

PUBLIC-PRIVATE INSTITUTIONS AS CATALYSTS OF UPGRADING IN EMERGING MARKET SOCIETIES

GERALD A. McDERMOTT
University of South Carolina

RAFAEL A. CORREDOIRA
University of Maryland

GREGORY KRUSE
University of Pennsylvania

In this article, we argue that the ability of a firm to access a variety of knowledge resources and, in turn, upgrade its products depends on its being tied not simply to any or many organizations and institutions, but rather to those that act as social and knowledge bridges between previously isolated producer communities. Through a multimethod 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.

Since the late 1990s, scholars of international management and economic development have increasingly argued that the competitiveness of emerging market countries often depends 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 has emphasized 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 body of work in the management literature states that access to knowledge often depends on whether firms are embedded in rich interfirm networks that enable them to build col-

laborative relationships, gain resources, learn, and coordinate experiments (McEvily & Marcus, 2005; Powell, Koput, & Smith-Doerr, 1996). However, scholars have also noted how past firm practices, social structures, and institutions are slow to change and can constrain 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 in Latin America, where societies are often noted for their weak institutions and social capital (Henisz & Zelner, 2005). But researchers have tended 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 addresses the dual nature of embeddedness in terms of the structure and composition of organizational networks (Campbell, 2004; Granovetter, 2002; Knoke, 2001). For instance, both policy and network scholars have noted how the very interorganizational networks and their attendant norms that can promote cohesion among firms in a certain community can also thwart broad-based upgrading by restricting firms' access to knowledge beyond the community (Lin, 2001; Locke, 1995; Ostrom, 1999; Safford,

We would like to thank our guest coeditor, Siobhan O'Mahony, and the anonymous reviewers for excellent comments and suggestions; Michael Gruber, Jonathan Kramer, Valentina Marano, and Maura Pape for their outstanding research assistance; and IDR Mendoza and IAE Buenos Aires for collaboration in data collection. We are especially grateful to our colleagues for numerous suggestions on improving the paper during various research seminars and to the Reginald Jones Center at Wharton, the University of Pennsylvania Research Fund, the William Davidson Center at the University of Michigan, and CIBER at the Moore School of Business for their generous financial support of this project. All errors and omissions are our own.

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 and Sgourev (2006), showed how certain voluntary civic and industry associations facilitate learning via their ability to create horizontal, or cross-cutting, ties between firms from different social and geographic communities. McEvily and Zaheer (1999) and Owen-Smith and Powell (2004) stated that government support institutions (GSIs), such as public research institutes and training centers,¹ help firms access new knowledge because of 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's being tied not simply to any or many organizations and GSIs, but rather to those that act as social and knowledge bridges between 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 also by constructing new sets of institutions 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 among them. That is, governments can reshape the structure and composition of organizational fields and, as a result, 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 wine-making provinces

of Mendoza and San Juan. On the one hand, Argentina is a country known for its dysfunctional social capital and institutions, and 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 interfirm networks that appears to have facilitated widespread product upgrading. San Juan, in contrast, remained a laggard, despite its numerous firms, high density of associations, and policies that ushered in new investment. This setting allowed 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 in 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 among 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 with 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 organi-

¹ This article focuses on the heterogeneity of organizations and institutions in a region. For the sake of simplicity, we consider 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 as a government support institution. 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.

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

zations. These mediating firms and GSIs have particular value because of their centrality and bridging qualities that offer 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*, 2007

Argentina is historically one of the largest-volume producers of wine in the world, and 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 advances in product quality and innovation. Argentine vineyards significantly increased the grape varieties of high enological value from 20 percent of vine surface area in 1990 to about 43 percent by 2001 (Cetrangolo, Fernandez, Quagliano, Zelenay, Muratore, & Lettier, 2002). Wine quality improved to the extent that 85 percent of wine exports represented 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 new products, such as previously undervalued varietals, "redesigned" varietals from other regions of the world, and distinctive³ blends.

Mendoza became the leader of this transformation, charting a path of innovation in the 1990s that diverged remarkably from both its own past and that of its neighbor, San Juan, despite their common, unproductive histories (Cetrangolo et al., 2002; Ruiz & Vila, 2003). Mendoza and San Juan account for roughly 60 percent and 30 percent, respectively, of the country's wine production. But the former's share of wine exports is over 90 percent and the latter's, only 6 percent. Analyses showed that improvements in product quality and vineyard conversion were both more widespread and advanced among firms in Mendoza than in San

Juan by the late 1990s. Indeed, even a number of firms from zones of Mendoza (subregions, such as 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; Moran & Ghoshal, 1999; Schmitz, 2004). As Fleming (2001) argued, this process of recombination is fraught with technological and market uncertainties, demanding that firms gain the 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. Although firms gain 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 nonmarket actors such as trade associations and GSIs that provide training or R&D services (McEvily & Zaheer, 1999; Owen-Smith & Powell, 2004).

Such a view of product upgrading has been 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; the process begins with transforming the middle segments of the value chain, instituting 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 varietals 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. Therefore, to accelerate product upgrading, wineries gain a variety of market and applied technical knowledge from other firms, as well as col-

³ Details on the prominence of Argentine wines in world markets and their unique product innovations can be found in Cetrangolo et al. (2002); in *El Mercurio* (2005); and in the lengthy annual reviews of Argentine wines in the *Wine Spectator* for December 15, 1997, March 24, 2003, November 30, 2004, and 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 percent possessed modern quality control systems (McDermott, 2007).

lective resources housed in industry associations, schools, and GSIs.

Such coordination and relation-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 studied here, there are over 100 microclimates supporting a wide variety of high-value grapes and thousands of small producers, which typically supply 30 to 50 percent of a winery's needs. Mendoza and San Juan still have over 680 and 170 wineries, respectively, which range from many small and medium-sized family firms to some cooperatives and a few large diversified corporations. Industry concentration remains low by international standards, with over 300 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 interfirm experiments, the sustained provision of collective resources, and the widespread 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 be 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 rely on the determinate power of different inherited economic and social endowments to enable or constrain the ability of a region to innovate. According to the first view, innovative capacities emerge in a 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). According to the second view, upgrading is likely to occur in societies historically rich in enduring networks and their attendant social capital, a richness manifested in a high density of associations and cooperatives, as well as in coherent public policies (Putnam et al., 1993; Schmitz, 2004). Given the market liberalization policies launched in Argentina in 1989, both views would lead to an assertion that variation in upgrading between firms in Mendoza and San Juan was largely the result of different preexisting 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 provinces' wine industries, McDermott (2007) showed that although Mendoza was about twice the size of San Juan in population and gross domestic product (GDP), the two 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 1,000 inhabitants, and San Juan in fact had more agricultural cooperatives.⁶ Through the 1980s, they also had similar structures and histories of business and sectoral

⁵ On the variety and decentralized structure of wine and grape production, see Cetrangolo et al. (2002), Ruiz and Vila (2003), and McDermott (2007). As of 2003, there were still over 16,000 vineyards in Mendoza and 6,000 in San Juan; 90 percent had less than 25 hectares; in Mendoza, the owners of the largest 18 vineyards controlled only 5 percent of vineyard surface area, and about 1,100 owners controlled 50 percent. About 90 percent of the exporting wineries were in Mendoza. As of 2004, the top five firms accounted for 40 percent of wine export sales and the top 20 for about 70 percent, a far lower concentration than in Australia and Chile. About 45 percent of the wineries in our own database had at least 10 percent 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 and the latter is a finer-tuned indicator of innovation ability, regardless of size and volume.

⁶ As of 2003, only 4 percent of Mendoza wineries had foreign investment, and about 6 percent were linked to Argentine business groups. Foreign investors controlled less than half of the 30 top exporters, and foreign direct investment (FDI) accounted 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 nongovernmental organizations (NGOs) per 1,000 inhabitants, and San Juan had about 2.2. As of 1989, Mendoza had 64 cooperatives

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 a lack of coherent policies for propping up thousands of weak grape growers (Azpiazu & Basualdo, 2003). The few training and R&D programs in agriculture-related industries typically ossified under bureaucratic ministry offices that were unresponsive to firm needs (Casaburi, 1999).

