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RESEARCH PAPER

The Argentine wine industry: creating new spaces for coordination?

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This article compares and examines the institutional arrangements in the wine industry of three Argentine provinces and at the national level. It finds that the Triple Helix approach of university (research)–industry–government interaction is useful for understanding the institutional foundation for innovation, knowledge diffusion and economic success; however, it struggles to explain how different actors make sense of coordination and how the latter is achieved. The article demonstrates that the different institutional arrangements behind each region lead to different mechanisms for achieving coordination and the influence this has on the development and success of the industry.

Introduction

The successful incorporation of Argentine wines in the international market is closely linked to flows of knowledge throughout the sector (Giuliani *et al.*, 2011) and, consequently, the construction of competitive advantages in the form of cost (price), quality and brand recognition. As noted in the introductory chapter of this special issue (Hira, 2014), it is well established that even though Malbecs can be produced in a variety of regions, Argentinean wines are the only ones able to be sold in high volumes and at high price points. That said, knowledge creation, diffusion and utilisation have been unequal across different regions of the Argentine wine industry. The different institutional arrangements across wine-producing provinces are deeply implicated in the successes and failures of these provinces to achieve competitiveness.

The Triple Helix (TH) model of university (research), industry and government serves as a framework to understand the dynamic behind the different innovation systems (Etzkowitz and Leydesdorff, 1998, 2000; Etzkowitz, 2002a, 2002b, 2003, 2008; Etzkowitz and Dzisah, 2008; Etzkowitz and Viale, 2010) in the Argentine wine industry. The intersection among these institutional spheres creates hybrid organisations for new technology-based firms that emerge in different forms over time. These hybrid organisational forms include: technology-transfer offices in universities, firms, government research labs and business, and financial support institutions such as angel networks and venture capital. However, as our analysis below will demonstrate, the TH framework as such has limited explanatory power in this context where there are such strong contextual factors as the difficulties of reproducing coordination among actors and at different levels, and the interaction among the TH

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institutional spheres has led to the creation of coordinated public private institutions rather than hybrid (mixed governance) institutions.

This article compares the different institutional structures within the Argentine wine industry. It analyses the nature and dynamic of actors' interaction and how coordination is achieved among them. Specifically, this case study aims to understand the extent to which the actors who make up the triple helix – university (research), government and industry – and the coordination among them boost or create competitive advantages through knowledge sharing, in both domestic and (significantly) international markets.

The paper will focus on three main Argentine provinces: Mendoza, San Juan and Salta. Mendoza and San Juan are the largest producers and exporters of Argentine wines both in volume and value. Salta, while being the fourth producer and exporter of wine in quantity, is the third largest exporting province in terms of value. This study also analyses the institutional structure of Argentina's wine industry at the national level.

This article is based on an analysis of primary, secondary and statistical sources. As there is little literature on the institutional structure of Mendoza and San Juan's wine industry, this study will build upon McDermott and McDermott *et al.*'s articles *The Politics of Institutional Renovation and Economic Upgrading: Recombining the Vines that Bind in Argentina* (McDermott, 2007) and *Public–Private Institution as Catalysts of Upgrading in Emerging Market Societies* (McDermott *et al.*, 2009) to understand how these industries achieve competitive advantages. To examine and analyse the institutional arrangement of Salta's wine industry, a survey and semi-structured interviews were conducted with relevant actors in the sector during the months of October and November 2011. The survey was developed by Anil Hira and David Aylward for the study of the other cases presented in this special issue and was adapted for the specific case under analysis. Relevant actors are from private, public and public–private sectors and respondents include: winery owners and workers, and managers, and public agents from support institutions. The interviews were conducted in: (a) Buenos Aires, where most of the national institutions that support the country's wine industry are located; and (b) Salta City and the department of Cafayate (Salta). Most of the support institutions at the provincial level are based in Salta City while the department of Cafayate hosts 63% of the wineries of this province. The responses from these surveys and interviews were useful for both building the institutional structure of the wine industry of Salta and measuring the degree of competitiveness of the firms and this sector as a whole. It is important to highlight that there is no literature on the institutional architecture of the Salta wine industry. Thus, this study shall enable us to better understand how coordination is created among the different actors and how competitiveness is achieved in the wine sector in Salta.

