, A., McDermott, G. A., & Kogut, B. 2000. Entrepreneurship and privatization in central Europe. *Academy of Management Review*, 25(3): 630-646.
- Stark, D., & Bruszt, L. 1998. *Post-socialist pathways: Transforming politics and property in Eastern Europe*. New York: Cambridge University Press.
- Stark, D. & Vedres, B. 2006. Social times of network spaces: Network sequences and foreign investment in Hungary. *American Journal of Sociology*, 111(5): 1367-1411.
- Strauss, A. & Corbin, J. 1998. *Basics of qualitative research*. London: Sage Publications.
- Swaminathan, A. 2001. Resource partitioning and the Evolution of specialist organizations: The role of location and identity in the U.S. wine industry. *Academy of Management Journal*, 44(6): 1169-1185.
- Tendler, J. 1997. *Good government in the tropics*. Baltimore: Johns Hopkins University Press.
- Thelen, K. 2003. How institutions evolve: insights from comparative historical analysis, in J. Mahoney & D. Rueschemeyer (Eds.) *Comparative historical analysis in the social sciences*: 208-240. New York: Cambridge University Press.
- Uzzi, B. 1996. The sources and consequences of embeddedness for the performance of organizations: The network effect. *American Sociological Review*, 61(4) 674-698.
- Walters, A. 1999. *Rebuilding technologically competitive industries: Lessons from Chile's and Argentina's wine industry restructuring*. Unpublished doctoral dissertation, Massachusetts Institute of Technology.
- Wasserman, S.; & Faust, K. 1994. *Social network analysis: Methods and applications*. Cambridge: Cambridge University Press.
- Wooldridge, J. M. 2002. *Econometric analysis of cross section and panel data*. Cambridge, Mass.: MIT Press.
- Zollo, M., & Winter, S. G. 2002. Deliberate learning and the evolution of dynamic capabilities. *Organization Science*, 13(3): 339-351.
- Zuckerman, E. & Sgourev, S. 2006. Peer capitalism: Parallel relationships in the U.S. economy. *American Journal of Sociology*, 111(5): 1327-1366.

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