The second reason for caution builds on Granovetter's (2002) insight that the development of, and differences between, regions or clusters depend more on the relational structure of socioeconomic life than on its density. Management and development scholars have echoed this view in their analyses of the enabling and constraining nature of embeddedness. Research 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, a firm's "ego network" can easily restrict access to different resources and blind it to 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 in the 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 has shown that although a society may contain a plethora of, for example, 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 groups and localities have different needs and resources, are relatively isolated, and are not incorporated into more encompassing institutions, a diverse socioeconomic 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 coher-

ent policies is rooted not in the absence of social ties, but in 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 interorganizational 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) have suggested that when more encompassing, bridging structures are not historically or organically present, government can provide them and so 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 traditions 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, a 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 & MacGarvie, 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 to also reshape the social and knowledge ties among a 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 responsibili-

in agro-related industries, and San Juan had 79 (McDermott, 2007).

ties in defining and evaluating the development of certain industry support programs. As such, they offer participants new structures for engaging in collective problem solving, improving mutual monitoring, and building broader strategic considerations on top of their past rent-seeking, “mutual holdup” instincts (Sabel, 1994; Schneider, 2004; Stark & Bruszt, 1998; Tandler, 1997).

We refer to this subgroup of GSIs as public-private institutions (Ostrom, 1999; Tandler, 1997). Our main interest is not their hybrid ownership *per se*, but the way in which their governance principles foster multiplex, cross-cutting ties among previously isolated public and private actors and improve firms’ access 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 researchers 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 allowed us to focus on the configuration of factors that appeared different (Eisenhardt, 1989; Ragin, 1987), namely, the provinces’ divergent institutional policies in the 1990s.

During four field trips in 2003 and 2004, the first author interviewed the directors, enologists, and agronomists of 33 firms (wineries and independent grape suppliers), the presidents of eight sectoral and peak-level business federations,⁷ policy makers in the relevant provincial government ministries, and select staff members of seven of the GSIs and public-private institutions discussed below. Using a directory of wineries and grape suppliers in the two provinces, industry experts helped select firms that were located in different subregions or zones of the provinces and that varied in their size, ownership, age, and production sophistication.

The first author also interviewed key collaborators, suppliers, and customers of this first set of firms.

Data collection and analysis followed Strauss and 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 firm actors 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 nonfirm actors focused on identifying the causes of previous stagnation and current innovation in the industry, the roles of nonfirm 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 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 qualitative results 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, giving special attention to the knowledge

⁷ A peak-level business federation has sectoral specific trade or business associations as members and attempts to aggregate and represent the broader commercial and economic interests of firms. See Schneider (2004).

transmission mechanisms created by new GSIs in Mendoza.

Social fragmentation of communities. The interviews revealed how existing interorganizational networks both facilitated joint learning between firms and created barriers to 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 wine making (Paladino & Jauregui, 2001; Walters, 1999).

On the other hand, these prior relationships were insular and did little to bridge social and economic gaps among the zones of Mendoza, and thus did little to diffuse new knowledge. The learning groups and competitions included only the most elite wineries of the Primera Zona, which viewed firms in the other zones of Mendoza and San Juan as incapable of producing fine wines because of their apparently substandard economic, educational, and climate conditions. At the same time, winemakers of these "lesser" zones confirmed for us Walters's (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 preconceptions of one another's skills and capacities. As one leading enologist 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 to adapt the grapes, pruning, and watering conditions I had to deal with.

This legacy of socioeconomic fragmentation was reinforced by the aforementioned zero sum game of industry policy, as it fostered weak horizontal ties among sectoral and zonal associations and ad hoc vertical ties between just a few associations and the

government (Paladino & Jauregui, 2001; Rofman, 1999).

A 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 among 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 institution-building processes.

The emergence of public-private institutions in Mendoza. A fruitful comparative analysis would focus on how contrasting policies for 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' state-owned, perennially loss-taking 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 imposed high-powered, arm's-length economic incentives on society to induce change. It first chose to privatize Cavic, 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 record levels of investment into 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.⁸ For instance, on several occasions during the 1990s, different sec-

⁸ Gago and De La Torre (1996) and Rofman (1999) gave details of San Juan policy. They also showed that between 1990 and 1998, 424 firms invested over \$1 billion in San Juan agriculture. About 193 of these firms invested in wine and grape production.

toral associations proposed new institutions to support training and export promotion. All attempts 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 the 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 in the wine-making value chain (e.g., hazard insurance, training, R&D, export promotion). The first experiment came in 1987-88, when the newly elected provincial administration chose to transform Giol into Fecovita, a federation of cooperatives that 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 public-private institutions *de novo* and then later reform existing GSIs with socioeconomic partners over ten years (McDermott, 2007).

Table 1 gives brief descriptions of the most prominent public-private institutions, their 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 subsectors. As a subgroup 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 public-private institutions distinct from the existing GSIs, as the latter had governance centered in the state and bureaucracy 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 existing sectoral and zonal associations, as the latter were voluntary organizations with no government representation or resources, were narrow in membership and mission, and provided few services other than lobbying the government.

Our particular interest was how the distinct governance rules of public-private institutions anchored their ability to act as multiplex bridges (Burt, 1992; Padgett & Ansell, 1993) between the public and private domains, as well as among 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 the public-private institutions to become more intertwined with one another, the preexisting 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 public-private institutions 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 public-private institutions opened up new cross-cutting lines of communication among these associations. To illustrate this structural trait further, we collected data on the members and boards of the public-private institutions, associations, schools, and GSIs relevant to the wine industry. Figure 1 pictures the network of these groups resulting from a UCINET analysis (Borgatti, Everett, & Freeman, 2002). Notice that public-private institutions 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 public-private institutions were key hubs of diverse membership and potentially diverse information (Borgatti, 2005). Although not conclusive, the data suggest that by 2001, the public-private institutions (as well as some of the reformed GSIs) tied the different associations and communities together.

The multiplex quality of the ties between the public-private institutions and different producer communities emerged from 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 transmitted the interests of his or her constituents. In meeting their material responsibilities to the public-private institutions and in trying to ensure that the relevant programs attended 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 of and information from their constituent firms. As the associations incrementally and jointly helped develop services, they increased their confidence in the public-private institutions and encouraged firms to use the new resources.

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

Institution	Year of Creation or Restructuring	Governing Members	Activities	Resources	Legal Form
Instituto Nacional de Tecnología Agropecuaria (INTA) subregional centers ^b	1991; INTA San Juan reformed in 1996	Government of Mendoza, 15 agriculture associations, national and provincial institutes and universities	R&D (inputs, plants, technology), extension training, consulting	50 percent, government budget (salaries and overhead); 50 percent, services, alliances, cooperadoras ^c	Part of INTA Cuyo; four in Mendoza, one in San Juan; public, nonstate, nonprofit entity
Fondo Vitivinícola	1993–94	Government Mendoza, 11 wine/grape associations	Oversight of new wine regulations, promotion of wine industry/marketing	Tax on firms from overproduction of wine	Public, nonstate, nonprofit entity
Fondo para la Transformación y el Crecimiento (FTC)	1993–94	Government of Mendoza, regional advisory councils, associations	Subsidized loans and credit guarantees to small-to-medium-sized enterprises (SMEs) for technology against extreme weather and for grape conversion	Self-financing; initial capital from government	Independent legal entity under authority of governor
Instituto Desarrollo Rural (IDR)	1994–95	36 founders: INTA Cuyo, government of Mendoza, two peak-level business federations, various agriculture sectoral associations	Technical information collection and dissemination; data base management; R&D, training, consulting	Mendoza government; services; gradual increase of fees from member associations	Nonprofit foundation, with oversight by ministry of economy
Instituto Tecnológico Universitario (ITU)	1994	Founders: Government of Mendoza, Universidad Nacional Cuyo, Universidad Tecnológica Nacional (UTN), two peak level business federations	Continuing education for managers and some R&D in management and technology	Founders; fees for services	Nonprofit foundation
Pro Mendoza	1995–96	Government of Mendoza, three peak-level business federations	Export promotion: organize fairs, delegations, strategic information, training	Government of Mendoza; peak-level business federations; services	Nonprofit foundation

^a Adapted from McDermott (2007: 123).

