

The Argentine Wine Industry: Creating New Spaces for Coordination?

by

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Abstract

The purpose of this study is to understand the effects of public policies and institutional support in the development of the wine industry of Argentina. It is concerned principally with understanding how interaction and coordination among actors within this sector aids the developments of this industry. It relies upon the Triple Helix approach of university /research-industry-government interaction to compare and examine the institutional arrangements in the wine industry of three Argentine provinces and at the national level. It finds that this approach 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. This study demonstrates that it is necessary to first build a sense of collaboration and coordination among the relevant institutional spheres to reproduce a Triple Helix framework in practise.

Keywords: Argentina; coordination; wine industry; knowledge diffusion; institutions; innovation systems

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List of Acronyms

AER	Agencia de Extensión Rural (Rural Extension Agency)
BdeS	Bodegas de Salta (Association of Salta Wineries)
CBSJ	Cámara de Bodegueros de San Juan (Chamber of Wineries owners of San Juan)
COVIAR	Corporación Vitivinícola Argentina (Argentine Wine Corporation)
EEA	Estación Experimental Agropecuaria (Agricultural Experiment Station)
FeCoVitA	Federación de Cooperativas Vitivinícolas Argentinas (Argentinian Viticulture and Winemaking Cooperatives Federation)
FTyC	Fondo para la Transformación y el Crecimiento (Transformation and Growth Fund)
FVM	Fondo Vitivinícola Mendoza (Mendoza Wine Fund)
IDR	Institución de Desarrollo Rural (Rural Development Institute).
INTA	Instituto Nacional de Tecnología Agropecuaria (National Institute of Agricultural Technology)
ProSalta	Fundación ProSalta (Prosalta Foundation)
ProMendoza	Fundación ProMendoza (ProMendoza Foundation)
PEVI	Plan Estratégico Vitivinícola (Long-term national strategic plan for the development of the Argentine Wine Industry)
TH	Triple-Helix
UCCuyo	Universidad Católica de Cuyo (Catholic University of Cuyo)
Umaza	Universidad San Agustín Maza (University of San Agustín Maza)
UNCU	Universidad Nacional de Cuyo (National University of Cuyo)
WofA	Wines of Argentina

1. Introduction

The purpose of this study is to understand the effects of public policies and institutional support in the development of the wine industry of Argentina. It is concerned principally with understanding how interaction and coordination among actors within this sector aids the developments of this industry.

In a knowledge-based economy, knowledge is the main driver for economic growth and competitiveness. As the influential work of Peter Drucker (1969) *The Age of Discontinuity* suggests, knowledge has become the key to productivity, competitive strength, economic achievement and international economic strength (Ibid. p.264-265). “What matters in a ‘knowledge economy’ is whether *knowledge, old or new, is applicable* [my emphasis]” (Ibid. p.269).

The application of knowledge either old or new goes beyond the creation of technologies for the development of new products and/or process. Nowadays, the technological gap between ‘north-south’, ‘center-periphery’ and ‘developed-developing’ countries means that economies are not sufficiently knowledge-based to perform, to grow and to compete (Drucker 1969, p.266). “What used to be technology is becoming knowledge” (Ibid. p.352). Then, knowledge has also become a key component in any process of innovation.

Therefore, if knowledge is what drives competitiveness and economic growth in today’s societies, understanding the creation, dissemination and utilization of it is crucial for the development of any industry and country. Then, the following questions arise: 1) Which actors (institutions) should be involved in the process of knowledge creation, diffusion and utilization? and 2) Which role should each of these actors play in this (innovation) process?

Seeking an answer to these questions, recent literature –i.e. Freeman 1987, Malerba 2002 and 2005; Edquist 2005; Edquist and Hommmen 1999; and Lundvall 1992

and 2007, among others- has been applying a system perspective to the study of innovation. The adoption of this perspective has contributed to a shift from a linear model of innovation to a more complex study of the interdependency and interaction between the various elements (and actors) of the innovation process (Edquist and Hommen 1999 and Fagerberg et al 2005).

In the international wine industry, 'New World' producers such as Australia, Argentina and Chile have radically improved the quality of their wine. As Giuliani et al (2011) show in *Innovation and Technological Catch-Up: The Changing Geography of Wine Production*, these new emerging wine producer countries have been able to catch up with the "Old World" –e.g. Italy and France- and "firms and other organizations in the wine industry have in fact created successful innovation systems that have permitted the production of innovate and high value products" (Ibid. p.7).

Therefore, the study of the catching up process and innovation systems of these New World wine-producing countries is of great importance to understand what are the institutional foundations behind their innovation and economic success. Argentina is among the New World wine-producing countries. Since the early 90's the wine industry of Argentina has reoriented towards the production of vine strains for fine wines. Since then, 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.

This study relies upon the Triple Helix for innovation systems as a theoretical framework to compare the different institutional structures within the Argentine wine industry. Its purpose is to understand to what extent the actors that make up the Triple Helix -i.e. university (research), government and industry- and the coordination among them boost or create competitive advantages – i.e. quality, price and brand recognition both in the domestic but particularly in the international market- through knowledge sharing. As will be explained in depth in chapter 2, the Triple Helix is a useful framework for analysing the dynamic of innovation and knowledge flow. In contrast to the system of innovation approach –i.e. National, Regional and Sectoral, the TH approach is not bounded by any particular location thus it allows to contrast and compare the same industry in different locations.

This study focuses on three main provinces: Mendoza, San Juan and Salta. Mendoza and San Juan are traditionally 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. 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. This study also analyses the institutional structure of Argentina's wine industry at the national level.

This thesis shows that in the successful case of Mendoza's wine industry, a Triple Helix framework for innovation works. However it is hard to spread this model both among other provinces –i.e. San Juan and Salta – and at the national level. The difficulties of reproducing coordination among actors and at different levels make it hard to create this model in practise. Argentina is a successful example of a catching up wine producing country in which a Triple Helix model is implemented in some wine producing regions but cannot be reproduced equally in others. As Sábato and Botana (1993) also suggest in their 'Triangle' model, the existence of the three vertices –industry, government and scientific-technological infrastructure- it is not enough for a society to know where and how to innovate. Innovation is the result of multiple coordinated and deliberated actions among these three fundamental elements.

In a broader perspective, this study also brings forth the general question on how much state intervention is needed in the economy –i.e. state intervention vs. free market. For instance, the successful case of Mendoza shows that industrial policies towards the wine industry are both producer and (provincial) state-driven. The private sector took the lead but provincial state intervention was needed in other to create new public-private institutions. This shows that the general assessment of neoliberalism vs. state intervention is too general to capture the actual complexity of the economies' reality.

The rest of the thesis is organized as follow. This first chapter has provided with an introductory overview of the importance of knowledge creation, dissemination and utilization in the innovation process and for promoting economic and social development.

It has explained the purpose of this paper and it will continue by presenting the methodology used to explore the subject matter of study.

Chapter 2 presents the theoretical and conceptual framework under which this investigation is based. It looks at how the literature studies innovation; which are the different approaches applied to the study of the latter; and at what levels –i.e. micro, meso and macro- innovation can be achieved. This chapter finishes by introducing and describing the conceptual framework used in this study –i.e. the Triple Helix framework.

Chapter 3 focuses on the wine industry of Argentina. It first presents a historical background and evolution of the Argentine wine industry. It continues by examining and applying the triple helix framework to understand the institutional arrangement of the three wine-producing provinces under analysis: Mendoza, San Juan and Salta; and the institutional structure and public policies of the wine industry at the national level.

The last chapter (4) presents the conclusion and final remarks for the analysis of the Argentine wine industry. It restates the institutional foundation behind the success (or failure) of its wine-producing provinces and the industry as a whole. Finally, it identifies the limitations of the replication of the Triple-Helix approach in each of the cases under analysis and proposes solutions to them.

1.1. Methodology

1.1.1. *Survey and Interviews*

The study was based on a common survey for understanding which policies and institutional arrangement are behind the development of Salta's wine industry. The survey was developed by Anil Hira and David Aylward (please see Appendix A) for a previous study on global wine industry dynamic and the factors behind the success of New World wine-producing countries (Hira 2013, forthcoming). This survey was adapted for the specific case under analysis.

The common survey and the semi-structured interviews were conducted to relevant actors in the sector during the months of October and November 2011.

Relevant actors are from private, public and public-private sectors and 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.

Some examples of the open-ended questions for the semi-structured interviews are as follows¹:

1. Do you consider exporting as a strategy for your company? Do you believe exporting could make your firm more competitive? In which ways?
2. Do you believe that any of the following institutions -INTA Cafayate, INV Cafayate, ProSalta, Cooperative of Winegrowers "Cafayate" and the Association of Salta Winemakers- can assist your company in this (upgrading/innovation) process? If so, in which areas?
3. What are the areas in which you believe these institutions could provide your company some support but are currently not doing so?
4. What do you believe could be a possible strategy to follow in order for these institutions to help your company's process of upgrading/innovation? Do you consider the creation of a new institution as an alternative? If so, what would be its role and what services do you believe are crucial for carrying on its function?

