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Competitiveness of clusters

A comparative analysis between wine industries in Chile and Brazil

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Abstract

Purpose – The purpose of this paper is to deepen the discussion regarding the competitiveness of clusters based on a theoretical and empirical study that compares the level of competitiveness of the Brazilian wine cluster located in Serra Gaúcha with the competitiveness of the Chilean cluster located in Valle del Maule.

Design/methodology/approach – A qualitative-descriptive approach was applied to the study, and data collection was conducted through secondary sources.

Findings – The analysis employed a competitiveness analysis model consisting of 11 competitiveness factors. The Chilean cluster presented a higher level of competitiveness in four competitiveness factors ("scope of viable and relevant business," "introduction of new technologies," "balance with no privileged positions" and "oriented strategy"), while the Brazilian cluster presented a higher level of competitiveness in three competitiveness factors ("concentration," "cooperation" and "replacement"). For four of the competitiveness factors of the model, both clusters presented similar levels of competitiveness.

Practical implications – By comparing the two wine clusters, it was possible to identify aspects that can be improved to increase competitiveness, especially in the Brazilian cluster. These aspects include, first, the need for bottle manufacturers in Serra Gaúcha, which would have a positive impact on production costs; second, the expansion of the geographical indication registration for the entire Serra Gaúcha region, resulting in an enhanced image of Brazilian wine abroad; and third, greater incentives for exports, which would result in an increase in market share.

Originality/value – The paper proposes an explanation for the superior level of competitiveness of the Chilean cluster regarding the "scope of viable and relevant business," "balance with no privileged positions," "introduction of new technologies" and "strategy focussed on cluster development." In terms of its contribution, the study developed additional metrics for the model adopted, which can be used for the competitive analysis of other agribusiness clusters.

Keywords Competitive advantage, Brazil, Chile, Competitiveness, Business clusters, Geographical concentration

Paper type Research paper

1. Introduction

The first ideas on clusters of firms were published by Alfred Marshall in 1920 in the book *Principles of Economics*. Since then, many researchers have analyzed the forms of clusters of firms in different historical and geographical contexts and under different epistemological premises (Sacomano Neto and Paulillo, 2012).

An important contribution to the studies involving clusters of firms was the study conducted by Porter (1990) titled *The Competitive Advantage of Nations*. In this study, Porter (1990) presented a survey conducted in several countries, in which he identified that the competitive advantage was related to specific regions that concentrated their activities in specific businesses, naming these concentrations as the "cluster."

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Over the past decades, clusters have been recognized as one of the paths to overcome the limitations of small and medium enterprises, whereby the geographical proximity produces effects in terms of increased productivity, innovation and competitiveness of regions (Karaev *et al.*, 2007).

Studies on the subject tend to analyze the specific aspects related to the competitiveness of clusters or the cluster effects on the competitiveness of companies. These studies have focussed their attention mainly on the issues related to knowledge management and innovation, as in the studies conducted by Bell (2005), Piperopoulos and Scase (2009), Casanueva *et al.* (2013), Connell and Voola (2013) and Lai *et al.* (2014).

However, studies that analyze the competitiveness of clusters from a systemic perspective or that compare the competitiveness of two clusters are rarely found in the literature, such as the studies conducted by Carlsson (2002) and Siqueira *et al.* (2011). As a result, this study aims to deepen the discussion regarding the competitiveness of clusters based on a theoretical and empirical research study that compares the level of competitiveness of the Brazilian wine cluster located in Serra Gaúcha with the competitiveness of the Chilean cluster located in Valle del Maule.

The choice of these objects of study is justified for three reasons. First, both clusters are located in countries with developing economies (International Monetary Fund, 2014). This characteristic is important because there is likely a higher level of familiarity between two developing economies than between developing and developed economies (Arita, 2013).

The second is due to the importance of these clusters to their countries. In Brazil, more than 90 percent of domestic wine production is concentrated in Serra Gaúcha (Ministry of Agriculture, 2012). In Chile, Valle del Maule is the largest wine region in the country, producing 46.3 percent of Chilean wines (SAG, 2013).

The third reason stems from the superior competitive capacity of Chile in relation to Brazil. Evidence of such superior competitiveness is the significant export of Chilean wines, more than six million liters in 2011. Due to this export volume, Chile ranked fifth among the largest exporters of wine in the world (OIV, 2014). Brazil, in the same year, exported a total of 13,000 liters of wine and was ranked 55th (OIV, 2014).

In addition, over the past few years, Brazil has lost market share for imported wines in the domestic market (Fensterseifer, 2007). Its main competitors are the Chilean and Argentinean wines, which consist of approximately 50 percent of the Brazilian market (Nierdele and Vitrolles, 2011).