^b In Spanish, the subregional centers are called *estaciones experimentales* (EEAs).

^c *Cooperadoras* are nonprofit NGOs.

New access to a variety of knowledge resources. The combination of these governance rules and network qualities in public-private institutions fostered three mechanisms for transmitting a new variety of applied knowledge to firms (McDermott, 2007: 121–126). First, in combining the material and informational contribu-

tions of the public and private participants, the public-private institutions gradually built up knowledge resources at a scale, scope, and cost that had not existed before or in other provinces and that the government and the associations could not have provided individually. For instance, INTA Mendoza, IDR, and ProMendoza

TABLE 2
Largest Betweenness Scores, Mendoza 2001^a

Associations and GSIs	Betweenness	Normalized Betweenness
FEM ^b	20,718	39.59
IDITS	18,107	34.60
UCIM ^b	13,556	25.91
Fecovita ^c	12,894	24.64
INTA Mendoza	8,431	16.11
IDR	8,041	15.37
Wines of Argentina	5,469	10.45
INTA Junin^d	4,148	7.93
INTA Rama Caida^d	3,734	7.14
INTA San Juan	3,429	6.55
Pro Mendoza	2,962	5.66
INTA Cuyo	2,805	5.36
South Zone Association	2,498	4.78
Fondo Vitivinicola	1,363	2.61
Bodegas de Argentina, AC ^e	1,353	2.59
University National Cuyo	1,205	2.30
Government of Mendoza	969	1.85
Association Vinas Mendoza	943	1.80

^a Bold entities are public-private institutions.

^b Peak-level business federation.

^c Federation of Cooperatives created in 1987–88 by the Mendoza government

^d Subregional center (EEA).

^e Elite association.

forced these public-private institutions 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 Fondo para la Transformacion y el Crecimiento (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 were favoring one group over the other. ProMendoza thus 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 public-private institutions built programs to help firms learn from one another and

create new relationships. Both firm managers and the 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, including the most elite ones and the fragile cooperatives. With this diverse experience, INTA Mendoza began documenting, benchmarking, and teaching practices ranging 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 multifirm 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 at the different firms. An important by-product of these programs was the creation of new professional relationships among firms. As one wine-maker 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 enologists from different zones on the evaluation committees, firms with little previous contact were directly learning from one another about their product development methods. At the same time, the public-private institutions were becoming "network facilitators," playing a vital role McEvily and Zaheer (2004) identified in public-private technology centers in the United States that 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. In 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 because of their participation in new advisory councils. The Mendoza government and associations also spearheaded replication of the institutional model at a national level, which 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 that firms had to a variety of knowledge resources and by functioning similarly to a network facilitator (McEvily & Zaheer, 2004). The rules of inclusion and multiparty 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.

DEDUCTIVE ANALYSIS: NETWORK COMPOSITION AND PRODUCT UPGRADING

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

The baseline view in the network literature is that a firm's access to a variety of knowledge resources depends on its being highly embedded in an interorganizational network as indicated by the "degree centrality" of its ego network (Uzzi, 1996; Wasserman & Faust, 1994). The more ties a firm has to all types of organizations, the more likely it is to be able to access a high volume and, potentially, a great variety of information. Although this claim may be valid in general, it can blur one's view of the way Mendoza's approach created new actors

and mechanisms for transferring knowledge. That is, underlying the degree centrality claim is an assumption of a certain level of homogeneity in the members of an organizational field and the types of information and resources they can afford one another. Recent work on networks and innovation has increasingly sought to differentiate elements of a firms' networks, emphasizing that only certain types of alters, be they firms or nonfirm organizations, lend valuable information and resources for given tasks (Ahuja, 2000; Borgatti, 2005; Fleming & Waguespack, 2007; Lin, 2001; McDermott & Corredoira, 2010).

Our theoretical and empirical argument has been that the alters that appeared most valuable to firms were those offering a new variety of applied knowledge resources and cross-cutting information and professional contacts between different producer communities, especially different zones. Mendoza's approach appeared to improve firms' access to a variety of knowledge resources by creating a new set of GSIs, the public-private institutions, and then reforming the old GSIs to offer new services directly to firms, which 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 and interactive relationships for solving product development problems. In contrast, preexisting organizations (schools, banks, associations, and cooperatives) were not the repeated recipients of policies of new knowledge resources and continued to focus their memberships, clienteles, and orientations on their localities or zones.⁹ Thus, our broader claim is that firms will benefit from ties to organizations and institutions whose activities and governance principles underpin access to different applied

⁹ As previously mentioned, a GSI receives government funding, has at least one government representative on its board, and provides support services to firms, such as training, R&D, and sales promotion. Public-private institutions are a subgroup 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 their boards, 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 nongovernment members. Following the literature on development and governance, we also classify banks and cooperatives as distinct from private commercial firms engaged in the focal industry (Spencer et al., 2005; Tendler, 1997).

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 the number of ties a firm has to other firms, the higher its level of product upgrading.

Hypothesis 1b. The greater the number of ties a firm has to government support institutions, the higher its level of product upgrading.

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

We can further distinguish the impacts of different types of GSIs on product upgrading. Although we suggested that the overlapping ties between the public-private institutions and the old GSIs facilitated recent changes in the mission and programs of the latter, one would expect that firms would find greater value in the former. First, the public-private institutions were *created* with distinct governance rules and network qualities, whereas the old GSIs were not. Our qualitative analysis emphasized that the rules of inclusion and participatory governance fostered multiplex, bridging qualities in the public-private institutions, 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 access to diverse sources of information (McEvily & Zaheer, 2004; Zuckerman & Sgourev, 2006). Second, researchers in economic sociology and historical institutionalism have noted that older institutions and their stakeholders are often slower to change than newer ones, especially if they have long histories of being unresponsive or were built for particular aims in one period that lost 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 variety of programs grew. For example, IDR and ProMendoza grew out of initiatives within INTA Mendoza and the Fondo Vitivinicola.

The broader claim is that firms will gain access to a variety of knowledge resources, and thus to rela-

tively high levels of product upgrading, to the extent that they have many ties with GSIs created *de novo* with rules of inclusion and participatory governance.

Hypothesis 3. The greater the number of ties a firm has to public-private institutions, the higher its level of product upgrading.

The foregoing contains inferences about the mechanisms for knowledge transfer from the Mendoza policies and the governance histories of GSIs. Given our previous claim of a positive association between product upgrading and ties to other firms and GSIs, we focus here directly on how these alters facilitate 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 socioeconomic 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 among firms from different zones. According to recent research on networks, 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 are key tests of access to diversity.

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

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

Hypothesis 4b. The greater the number of ties a firm has to government support institutions with high levels of network centrality, the higher its level of product upgrading.