1.1.2. Secondary Sources

For the case study of Salta, the survey and interview responses collected in this study were used to construct the institutional architecture of Salta's wine industry as there are no secondary sources available to build on. In the case study of Mendoza and

San Juan, interviews and surveys could not be conducted due to time and budget constraints. Then, this study will build upon McDermott's (2007) and McDermott et al's (2009) articles *The Politics of Institutional Renovation and Economic Upgrading: recombining the Vines That Bind in Argentina (2007)* and *Public-Private Institution as Catalysts of Upgrading in Emerging Market Societies (2009)* to understand how these latter industries achieved competitive advantages. These studies are particularly useful as they compare the evolution of policies and industry (institutional) restructuring of San Juan and Mendoza's wine industry from (and during) the 1990s.

¹ All participants were requested to sign a consent form which details: the study's purpose, the name of the principal investigator (PI), how the data will be stored, used and who will have access to it; and who to contact for any concern or to receive a copy of the final report. All interviews and surveys were voluntary. The comments and opinions made by these actors are their own and do not necessarily represent their associated organization. Please see the attach consent form in Appendix B.

2. Systems of Innovation and Conceptual Framework

2.1. Introduction

Knowledge and learning have become the main foundations of modern societies such as post-industrial and knowledge-based economies, or learning and information societies (Drucker 1969 and Kuhn 2006). Knowledge is the key to productivity, competitive strength, economic achievement and international economic strength (Drucker 1969 p.264-265). Productivity and growth are determined by the accumulation of knowledge and technical progress (OECD 1996, p,18). For instance, the ideas of knowledge-based economy have become the basis for designing the strategic policy agenda of the European Union making Europe “the most competitive and dynamic knowledge-based economy in the world” (European Commission 2000, quoted in Kuhn 2006, p.20).

In a knowledge-based economy, the diffusion and use of knowledge is as important as its production. “What matters in a ‘knowledge economy’ is whether *knowledge, old or new, is applicable* [my emphasis]” (Drucker 1969, p.269). Additionally, a knowledge-based economy is characterised by its network characteristic among different actors in the economy. This characteristic has emerged with changes to the linear model of innovation.

The innovation process was first viewed in the literature as a lineal process: “science leads to technology and technology satisfies market needs” (Gibbons M. et al 1994, quoted in Edquist et al 1999 p.64). In a knowledge-based economy, innovation has countless definitions. It can be seen as incremental improvements on existing products; the utilization of new technology to serve an existing market or the application of technologies to new market (OECD 1996, p.14);“the first attempt to carry it [invention]

out into practise” (Fagerberg et al 2005, p.4) or the “reconfiguration of elements into a more productive combination” (Etzkowitz 2008, p.4). Regardless of its meaning, the innovation process requires considerable communication among different actors –i.e. academic institutions, consumers, firms, government, etc. Firms search for linkages to promote both inter-firm interactive learning and complementary assets from outside partners and networks. Interactive learning among actors is then crucial for realising the productivity potential of new technologies/knowledge and long-term economic growth (OECD 1996, p.18).

In the wine industry, the increasing global tendency of the industry may blur and disappear the distinctions between “Old” and “New” World (Aylward 2005, p.421). ‘New World’ wine producers such as Australia, Argentina and Chile, have radically improved the quality of their wine as well as have changed the way how wines are sold and consumed in the global market. Behind the economic success of these New World producers, investment in knowledge-intensive activities, institutions devoted to its production and diffusion, and coordination among the latter actors, have been key in their innovation and catching-up processes. As Giuliani et al (2011) show in their work of innovation and technological catching-up process in the international wine industry, these new emerging wine-producing countries have been able to catch up with the “Old World” –e.g. Italy and France- and “firms and other organizations in the wine industry have in fact created successful innovation systems that have permitted the production of innovate and high value products” (Ibid. p.7).

Hence, analyzing the structure and dynamic of the these New World wine producer countries’ innovation systems will help understanding the factors behind their economic success. Specifically, how knowledge is created, used and disseminated, and which actors are involved and what are their roles. In other words, this analysis will help us understand what is the institutional foundation behind the development of competitive advantages for succeed in the international wine industry. We will first proceed to review how the literature assesses innovation processes in a knowledge-based economy.

2.2. Systems of Innovation (SI)

As mentioned earlier, the innovation process was first viewed in the literature as a lineal process. The systems of innovation (SI) approach acknowledges the complex interdependencies and multiple interaction among the different determinants of the innovation processes (Edquist et al 1999, and Edquist 2005). Broadly, these determinants are “all important economic, social, political, organizational, institutional, and other factors that influence the development, diffusion, and use of innovations” (Edquist 2005, p.182). The key for this approach is to understand what role systems play in the creation, diffusion and utilization of knowledge leading to innovation.

The strengths of the SI perspective are that it: 1) places innovation and learning processes at the center of the focus; 2) adopts a holistic and interdisciplinary perspective; 3) employs a historical perspective; 4) stresses the differences between systems rather than the optimality of systems; 5) emphasizes interdependence and non-linearity of the process; 6) encompasses product technology and organizational innovation; and 7) emphasizes the central role of institutions. The downside of this approach, however, is that it is 8) still associated with conceptual diffuseness; and 9) it is a conceptual framework rather than a formal theory (Edquist 1999, p.65-66).

SI places innovation as the driving force for economic growth. However, the latter can occur at different levels: micro, meso and national level. In what follows, we will proceed to describe how this approach is applied in these different levels.

2.2.1. National System of Innovation (NSI)

The study of SI at the national level was first introduced by Freedman (1987), Lundvall (1992) and Nelson and Rosenberg (1993). Freedman’s (1987) book on the Japanese national system of innovation (NSI) focuses on: interfirm relationships and R&D strategies; the role of government; the role of training, education, and other social innovations; and the conglomerate structure of the industry (Freedman 1987, p.4). At a county-specific level, his analysis aims to understand the interaction between the production system and process system: which organizational structures are more conducive to the use and development of new technology (Lundvall 1992 p.17).

For Nelson and Sampat (2001) and Nelson and Nelson (2002), the idea of SI is an *institutional conception par excellence*. Their studies focus on institutional structures at national level and how they enable the implementation or support activities that create new physical technologies. Specifically, they study the role of firms, governments and industry in the development of new technologies. As Nelson and Nelson (2002) suggest, this is not an static process; the interdependence between the physical technology and the social technology leads to the co-evolution of institutions. This co-evolutionary process is then the key factor for economic growth (Ibid. p.271).

Lundvall's (1992) work on NSI incorporate to some extent both Nelson's and Freedman's perspective. For this author, two dimensions are key in the NSI: 1) the economic structure and 2) the institutional set-up. The emphasis is placed on the internal organisation of firms; the interfirm relationships; the role of public sector; the instructional set-up of the financial sector; and R&D organizations (Ibid. p13). Here, innovation is seen as an interactive learning process and knowledge as the most important resource in the current economy. Then any changes in the economic and institutional dimension can affect this learning process as well as the dynamic of knowledge creation, dissemination and utilization (Ibid. p.12).

2.2.2. Regional Innovation System (RIS)

The RIS framework adds to the territorially based innovation systems debate by exploring SI at a subnational, regional, or meso level. An RIS is "the institutional infrastructure supporting innovation within the production structure of a region" (Asheim and Gertler 2005, p.299).

From this perspective, the concept of region refers not only to the territorial location. More importantly, it highlights the power of governance of economic processes between the national level and the particular firms or cluster. That is, the capability of a cluster to develop innovation support policies and organizations (Cooke et al 1997, p.480) is mediated by regional institutions. The technological capacity of a RIS stems from the existence of three key institutional forms or subsystems: 1) financial; 2) learning; and 3) productive 'cultures' (Ibid. p.476).

The first institutional form –i.e. financial- refers to the regional government's autonomy and financial competency to implement policies to aid financing for innovation. In particular, these policies should be directed to built trust relations between the parties by minimizing uncertainties and also to support investment in infrastructure for innovation in the region (Cooke 1997 and 2001).

The second institutional form bears on the interactive learning capacity of the RIS. Since knowledge and learning processes are the main drivers for developing technological and innovation capabilities, regional policies would be forced to support learning processes to: a) secure “the appropriate external conditions in which such externalized learning and innovation can occur” (Cooke et al 1997, p.485); and b) foster cooperation among firms and knowledge produced by institutions such as universities or technological centres.

Finally, the term ‘productive culture’ refers to the link between two different systems: the productivity system (mainly firms) and the social system. This linkage is of great importance as it determines the success of the development of the region's innovation process. For instance, the social function firms carry on in the setting where they are located is an interesting aspect of a country's ‘productive culture’: “the links or systematic interactions between companies and their surroundings” (Cooke et al 1997, p.488). In general, the more trusting relationships are built among society-firms, the better the region is able to develop an innovation process efficiently regardless of the capacity of control it might have over the financial subsystem (Cooke et al 1997 and Cooke 2001).

All in all, the RIS perspective suggests that the main driver for developing a region's innovation process is the linkages built among the actors of the region and not the local proximity *per se*. As Porter (1998) also highlights in his study of clusters and economic competition, the success of creating an innovation system is rather the coordination and cooperation developed among actors within a regional territory: the linkages, and trust built in relations among the companies, institutions and the region's social sphere.

2.2.3. Sectoral System of Innovation (SSI)

In contrast to the NSI and RIS perspective, the SSI explores systems of innovation beyond the geographical boundaries. Whereas a NSI is somehow limited by national boundaries and RIS is within a subnational region, SSI approach claims that a sectoral system may have local, national and/or global dimensions, (Malerba 2002, 2005 and 2009).