The Argentine wine industry

Vine cultivation in Argentina originates in the colonial period, at the beginning of the sixteenth century (Schrock *et al.*, 1993; Azpiazu and Basualdo, 2001; Richard-Jorba, 2008; Kentnor Corby, 2010; WofA, 2012). However, the real takeoff period of Argentine wine exports is quite recent, dating back to the 1990s. The implementation of neoliberal policies together with the incorporation of new leading edge technologies (Azpiazu and Basualdo, 2001; Foster and Valdés, 2004; Farinelli, 2007;

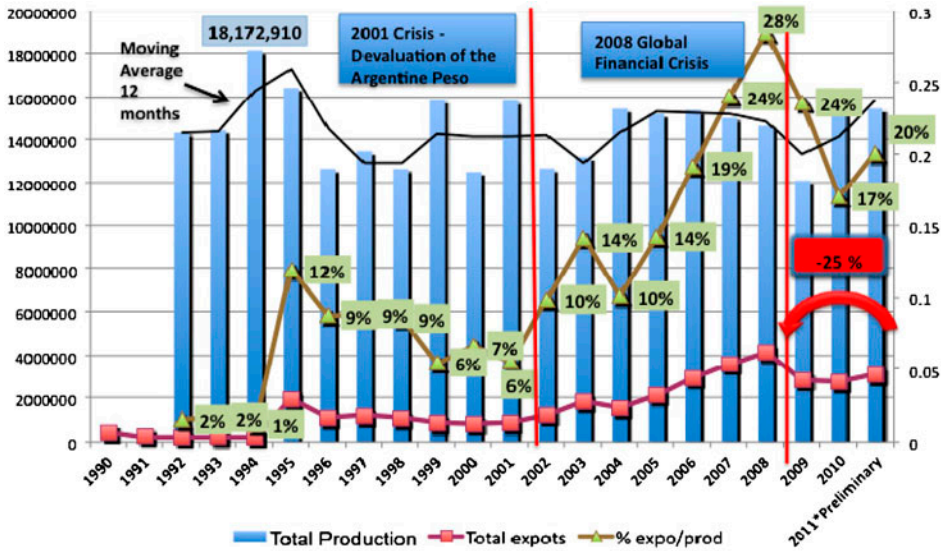


Figure 1. Evolution in production and exports of Argentine wine (in hectolitres)

Notes: % export/prod=percentage of wine exports is calculated by dividing the annual export amount (in hectolitres) by the total production.

Source: Author from INV (*National Wine Institute*).

Richard-Jorba, 2008; WofA, 2012), facilitated this New World wine-producing country in its catching-up efforts towards the Old World. As Figure 1 shows, over the years, except for during periods of crisis, Argentina has been increasing both the total amount of wine exports and the percentage this represents from total production.

Nonetheless, as mentioned earlier, the different institutional foundations across wine-producing provinces have led each of these provinces under analysis to reach different levels of competitiveness. As Figures 2–4 show, over the years Mendoza has been increasing the volume of wine production. The province has also seen the value of its exports rise as well as the percentage of wine exported in terms of its total production. In contrast, the province of San Juan has been showing a decrease in the growth of the production of wine as well as the percentage exported and the rate of increase in the value of its exports. Thirdly, Salta shows a similar trend to Mendoza's although in a smaller scale: its production has been increasing as well as its exports and the value of the latter.

Mendoza, institutional structure and the wine industry

Mendoza is the most important and large winemaking province of Argentina. Historically, it has led the production and export of wines in the country (Schrock *et al.*, 1993; Farinelli, 2007; McDermott, 2007; Kentnor Corby, 2010) both in volume and value. By 2011, over 61% of the grapes intended for wine production were of high oenology quality (INV, 2011), indicating that Mendoza produces primarily high-end wines. From this percentage, 72% were red grapes (30% Malbec) and the remaining white grapes. Yet, as mentioned earlier, the process of upgrading that started back in