One can also emphasize the ability of Mendoza's GSIs to act as social and knowledge bridges between distinct, previously isolated communities, particularly those bounded by the aforementioned zones. Centrality may simply reflect dominance and offer redundant knowledge (Burt, 1992; Romanelli & Khessina, 2005). That is, to the extent that variety is key for developing new product-upgrading capabilities, the importance of intermediating organizations and institutions resides in 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, 2007). Obstfeld's (2005) theory of *tertius iungens* and Zuckerman and Sgourev's (2006) notion of "peer capitalism" highlight the importance of structures bringing previously unconnected actors together. McEvily and Zaheer (1999) also found 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 could not estimate which firms and institutions bridged 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 of how the provinces were socially fragmented by zones, a reasonable proxy for an intermediating organization's bridging role was the geographic diversity of the firms associated with it. We operationalized the relative value of a firm's being tied to intermediaries with strong bridging qualities in the following hypotheses:

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

Hypothesis 5b. The greater the number of ties a firm has to government support institutions with high geographic diversity, the higher its level of product upgrading.

DEDUCTIVE ANALYSIS: DATA AND METHODOLOGY

The designs of the sample and survey were based largely on the aforementioned field interviews in Mendoza and San Juan. We developed and administered our survey instrument during 2004 and 2005. Our survey captured a focal firm's level of product upgrading, demographics, and location, as

well as its ties to firms, public support institutions, and other organizations.

A simple random sample 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, randomly selected firms. One hundred and twelve firms completed surveys, giving a 97 percent response rate.¹⁰ We compared government data on wineries with our data and found no significant differences between them in geographic distribution, age, size, and FDI. For instance, about 60 percent of the firms were less than 20 years old, about 70 percent had less than 25 employees, and 50 percent had less than \$330,000 in sales. Roughly 10 percent had foreign investment.

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

Dependent Variable

As discussed above, our dependent variable, *product upgrading*, is a particular form of innovation in which firms focus on the creation of new products of higher value by incrementally experimenting with new combinations of knowledge, materials, and natural resources (Fleming, 2001; Giuliani et al., 2005; Moran & Ghoshal, 1999). Following a well-established research stream in the strategy and organizations literatures, we measured product upgrading by asking respondents to assess the extent to which their firms implemented four practices associated with product upgrading in this

¹⁰ Of the 112 wineries, 22 were from San Juan and 90 were from Mendoza, of which 26 were from Gran Mendoza, 32 from the Zona Este, 15 from Valle de Uco, and 17 from Zona Sur. Because of missing variables, our models include data from 97 firms (an effective response rate of 84 percent).

context using a five-point scale (MacDuffie, 1995; Zollo & Winter 2002). The practices, which came from our interviews with winemakers and were confirmed by a team of experts from our collaborating center and five well-known wine consultants in Argentina, were regular introduction of new and higher-value wines; emphasis on quality over cost; experimentation with new blends, varieties, and clones; and monitoring domestic and overseas markets.

To assess the validity of our instrument, we conducted an exploratory factor analysis with oblimin rotation ("proc factor," SAS version 9) on 22 questions that extracted five factors. Questions that loaded on more than one factor were dropped. Two of the five factors were associated with distinct aspects of product upgrading, and each contained four items. (Details on the questions and factor loadings are available from the authors on request.) The items in these two factors directly addressed the extent to which a firm overcame technological and market uncertainties, respectively; as discussed earlier, product upgrading in the wine industry involves such uncertainties. Our dependent variable was the additive score of responses to the eight questions loading on the two product upgrading factors. The index had a Cronbach's alpha coefficient of .78. A third factor was associated with *upgrading intent*, which we used as a control for a firm's underlying motivation for engaging in product upgrading.

Explanatory Variables

To collect network data, we asked enologists to identify firms (up to seven) and nonfirm entities (up to five) with which they regularly interacted, collaborated, or exchanged information regarding specific strategic areas, such as product development, production methods, technology acquisition, training, marketing, and exports.¹¹ Following our terminology presented in the preceding sections, we validated and classified these firm and nonfirm alters into six categories: associations (trade, peak level, etc.); banks; cooperatives; firms (wineries, independent grape growers, technology suppliers, etc.); government support institutions; and schools (universities, technical schools, etc.). As noted above, most GSIs were provincial and, hence, firms had access to them mainly within their own jurisdictions. In accordance with the preceding discus-

sions, we also decomposed GSIs into two categories: public-private institutions and old GSIs.¹²

We constructed a two-mode network consisting, on the one hand, of focal firms, and, on the other hand, of alters (firm and nonfirm). A tie was defined as any relationship between a focal firm and an alter. All the measures based on ties were generated from the total count of mentions of an alter, which included repeated counts of the same alter if a focal firm identified it as providing useful information or services in multiple operational areas of firm management and wine making. By doing so, we generated variables that combined the structural aspects of a firm's network with the strength of a relationship in a manner consistent with Cross, Borgatti, and Parker's (2001) view of 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 accessing diverse, tacit knowledge to generate innovations, multiplex relationships provide the repeated interactions that offer mutual understanding and facilitate knowledge transfer (Hansen, 1999). As opposed to equating single and multiple mentions of an alter, this relatively high threshold for identifying alters eliminated irrelevant ties in the context of information flow, and the multidimensionality of relationships provided a window into the value of the strength of ties.

Several variables measured degree centrality (Freeman, 1979), capturing a focal firm's exposure to alters' knowledge and immediate influence (Borgatti, 2005) by counting its total number of ties to other organizations and institutions. Degree centrality is based on ego-network and lacks any dyadic characteristic. *Ties to all alters*, the count of a firm's ties to all the types of organizations and institutions mentioned above, captured the overall embeddedness of the firm, assuming homogeneity of alter types in knowledge resources afforded. We relaxed this assumption and emphasized heterogeneity by decomposing this variable, using standard methods (Ahuja, 2000; Lin, 2001; Owen-Smith & Powell, 2004), into six variables that captured the composition and structure of the focal firm's ego

¹¹ Respondents were provided with a roster of nonfirm entities developed with local experts but were also allowed to report entities not on the roster.

¹² The public-private institutions included Fondo de Vitivincola, Fondo para la Transformacion y Crecimiento, IDR, Promendoza, INTA Mendoza, INTA San Juan, and ITU. Old GSIs included all other GSIs, which predated PPIs and differed in their governance, as discussed above.

network. The variables, *ties to firms*, *ties to associations*, *ties to banks*, *ties to cooperatives*, *ties to schools*, and *ties to GSIs*, were constructed by counting the number of ties between the focal firm and the given type of alter. We followed the same method to decompose ties to GSIs into *ties to public-private institutions* and *ties to old GSIs*. We discuss our second method of decomposition and aggregation of network ties below.

Ties to top central firms and *ties to top central GSIs* captured the benefits that a firm could obtain indirectly from being connected to alters with high centrality and, therefore, exposure to the influence and resources of a large number of network actors (Burt, 1983). We first identified all the firm and GSI alters and ranked them separately by number of ties with focal firms (Frank, 2005). Firms and GSIs thus ranked in the top decile (those with in-degree centrality in the top decile) were considered to be highly central alters.¹³ Then, for each focal firm, we calculated the total number of ties to these high-network-centrality alters.

Ties to top geographically diverse firms and *ties to top geographically diverse GSIs* captured the diversity of knowledge accessed through network ties by using geographic zones as proxies for different bodies of knowledge. High network heterogeneity is associated with increased opportunities to innovate (Burt, 1983). We calculated the geographic diversity of network ties by examining an alter's direct ties to firms in different zones of the region. Though we lacked information about the complete network, our random sample of firms provided adequate 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 according to 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 on the basis of their diversity scores, and the top decile was selected.¹⁴ We generated the variables by counting the number of ties that a focal firm had to

these geographically most diversified alter firms and GSIs.

Control Variables

The location variables were dichotomous, associated with different zones identified by experts (Grand Mendoza, East, Valle Uco, South, and San Juan). In addition to the usual location fixed effects (e.g., local resources and natural endowments), this variable absorbed systematic error in the measurement of our dependent variable because of its perceptual nature. Since respondents might have used the performance of their neighbors as anchors, we could not infer upgrading differences between regions by comparing the coefficients of different zones.