Specifically, the SSI perspective broadly defines sector as a “set of activities unified by some linked product groups for a given or emerging demand and which share some common knowledge” (Malerba 2005 p.385). Accordingly, each sector has its own market dynamic; innovating firms; technology trajectory; innovation policies; learning process; type of interaction among actors; and institutional set-up. Thus, there can be as many possible institutional arrangements as different existing sectors are.

Under the SSI perspective, the innovation system is analyzed at a micro-level: it takes into consideration both the supply and demand sides on markets in the innovation process. It incorporates in the analysis both market and non-market interaction among actors and in the same line with previously presented SI approaches, SSI highlights the importance of the 1) knowledge and technological domain; 2) actors and networks; and 3) institutions (Malerba 2002, 2005 and 2009) in the innovation process. However, the value of this perspective is that it focuses on the transformation of each system across geographical boundaries rather than considering sectoral boundaries as given (Malerba 2005, p.67).

2.2.4. SI and some critical considerations

Undoubtedly, the study of innovation processes applying a system perspective is a useful approach to understand the different factors behind the creation, utilization and diffusion of knowledge. This perspective also shows how institutional relations and structures have been evolving over time within a specific innovation system. However, little has been said about the dynamic of the SI or, in other words, “the forces of motions underlying the institutional linkages” (Leydesdorff and Zandie 2010, p.790). Specifically, ‘forces of motions’ refers to “the way knowledge infrastructure evolves and can have implications for technological opportunities; and the way the political economy evolves to

determine the institutional mechanism for the selection of the technological trajectories” (ibid.).

Understanding the dynamic of knowledge creation, diffusion and utilization, and the internal transformation of each institution within the innovation system is as important as understanding the institutional structure of the innovation system. Broadly, understanding the dynamic of the capitalization of knowledge –i.e. when knowledge generates a ‘direct’ or ‘indirect’ economic added value (see Viale and Etzkowitz 2010, p.31 for a detailed definition of direct and indirect economic value)- is key for the development of any knowledge-based economy.

2.3. Conceptual Framework

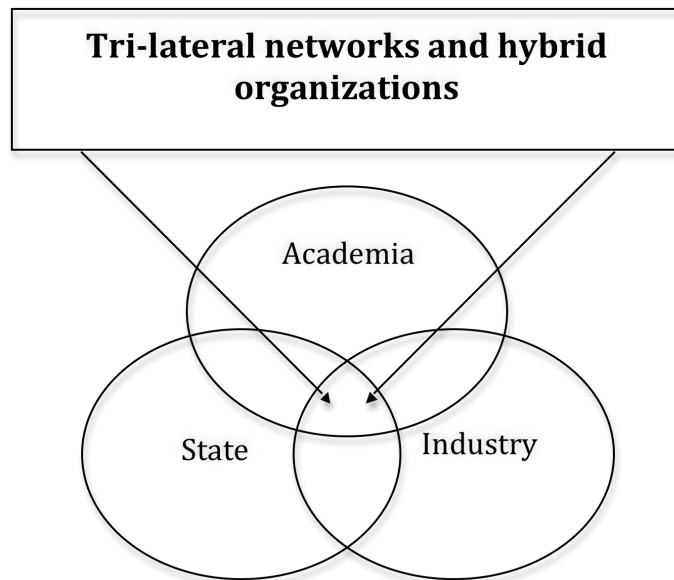
In the international wine market, the capitalization of knowledge through the development of methods of production and new ideas for product innovations in the domestic industry has helped New World countries in their catching-up efforts towards the Old World. In fact, firms and other organizations have created successful innovation systems that allow for the production of innovative and high-value products (Giuliani et al 2011, p.7). The New World producers have become more export-oriented and have been adopting aggressive branding and marketing strategies to position themselves in a highly competitive international market. Exploring the dynamic behind these innovation systems is without a doubt of great interest to understand how these new wine-producing countries came to position themselves within the global market.

The Triple Helix (TH) model of university (research), industry and government institutions serves as a framework to understand the dynamic behind the innovation system. It is useful to understand the institutional foundations for innovation, knowledge diffusion and economic success. In particular we can apply this approach to the case study under analysis, that is, to understand how Argentina, as a New World country, successfully positioned itself within the international wine market. The following subsection will present in depth how the TH for innovation approach works and what are the roles of each actor in the process of knowledge capitalization.

2.3.1. The Triple Helix Approach

The TH is a “spiral model of innovation that captures multiple reciprocal relationships at different points in the process of knowledge capitalization” (Etzkowitz 2002, p.2). It is about the dynamics arising from the interactions between the three institutional spheres (or helices) that are considered key to innovation in increasingly knowledge-based economies: university-industry-government –i.e. research, production and policy. Specifically, university takes a leading role in the economy as an entrepreneurial actor. The traditional teaching and research mission of university has extended to ensure that the knowledge it produces can be shared and applied for industry stakeholders, ultimately translating into regional and national economic and social development. This is ‘the university’s third mission’ (Etzkowitz 2002a, 2002b, 2003, 2008, 2008, Etzkowitz and Leydesdorff 1998 and 2000, and Etzkowitz and Viale 2010).

Figure 1: The Triple Helix Model of University-Industry-Government



Source: Etzkowitz and Leydesdorff (2000, p. 111).

Under this approach, a TH begins where “specific contexts of industrial clusters, academic development, and presence or lack of governing authority” (Etzkowitz 2008, p.8) influence the development of reciprocal relationships as part of a strategy to renew an older economy or create a new economic activity (Ibid.). At this stage, each sphere

collaborates to innovate independently, by talking place through their traditional roles. When the production of new knowledge and technology becomes more important, each of the helices go through an internal transformation in which, apart from performing its traditional functions, they take 'the role of the other'. They instigate new tasks while they also become a source and support of innovation that arises in other spirals. The interaction among the three spheres leads to the creation of new overlay of networks and hybrid organizations for the aim to come up with new ideas and formats for high-tech development (Etzkowitz and Leydesdorff 2000, and Etzkowitz 2008).

The questions that arise from the above description are: 1) What is the role of each sphere in the process of innovation and knowledge capitalization? And, specifically, 2) what is their role in the wine industry? Bellow, we will expand on what the TH framework says about the role of university, industry and government in the innovation process and the capitalization of knowledge.

2.2.1.1 The role of the entrepreneurial university

As mentioned earlier, in a knowledge-based economy, the university's role goes beyond its traditional mission as an academic and research institution. The university becomes an economic actor in its own right: its new mission as an entrepreneurial university is the capitalization of knowledge and the direct interaction with regional stakeholders. Specially the entrepreneurial university actively seeks resource from various external sources to further its development and it participates with other institutional spheres in joint projects for the economic and social development of the region; yet, without losing its autonomy (Etzkowitz and Dzisah 2008, Etzkowitz 2003 and 2008).

The university combines its research and teaching capabilities to shaping organizations in entrepreneurial education and incubation programs, and it becomes a source of new firm formations (Etzkowitz and Dzisah 2008, p.654). In other words, "the core competency of the university has expanded from the production and distribution of human capital and knowledge to the packaging and diffusion of intellectual property, increasingly by recombining and enhancing internal and external innovation" (Etzkowitz 2003, p.324).

In the wine industry, the capacity of a winery to absorb and generate knowledge is primarily determined by the employment and linkages with two main professionals: oenologist and agronomists (Kunc and Tiffin 2011 p.101). These actors have the capability for conducting knowledge generation, transfer and application to solve problems in all phases of the productive chain -i.e. grape growing and wine producing (Ibid.). However, it is necessary for these actors to engage in processes of knowledge exchange with peers in the region and through interorganizational relations in order to produce and apply new knowledge. In this sense, regional universities can be a critical institution: a) by providing knowledge and/or training workers to strengthen the knowledge of weaker firms; and b) in the development and connection of these actors who can transfer knowledge to the industry (Ibid).

2.2.1.2 The role of government

The basis for innovation in a TH includes both bottom-up and top-down initiatives. This approach calls for an 'innovation state' rather than a statist or a laissez-faire society. A state which creates sources of productivity in science and technology through 1) new forms of cooperative relations (Etzkowitz 2008, p.73) among university-industry; and 2) by implementing policy initiatives. "Government assumes a new role in innovation by encouraging university-industry interaction of various kinds ... [and] as public venture capitalist" (Etzkowitz 2008, p.63). Broadly, the basic functions of an innovative state are: to provide a regulatory framework to private capital that minimizes the risk in investing in new ventures; to establish special rights such as patents systems for universities as temporary monopolies to promote innovation; to use levying of taxes system or grant R&D credits to promote innovation; and to encourage the formation of new public-private partnerships including hybrid organizations (Ibid. p.73).

Then government becomes a partner in encouraging cooperative initiatives from both the academic and industry spheres and policy-making process. "Science, technology and innovation policies thus tend to become an outcome of the interaction among the triple helix agencies" (Etzkowitz 2002b p.19).

All in all, this approach calls for a balance between too much and too little government intervention. While government intervention is essential for creating and

promoting university-industry relations, too much government control limits the sources of initiatives to a narrow range of officials. A TH of policy, production and research institutions, at a regional level, will cooperatively create and implement policy initiatives towards the industry's development.