This evidence is consistent with the proposition of Farina (1999), who studies the competitiveness of the agribusiness systems and highlights that an indicator of the system competitiveness is the growth or at least the stability of market share in relation to foreign and domestic markets.

When comparing the competitiveness of these clusters, this study provides two contributions. The first is a methodological contribution, as we propose metrics for the analysis of the competitiveness in the agribusiness clusters. The second practical contribution refers to the identification of the aspects of the Brazilian cluster that can be improved to increase its competitiveness.

2. Theoretical framework

2.1 Clusters and competitiveness

The geographical concentration of firms belonging to the same industry has been observed for many years, and its historical reference is based on the study by Marshall (1920) on industrial districts in England. According to Marshall (1920), agglomerations

provide positive externalities, arising from the presence of three factors: first, the concentration of companies specializing in different stages of the production process of a given area; second, easier access to productive resources; and third, the constant availability of skilled labor.

However, only in 1990, with the publication of the book *The Competitive Advantage of Nations* by Michael Porter were the reasons for the competitiveness of these agglomerations explored. Porter (1990) termed these agglomerations as "clusters," defining them as "geographic concentrations of interconnected companies and institutions in a particular field" (Porter, 1998, p. 78). Clusters encompass a number of related industries and other entities important to competition, such as suppliers, customers, government entities, educational institutions and trade associations (Porter, 1998).

Companies included within a cluster take advantage of a series of relationships that are not available to external companies (Capó-Vicedo *et al.*, 2008).

Sheffi (2010), for example, notes five advantages of clusters that justify why industries tend to cluster in urban areas or other places:

(1) Trust: in general, clusters include people with similar origins, languages, cultures, religions and customs, which makes it easier to develop trust between organizations and individuals. In most cases, this trust is based on relationships built outside the workplace. These relationships of trust result in lower transaction costs among firms whether they are business partners, horizontal contributors or competitors.

(2) Exchange of tacit knowledge: this exchange of knowledge allows discussions regarding specifications with a supplier; the exchange of information regarding benchmarks with a competitor; and the customer support in an easier, faster, cheaper and more effective manner when performed within a cluster. These advantages are due to face-to-face and random meetings.

(3) Collaboration: the concentration of companies in the same industry naturally gives rise to joint activities, given their similar needs and concerns. These activities include first, lobbying for government benefits; second, development of organizations for the development of the cluster, such as chambers of commerce; third, developing cluster-focussed procurement strategies, leading to lower costs and higher quality for all members; fourth, engaging in cluster-specific marketing and branding activities, etc.

(4) Research and education: many clusters support education and professional training, and as a result companies have access to state-of-the-art research and have a steady supply of educated employees.

(5) Supply base: as indicated by Marshall (1920), clusters attract suppliers who find advantages in the proximity to their customers. This proximity can create opportunities for interaction and collaboration with customers. In addition, from the perspective of the customers, a large number of suppliers may be associated with innovations and competitive prices, which are essential for competitiveness.

Furthermore, the cluster can provide better access to employees and suppliers; access to specialized information; complementarities; access to institutions and public goods; better motivation and measurement; opportunities for innovation; more visible capacity and the flexibility to act rapidly (Porter, 1998).

Clusters affect the competitiveness within countries and across national borders (Porter, 1998). In recent years, empirical data have confirmed the strong relationship between cluster and economic performance (Ketels and Memedovic, 2008).

Clusters have also become an area of interest for public-policy makers (Ketels and Memedovic, 2008). In this sense, Falck *et al.* (2010) suggest that cluster-oriented policies are very popular among politicians, despite the controversy surrounding these policies in academia. The authors above evaluated the cluster-oriented policy introduced in Bavaria, Germany, in high-tech companies, and identified that cluster-oriented policies have a positive effect on firms' propensity to innovate. Their findings point toward the effectiveness of the policy in terms of fostering cooperation, as firms produce more innovation output with less costly innovation input. The authors also find increased opportunity for obtaining access to external know-how, cooperating with public scientific institutes, and accessing suitable R&D personnel (Falck *et al.*, 2010).

However, Bresnahan *et al.* (2001), based on their research on clusters of innovative activity, warn that directive public-policy efforts to jump-start clusters or to make top-down or directive efforts to organize them may fail, since clusters of innovative activity do not respond well to this sort of initiative. On the other hand, their results indicated that accommodative government policies might be an important element in cluster development, in which governments invest in areas such as education and also help to facilitate entrepreneurship.

2.2 Cluster competitiveness models

In terms of competitive analysis, Porter (1990) proposes the diamond model. This model considers four determinants of the competitive advantage in countries or regions: first, strategy, structure and rivalry of the companies within the country or region under study; second, conditions of demand for the products or services offered by the companies; third, existence of correlated industries, including those activities that directly or indirectly complement the activities of the company under study; and fourth, conditions of factors, that is, the positioning of the country or region in terms of resources, such as skilled labor, the availability of specialized professional services, infrastructure, etc.