We controlled for superior resources with *foreign ownership*, a dummy variable taking the value 1 for firms with foreign investment greater than 10 percent of equity and 0 otherwise, and with *total sales*, an interval variable with five levels. Using sales instead of employment provided a measure of resources that was consistent across technologies and scale.¹⁵ To control for differences in absorptive capacity (Cohen & Levinthal, 1990) and learning capabilities, we introduced *education* and *enologist*.¹⁶ The former was measured as an index based on the education levels of firms' general managers and enologists. The latter was a dummy variable that took the value 1 when a firm had at least one full-time enologist. Both are common indicators, in emerging markets and in wine making, of a firm's ability to incorporate new practices (Giuliani & Bell, 2005).

Finally, to control for the effects of a firm's demand structure and positioning choice, we introduced *upgrading intent*, a perceptual variable derived from the factor analysis that captured the firm's unobserved intention to upgrade by assess-

10 percent threshold, we used a methodology described in footnote 12.

¹⁵ 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 to improve statistical power, we excluded age from the reported models.

¹⁶ R&D intensity was 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).

¹³ An analysis of the number of ties of each alter showed a skewed distribution with an inflection point at around 10 percent. 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 percent and 20 percent. Models using all three versions produced similar results.

¹⁴ We subtracted this Herfindahl index from 1, so that a higher score represented greater geographic diversity in the ties of the organization. In selecting the

ing its commitment to activities and assets that support upgrading (technology agreements, wine research and development agreements, and investment in microfermentation). As Kaplan (2008) showed, firm actions are motivated by cognition, capabilities, and incentives. Although we controlled for capabilities, the inclusion of upgrading intent added 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, the questions in this measure revealed allocation of limited resources in a way that was consistent with acting on a perceived demand for upgrading. We further discuss use of this variable below.

Methodological Issues and Statistical Inference

Table 3 presents descriptive statistics and correlations for all variables used in analyses. 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 a firm as the unit of analysis. To correct skewness in our network variables, we applied the Box-Cox transformation (Box & Cox, 1964) to each of our network measures.¹⁷ To address the problem of outliers, we report the results from robust regression ("proc robustreg," SAS version 9) with least trimmed squares (LTS) estimation (Rousseeuw, 1984), which generates ordinary least squares (OLS) estimates robust to the presence of outliers.¹⁸

The first set of models, presented in Table 4a, explores the relative impact of being tied to distinct types of alters on a firm's level of product upgrading. Model 1 is the baseline, including 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 of the six networks according to the type of alter (ties to associations, banks, cooperatives, schools, firms, and GSIs, respectively). Model 4 decomposes ties to GSIs into ties to public-private institutions 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. Table 4b presents these results. We limited 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 consistency between the two sets of models and to account for our limited degrees of freedom, we modified our method of decomposition and aggregation in three systematic ways. First, in models 5 to 8, we continued 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 and 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 and 5b by decomposing ties to firm and ties to GSIs into, respectively, ties to most geographically diverse firms and ties to all firms except most geographically diverse firms, and ties to most geographically diverse GSIs and ties to all GSIs except most geographically diverse GSIs.

The differences between models reflect decomposing ties to all alters in different ways rather than adding new variables. In every case, the sum of the decomposing variables was equal to the decomposed variable. In this way, we were 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 .78 to .85 (Table 3). For this reason, and for lack of better solutions (Wooldridge, 2002), we report only 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 was comparing the effects of the most central and geographically diversified mediating firms and institutions with those of the others.

Use of cross-sectional data constrained our ability to address reverse causality issues. One issue of concern was that ties to GSIs and upgrading might be associated through a third, omitted variable. The decomposition of our GSI variable into public-private institutions and old GSIs reduced this concern because of their respective timing of inception and governance characteristics, as revealed in our qualitative study. Self-selection into cultivating ties

¹⁷ 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).

¹⁸ We also ran robust regressions with M-estimation. Results from robust M- and OLS estimations were similar to the ones reported and are available from the authors.

TABLE 3
Descriptive Statistics and Correlations^a

Variables ^b	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27									
1. Product upgrading	19.20	0.68																																				
2. Total sales	3.06	0.19	.12																																			
3. Foreign ownership	0.09	0.03	.24*	.23*																																		
4. Education	4.14	0.25	.24*	.17	.34*																																	
5. Enologist	0.71	0.04	.18	.17	.03	.09																																
6. Upgrading intent	4.76	0.32	.39*	.12	.25*	.38*	.05																															
7. East	0.31	0.04	-.06	.01	-.21*	-.18	.15	-.26*																														
8. South	0.15	0.03	-.21*	.20*	-.05	-.05	-.03	-.09	-.31*																													
9. Valle Uco	0.13	0.03	.05	-.16	.16	.31*	-.26*	.49*	-.29*	-.20																												
10. San Juan	0.20	0.04	.01	-.15	-.15	-.07	.10	-.07	-.31*	-.21*	-.20																											
11. Ties to all alters	21.28	1.32	.20	.19	-.08	.21*	-.08	.24*	.04	-.10	.52*	-.35*																										
12. Ties to all alters except firms and GSIs	4.42	0.43	.07	.18	-.01	.31*	-.05	.31*	-.23*	.08	.41*	-.12	.63*																									
13. Ties to associations	1.39	0.19	.26*	.23*	.28*	.57*	.12	.43*	-.26*	-.03	.37*	-.04	.52*	.59*																								
14. Ties to banks	1.08	0.12	-.03	.18	-.09	.19	-.31*	.20	-.28*	.25*	.41*	-.12	.53*	.64*	.29*																							
15. Ties to cooperatives	0.84	0.16	-.05	.11	-.06	.04	-.07	.20	.00	-.02	.44*	-.21	.48*	.48*	.17	.49*																						
16. Ties to firms	12.02	0.76	.19*	.25*	-.11	-.04	.06	-.04	.37*	-.15	.06	-.36	.77*	.20	.17	.14	.19																					
17. Ties to GSIs	4.84	0.51	.19	.03	.06	.32*	-.11	.42*	-.29*	.01	.60*	-.21	.59*	.54*	.50*	.46*	.36*	.09																				
18. Ties to schools	1.11	0.15	.30*	.21*	-.03	.09	-.03	.25*	-.19	-.10	.15	.03	.46	.56*	.32*	.37*	.25*	.19	.35*																			
19. Ties to old GSIs ^b	2.11	0.26	.02	-.08	-.09	.19	.00	.25*	-.19	-.01	.39*	.09	.36	.48*	.38*	.29*	.26*	-.07	.72*	.21*																		
20. Ties to public-private institutions	2.72	0.31	.20*	.10	.11	.24*	-.15	.37*	-.21*	.08	.56*	-.51	.62*	.43*	.38*	.42*	.34*	.25*	.85*	.31*	.38*																	
21. Ties to all firms except top geographically diverse firms	8.62	0.57	.09	.25*	-.19	-.09	.04	-.14	.38*	-.08	.01	-.29	.68*	.14	.07	.13	.20	.93*	.00	.15	-.09	.17																
22. Ties to all GSIs except top geographically diverse GSIs	3.29	0.39	.15	.00	-.09	.22*	-.02	.36*	-.17	-.08	.43*	.00	.45	.48*	.40*	.31*	.24*	.05	.82*	.30*	.87*	.54*	-.02															
23. Ties to top central firms	6.09	0.42	.20*	.32*	-.12	-.10	.17	-.14	.21*	.04	-.23*	-.16	.49	.05	.01	.02	.06	.82*	-.12	.13	-.18	.07	.86*	-.10														
24. Ties to all GSIs except top central firms	2.25	0.28	.11	-.07	.03	.21*	-.15	.32*	-.34*	-.15	.45*	.15	.37	.46*	.44*	.36*	.21*	-.09	.72*	.37*	.72*	.45*	-.16	.73*	-.21*													
25. Ties to top central firms	5.93	0.44	.06	.14	-.07	-.01	-.03	.00	.39*	-.24*	.25*	-.42	.72*	.24*	.22*	.15	.22*	.80*	.25*	.16	.08	.35*	.66*	.19	.40*	.05												
26. Ties to top central GSIs	2.59	0.28	.17	.13	.07	.22*	-.05	.32*	-.11	.20*	.41*	-.57	.57*	.39*	.33*	.34*	.31*	.28*	.78*	.22*	.39*	.89*	.21*	.55*	.11	.25*	.38*											
27. Ties to top geographically diverse firms	3.40	0.28	.26*	.14	.05	.02	.10	.09	.22*	-.14	.09	-.32	.58*	.28*	.28*	.10	.16	.68*	.18	.19	.04	.24*	.42*	.14	.41*	.06	.71*	.26*										
28. Ties to top geographically diverse GSIs	1.54	0.16	.17	.05	.17	.12	-.13	.28*	-.22*	.17	.42*	-.53	.51*	.35*	.29*	.35	.29*	.22*	.74*	.24*	.31*	.88*	.14	.39*	.08	.41*	.29*	.81*	.23*									

^a $n = 97$. Descriptive statistics are based on nominal values. Network variables are transformed in the correlation table.