2.2.1.3 *The role of the industry*

As firms seek discontinuous innovation, they first tend to partner with firms similar to themselves and then to other types of entities such as university centers (Etzkowitz 2008, p.45). However, a knowledge-based economy is particularly characterised by firms that pursue strategies based on academic innovation and incubation. There is a transition from the hierarchical model of large firms to start-ups and the spin-offs phenomenon from universities that incorporate academic characteristics (Etzkowitz 2003 and 2008). A mix between research and business is the key component of a knowledge based firm. Industry guides research –i.e. knowledge creation- and utilizes it for the development of new products and services. Simultaneously, when they develop goods and services, they are either directly or indirectly commercializing the knowledge created by these research centers and universities.

As mentioned, government plays a key role in encouraging this interaction between industry and university. Firm-formation and start-ups based on technological and organizational innovation result from cooperation, coordination and collaboration among these three institutional spheres. This new mode of interdisciplinary knowledge production inspires the creation of hybrid organizations for new technology-based firms. Examples of these organizations are: technology-transfer offices in universities; firms; government research labs and business; and financial support institutions such as angel networks and venture capital.

2.2.1.4 *The TH framework and some considerations*

All in all, the TH framework for production, research/training and policy institutions is a useful starting point for understanding the institutional foundation of innovation and economic success. Additionally, it provides a model for analysis of the

dynamic of innovation as well as it helps understanding the role of institutions in knowledge creation, diffusion and utilization within any system of innovation.

In the next chapter, we will proceed to analyze whether this framework stands up within the wine industry of Argentina and, particularly, for the cases under analysis: Mendoza, San Juan, Salta and the national wine industry. We will compare the institutional structure of each of these wine-producing province and determine to what extent has this model (if applicable) helped boosting or creating competitive advantages – i.e. quality, price and brand recognition- through knowledge sharing.

3. The Argentine Wine Industry

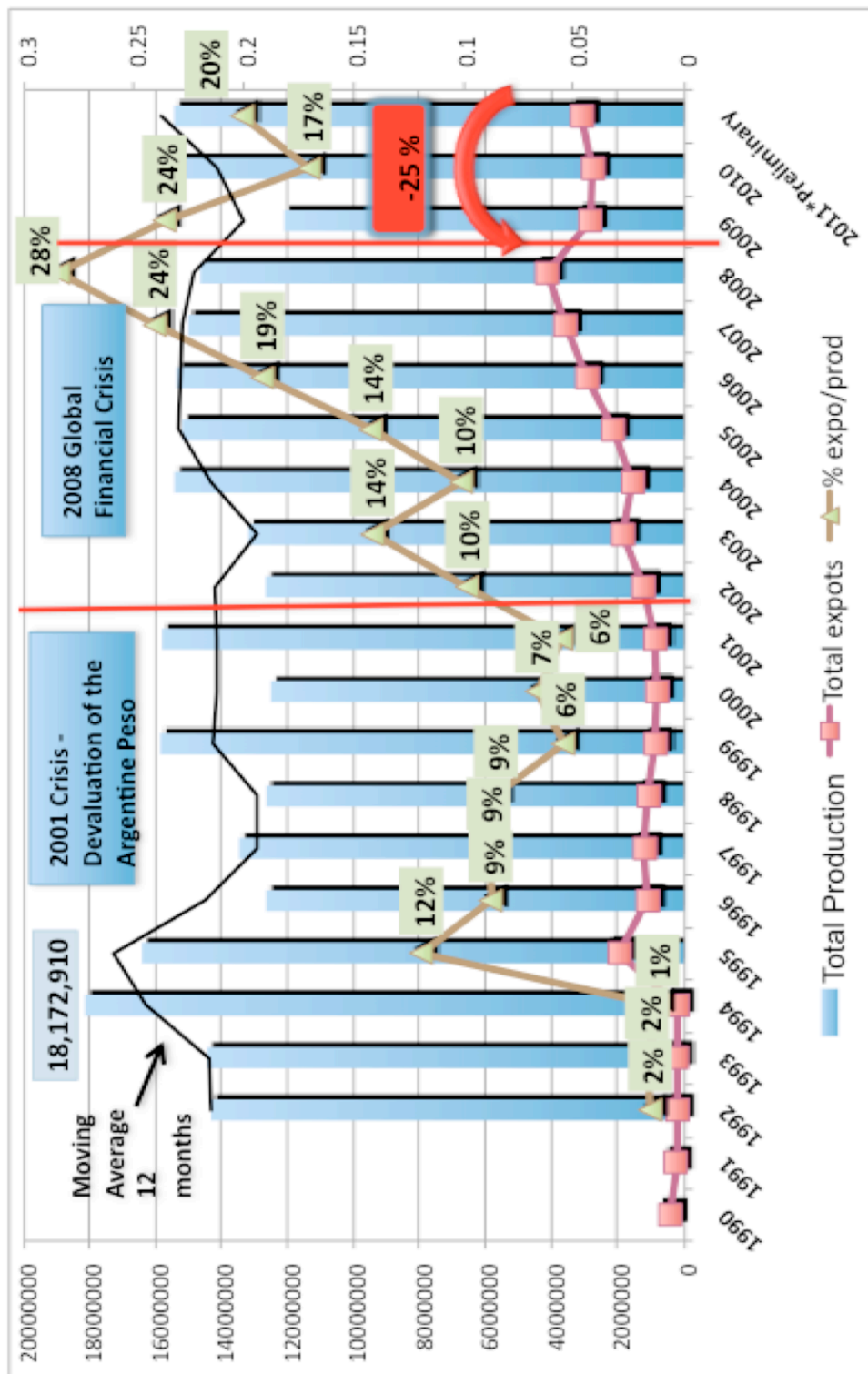
3.1. Evolution of the wine industry

Vine cultivation in Argentina finds its origins in the colonial period, at the beginning of the sixteenth century (Schrock et al. 1993, Azpiazu et al. 2001, Richard-Jorba 2008, Kentnor Corby 2010 and WofA 2012). However, the real takeoff period of Argentine wine exports is quite recent; it goes back to the 90s. The implementation of neoliberal policies together with the incorporation of new leading edge technologies (Azpiazu 2001, Foster and Valdés 2004, Richard-Jorba 2008, Farinelli 2007 and WofA 2012), facilitated this New World wine-producing country in its catching-up efforts towards the Old World.

The successful incorporation of Argentine wines in the international market is closely linked to creating flows of knowledge throughout the sector (Giuliani et al 2011) and accordingly the construction of competitive advantages –i.e. price, quality and brand recognition. Notwithstanding, (the success of) knowledge creation, diffusion and utilization has not been equally among the Argentine wine industry. The different institutional arrangements across wine-producing provinces has led each of these provinces to reach different levels of competitiveness.

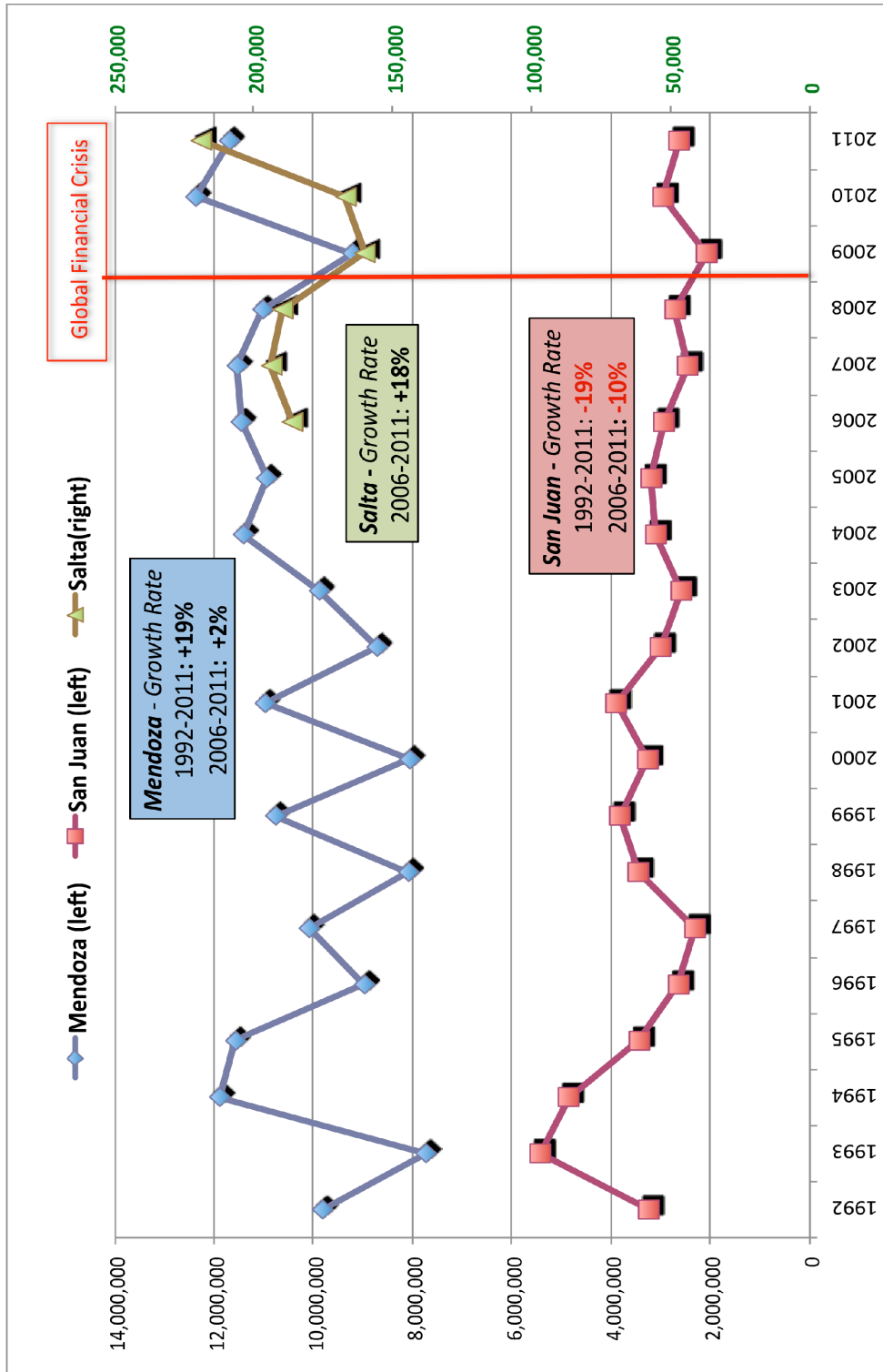
As Figures 3, 4 and 5 show below, over the years Mendoza has been increasing the volume of wine production. The province has also seen the value of its exports raise as well as the percentage of wine exported in terms of its total production. In contrast, the province of San Juan has been showing a decrease 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. Finally, Salta shows a similar trend as Mendoza's although in a smaller scale: its production has been increasing as well as its exports and the value of the latter.