Partiwi *et al.* (2014) have also analyzed the competitiveness of industrial clusters considering four aspects: basic resources, research and innovation capacity, the core business and the human capital. However, their study focussed on regional industrial high-tech in the competitive evaluation system.

An additional model for the analysis of cluster competitiveness is the one proposed by Zaccarelli *et al.* (2008). The business cluster model proposed by these authors uses a strategic approach focussed on the creation of a supra-enterprise system, in which the business cluster is understood as a specific and integral system of a superior level in relation to other companies. Therefore, under certain conditions, companies or businesses concentrated in the same geographic area naturally develop the behavior of a system, with extraordinary effects on the competitiveness of the whole as an integrated whole (Zaccarelli *et al.* 2008).

This systemic nature can be evidenced by the presence of effects that cannot be attributed to companies alone, such as the development of a culture of community, cooperation processes, and the movements of specialization and integration between the companies, among other specific characteristics (Zaccarelli *et al.* 2008). According to these authors, the competitiveness of a cluster can be analyzed in terms of 11 competitive factors.

In this study, the model proposed by Zaccarelli *et al.* (2008) was used as the model of analysis because this model provides a more complete range of competitive factors for the analysis of cluster competitiveness.

2.2.1 Definitions and assumptions of the model of Zaccarelli et al. (2008). This section aims to explain the model of Zaccarelli *et al.* (2008), which will be used to analyze the competitiveness of clusters from Serra Gaúcha and Valle del Maule.

According to Zaccarelli *et al.* (2008), the 11 competitive factors proposed can be classified into two categories.

The first category is associated with self-organization and includes the competitiveness factors 1 through 9. The authors conceptualize supra-enterprise self-organization as "a process of evolutionary and spontaneous nature resulting from the set of systemic effects arising from the relationship established in a supra-enterprise entity (businesses among one another and with the environment), characterized by the development of increasingly complex and competitive conditions over time" (Zaccarelli *et al.*, 2008, p. 46).

The second category is only possible with the presence of supra-enterprise governance and includes the competitiveness factors 10 and 11. The authors conceptualize supra-enterprise governance as "the exercise of the strategy-oriented influence of supra-enterprise entities, facing the vitality of the cluster, composing competitiveness and the aggregate result and affecting all of the organizations comprising the supra-enterprise system" (Zaccarelli *et al.*, 2008, p. 52).

Table I displays the operational definition of each competitiveness factor that composes the model.

In a way, it is implicit that governance complements the process of evolution of a cluster, the origin of which is based on self-organization. According to the authors, a cluster can reach an advanced stage of self-organization without any governance. However, the advent of governance complements the evolution of the cluster, promoting enhanced quality of the total business of the cluster and improving business results. Therefore, governance stands out as a distinctive factor of the competitiveness of the cluster (Zaccarelli *et al.*, 2008).

Zaccarelli *et al.* (2008) explain the relationship of each competitiveness factor to the competitiveness of the cluster, as displayed in Table II.

2.3 Empirical studies that employed the model by Zaccarelli et al. (2008)

We have found studies that empirically employed the model of Zaccarelli *et al.* (2008) to analyze the competitiveness of clusters. In this section, these studies and their contributions to the model will be presented.

The study by Siqueira *et al.* (2011) used the model by Zaccarelli *et al.* (2008) to compare the competitiveness of two shoemaking industrial clusters located in the cities of Franca and Birigui (in the state of São Paulo). The authors indicate as contributions of the paper first, the evaluation, although in an exploratory manner, of the possibility of the practical use of the model by Zaccarelli *et al.* (2008) and second, the comparison of the ability to compete of both clusters. Siqueira *et al.* (2011) conclude that there was no difficulty in the understanding and use of the model proposed by Zaccarelli *et al.* (2008), although certain metrics suggested appeared to be difficult to use, requiring the development of new metrics. According to these authors, the metrics of the model serve as guidelines or suggestions, but they may require adaptation or even replacement depending on the specific characteristics of the cluster studied.