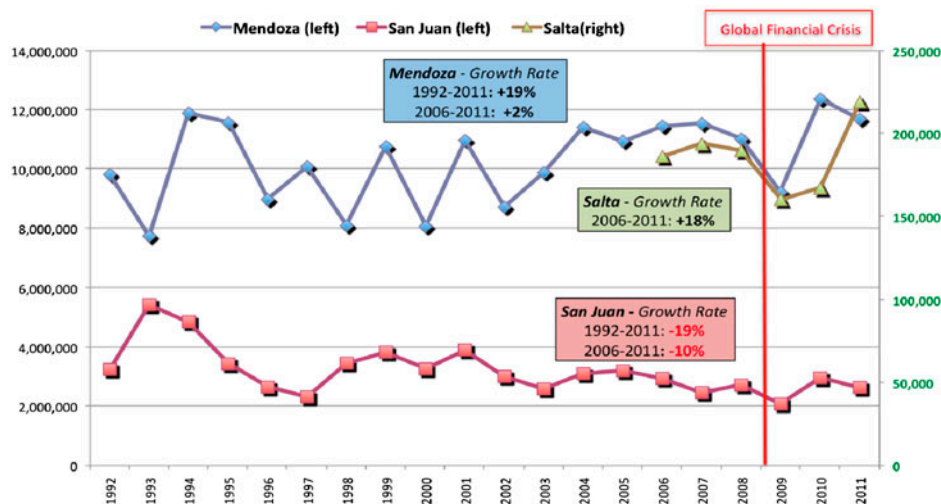


Figure 2. Wine production by province (in hectolitres)
Source: Author from INV (*National Wine Institute*).

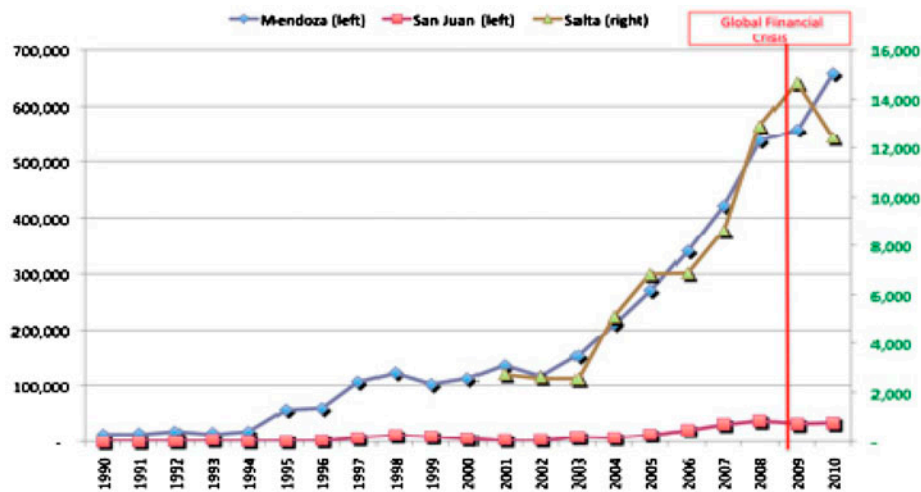


Figure 3. Wine exports by province (in thousands of dollars)
Source: Author from INV (*National Wine Institute*).

the early 1990s enabled Mendoza's wine industry to gain competitiveness and to successfully enter foreign markets. As McDermott (2007) suggests, the basis and foundation for this successful process of upgrading is principally the institutional structure of the province, firstly through the integration of actors within the public–private sector in the process of policy formulation and the development and institution-building processes; and secondly by requiring these actors to jointly govern the new institution according to rules that encourage collective problem solving and mutual monitoring (McDermott, 2007, p.105).

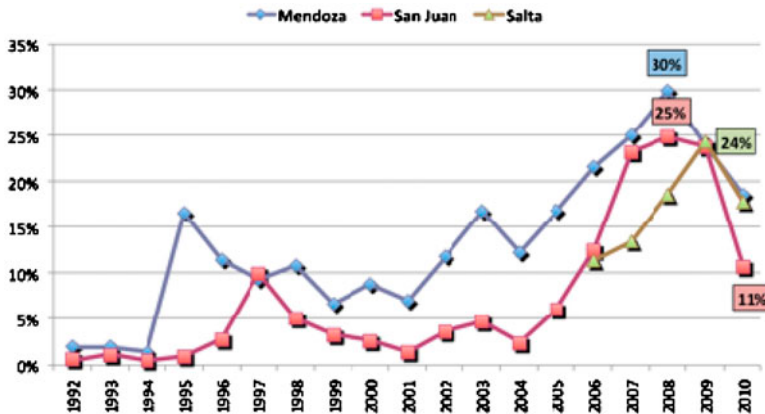


Figure 4. Percentage of wine exports/production by province (in hectolitres)

Notes: % export/prod=percentage of wine exports is calculated by dividing the annual export amount (in hectolitres) by the total production.