^b "GSIs" are government support institutions.

* $p < .05$

TABLE 4a
Results of Regression Analysis with Product Upgrading as Dependent Variable^a

Variables	Model 1	Model 2	Model 3	Model 4
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 public-private institutions				3.03 (1.28) [*]
<i>R</i> ²	.53	.59	.63	.62

^a *n* = 97. Standard errors are in parentheses. The Grand Mendoza Zone is the omitted location.

⁺ *p* < .10

^{*} *p* < .05

^{**} *p* < .01

^{***} *p* < .001

with firms and GSIs associated with upgrading did not appear to be a serious issue, and the introduction of the upgrading intent control helped to reduce this concern.

Another issue was the probability that firms might not engage in upgrading because of cognition, capabilities, or incentives (Kaplan, 2008). One could argue that firms estimate larger benefits from producing the same old products instead of engaging in product upgrading. Whereas the variables total sales, foreign investment, education, and enologist controlled for different aspects of capabilities, upgrading intent controlled for unobserved differences in cognition (for example, 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 upgrading intent was actually driven by an unobserved upgrading motivation and, as such, would be an endogenous variable in our models.¹⁹ We believe that this was not the case. First, our oblimin factor analysis measured the unobserved construct driving the responses to questions loading on a factor and, in our

case, yielded an actual measure of upgrading intent. The questions from which this variable is derived focused on a firm's actions driven by its motivation to upgrade and not necessarily on the ability to execute the recombination of inputs or the experimental processes that underpin product upgrading. Factors used to generate the product upgrading variable were clearly associated with 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 treated Upgrading Intent as an endogenous variable. We estimated the models with the command "proc syslin" from SAS version 9. We did not find major differences between the analysis reported below and the 2SLS. Results are available upon request.²⁰

²⁰ The best instrument we had was 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 with upgrading intent, but not with product upgrading, as it refers mainly to a firm's investment in state-of-the-art equipment to improve processes but not necessarily to creating new products with greater value.

¹⁹ We thank an anonymous reviewer for pointing us in this direction.

TABLE 4b
Results of Regression Analysis with Product Upgrading as Dependent Variable^a

Variables	Model 5	Model 6	Model 7	Model 8
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 and 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 public-private institutions		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 geographically diverse firms				0.18 (0.19)
Ties to all GSIs except top geographically diverse GSIs				0.72 (1.22)
Ties to top geographically diverse firms				1.53 (0.73)*
Ties to top geographically diverse GSIs				5.44 (2.75)*
R^2	.61	.63	.62	.62

^a $n = 97$. Standard errors are in parentheses. The Grand Mendoza Zone is the omitted location.

[†] $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

DEDUCTIVE ANALYSIS: RESULTS AND DISCUSSION

In our analyses, the most consistently significant firm demographic control variable was upgrading intent, which was positive, followed by education, which was also positive but less frequently significant and only at the .10 level. Given the limitations of our survey data and relatively small sample, the lack of significance of the other demographic control variables should not be construed as firm-level factors failing to influence upgrading. Indeed, the relative significance of both upgrading intent and education supports the increasingly well established work in strategy showing that knowledge stock and perceived demand impact the likelihood that firms will upgrade products (Cohen & Levinthal, 1990; Kaplan, 2008). Given the strength of our results, as described below, the significance of these variables supports calls by Giuliani and Bell (2005) for further research on their interaction with network variables.

With regard to the network variables, model 2

shows a positive and significant effect of ties to all alters ($\beta = 0.20$). This model served as an additional baseline in two ways. It supported an argument increasingly made in both the network and development literatures that a firm's overall embeddedness is strongly associated with product upgrading, as the multiplicity of interactive relationships to organizations and institutions can increase its access to knowledge resources. It was also a point of comparison as we decomposed the networks. Following Fleming (2001), Lin (2001), and Owen-Smith and 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 gained support from the increase in variance explained (indicated as R^2 values) for the subsequent models, and it was magnified when we considered the effects of the different network variables.

As just discussed, we created two sets of models to allow for consistency in the way we decomposed

the network variables. We found support for 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 both to other firms ($\beta = 0.41$) and to GSIs ($\beta = 1.12$), with significance at the .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 had to associations, schools, banks, cooperatives, and schools were either negative or insignificant. These types of organizations could be beneficial to the extent they promote support services and cross-cutting ties that provide access to a variety of knowledge resources (Safford, 2007; Zuckerman & Sgourev, 2006). However, the results suggest that in this context these organizations did not have such traits; instead, wineries accessed 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 GSIs and the way their programs helped firms learn from one another.²¹

The effect of GSIs was 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 public-private institutions and ties to old GSIs, while holding all other variables constant. Both models show that higher levels of product upgrading were positively and significantly (at the .05 level) associated with the number of ties a focal firm had to public-private institutions but not significantly associated with the ties to the old GSIs. These results support our qualitative analysis showing that wineries found value mostly in the public-private institutions, 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.

With Hypotheses 4 and 5, we sought to explore further the different mechanisms through which mediating firms and GSIs provided access to a va-

riety of knowledge resources. To test these hypotheses, we decomposed ties to firms and ties to GSIs by isolating ties to the most central firms and GSIs (model 7), and ties to the firms and GSIs 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 were positively and significantly associated with the number of ties a focal firm had to the most central GSIs ($\beta = 3.59$, $p < .05$). We also found support for Hypotheses 5a and 5b, as shown in model 8 (Table 4b). Higher levels of product upgrading were positively and significantly associated with the number of ties a focal firm had to other firms and GSIs with the most geographically diverse pattern of connections ($\beta = 1.53$ and 5.44 , respectively, both $p < .05$). Models 7 and 8 also reveal that the effects of the other network variables were 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 was 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 was dominant, the combination of these quantitative results and our qualitative analysis suggest that a firm's access to diverse knowledge resources depends on its being tied not just to any or many organizations and institutions, but in particular 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 example, Mendoza's public-private institutions appeared to foster flows of information, resources, and contacts between 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 (compared to the number of different firms). To the extent that the Mendoza reforms and the institutions were 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 the Mendoza policy was that the complementarities of the traits allowed GSIs to be vital sources of sustainable value creation for

²¹ Given our cross-sectional data, we can not exclude, however, the supposition that the interfirm ties were formed prior to these policies or via unobserved third parties.

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 gatekeeper, 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

Our statistical analysis alone might have suffered from problems of endogeneity because of our use of cross-sectional data. For instance, given the lack of longitudinal statistical evidence, one could still argue that old interfirm relationships drove upgrading or that the institutions of Mendoza worked mainly for firms with superior capabilities. Our research design and the combination of qualitative and quantitative analyses were intended to overcome these limitations, revealing less a definitive theory of upgrading and more a plausible role for public policy in improving firms' access to a variety of knowledge resources (Edmondson & McManus, 2007; O'Mahony & Ferraro, 2007; Uzzi, 1996).