Figure 2: Evolution in the production and exports of Argentine wine (in hl.)



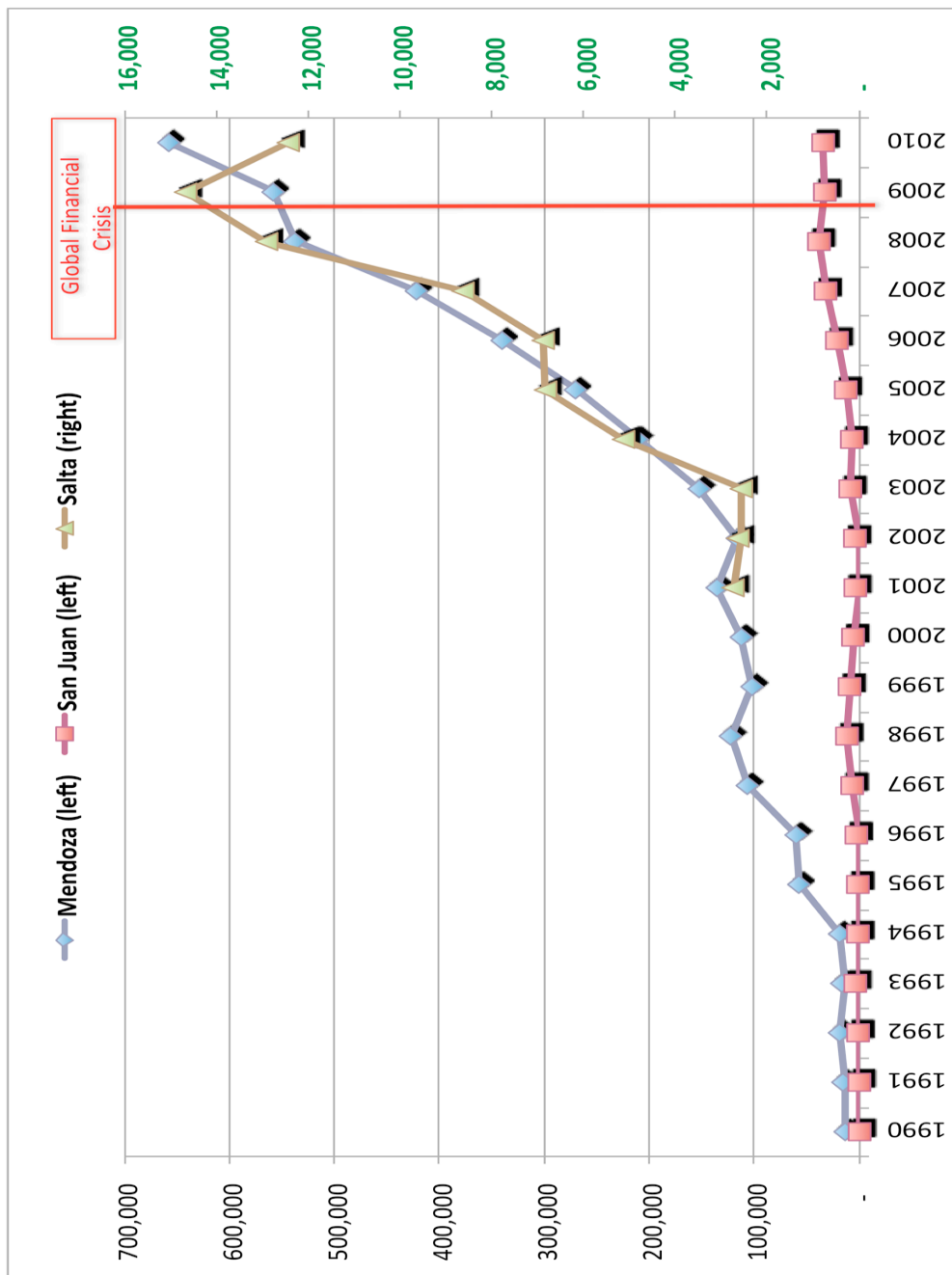
Sources: Author calculations based on INV (National Wine Institute).

Figure 3: Wine production by province (in hl.)



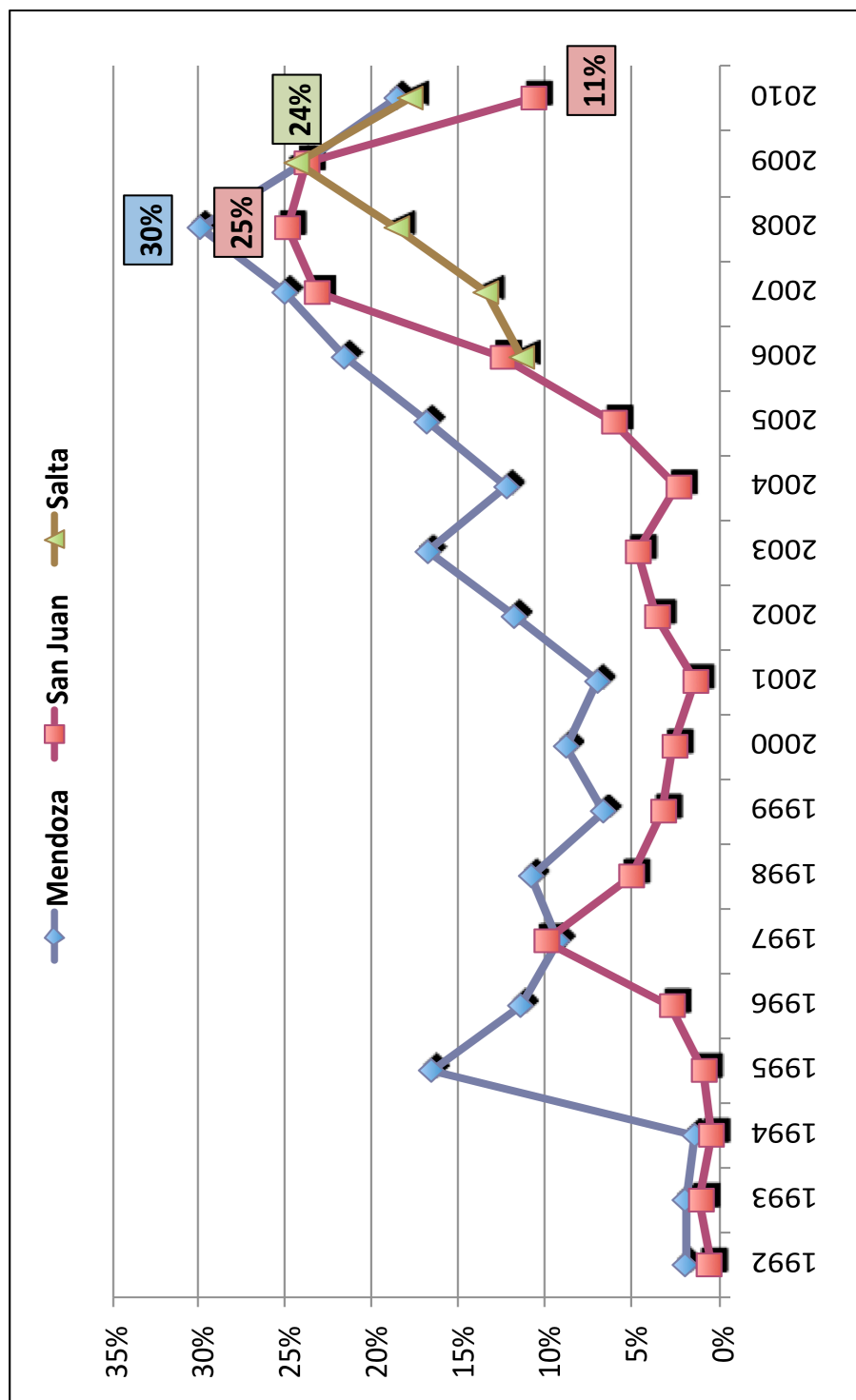
Source: Author calculations based on INV.