Source: Author from INV (*National Wine Institute*).

The institutional structure of Mendoza's wine industry comprises the three main spheres of the TH model: university (and R&D centres), industry and government. The *Universidad Nacional de Cuyo* [UNCU] (*National University of Cuyo*) and *Universidad Juan Agustín Maza* [UMAZA] (*Juan Agustín Maza University*) are the two main academic institutions. They enhance social and regional economic development by offering MA and BA programmes in Oenology and Viticulture (UNCU, 2012; UMAZA, 2012) and R&D services for the wine industry. The *Instituto Nacional de Tecnología Agropecuaria* [INTA] (*National Institute of Agricultural Technology*) is a federally and locally founded agent for technology transfer. Its *Estación Experimental Agropecuaria* [EEA] (*Agriculture Experiment Station*) specialises in the wine sector and has become a reference centre at the national level and within Latin America. This EEA carries out research, expansion and development activities, and forms strategic partnerships with cooperatives, and enters into contracts with various actors of the sector (INTA, 2012). Within the industry sphere, Fecovita is the main second-degree cooperative that comprises 5000 members from wine producers and processors (FeCoVita, 2012). Its position within the market makes the organisation a major actor and allows it to influence the decision-making process of the *Bolsa de Comercio*, the entity responsible for setting the prices of wines within the domestic industry (Kentnor Corby, 2010, p.41). As Kentnor Corby (2010) points out: FeCoVita 'has augmented rather than reduced the benefits to its member co-ops and their memberships' (p.42) and it has proved to be globally competitive without scarifying the benefits offered to its members (pp.40–43). Due to its success, FeCoVita, and the idea of cooperatives in general, have become central in the planning for the future of the wine industry in Mendoza (p.43).

The role of the provincial government has been the key to upgrading the wine industry of Mendoza. As the TH approach suggests, 'government assumes a new role in innovation by encouraging university–industry interaction of various kinds ... [and] as public venture capitalist' (Etzkowitz, 2008, p.63). Specifically, the approach of this provincial state was to convene a variety of previously isolated, and even

antagonist stakeholders groups – i.e. both in public and private sectors – to the process of policy formulation and the development and institution-building processes (McDermott, 2007; McDermott *et al.*, 2009). The creation of new institutions of a public–private nature allowed for the recombining of the existing social and knowledge resources in an innovative way and at different levels of society. Institutions such as the *Fondo Vitivinícola Mendoza* [FVM] (*Mendoza Wine Fund*), the *Instituto Nacional de Tecnología Agropecuaria* [INTA] (*National Institute of Agricultural Technology*) and the *Fundación ProMendoza* (*ProMendoza Foundation*), which were created around the 1990s, provide R&D activities, collect and disseminate information, oversee new wine regulations, guide the industry in export strategy and promotion, among others. All these institutions help improve firms' access to a variety of resources by acting as social and knowledge bridges among the community which results in knowledge flow (McDermott *et al.*, 2009, p.1271) and creating coordination. Additionally, the provincial government financially supports the industry – mainly SMEs – through the *Fondo para la Transformación y el Crecimiento* [FTyC] (*Transformation and Growth Fund*): an independent governmental entity that was established in 1994 with initial capital that came from the privatisation of hydrocarbon resources in the province (McDermott, 2007; FTyC, 2012).

McDermott's (McDermott, 2007; McDermott *et al.*, 2009) studies demonstrate that in the case of Mendoza, the more numerous ties a firm has to other firms and particularly to knowledge bridges institutions – i.e. public–private institutions – the higher level of product upgrading the firm and the industry will have as a whole. Thus, the role of the provincial government has been key in the upgrading process and development of the wine industry as it encourages the construction of these types of institutions. As one of the interviewee suggested: Mendoza and its institutions have become key in the development of the wine industry both within its region but also for other wine-producing regions in the country: '... everything that is for wine [in Salta] comes from Mendoza and Buenos Aires'.

The TH approach works under the case of Mendoza's wine industry. Yet, interaction among university–industry–government creates public–private institutions such as the *ProMendoza Foundation* rather than hybrid organisations. Specifically, the main difference between public–private institutions and hybrid organisations is that the former are governed jointly by different actors from the private and public sector. These actors govern according to rules that encourage collective problem solving and mutual monitoring. Meanwhile, hybrid organisations are generally private organisations that are assigned many of the attributes normally associated with the governmental sector and financially supported by the government. They also include financial support institutions such as venture capital and angel networks.