Competitiveness factor	Operational definition
1. Geographical concentration	Geographical concentration is the basic element for the identification of a cluster. This factor refers to the geographical proximity of companies and institutions of the group, and the ideal concentration is the largest possible. In addition, the authors highlight that, preferably, a cluster must be located within only one city
2. Scope of viable and relevant business	This factor refers to the degree of activities and operations integrating the cluster, which ranges from processing activities to the commercialization of a product or categories of products
3. Specialization of companies	Specialization refers to the level at which the companies within the cluster are focussed on certain products and solutions. Developed clusters are usually comprised of small specialized companies dedicated to a few or a single operation
4. Balance with no privileged positions	This factor analyzes whether there are companies that, in a privileged manner, dominate portions of the production process or the access to raw materials. The existence of a monopoly company, for example, would yield a negative impact on the competitiveness of the cluster
5. Complementarity through the use of subproducts	This factor analyzes the presence of activities that are intended for the reuse of products resulting from the production process and no longer usable, such as waste or material for recycling
6. Cooperation between companies in the business cluster	The cooperation between companies in the cluster is related to the level of cooperation practiced between companies in the cluster. This collaboration is of a voluntary and spontaneous nature, rarely deliberated by the executives
7. Selective replacement of companies in the cluster	The selective replacement of companies is a natural process of the openings and closings of companies, whereby the most competitive companies survive. In other words, there is a process of exclusion and subsequent entry of new companies due to high competition and limited conditions for sustaining unique competitive advantages over time
8. Uniformity of the technological level	This factor is related to the degree of homogeneity of the technologies in use in the cluster. The homogeneity of the technological level is evaluated considering the most outdated technology in use, whereby major technological differences would not strengthen the competitiveness of a cluster
9. Community culture adapted to the cluster	The culture adapted to the cluster refers to the social behavior of the region integrated naturally with the presence, operation and improvement of the cluster, forming a cohesive system of values, authority at work, status, etc.
10. Evolutionary character through the introduction of (new) technologies	This factor refers to the existence of a competence focussed on the development, identification, adaptation and adoption of new technologies by the cluster
11. Cluster-oriented result strategy	The cluster-oriented result strategy is related to the effective and deliberate presence of guidance toward the actions and decisions of the companies participating in the cluster, aiming to achieve a market leadership position

Source: Zaccarelli *et al.* (2008)

Table I. Operational definition of competitiveness factor

Thus, the model by Zaccarelli *et al.* (2008) proved feasible for practical use, although occasional adjustments may be necessary. With regard to the competitiveness of clusters, according to the use of the model, the authors indicate that the cluster in Franca is in a more advanced stage of competitiveness than the cluster in Birigui because, in general, Franca exhibits aspects of the competitiveness factors to a greater degree (Siqueira *et al.*, 2011).

Competitiveness factor	Relationship with competitiveness
1. Geographical concentration	This factor is related to the competitiveness of the cluster with regard to the attraction of customers because the geographical concentration of companies and institutions affect the perception of customers regarding the superior variety, increased power of choice of the supplier and the greater reliability of prices
2. Scope of viable and relevant business	This factor may have a significant influence on the cost of supplies and, therefore, on the cost of the final product. Furthermore, the scope relates to the competitiveness of the cluster once it can reduce search costs and access to customers, as well as reduce the need for large inventories or replacement terms due to the proximity of suppliers
3. Specialization of companies	The specialization is associated with the efficiency of companies and the superior quality of the products. Thus, the competitive advantage stems from the speed of the development of the companies with lower investments and costs because the specialization can reduce the aggregate operation expenses and the volume of investment required
4. Balance with no privileged positions	Although a privileged position may be appealing to the company's shareholders, a privileged position would result in the reduction of the margins of other companies or raise the prices paid by customers, reducing the competitiveness of the cluster as a whole
5. Complementarity through the use of subproducts	The complementarity affects competitiveness, as it offers alternatives of cost recovery and the possibility of new sources of revenue for the company. In addition, it favors the presence and the establishment of new businesses that use the subproducts as raw materials
6. Cooperation between companies in the business cluster	This factor increases the competitiveness of the cluster in an integrated manner due to the transfer and development of shared competencies
7. Selective replacement of companies in the cluster	The selective replacement of companies affects the competitiveness of the cluster, as the replacement ensures the effective and permanent presence of competent companies
8. Uniformity of the technological level	The uniformity of the technological level affects competitiveness because companies with superior technology would be somehow rewarded. In other words, superior technology would incur price increases for customers and, consequently, reduce the overall competitiveness of the cluster
9. Community culture adapted to the cluster	The competitive advantage of this competitiveness factor is associated with the sense of belonging and pride of the employees of companies in the cluster. Consequently, there is an increase in employee motivation and satisfaction
10. Evolutionary character through the introduction of (new) technologies	This factor requires a tactic of intervention, such as the adoption of strategies. The competitive advantage resulting from innovation may include cost reduction, maintenance or expansion of markets, extension of supply, etc.
11. Cluster-oriented result strategy	As in the previous factor, the strategy focussed on results includes a tactic of intervention, such as the adoption of strategies to combat opponent clusters. This competitiveness factor affects competitiveness because there is an expansion of the capacity to compete and increase the aggregate profit

Source: Zaccarelli *et al.* (2008)

Table II.
Relationship of each competitiveness factor with the competitiveness of the cluster

Santos *et al.* (2012) used the model to evaluate the competitiveness of a Brazilian technology cluster, the local productive arrangement of electronics, informally known as the valley of electronics. Similar to the study by Siqueira *et al.* (2011), due to the impossibility of applying certain metrics, these authors propose alternative metrics for analysis of some of the competitiveness factors of the model. The authors analyze the

empirical evidence of each competitiveness factor of the model present in the cluster, identifying important aspects of the competitiveness of the cluster.