Figure 4: Wine exports by province (in thousands of dollars)



Source: Author calculations based on INV.

Figure 5: Percent Wine exports/production (in hl)



Source: Author calculations based on INV.

Bellow, we will proceed to analyze these differences for the cases under analysis: Mendoza, San Juan, Salta and at the national level.

3.2. Mendoza: Institutional structure and the wine industry

Mendoza is the most important and largest 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 and Kentnor Corby 2010) both in volume and value. By 2011, over 61% of the grapes intended for wine production were of high enology quality (INV 2011b), indicating that Mendoza produces primarily high-end wines. From this percentage, 72% were red grapes (30% Malbec) and the remaining white grapes. Yet, the process of upgrading that started back in the early '90s 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 through 1) the integration of actors within the public-private sector in the process of policy formulation and the development and institution-building processes; and 2) requiring these actors to jointly govern the new institution according to rules that encourage collective problem solving and mutual monitoring (Ibid. p105).

The institutional structure of Mendoza's wine industry comprises the three main spheres of TH model: university (and R&D centres), industry, and government. The Universidad Nacional de Cuyo [UNCC] ("National University of Cuyo") and Universidad Juan Agustin Maza [UMAZA] ("Juan Agustin Maza University") are the two main academic institutions. They enhance the social and regional economic development by offering MA and BA programs in Oenology and Viticulture (UNCC 2012 and 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 founded agent for technology transfer. Its Estación Experimental Agropecuaria [EEA] ("Agricultural Experiment Station") specializes in the wine sector and has become a reference center at the national level and within Latin America. The 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 5,000 members between wine producers and processors (FeCoVita 2012). Its position within the market makes the organization a major actor and allows 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” (Ibid. p.42) and has proved to be globally competitive without scarifying the benefits offered to its members (Ibid. p 40-43). Due to this success, the idea of cooperatives in general has become central in the planning for the future of the wine industry in Mendoza (Ibid. p.43).

The role of the provincial government has been the key in the upgrading process of the wine industry of Mendoza, however. 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 2008a, 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 and McDermott et al 2009). The creation of new institutions of public-private nature allowed to recombine 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”), Fundación ProMendoza (ProMendoza Foundation) which were created around the 1990s to provide R&D activities, collect and disseminate information, oversee new wine regulations, guide the industry in the 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 into 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 privatization of hydrocarbon resources of the province (McDermott 2007 and FTyC 2012).

McDermott's (2007 and 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 bridge institutions –i.e. public-private institutions-, the higher the 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 type of institutions. As one of the interviewee suggested, Mendoza and its institutions have become key in the development of the wine industry both within the region but also for other wine producing regions: "...everything that is for wine comes from Mendoza and Buenos Aires".

The TH approach works in the case of Mendoza's wine industry. Yet, interaction among university-industry-government creates public-private institutions rather than hybrid organizations. Specifically, the main difference among public-private institutions and hybrid organizations 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 organizations are generally private organizations that are assigned many of the attributes normally associated with the governmental sector and financially supported by the government. Hybrid organizations also accounts for financial support institutions such as venture capital and angel networks.

In conclusion, these knowledge bridge organizations –i.e. public-private institutions- help with coordination and knowledge transfer among the different institutional sphere and the question that this successful case raises is to what extent can this model can be spread to other provincial and national levels? If so, what are the conditions under which this model can be successfully reproduced?

3.3. San Juan: Institutional structure and the wine industry

In contrast to Mendoza's, the San Juan's wine industry has lagged behind even though both share similar *terroir*. As table 1 and 2 show (see appendix C), San Juan's participation in the country's total wine production has been falling over the years. The province produces, on average, 70% less than Mendoza; exports on average only 14% of the quantities exported by the latter, and only 6% of its respective value.

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, this approach "exacerbated fragmented antagonist relations among the government and the relevant sectoral associations, thus impeding new collective sources for upgrading" (Ibid. p.132). In other words, this laissez faire approach did not help to create any 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 sectoral 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) (INTA 2011 and INV 2012) have not been able to successfully develop linkages among them.

The lack of trilateral networks together with the provincial government laissez faire approach have brought limited upgrading to the wine industry of San Juan. As showed earlier, the industry as a whole has been performing poorly and seems to be becoming less competitive in comparison to its counterparts 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, San Juan's government formed 'La Mesa Vitivinícola de San Juan' (The Viticultural Roundtable of San Juan) in which this government works side by side with the entities representing the wine sector. Because the creation of this roundtable is a very recent event, there is little information available regarding the actions undertaken by it. Yet, as this province's government states, "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 "(Gov. San Juan 2012).

The Viticultural Roundtable of San Juan is an attempt to create a space of coordination: a 'consensus space'. Within the TH framework, a 'consensus space' is "... 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 2008a p.78). The creation of this roundtable is a step forward towards the reproduction of a TH approach, linking university-industry-government to encourage innovation within the wine industry. The question is whether this interaction will result in the creation of hybrid organizations, public-private institutions –as in Mendoza's case,- and/or a more porous network.

The San Juan case suggests 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. Once the latter is achieved, the different knowledge resources could support the industry through its innovation process. Meanwhile, it is not that clear that the interaction among university-government-industry results in the creation of hybrid organizations, rather than other alternatives such as mixed public-private, and/or a more porous network.

3.4. Salta: Institutional structure and the wine industry

The wine industry of Salta started developing around the 2000's 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 wine industry of Salta was already in the process of growing when the province 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 program within Salta's Ministry of Tourism and Culture with the objective of differentiating and positioning Salta wines within and abroad the country. "Such differentiation goes hand in hand with two things: 1) the quality of the wines, and 2) altitude as a distinctive feature". The Valles Calchaquíes ("Calchaqui Valleys") is the

leading wine region of the province and it is the highest in the world as for its vineyards' altitude (WofA 2012. and 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 among the grape varieties, the most prominent 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 make up the 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 developing or boosting its wine industry. In Cafatyate there is a higher technical education institution that was launched in 2007 and that offers certificates in oenology and viticulture. The technical body that teaches the related subjects are the same oenologists from the wineries of the region which shows how linkages among university-industry are initially being created.

The industry also lacks R&D centres that could support wineries in the process of upgrading and knowledge transfer. For instance, INTA Cafayate lacks staff that specializes in viticulture and that can provide technical support and R&D services to the province's wine region. This office sometimes gets support from INTA Mendoza's body – i.e. when providing conferences or trainings courses; however this activities are not frequent enough to foster the development and upgrading of the industry in the long run. The lack of R&D centers is a major concern within the industry, specially 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' –i.e. that comprises the Northeast Argentine wine region: Catamarca, Tucumán and Salta. "[We want the Calchaqui 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, it points out two important facts: 1) there is a sense of collaboration and/or inter-wineries linkages that, even when not reflected in the interviews, may contribute to the adoption of new technologies and innovation processes of the industry in the long run; and 2) a possible extra-cluster

collaboration that could help increase the sector's overall competitiveness both at provincial and national levels. Among other factors, the lack of R&D institutions also led wineries, especially SMEs, to rely most of the time upon their internal company sources for engaging in innovation activities. The weak linkages among university-industry linkages are therefore a great challenge (not necessarily a constrain) for the Salta's wine industry to achieve competitive advantages. As noted above –i.e. figures 3 and 4- over the last years, the industry has been able to increase the volume and value of both its production and exports regardless the weak linkages created among industry-university. Also, the existence of MNCs in the wine industry of Salta have limited spill-over benefits. The lack of a sense of collaboration among these corporations and the SMEs limited the development and share of any training and R&D activities.

Ties among industry-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 its most part, frequent: "There [at the secretariat] good actions [have] began 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 also ensure that,

... 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 foster upgrading at a firm level. Yet, it is not clear to what extent these types of ties will foster knowledge transfer and innovation

within Salta's wine industry. The creation and implementation of either direct or indirect innovation policy are still needed to foster the competitiveness of this industry as a whole.

Regardless of the nature of these linkages, coordination among industry-government is achieved in two different ways through: 1) Asociación Bodegas de Salta [BdeS] ("Association of Salta Wineries") –a private association; and 2) 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] ". Or, "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 formalized (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 the meetings, the wineries discuss topics that are of common interest and that affect the industry such as infrastructure issues, wine industry national regulation, etc.

The 'Mesa Vitivinícola' is a panel that the Salta government organizes and which is formed by different public and private actors of the wine sector. Depending on the issue in question, 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 later will be taken into consideration for carrying out policies for the sector. "It is non-voting, but there, in a certain manner, the province takes what was raised at these meetings in order to take action later. The viticultural roundtable discusses several issues at either the local, provincial or provincial-federal level".

However, coordination issues within the wine industry of Salta arise at the provincial-national level. According to the interviewees (both in the public and private sector), by 2011, the province of Salta was unable to allocate the funds raised by the Corporación Vitivinícola Argentina [COVIAR] ("Argentine Wine Corporation") for the promotion of wine exports.. COVIAR is a public-private entity responsible for the

implementation of the long-term strategic plan for the Argentine wine industry, PEVI. 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 welfare-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, knowledge creation, diffusion and implementation is still a major constraint 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.

Regardless, the wine industry of Salta is displaying good performance. As shown in Tables 1 and 2, over the years it has been increasing its share in the total country's wine production; the volume of exports has been increasing and the value of its exports has gone beyond the third wine exporter province, La Rioja. 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 comparative advantages.