In conclusion, knowledge bridging organisations help public–private institutions with coordination and knowledge transfer among the different institutional spheres. The question that this successful case raises is to what extent this model can be spread to other provinces and to the national level? If so, what are the conditions under which this model can be successfully reproduced?

San Juan, institutional structure and the wine industry

As Figures 2–4 show, San Juan's wine industry has lagged behind its counterpart Mendoza, even though both share similar *terroir*. The implementation of arm's length economic incentives in the 1990s by San Juan's government brought limited

upgrading to its wine industry. As McDermott (2007) points out, the approach ‘exacerbated and fragmented antagonist relations between the government and the relevant sectorial associations, thus impeding new collective sources for upgrading’ (p.132). In other word, this *laissez faire* approach created neither horizontal ties nor coordination between association or government bodies. That is, educational institutions such as the *Universidad Católica de Cuyo* [UCCuyo] (*Catholic University of Cuyo*), research centres such as INTA San Juan, and other sectorial associations like *Cámara de Bodegueros de San Juan* [CBSJ] (*Chamber of Wineries Owner of San Juan*) and the *Cámara de Productores Vitícolas de San Juan* (*Chamber of Winemakers of San Juan*) (Ruiz and Vitale, 2011; INV, 2012) have not been able to successfully develop linkages.

The lack of a strong trilateral network, together with the provincial government’s *laissez faire* approach, have resulted in limited upgrading to the wine industry of San Juan. As shown earlier, the industry as a whole has been performing poorly and seems to be becoming less competitive in comparison to its counterparts in Salta and, particularly, Mendoza. In spite of these limitations, San Juan’s government, together with the actors of its wine industry, have been trying to find alternative ways to reach some degree of coordination and competitiveness. By early 2012, *La Mesa Vitivinícola de San Juan* (*The Viticultural Roundtable of San Juan*) was formed in which the government works side-by-side with the entities representing the wine sector. The roundtable is comprised, among others, of representatives from: industry associations such as the province’s *Cámara Vitivinícola* (*Viticultural Chamber*), the *Cámara de Bodegueros de San Juan* (*Chamber of Wineries of San Juan*), the *Consejo Profesional de Enólogos*, *Centro de Enólogos* (*Professional Council of Enologists*, *Centre of Enologists*) and national level public–private institutions such as the COVIAR (*The Argentine Viticultural Corporation*). At present there is little information available regarding the actions undertaken by it. Yet, as this province’s government states in its website:

... this collaborative work between the public and private sectors is a great opportunity to find the consensus needed among the actors [that will benefit] the competitiveness of the winemaking industry in San Juan. (Government of San Juan, 2012)

The *Viticultural Roundtable of San Juan* is an attempt to create a space of coordination: a ‘consensus space’ as the TH model suggests or, in other words, ‘... a neutral ground where the different actors in a region, from different organizational backgrounds and perspectives, can come and get together to generate and gain acceptability and support for new ideas to promote economic and social development’ (Etzkowitz, 2008, p.78). The creation of this roundtable may be seen as a step forward towards both achieving coordination among actors and the reproduction of a TH approach, linking university–industry–government to encourage innovation within the wine industry. The question that arises and needs to be addressed once the roundtable has been running for a considerable period of time is whether this interaction will result in the creation of hybrid organisations, public–private institutions – as in Mendoza’s case – and/or a more porous network. That said, the story to date is that the San Juan case reinforces the premise that even when institutions that make up the TH exist in an industry, it is first necessary to build a sense of coordination and cooperation among actors. This finding parallels that of other cases in this special issue.

Salta, institutional structure and the wine industry

As distinct from Mendoza and San Juan, the wine industry of Salta only started developing around the 2000s according to those interviewed. While the crisis of 2001 and the consequent devaluation of the Argentine peso helped to boost the competitiveness of the sector, the very same was already in the process of growing when Salta began to develop its *La Ruta del Vino* (*The Wine Route*) and the notion of *Vinos de Altura* (*Altitude Wines*). *The Wine Route* is a programme within Salta's Ministry of Tourism and Culture with the objective of differentiating and positioning Salta wines within and outside the country: 'Such differentiation goes hand in hand with two things: firstly the quality of the wines, and secondly height as a distinctive feature'. The *Valles Calchaquíes* (*Calchaquí Valleys*) is the leading wine region of the province and has the highest altitude in the world for its vineyards (WofA, 2012; ProSalta, 2012). The department of Cafayate houses 63% of the wineries and accounts for 70% of the vineyards in the valley; 99% of the crops are intended for the production of fine wines and the most prominent among the grape varieties is the '*Torrontés Riojano*, a very fruity wine, considered the finest expression of the province' (WofA, 2012).