In the literature, we found two other studies employing the model by Zaccarelli *et al.* (2008) to analyze the competitiveness of clusters. They are first, the study by Telles *et al.* (2011), which analyzed the performance of bars in the city of São Paulo that were located both in cluster and non-cluster areas; and second, the study by Pereira *et al.* (2014), which developed metrics for the Brás, which is a cluster of the textile and clothing sector located in Sao Paulo.

It can be observed that the metrics suggested by Zaccarelli *et al.* (2008) for the analysis of each competitiveness factor are not universal due to the peculiarities of each cluster. Thus, the studies that use the model and propose new metrics contribute to the development of the theory. Table III summarizes the metrics used by some of these studies, as well as the metrics proposed by Zaccarelli *et al.* (2008).

3. Methodology

This study aims to compare the level of competitiveness of two clusters in the wine industry, the Brazilian cluster of Serra Gaúcha and the Chilean cluster of Valle del Maule, adopting as theoretical framework the competitiveness analysis model of clusters proposed by Zaccarelli *et al.* (2008). To reach the objective of the study, we first, proposed metrics for the analysis of clusters; second, identified the factors of competitiveness present in the cluster of Serra Gaúcha; third, identified the factors of competitiveness present in the cluster of Valle del Maule; and fourth, analyzed the differences in the factors of competitiveness of the clusters.

3.1 Research type and data collection

The nature of the study is qualitative and descriptive, and the data collection was conducted through secondary sources. The data are derived from government websites, research institutes, scientific articles and the websites of companies that integrate the clusters.

3.2 Metrics adopted

For the operationalization of the study, we have proposed metrics, complementing those proposed by Zaccarelli *et al.* (2008) that meet the peculiarities of the objects of study. It is worth noting that, for the analysis of some competitiveness factors, we used two metrics, such as competitiveness factor 9. In this case, the result is the average of the cluster performance in both metrics.

The metrics used in the analysis are described below.

3.2.1 Geographical concentration. For this competitiveness factor, we used two metrics: demographic density of the companies and the number of municipalities involved in the cluster.

The metric "demographic density of companies" is measured by dividing the number of companies in the cluster by the city area and had already been used by Siqueira *et al.* (2011). This metric was used to meet the theoretical proposition of Zaccarelli *et al.* (2008) that the ideal geographical concentration is the largest possible. It is worth noting that, for this study, this metric was adapted to the context of the cluster, and hence the calculation is made by dividing the number of wineries by the total area of the cluster.

Comp. factor	Metrics of the model Zaccarelli *et al.* (2008)	Siqueira *et al.* (2011)	Santos *et al.* (2012)
1	Distance from major competitors (km)	Number of companies in the cluster divided by city area	Number of municipalities involved in the cluster; demographic density of companies
2	Complement to the percentage of important businesses outside the cluster (%)	Analysis of secondary data and list of institutions and companies	Categories of actors in the production chain that are part of the cluster; number of correlated and complementary sectors
3	Number of companies in the same industry or sector (–)	Coefficient of specialization	Percentage of companies that outsource part of their production; average number of local suppliers involved in the production of a product of the cluster
4	Maximum number of businesses within a company that can be potentially outsourced (–)	Number of companies in each activity related to the cluster	Number of businesses in the same industry and uniformity of size of companies/industry
5	Number of companies operating with recycling (–)	Actions of companies in the cluster focussed on the use of subproducts	Number of companies that buy and sell subproducts from others
6	Average levels of collaboration assigned by the sample of executives in the cluster (1-10)	List of supporting institutions created by the companies	Degree of cooperation between companies (qualitative indicator)
7	Statistical indices of companies closed and new companies (%/year)	Analysis of the opening date of companies associated with the union	Statistical indices of companies closed and new companies
8	Presence of inferior technologies (%)	Qualitative analysis	Index of innovation and investment in R&D by companies in the cluster
9	Percentage of families with a worker in the cluster in relation to the total number of families in the region (%)	Number of employees related to the cluster divided by the population of the city	Percentage of families with a worker in the cluster in relation to the total number of families in the region
10	Qualitative indicator based on the opinion of technologists (position vs most advanced situation)	Methods of introduction of new technologies in the cluster	Degree of introduction of technology (qualitative indicator)
11	Rate of increase in aggregate profit (%) Rate of expansion of the area supplied (%)	Actions of the union intended for the strategy of the cluster	Growth rate of the revenue in the region Growth rate of the number of companies Growth rate of the number of jobs

Table III.
Metrics found in the literature

The metric "number of municipalities involved" was used by Santos *et al.* (2012) and is in line with the theoretical proposition that, preferably, a cluster must be located in only one municipality (Zaccarelli *et al.*, 2008).