In the qualitative analysis, we sought to illuminate the institutional mechanisms that can reshape network ties and knowledge diffusion among firms by examining how the policy divergence between San Juan and Mendoza accounted for differences in product upgrading. The evidence suggests that although preexisting socioeconomic relationships could impede broad-based collective action and knowledge diffusion, Mendoza's approach to constructing public-private institutions helped firms improve their access to new knowledge resources by providing a new scale and scope of services and by facilitating new relationships among the firms themselves. In particular, the resulting public-private institutions had governance rules that allowed them to develop multiplex, bridging relationships among different producer communities, as well as to facilitate collective problem solving among their representatives, who governed the public-private institutions. The combination of these rules and network qualities helped the public-private institutions, and later some older GSIs, to remove two major barriers to product upgrading and learning for firms in emerging markets—weak institutional resources and socioeconomic fragmentation.

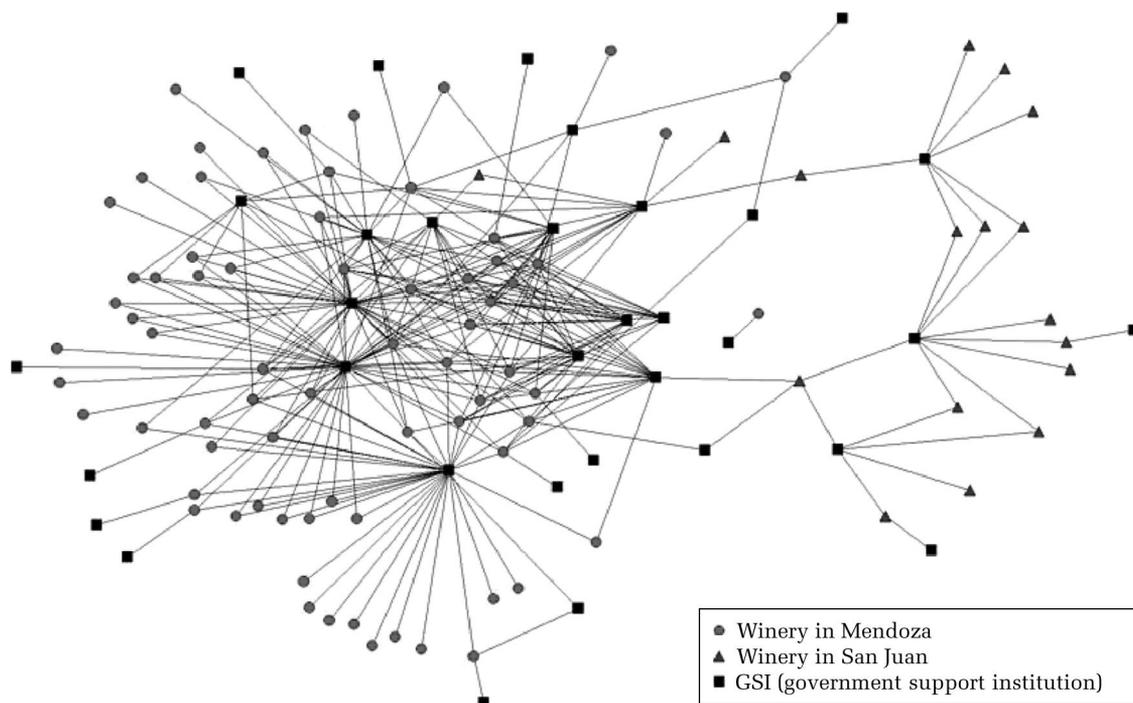
The statistical analysis then tested the relationship between product upgrading and a focal firm's ties to other firms, GSIs, and public-private institutions, and it explored more fully the mechanisms

that facilitate access to a variety of knowledge resources via these intermediating firms and institutions. The statistical evidence appears to support our claims about the role of Mendoza's approach in improving access for firms to a variety of new applied knowledge resources. This access to knowledge appears to have then stimulated their product upgrading, particularly given the positive and significant impact of such variables as the ones capturing ties to the public-private institutions and those capturing ties to the alters with the highest centrality and bridging traits. The evidence reinforces the view that access to a variety of knowledge resources depends not simply on whether alters are public or private per se, but rather, on whether alters are constituted in ways that provide cross-cutting ties among producer communities (Fleming & Waguespack, 2007; Safford, 2004; Zuckerman & Sgourev, 2006). In fact, if we had limited analysis to only market and nonstate actors, we might have missed 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 notions 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 in helping to diffuse knowledge by 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 is seen to be rooted in the institutionalization of their network qualities. The innovation in Mendoza's approach was constructing a new set of GSIs, the public-private institutions, with rules of inclusion and participatory governance. These rules anchored the multiplex bridging qualities of these institutions that underpinned their ability to provide a new scale and scope of knowledge resources to firms and mold new relationships among 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

FIGURE 2
Ties between Focal Firms and GSIs in Mendoza and San Juan^a



^a Authors' 2004–05 survey data are the source.

ways, primarily because one component—government support institutions—is highly responsive to government policy. This view is consistent with increasing work on issues ranging from technology diffusion to health care to emerging market corporate governance that shows the impact of government policy in structuring interorganizational 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 those in the province's past and from San Juan's. For example, Figure 2 offers a UCINET (Borgatti et al., 2002) depiction of the ties among 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. This view coincides with the steadily 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).

Conclusion

In this article, we have 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 or 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 on its ties 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 and in turn underpin their ability to provide firms with 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 among actors engaged in public policy and firm strategy. Our interdisciplinary 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. Whereas much of the research on knowledge transfer and innovation has focused on the types of relationships between firms and individuals (Bell & Zaheer, 2007; Sorenson, Rivkin, & Fleming, 2006), students of public policy have tended to focus on the stock of collective knowledge resources provided by nonmarket 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 emphasizing how public and private actors can construct new institutions that improve firms' access to a variety of knowledge resources because of the underlying network properties of these nonmarket intermediaries (McEvily & Zaheer, 1999; Zuckerman & Sgourev, 2006).

Second, our research calls for further analysis of the relationship between the governance principles of intermediating organizations, namely GSIs, and their ability to alter the flow of knowledge in industries. Although such scholars as Owen-Smith and Powell (2004) have studied how the institutional demography of networks shapes the content of information, they have stressed how GSIs and nonprofit 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 public-private institutions in Mendoza. Such principles as empowered inclusion and participatory governance for a diverse set of relevant public and private actors 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 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 among 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 holdup instincts. As a result, such an institutional approach, be it for new regulatory bodies or for agencies that provide R&D and training, has the opportunity to facilitate a recombination of different knowledge resources and help constituent firms to learn from one another.