The development of the institutional structure of the wine industry of Salta is very recent, however. Many of the institutional spheres that one would expect to make up a TH do not exist or have not yet been formally established. For instance, the province lacks universities that offer any degree in oenology and/or viticulture or that can help in developing or boosting the regional wine industry. In Cafayate there is a higher technical education institution that was launched in 2007 and offers certificates in oenology and viticulture. The technical body that teaches the related subjects are the same oenologists from the wineries of the region, promising embryonic linkages between education and industry at least.

The industry also lacks R&D centres that could support wineries in the process of upgrading and knowledge transfer. For instance, INTA Cafayate does not cover all the specialisms within viticulture that are needed to provide technical support and R&D services to the province's wine region. This organisation sometimes gets support from INTA Mendoza's body – when providing conferences or trainings – however these activities are too infrequent to cement the development and upgrading of the industry in the long run.

The lack of R&D centres is a main concern for the industry, especially the SMEs. As one of the interviewees claims:

What we want to achieve is that [the INTA Cafayate] starts to work with the wineries, with whom it has not worked for many years ... work in the vineyards, in vine research.

The industry also raised this concern by proposing the creation of an R&D agency 'outside the provincial boundary' that comprises the Northeast Argentine wine region: Catamarca, Tucumán and Salta.

[We want the *Calchaquí* INTA] for research, development, [and] a lot of things that we need, because Mendoza is too far for us; by the time [the] information gets here, it is already old

Even when the proposal for this project was rejected, two issues became clear. Firstly, there is a sense of collaboration and inter-wineries linkages that, even when not reflected in the interviews, may contribute to the adoption of new technologies and innovation processes by the industry in the long run. Secondly, the proposal flagged a possible extra-cluster collaboration that could help increase the sector's overall competitiveness both at provincial and national levels.

Other factors limit competitiveness. The lack of R&D institutions also led wineries, especially SMEs, to rely most of the time upon their internal company sources for innovation activities. The weak linkages among university–industry are therefore a great challenge for Salta's wine industry. Yet, as noted above in Figures 2–4, over the last several years, the industry has been able to increase the volume and value of both its production and exports regardless of these weak linkages. The existence of MNCs in the wine industry of Salta has provided limited spill-over benefits, however. There is but little sense of collaboration among these corporations and the SMEs, hence the latter are limited in the development and share of any training and R&D activities.

Ties between industry and government in the wine industry of Salta are mainly commercial in nature. For example, The Ministry of Economic Development, and more specifically the Secretariat of Commerce, is the nexus between the wine sector and the government. The secretariat's goal is to promote the wine sector both domestically and nationally. The interaction with the agency is, for the most part, frequent:

There [at the secretariat] good actions [have] begun to take place, with trade fairs, and fair promotions ... sometimes they will even pay for small wineries' [travel] tickets or they will give them booth space [in trade fairs]. This is important ... because before [this] there was nothing [being done].

A winery owner states,

... we are doing fairs like 'Vinos de Altura' ... bringing reporters and, lately, through the Ministry [of Economic Development], setting a distribution in Buenos Aires with some [of the] distributors that they arranged. Yes, I have plenty of interaction with them [The Ministry of Economic Development and the Secretariat of Commerce] and [it is] a good one.

Commercial linkages are also built through a public–private institution that promotes Salta's exports: *Fundación ProSalta* (*PorSalta Foundation*):

ProSalta for me is one of the most important institutions for the companies in *Salta*, because it 'decodes' the maze of bureaucracy in order to help SMEs ... it organizes you [your company] ... it establishes a vehicle to provide you with some money

These commercial linkages are of great importance when it comes to fostering upgrades at a firm level. Yet, it is not that clear to what extent these types of ties will foster knowledge transfer and innovation within Salta's wine industry as a whole. The creation and implementation of either direct or indirect innovation policy are still needed at the industry level.