In this case, the cluster with the highest demographic density and in fewest municipalities is considered as the one with the highest level of competitiveness in this competitiveness factor.

3.2.2 Scope of viable and relevant business. To study this competitiveness factor, we used the model developed by Fensterseifer (2007), which presented a mapping of the activities involved in the wine cluster of Serra Gaúcha. We adopted this mapping to analyze the presence of the actors of the production chain, as it is specific to a wine cluster, that is, it meets the peculiarities of the clusters under study, which would not be possible with the use of another classification.

According to Fensterseifer (2007), the companies that make up a wine cluster are grape growers, winemakers, producers of seedlings, fertilizers, pesticides and herbicides, barrels, bottles, caps and corks, labels, machinery and equipment, educational and research bodies, funding, regulatory, inspection and coordination entities, specialized public relations companies, specialized trade publications, tourism offices, and food facilities/restaurants.

The cluster with the highest level of competitiveness in this competitiveness factor will be the one that has the highest number of activities in the winemaking chain, as proposed by Fensterseifer (2007).

3.2.3 Specialization of companies. To analyze this competitiveness factor, we sought to identify the stages of the wine production chain that are outsourced by the companies because it is understood that the more the activities are outsourced, the greater the specialization of companies. A metric similar to this proposal was used by Santos *et al.* (2012); the difference is that these authors analyzed the percentage of companies that outsource part of their production.

For the identification of the activities, we used the classification of Ferreira *et al.* (2010, p. 1), which considers the production chain of wine as one of the most complex in agribusiness, containing 11 steps after grape-growing (input), as follows: harvesting, grape gathering, crushing and destemming, fermentation, refinement, wine maturation, filtering, bottling and labeling, aging, wine analysis and grape leftovers processing.

To collect this information, we visited the sites of the companies that compose both clusters, which, in most cases, provide information about the winemaking process and indicate the outsourced activities.

As a result, the cluster that exhibits the highest number of parts of the production chain that are outsourced is considered the cluster with the highest level of competitiveness for this competitiveness factor plea.

3.2.4 Balance with no privileged positions. The evidence of the balance between companies in a cluster is that there are no significant differences in the size of companies. Santos *et al.* (2012), for example, used as a measure of this competitiveness factor the degree of homogeneity of the company size of the cluster.

We understand that the measure of size for the clusters of agribusiness may be the area for the growth of raw material, hereby being grapes. Because of this, in order to determine whether there is equilibrium between the companies in the clusters, we use as a metric the coefficient of the variation of hectares planted by the companies.

Therefore, the smaller the coefficient of variation of hectares planted, the greater is the balance between the companies in the clusters and, consequently, the greater its level of competitiveness. Thus, the cluster that presents the lowest coefficient of variation will be considered to have the highest level of competitiveness.

The data for this competitiveness factor was collected from the company websites.

3.2.5 Complementarity through the use of byproducts. To analyze this competitiveness factor, we investigated the destination of winemaking leftovers by

the companies. The winemaking process generates waste such as stalk, grape leftovers and seeds (Makris *et al.*, 2007).

As a result, the cluster with the highest level of competitiveness is the one that has the largest number of initiatives to recycle these leftovers.

3.2.6 Cooperation among companies. As the metric for this competitiveness factor, we adopted the number of wine cooperatives in the cluster, with the requirement that the cooperatives consist of the members of the cluster itself and concentrate their efforts on the commercialization of the products, as opposed to the cooperatives and associations that focus on local development.

This qualification aims to meet the theoretical proposition of Zaccarelli *et al.* (2008) that the cooperation among companies consists of the level of spontaneous and voluntary collaboration practiced in the cluster.

It is understood, therefore, that the presence of this type of cooperative indicates the existence of relationships of cooperation among the companies in the cluster.

The cluster that contains the highest number of such cooperatives will be considered the one with the highest level of competitiveness for this competitiveness factor.

3.2.7 Selective replacement of companies. For this competitiveness factor, we used as a metric the percentage of new businesses in the sector. This metric is similar to that used in the study by Siqueira *et al.* (2011). The difference is that these authors used the absolute number of companies, while we used the percentage of new companies because it is understood that a relative metric can reflect more reliably the competitive difference between both clusters for this competitiveness factor. Similar to Siqueira *et al.* (2011), the lack of information regarding the closure of companies made the metric used in the study simpler than that one proposed by Zaccarelli *et al.* (2008).