REFERENCES

- Ahuja, G. 2000. Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly*, 45: 425–455.
- Aylward, D. K. 2003. A documentary of innovation support among new world wine industries. *Journal of Wine Research*, 14(1): 31–43.
- Azpiazu, D., & Basualdo, E. 2003. *Industria vitivinicola—Estudios sectoriales: Estudio 1.EG.33.6* [The viticulture industry—Sectoral studies: Study I.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: 563–589.
- Borgatti, S. P. 2005. Centrality and network flow. *Social Networks*, 27: 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. 1992. *Structural holes: The social structure of competition*. Cambridge, MA: Harvard University Press.
- Burt, R. S. 1983. Range. In R. S. Burt & M. J. Minor (Eds.), *Applied network analysis*: 176–194. Beverly Hills, CA: Sage.
- Burt, R. S. 2000. The network structure of social capital. In R. I. Sutton & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 22: 345–423. Greenwich, CT: JAI Press.
- Buse, R. C. 1973. Increasing response rates in mailed questionnaires. *American Journal of Agricultural Economics*, 55: 503–508.
- Campbell, J. L. 2004. *Institutional change and globalization*. Princeton, NJ: 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** [The business wines in Argentina]. Buenos Aires: FAUBA.
- Cohen, W. M., & Levinthal, D. A. 1990. Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35: 128–152.
- Cross, R., Borgatti, S. P., & Parker, A. 2001. Beyond answers: Dimensions of the advice network. *Social Networks*, 23: 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: 321–361.
- Edmondson, A., & McManus, S. E. 2007. Methodological fit in management field research. *Academy of Management Review*, 32:1155–1179.
- Eisenhardt, K. M. 1989. Building theories from case study research. *Academy of Management Review*, 14: 532–550.
- Fleming, L. 2001. Recombinant uncertainty in technological search. *Management Science*, 47: 117–132.
- Fleming, L., & Waguespack, D. M. 2007. Brokerage, boundary spanning, and leadership in open innovation communities. *Organization Science*, 18: 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*: 31–65. Cambridge, U.K.: 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 and Organization*, 63: 756–776.
- Gago, E., & De La Torre, M. 1996. *Las nuevas tendencias de desigualdad, polarización y exclusión* [The new trends of inequality, polarization and exclusion]. Working paper, La Rabida, Spain.
- Giuliani, E., & Bell, M. 2005. The micro-determinants of meso-level learning and innovation: Evidence from a Chilean wine cluster. *Research Policy*, 34: 47–68.
- Giuliani, E., Pietrobelli, C., & Rabellotti, R. 2005. Upgrading in global value chains: Lessons from Latin American clusters. *World Development*, 33: 549–573.
- Gobierno de San Juan. 2004. *Proyecto de fortalecimiento institucional para el desarrollo rural: Provincia de San Juan* [The project for the institutional strengthening for rural development: Province of San Juan]. White paper, Gobierno de San Juan.
- Granovetter, M. 2002. A theoretical agenda for economic sociology. In M. F. Guillen, R. Collins, P. England, & M. Meyer (Eds.), *The new economic sociology*: 35–60. New York: Russell Sage.
- Greene, W. H. 2000. *Econometric analysis*. Upper Saddle River, NJ: 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, L. M. 1980. Testing the effectiveness of alternative foot-in-the-door manipulations. *Journal of Marketing Research*, 17: 359–364.
- Henisz, W. J., & Zelner, B. A. 2005. Legitimacy, interest group pressures, and change in emergent institutions. *Academy of Management Review*, 30: 361–379.
- Jacobs, J. 1984. *Cities and the wealth of nations: Principles of economic life*. New York: Random House.
- Kaplan, S. 2008. Cognition, capabilities and incentives: Assessing firm response to the fiber-optic revolution. *Academy of Management Journal*, 51: 672–695.
- Knoke, D. 2001. *Changing organizations: Business networks in the new political economy*. Boulder, CO: Westview.
- 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: 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: 197–221.
- McDermott, G. A. 2007. The politics of institutional renovation and economic upgrading: Recombining the vines that bind in Argentina. *Politics & Society*, 35: 103–143.
- McDermott, G. A., & Corredoira, R. A. 2010. Network composition, collaborative ties, and upgrading in emerging market firms: Lessons from the Argentine autoparts sector. *Journal of International Business Studies*, 41(2): In press.
- McEvily, B., & Marcus, A. 2005. Embedded ties and the

- acquisition of competitive capabilities. *Strategic Management Journal*, 26: 1033–1055.
- McEvily, B., & Zaheer, A. 1999. Bridging ties: A source of firm heterogeneity in competitive capabilities. *Strategic Management Journal*, 20: 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.
- El Mercurio*. 2005. La amenaza a las viñas chilenas [The threat to Chilean vines]. November 2: 12.
- Meyer, K. E. 2004. Perspectives on multinational enterprises in emerging economies. *Journal of International Business Studies*, 35: 259–79.
- Moran, P., & Ghoshal, S. 1999. Markets, firms, and the process of economic development. *Academy of Management Review*, 24: 390–408.
- Obstfeld, D. 2005. Social networks, the tertius iungens orientation, and involvement in innovation. *Administrative Science Quarterly*, 50: 100–119.
- O'Mahony, S., & Ferraro, F. 2007. The emergence of governance in an open source community. *Academy of Management Journal*, 50: 1079–1106.
- Ostrom, E. 1999. Coping with tragedies of the commons. In N. W. Polsby (Ed.), *Annual review of political science*, vol. 2: 493–535. Palo Alto, CA: Annual Reviews.
- 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: 5–21.
- Padgett, J. F., & Ansell, C. K. 1993. Robust action and the rise of the Medici, 1400–1434. *American Journal of Sociology*, 98: 1259–1320.
- Paladino, M., & Jauregui, J. M. 2001. *La transformación del sector vitivinícola Argentino* [The transformation of the Argentine wine sector]. Buenos Aires: 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: 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: 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: 1–33.
- 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*. Manuscript, Emory University, Atlanta.
- Rodrik, D. 2004. *Industrial policy for the twenty-first century*. KSG Faculty Research working paper series RWP04-047.
- Rofman, A. B. 1999. *Desarrollo regional y exclusión social: Transformaciones y crisis en la Argentina contemporánea* [Regional development and social exclusion: Transformation and crises in contemporary Argentina]. Buenos Aires: Amorrortu Editores.
- Romanelli, E., & Khessina, O. M. 2005. Regional industrial identity: Cluster configurations and economic development. *Organization Science*, 16: 344–358.
- Rousseeuw, P. J. 1984. Least median of squares regression. *Journal of the American Statistical Association*, 79: 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. Milan: 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*. Cambridge, MA: Harvard University Press.
- Saxenian, A. 1994. *Regional advantage: Culture and competition in Silicon Valley and Route 128*. Cambridge, MA: 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*. 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: 191–210.
- Sorenson, O., Rivkin, J. W., & Fleming, L. 2006. Complexity, networks and knowledge flow. *Research Policy*, 35: 994–1017.
- Spencer, J. W., Murtha, T. P., & Lenway, S. A. 2005. How

- governments matter to new industry creation. *Academy of Management Review*, 30: 321–337.
- Spicer, A., McDermott, G. A., & Kogut, B. 2000. Entrepreneurship and privatization in central Europe. *Academy of Management Review*, 25: 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: 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: 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: 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, Cambridge.
- Wasserman, S., & Faust, K. 1994. *Social network analysis: Methods and applications*. Cambridge, U.K.: Cambridge University Press.
- Wooldridge, J. M. 2002. *Econometric analysis of cross section and panel data*. Cambridge, MA: MIT Press.
- Wine Spectator*. 2007. 250 great values: Top values for \$20 or less. October 31: 45.
- Zollo, M., & Winter, S. G. 2002. Deliberate learning and the evolution of dynamic capabilities. *Organization Science*, 13: 339–351.
- Zuckerman, E., & Sgourev, S. 2006. Peer capitalism: Parallel relationships in the U.S. economy. *American Journal of Sociology*, 111: 1327–1366.



Gerald A. McDermott (gerald.mcdermott@moore.sc.edu) is an associate professor of international business at the Darla Moore School of Business at the University of South Carolina. He received his Ph.D. in political science at MIT. His work focuses on the interaction between institutional change and interfirm networks by analyzing industrial restructuring and innovation in emerging market countries, especially in East Central Europe and Latin America.

Rafael A. Corredoira (rcorredo@rhsmith.umd.edu) is an assistant professor at the Robert H. Smith School of Business, University of Maryland-College Park. He received his Ph.D. from the Wharton School at the University of Pennsylvania. His current research focuses on the role of social networks in interorganizational knowledge flows, economic development, and entrepreneurship.

Gregory Kruse (gkruse@wharton.upenn.edu) is a Ph.D. student in health care management at the Wharton School at the University of Pennsylvania.



Copyright of Academy of Management Journal is the property of Academy of Management and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.