Whatever the nature of these various linkages, coordination between industry and government is achieved in two different ways through the *Asociación Bodegas de*

Salta [BdeS] (*Asociation of Salta Wineries*) – a private association – and the *Mesa Vitivinícola* (*Viticultural Roundtable*):

BdeS sends us emails when they are informed of an event that will be held either through the government, through *ProSalta*, etc. ... [this] leaves us all equal conditions [to attend and participate in these events].

Similarly:

BdeS is important for us ... it is a very different thing each winery going separately than BdeS going as an institution. This is why BdeS is a better thing, because we are moving as a group.

Although it was created at the end of 2006, BdeS started to be formalised (as an agency) by 2010; they hired a manager and a secretary, and the members began to meet on a regular basis (once per month). At these meetings, the wineries discuss topics that are of common interest and that affect the industry such as infrastructure issues, wine industry national regulations, etc.

The *Mesa Vitivinícola* is a panel that the Salta government organises and which is formed by different public and private actors from the wine sector. Depending on the issue in hand, the roundtable incorporates other actors who act in an advisory capacity such as INTA, COVIAR and mayors of the different municipalities in the province, among others. It is a political discussion board, where each representative exposes their problems which will later be taken into consideration when carrying out policies for the sector.

It is non-voting, but there [in the roundtable], in a certain manner, the province takes what was raised at these meetings in order to later take action. The Viticultural Roundtable discusses several issues at either the local, provincial or provincial–federal level.

However, coordination issues within the wine industry in Salta arise at the provincial–national level. According to the interviewees (both in the public and private sector), by 2011, the province of Salta had been unable to execute the funds raised by the *Corporación Vitivinícola Argentina* [COVIAR] (*Argentine Wine Corporation*) for wine exports. The COVIAR is a public–private entity responsible for the implementation of the long-term strategic plan for the Argentine wine industry, PEVI (Plan Estratégico Vitivinícola). The problem, as identified, was that at the national level guidelines differed from the real needs of Salta's wine sector.

[Funds] should be applied to the sector and to *specific programs* (my own emphasis) ... One of the programs, has an assistentialist end from the state towards the small producers and not towards the bodeguero [winemakers] ... You have to prepare a program and a project that is applicable to Salta, otherwise we are missing all the benefits from COVIAR.

Fortunately, an agreement between the federal government, provincial government and a private association has been concluded recently, so that these funds can be used in infrastructure projects necessary for the development of the wine sector of the province – such as the redirection of the rivers bordering Cafayate. Nevertheless, this process took a long time and even led to the suspension of the Viticultural

Roundtable for a given period. Therefore, the lack of coordination among provincial–national governments, and between the PEVI’s guidelines and Salta’s wine sector needs, negatively affects and constrains the development and competitiveness of this industry.

All in all, in spite of some encouraging progress, knowledge creation, diffusion and implementation are still limited in the wine industry of Salta. Some institutions, such as *ProSalta* and the Ministry of Tourism and Economic Development, offer some training although this is not enough to foster innovation in Salta’s wine industry. Even when actors coordinate at two different levels – i.e. industry–government and firms–firms – the issues discussed still revolve around commercial ties and common problems rather than joint innovation activities.

Even though these various institutions and relationships are somewhat disjointed, the wine industry of Salta displays a good performance, suggesting both time and incentive to get things right. The fact that 99% of Salta’s crops are intended for the production of high quality wine is a key factor that contributes to building this sector’s competitive advantages, differentiating its wine in the international market. The ability to export will reflect the achievement of long-term competitiveness.

Given the scenario we have discussed, it is difficult to construct a university–industry–government institutional structure similar to the one in Mendoza or the one suggested by the TH approach. Industry seems to request that government should foster the development of universities and R&D centres in order, especially, for SMEs to carry on innovation activities in Salta’s wine industry. At the moment, most of these wineries rely on their internal sources to implement innovations processes. Intra-firm linkages, and government–industry relations are mainly for commercial issues; however, since some degree of coordination is already achieved between and among these actors, it is highly possible that a TH or Mendoza’s successful institutional model could be reproduced in Salta’s wine industry in the long run or a more porous network be created.

PEVI: a long-term strategic vision for the development of the Argentine wine industry

The success of Mendoza’s wine industry led wine associations at the board of INTA Mendoza, universities and R&D centres to propose the formulation of the PEVI: a long-term national strategic plan for the development of the Argentine Wine Industry (Ruiz and Vitale, 2011, p.6).