The cluster with the highest percentage of new companies will be considered to have a higher level of competitiveness for this competitiveness factor.

3.2.8 Uniformity of the technological level. To analyze this competitiveness factor, we used the metric originally proposed by Zaccarelli *et al.* (2008), that is, "the presence of inferior technologies," but with some adaptations. The first adaptation is that in this study it was not possible to analyze quantitatively the percentage of inferior technologies in the clusters, as proposed by Zaccarelli *et al.* (2008), given the absence of information in this regard. Considering this absence, we analyzed qualitatively only the presence or absence of inferior technologies. The second adaptation was to divide the analysis of the technologies used into two categories. The first category refers to technologies used in grape-growing activity, and the second one refers to the technology used in the winemaking process.

In this competitiveness factor, the cluster that indicates the greatest uniformity in these two categories was considered to have the highest level of competitiveness.

3.2.9 Community culture adapted to the cluster. For the analysis of this competitiveness factor, we adopted two metrics: the percentage of individuals in the region associated with the cluster and earliest date of grape-growing activity in the area. The first metric had already been used by two previous studies, Siqueira *et al.* (2011) and Santos *et al.* (2012). The second metric was proposed to consider the peculiarities of an agribusiness cluster because, as in the case of this study, the wine culture in both clusters developed due to the process of colonization.

For this competitiveness factor, the cluster with the highest percentage of individuals associated with the cluster and the earliest date of grape-growing activity will be considered as the one having the highest level of competitiveness.

3.2.10 Evolutionary nature due to the introduction of new technologies. The metric used to analyze the competitiveness factor was the number of institutions that operate in the cluster supporting technological research and development. This metric was adopted because it is understood that these institutions may contribute to the development and performance of governance.

For this competitiveness factor, the cluster with the highest number of institutions of this nature will be considered as the one with the highest level of competitiveness.

3.2.11 Cluster-oriented result strategy. For the analysis, we used two metrics: first, the registration of the geographical indication (GI) and second, the number of exporting companies. The first metric attempts to measure the effort to differentiate the products of the clusters, because the use of geographical indicators is a strong indication of a potential differentiation of products from a particular region (Skuras and Vakrou, 2002), and the second metric refers to efforts regarding the expansion of their market.

According to the Ministry of Agriculture (2012), the registration of the GI is assigned to products or services that are characteristic of their place of origin, giving them reputation, intrinsic value and identity, which distinguishes them from similar products or services available on the market. There are two modalities of the GI: "indication of origin" and "denomination of origin (DO)."

The cluster with the highest level of competitiveness in this competitiveness factor will be the cluster with the oldest record of GI, the largest territorial coverage and the larger number of exporting companies.

4. Results

4.1 Analysis of the elements of competitiveness of the clusters

This section presents the results achieved with the study. The data sources used allowed for the analysis of the 11 factors of competitiveness proposed by the theoretical model adopted, as presented in the following sections.

4.1.1 Geographical concentration. Table IV presents the figures for those two metrics adopted in the analysis of this competitiveness factor.

It can be observed that the concentration of companies in the Brazilian cluster compared to the Chilean cluster is higher. In addition, in the Brazilian cluster there is a lower number of municipalities involved.

Due to these results, it is considered that the Brazilian cluster has the highest level of competitiveness for this competitiveness factor because in the two metrics used for analysis, the Brazilian cluster exhibited evidence of increased geographical concentration.

4.1.2 Scope of viable and relevant business. Table V displays the business activities presented by Fensterseifer (2007) and the identification of the existence of these business activities in the two clusters.

Metric	Valle del Maule	Serra Gaúcha
Number of municipalities involved in the cluster	30	18
Demographic density of wineries	133 Wineries/30,296.1 km^2 = 0.0044 vin/km^2	475 Wineries/4,958.657 km^2 = 0.015 vin/km^2

Sources: Authors, based on data from the INE (2011), Instituto Brasileiro de Geografia e Estatística (IBGE) (2012) and Protas and Camargo (2011)

Table IV. Geographical concentration

Metric	Valle del Maule	Serra Gaúcha
Grape growers	Yes	Yes
Wineries – facilities and processing	Yes	Yes
Seedling producers	Yes	Yes
Fertilizers, pesticides and herbicides	Yes	Yes
Barrels	Yes	Yes
Bottles	Yes	No
Lids and corks	Yes	Yes
Labels	Yes	Yes
Machinery and equipment	Yes	Yes
Educational and research institutes	Yes	Yes
Promotion, regulation, inspection and coordination agencies	Yes	Yes
Specialized public relations	Yes	Yes
Specialized publications	Yes	Yes
Tourism	Yes	Yes
Food/restaurants	Yes	Yes

Table V.
Scope of viable and relevant business

Sources: Authors based on data from Lobos (2006), Wilks (2006) and Aprovale – Associação dos Produtores de Vinhos Finos do Vale dos Vinhedos (2012)

In the Brazilian cluster, there were no manufacturers of bottles. Wilks (2006) had already noted in previous research that in Brazil, there are only two suppliers of bottles, which produce on a larger scale for the brewing industry. In addition, Wilks (2006) observes that the corks are processed by five national manufacturers, and the raw material is imported from Portugal and Spain, representing a major cost item for the Brazilian wineries.