Under this scenario, it is difficult to construct a university-industry-government institutional structure such as the one in Mendoza or the one suggested by the TH approach. As the industry has requested, government should foster the development of universities and R&D centers in order, particularly, 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.

3.5. 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 (INTA 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 comprises 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 includes: to achieve annual sales of US\$2 billion by the year 2020 and to capture 10% of total global exports – i.e., exports of wine and must. To reach these targets, the PEVI's strategy focuses on: 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 (INTA 2011, p.32, COVIAR 2012 and INV 2012).

However, it is hard to replicate Mendoza's model at the national level. As noted earlier there are coordination and knowledge-diffusion problems, particularly at the provincial-national government level. As one respondent 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'"

Achieving coordination among actors at the provincial and national level fails, among other factors, for two main reasons. PEVI's strategy fails to recognize 1) the different degrees of development and needs in each wine-producing province; and 2) the institutional structure and degree of coordination of the actors found in each of these provinces. By acknowledging these differences and incorporating them into PEVI's strategy, the federal government would be able to achieve coordination among provincial-national levels while at the same time effectively designing policies that foster innovation, knowledge sharing, and competitiveness for the Argentine wine industry as a whole.

4. Conclusions

In a knowledge-based economy, knowledge is the main driver for economic growth, competitiveness, and social development. Knowledge production, dissemination and utilization is key in the innovation process of any industry and at any level: micro, meso and macro. However, the economic success of each industry and the capability of the former to share knowledge depends on its institutional structure.

As the literature of SI suggests, whether at a micro, meso or national level, behind each innovation process there exist complex interdependencies and multiple interactions among the actors that make up the innovation system. In particular, 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 organizations for new technology-based firms that are increasingly developed and help with knowledge diffusion.

This study aimed to understand the institutional foundation for innovation in the wine industry of Argentina and how collaboration and cooperation is achieved and understood among the actors of the industry. As a New World wine producer, Argentina has been able to catch up with the Old World and has become a great competitor in the international wine market. Specifically, the province of Mendoza has become the main player in the Argentine wine industry. The institutional restructuring of Mendoza's wine industry led to a TH approach, where industry-government-university collaborate in the innovation process. However, this interaction led to the creation of public-private institutions rather than hybrid organizations. These institutions act as knowledge bridges and create coordination among the different institutional spheres, while at the same time contribute 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 level.

The case of Mendoza also casts doubts on the general assessment of neoliberalism/free market vs. state intervention in the economy. As this successful case demonstrates, industrial policies towards the wine industry were both producer and (provincial) state driven. The private sector took the lead but provincial state intervention was needed in order to create new public-private institutions. The case of San Juan's wine industry suggests 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 also 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 are not formally established. On a small scale, they appear to exist informally, to construct themselves. However, once coordination and collaboration is achieved among actors, a pathway is open for the development of a more formal TH approach, either Mendoza's model or the creation of a more porous, informal, network.

It has also been a challenge to implement the TH or Mendoza's model at a national level. Coordination among provinces-nation has been difficult to achieve even when the long-term national strategic program for the Argentine wine industry is run by a mixed public-private institution. The key factors that hinder the implementation of these models and make it difficult to achieve coordination among province-nation are: the different degrees of development and needs of each of the wine-producing provinces of the country; their different institutional arrangements; and the different degrees of coordination among their actors. By acknowledging these differences and incorporating them into the long-term strategic plan, the federal government would be able to achieve coordination among provincial-national levels while at the same time effectively design policies that foster innovation, knowledge sharing, and competitiveness for the Argentine wine industry as a whole.

The study suggests that a TH model is a useful framework of university (research)-industry-government institutions for understanding the institutional foundations for innovation economic success. However, it is limited in explaining how actors make sense of coordination and how the latter is achieved. The TH works in practice but it is difficult to spread; building a sense of collaboration and coordination is necessary for this model to be reproduced in practice. The interaction among these

institutional spheres does not always lead to the creation of hybrid organizations; rather in successful cases such as Mendoza this interaction led to the creation of mixed public-private institutions or a more porous network as in the case of Salta.

All in all, both the TH approach and the SI perspectives are useful frameworks to study the institutional foundation and dynamic of innovation processes. However, further research is still needed to better assess how the actors in different SIs make sense of coordination and collaboration; the mechanisms through which these latter can be achieved; and, finally, how these factors also affects the different dynamics and structure of innovation systems.

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Appendices

Appendix A.

The Argentine Wine Industry Consent Form

The Argentine Wine Industry: Creating new spaces for coordination?

Application #: 2011s0622

Consent Form

The goal of this research is to analyze how the State -through its policies and institutions- and other private institutions promote the development and competitiveness of the Wine Industry of Salta, both at the national level and, especially, in the international market. The Principal Investigator's (PI) is a graduate student at Simon Fraser University, Canada, and is conducting this study as a fundamental part of her MA thesis. With your participation, the PI aims to better understand the major success of these policies, programs and initiatives, and to identify the barriers, if any, the Wine Industry of Salta still faces.

By participating in this research you agree to have your interviews with the PI recorded, either digitally or by hand. You also agree to choose between having or not the name of your organization displayed throughout this thesis project. All interviews will remain completely confidential and anonymous (no names and no job titles will be displayed –e.x. director, secretary, owner of, etc.) throughout the length of this thesis project, which also includes the presentation of the research findings.

Your contact information was obtained through public sources (internet), or upon others recommendation. Participation is voluntary and you have the right to withdraw from this study at any point in time. There are no risks or direct benefits whatsoever associated to this research and its participants.

All material used in the recording, transcription and analysis of the information gathered in this interview will be handled confidentially and will be kept under lock and key, with limited access to the PI and her supervisor, Dr. Anil Hira. All materials and information will be stored for three years, until November 2014; upon completion of this period, they will be destroyed and/or not used in any aspect.

If you would like to receive the results of this research, please contact:

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If you have questions or concerns regarding this research, please contact:

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If you have questions or concerns regarding the Ethics procedure, please contact:

Simon Fraser University, Office of Research Ethics:

Dr. Hal Weinberg, Director
Email: [REDACTED]
Phone: (001) 778-782-6593
Mail: Office of Research Ethics
Simon Fraser University
8888 University Drive,
Multi-Tenant Facility
Burnaby, B.C., Canada V5A 1S6

Please, choose between the following confidentiality protocols: (To be completed by the participant)

I agree to have the name of my/the organization/company displayed in this thesis project.

I do not agree to have the name of my/the the organization/company displayed in this thesis project.

Name of Participant: _____

Organization/Company: _____

Contact Information

Email: _____

Phone: _____

Signature: _____ Date: _____

Appendix B.

Survey Questionnaire

The Wine Industry of Salta

Questionnaire adapted from : Hira, Anil ed. (2013). What Makes Clusters Competitive? Cases from the Global Wine Industry. Montreal, McGill- Queen's U. Press.

I. Basic Firm and Industry-Level Information

1. Firm Identification as of OCTOBER 2011

- A. Name
- B. Address
- C. Acreage
- D. Region
- E. Year Founded
- F. Number of Employees
- G. Tonnes crushed or Liters/cases sold
- H. When did you start selling wine? Date:

2. Revenues

- a. Have your revenues increased /decreased in the past 12 months?
- b. By what percentage?
- c. Has the volume of wine sold increased/decreased?, by what %
- d. What price points are you currently targeting?
- e. Have these increased/decreased over the past 12 months?

3. Is your company part of a larger enterprise group?

- Yes
- No

4. Is your company Argentinean or Foreign Owned? Family Owned? (Y/N)

- Argentinean (please, specify province of origin)
- Foreign
- Family Owned?

5. What percentage of the grapes that your company uses is purchased from growers off your estate? Exact number or estimate %

6. If you purchase, what % of your grapes are from Salta, Argentina, or International

- Salta/Local
- Argentina (please, specify which province)
- International

7. What percentage of your wine is sold within? (last 3 years)

Salta?

Argentina?

Exported?

What percentage of your wine is currently surplus to demand?

8. How would you rate your firm's reliance on the following for competitive advantages?

(1-5) scale with 1 = not important, 2 slightly important, 3= neutral, 4= somewhat important and 5 being extremely important

Access to latest winemaking and viticultural information

Market placement at appropriate price-points (price competitiveness)

Marketing

Branding

New product development

Product differentiation

Employee training

Production process continual improvement

Distribution channels

Agents

Exporting

II. Networking

9. Give the relative importance and frequency of interactions with the following institutions
(1-5) scale with 1 = not important, 2 slightly important, 3= neutral, 4= somewhat important and 5 being extremely important (Annually, Monthly; Weekly; Daily; and Formal/Informal or Both)

Did they help you with innovation?