These experiences in identifying common constraints and formulating joint strategic responses laid the groundwork for the effort to replicate the model [Mendoza’s model] on a national scale via the creation of the Ley Pevi and its governing body, COVIAR [...] As Mendoza gained a foothold in the key world wine markets, the institutional participants increasingly realized that their sustained international competitiveness demanded resources that went beyond their own capacities. (McDermott, 2007, p.131)

Coordination and knowledge-diffusion problems are managed through the public–private institution, COVIAR. The PEVI comprised all actors from the wine industry, universities, and federal and provincial governments. It is financed through a common levy system and its set key targets include: to achieve annual sales of US\$2,000 million by the year 2020 and to achieve 10% of total global exports of wine and must. To reach these targets, the PEVI’s strategy has three strands:

- (1) positioning Argentine wine in Northern markets;
- (2) developing the Latin American wine market and re-boosting the domestic market;
- (3) supporting the development of small grape growers to profitably integrate into the wine business (Ruiz and Vitale, 2011, p.32; COVIAR, 2012; INV, 2012).

Despite the fact that PEVI is a national programme, Mendoza is the wine-producing province that leads the latter; as one public agent stated:

the PEVI is Mendoza.

This fact may challenge the ability of PEVI to incorporate the different needs of each wine-producing region into its strategy, therefore complicating existing knowledge-diffusion and coordination problems among the different wine-producing provinces of the country. As one winery owner suggested,

For us, it would be much easier if the money [from COVIAR funds] was released to us and the only thing they asked from us is that we use it in the sector ... First, we have to make this table [provincial] agree and then, we have to go to Buenos Aires and consult with another table ... and they tell us No! '[we] want everything to be given to the small producers'.

The quote above also highlights the difficulty in replicating Mendoza's model at a national level. Even when there is a bridge institution – i.e. COVIAR – responsible for the coordination of these actors, the different institutional structures and degree of coordination among actors in each of these provinces makes it hard to achieve coordination at a national level.

The PEVI's case suggests that further research is needed to understand how the different wine sectors' institutional structures (or THs) interact with each other and how coordination is achieved under these conditions. It also raises the question of whether the federal government rather than Mendoza should take the lead in order to create another mechanism of coordination and, if so, which would be this mechanism?

Conclusion and final remarks

The TH literature suggests that coordination and collaboration among university (research)–industry–government networks are a prerequisite for knowledge diffusion and innovation. The interaction among these spheres creates hybrid organisations for new technology-based firms that are increasingly developed and helps with knowledge diffusion. However, it struggles to explain how different actors make sense of coordination and how the latter is achieved.

As a New World wine producer, Argentina has been able to catch up with the Old World and become a great competitor in the international wine market. The province of Mendoza has become the main player in the Argentine wine industry. The institutional restructuring of Mendoza's wine industry has led to a TH approach, where industry–government–university collaborate in the innovation process. However, this interaction has led to the creation of public–private institutions rather

than hybrid organisations. These institutions act as knowledge bridges and create coordination among the different institutional spheres, while at the same time contributing to the innovation process and, consequently, to the sector's competitiveness. However, this model can work but is difficult to reproduce at any provincial and national levels.

The case of San Juan's wine industry reinforces the premise that it is a necessary but not sufficient condition for an industry to create competitive advantages, to be made up by the TH institutions. Coordination and collaboration among these spheres should be encouraged by government. The analysis of the wine industry of Salta suggests that coordination and collaboration can be achieved even when the institutions that make up the TH do not exist or are not formally established. However, once coordination and collaboration is achieved among actors, a pathway is open for the development of a TH approach, Mendoza's model or the creation of a more porous network.

It has also been a challenge to implement the TH or Mendoza's model at the national level. Coordination among provinces and the nation has been difficult to achieve. As noted, further research is needed to address how the different wine sectors' institutional structures (or THs) interact with each other and how coordination is achieved under these conditions. This case also raises the question on who should take the lead in the development of the country's wine industry and what other mechanisms of coordination can be implemented to achieve coordination among actors.

The study suggests that the TH model is a useful framework of university (research)–industry–government institutions for understanding the institutional foundations for innovation and economic success. However, it is limited in explaining how actors make sense of coordination and how the latter is achieved. Finally, the study shows that interaction among these institutional spheres does not always lead to the creation of hybrid organisations; rather in successful cases such as Mendoza this interaction leads to the creation of mixed public–private institutions or a more porous network as in the case of Salta.

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