Innovation	Importance	Frequency	Formal/
Help? (Y/N)	(1-5)	(A, Q, M, W, D)	Informal/
			Both

Ministry of Agric, Food, & Fisheries
National Institute for Agricultural Technology (INTA-Salta/Cafayate)
National Institute of Vitiviniculture (INV Branch- Cafayate)
Cooperative of Winegrowers "Cafayate"
Association of Salta Winemakers
ProSalta Foundation
National University of Salta
Mendoza Wine Fund (Fondo Vitivinícola de Mendoza)
Rural Development Instituto (Fundación IDR)
National Institute for Agricultural Technology (INTA-Mendoza)
MAZA University (Mendoza)
National Technological University (UTN - Branch, Mendoza)
Other (specify)

10. How would you rate the importance of geographical proximity to other firms & industry bodies?

Critical
Important
Marginally important
No impact
A disadvantage

III. Innovation

11. Innovative Activities

- a. How many new products (brands or lines) have you developed over the past 2 yrs?
- b. Have you seen significant product improvement over that period? Y/N
- c. To what extent have you improved production processes over this time not much, a little, or a lot

12. Are there any particular companies you see as leaders in innovation? List companies

13. In which areas has innovation occurred over the past three years in your company? (select all that apply)

- Retail Sales
- Marketing
- Finance
- Plant Breeding
- Use of Genetics
- Soil Adaptation
- Fermentation
- Information Systems
- Education/Training
- Other, please specify

14. How important were the following actors to innovation activities your company was involved in over the past three years? (select all that apply) (1-5) scale with 1 = not important, 2 slightly important, 3= neutral, 4= somewhat important and 5 being extremely important

Level of Importance (1-5)

- Internal Company Sources
- Suppliers of equipment, materials, components or software
- Clients or customers
- Joint research with Other Salta Wineries
- Wineries outside of Salta (please, specified from which province/country)
- Consultants
- Conferences, trade fairs, exhibitions
- Trade magazines or journals
- Internet
- Other (list)

15. How important were the following sources of funding for these innovations? 1-5 scale

(1-5) scale with 1 = not important, 2 slightly important, 3= neutral, 4= somewhat important and 5 being extremely important

Personal Finances
Commercial Bank/credit union
Venture Capitalists
Federal Government
Provincial Government
Local or Regional Government

16. If your company has not been involved in utilizing major innovation, why is this the case? (check all that apply)

Not needed by the company
Too expensive
Lack of human resources
Lack of information on technology
Lack of information on potential markets
Difficulty in finding co-operative partners
Lack of adequate or clear regulatory framework
Unaware of what's available

17. How is training given in your company? Y/N for each

In-house training
External provision of training
via Salta University
Consultants
Other, please specify

18. Number of trained employees as % of total employees?

19. How important is wine tourism for your strategy? 1-5

(1-5) scale with 1 = not important, 2 slightly important, 3= neutral, 4= somewhat important and 5 being extremely important

Appendix C.

Argentine Wine Production and Exports

Table C1: Wine production by province (in hl., as a % of the country's total and i.a. %)

Year	Mendoza			San Juan			La Rioja			Salta			
	hl	% of the total	% i.a.	hl	% of the total	% i.a.	hl	% of the total	% i.a.	hl	% of the total	% i.a.	Others
1992	9,821,418	68.4%		3,248,312	22.6%		N/A	N/A	N/A	N/A	N/A	N/A	1,281,015
1993	7,738,400	53.5%	-21%	5,434,457	37.6%	67%	N/A	N/A	N/A	N/A	N/A	N/A	1,297,985
1994	11,896,224	65.5%	54%	4,863,749	26.8%	-11%	N/A	N/A	N/A	N/A	N/A	N/A	1,412,937
1995	11,571,931	70.4%	-3%	3,435,082	20.9%	-29%	N/A	N/A	N/A	N/A	N/A	N/A	1,436,042
1996	8,974,847	70.8%	-22%	2,644,888	20.9%	-23%	N/A	N/A	N/A	N/A	N/A	N/A	1,061,271
1997	10,089,636	74.7%	12%	2,316,313	17.2%	-12%	N/A	N/A	N/A	N/A	N/A	N/A	1,094,343
1998	8,087,640	63.8%	-20%	3,458,087	27.3%	49%	N/A	N/A	N/A	N/A	N/A	N/A	1,127,655
1999	10,766,605	67.8%	33%	3,830,428	24.1%	11%	N/A	N/A	N/A	N/A	N/A	N/A	1,290,663
2000	8,062,633	64.3%	-25%	3,266,148	26.1%	-15%	N/A	N/A	N/A	N/A	N/A	N/A	1,208,039
2001	10,978,055	69.3%	36%	3,907,009	24.7%	20%	N/A	N/A	N/A	N/A	N/A	N/A	950,120
2002	8,721,480	68.7%	-21%	3,011,068	23.7%	-23%	N/A	N/A	N/A	N/A	N/A	N/A	962,597
2003	9,884,384	74.7%	13%	2,590,965	19.6%	-14%	N/A	N/A	N/A	N/A	N/A	N/A	749,927
2004	11,416,191	73.8%	15%	3,103,257	20.1%	20%	N/A	N/A	N/A	N/A	N/A	N/A	944,841
2005	10,951,498	71.9%	-4%	3,196,840	21.0%	3%	N/A	N/A	N/A	N/A	N/A	N/A	1,073,217
2006	11,463,003	74.5%	5%	2,943,233	19.1%	-8%	600,389	3.9%		186,326	1.2%		203,398
2007	11,540,808	76.7%	1%	2,463,861	16.4%	-16%	606,095	4.0%	1%	193,791	1.3%	4%	241,362
2008	11,024,275	75.1%	-4%	2,715,882	18.5%	10%	574,544	3.9%	-5%	189,839	1.3%	-2%	171,875
2009	9,215,113	75.9%	-16%	2,083,011	17.2%	-23%	448,513	3.7%	-22%	160,255	1.3%	-16%	228,576
2010	12,376,318	76.2%	34%	2,957,659	18.2%	42%	513,170	3.2%	14%	167,052	1.0%	4%	236,569
2011	11,696,463	75.6%	-5%	2,636,567	17.0%	-11%	649,334	4.2%	27%	219,136	1.4%	31%	270,870
Average	10,313,846	70.6%	3%	3,205,341	21.9%	2%	565,341	3.8%	3%	186,066	1.3%	4%	862,165

Source: Author calculations based on INV

Table C2: Evolution of Argentine wine exports by province (in hl, in thousands of dollars and exports as % of province production -in hl)

Years	Mendoza			San Juan			La Rioja			Salta			Others	
	thousand of dollars	hl.	% exp/prod (hl.)	thousand of dollars	hl.	% exp/prod (hl.)	thousand of dollars	hl.	% exp/prod (hl.)	thousand of dollars	hl.	% exp/prod in hl.	thousand of dollars	hl.
1990	13,928	434,964	N/A	157	2,270	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,150	8,302
1991	16,086	267,512	N/A	430	5,793	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,422	8,792
1992	19,291	197,838	2%	1,542	20,286	1%	N/A	N/A	N/A	N/A	N/A	N/A	1,261	9,260
1993	17,169	156,197	2%	4,267	57,958	1%	N/A	N/A	N/A	N/A	N/A	N/A	3,151	36,644
1994	19,275	173,337	1%	1,681	23,723	0%	N/A	N/A	N/A	N/A	N/A	N/A	2,662	29,322
1995	58,109	1,927,258	17%	1,781	30,949	1%	N/A	N/A	N/A	N/A	N/A	N/A	981	12,155
1996	60,631	1,032,955	12%	3,225	72,425	3%	N/A	N/A	N/A	N/A	N/A	N/A	2,002	14,504
1997	107,197	947,835	9%	7,146	231,217	10%	N/A	N/A	N/A	N/A	N/A	N/A	4,764	25,627
1998	123,233	880,171	11%	12,138	176,072	5%	1,524	15,058	N/A	N/A	N/A	N/A	3,109	17,741
1999	102,707	724,766	7%	9,732	124,277	3%	2,274	23,621	N/A	N/A	N/A	N/A	2,490	7,797
2000	112,915	714,838	9%	6,422	84,588	3%	3,166	31,505	N/A	N/A	N/A	N/A	2,376	12,092
2001	135,978	775,066	7%	4,249	54,039	1%	5,512	41,625	N/A	2,763	10,005	N/A	3,157	10,889
2002	116,690	1,035,844	12%	4,636	108,302	4%	4,236	67,420	N/A	2,654	22,359	N/A	2,841	22,843
2003	152,976	1,665,544	17%	9,009	121,962	5%	4,189	38,828	N/A	2,581	24,851	N/A	2,975	25,927
2004	212,251	1,404,102	12%	7,520	73,243	2%	5,503	45,723	N/A	5,144	18,282	N/A	6,208	30,322
2005	270,973	1,852,869	17%	13,311	194,374	6%	8,364	63,563	N/A	6,845	24,614	N/A	9,766	36,953
2006	340,818	2,485,287	22%	21,810	368,048	13%	5,692	48,347	8%	6,895	21,302	11%	11,076	32,566
2007	422,481	2,898,002	25%	32,683	572,419	23%	11,172	83,039	14%	8,642	26,176	14%	15,990	44,242
2008	538,571	3,307,346	30%	38,845	677,507	25%	14,287	95,917	17%	12,922	35,392	19%	30,288	59,779
2009	558,958	2,217,248	24%	33,245	496,273	24%	11,035	50,895	11%	14,684	39,131	24%	27,598	66,075
2010	658,408	2,307,070	19%	34,835	317,450	11%	11,711	53,679	10%	12,449	29,848	18%	28,924	66,112
Average	193,269	1,305,050	13%	11,841	181,580	7%	6,820	50,709	12%	7,558	25,196	17%	7,819	27,521

Source: Author calculation based on INV