Therefore, the Chilean cluster appears to be more competitive than the Brazilian cluster regarding this competitiveness factor because it has all of the activities involved in the winemaking chain.

4.1.3 Specialization of companies. For this competitiveness factor, the clusters appeared to be equally competitive because in both there is outsourcing of a few items in the production chain. The categories that are usually outsourced correspond to the production of inputs and bottling.

It is worth noting that, especially with regard to the exporters, the clusters have tended to verticalize their production, ranging from planting and harvesting to the sale of the product already bottled. This trend can be explained by the greater demand for wine quality, which depends directly on the quality of the input.

The verticalization seems to be a peculiarity of this type of industry, requiring further study as to the reasons for this trend.

4.1.4 Balance with no privileged positions. For the two clusters, 13 companies were found that presented information on their websites about the amount of hectares apportioned for growing grapes, as displayed in Table VI.

The Chilean cluster indicated a higher level of competitiveness in relation to the Brazilian cluster because it exhibited the lowest coefficient of variation, 0.79 vs 0.96 in the Brazilian cluster.

4.1.5 Complementarity through the use of byproducts. It can be observed that in both clusters, the most common practice is composting. According to the Ministry of the Environment (2012), composting is a biological process of decomposition and recycling of organic matter, the final result of which is an organic compound that can be applied to the soil to improve its characteristics, without causing risks to the environment.

Valle Del Maule	Ha	Serra Gaúcha	Ha
Balduzzi	300	Lidio	200
Bustamante	100	Campos de cima	15
Calina	85	Cavalleri	32
Casa Donoso	349	Dom Giovani	18
Cremaschi Furlotti	400	Don Guerino	50
Gillmore	54	Geisse	36
Hugo Casanova	100	Milantino	7
J. Bouchon	370	Miolo	120
Melozal	150	Pizzato	42
Mensajero	90	Terrasul Vinhos	65
Morande	45	Vinícola Gheller	18
Via Wine Group	550	Vinícola Marco Luigi	32
Viña Tinajas	600	Vinícola Perini	92
Mean	245.92	Mean	55.92
SD	193.59	SD	53.98
Coefficient of variation	0.79	Coefficient of variation	0.96

Source: Authors based on data from company websites

Table VI. Balance with no privileged positions

Large parts of the organic waste from the wine industry can be recovered by specialized companies for the generation of alcohol, the extraction of dyes and power generation. However, there are no major innovations in the incorporation of technologies for the reuse of waste in the large companies in the Chilean cluster (Tecnolimpia, 2010).

In the Brazilian cluster, according to a survey conducted by Sindivinho in 2011, approximately 70 tons of grape leftovers were generated, a residue resulting from the production of wine. Despite the large amount of this byproduct, it is used minimally, and their main destinations mentioned in the study include animal feed and disposal in agricultural soil (Sindivinho, 2011).

Because the initiatives for the recycling of waste from wine production are similar, the clusters indicated equivalent levels for this competitiveness factor.

4.1.6 Cooperation among companies. In the Chilean cluster, we identified a small number of companies that operate in the form of cooperatives. Only two cooperatives were identified: Vitivinícola Loncomilla and Lomas de Cauquenes. The first has 100 associate members, and the vast majority consists of small producers; the second has approximately 240 members and an annual production of 12 million liters.

Benavente (2006) emphasizes that cooperatives are important for small producers because they protect the establishments regarding production, storage and commercialization. These cooperatives are common in Italy and France, but in Chile, as observed in the Valle del Maulle, they failed to prosper (Benavente, 2006).

In the cluster of Serra Gaúcha, there is heavy presence of cooperatives; the Federation of Wine Cooperatives of Rio Grande do Sul (Fecovinho, 2014) has brought together ten large cooperatives. Together they represent more than 5,000 families and correspond to approximately a quarter of the annual production of grapes and wines in the state of Rio Grande do Sul. Table VII summarizes such information.

In this competitiveness factor, reflected by the metric regarding the existence of cooperatives, the Brazilian cluster indicates a higher level of competitiveness, as it brings together a greater number of cooperatives and cooperative members and has greater synergy between companies and producers.

4.1.7 Selective replacement of companies. Table VIII displays the results for the analysis of this competitiveness factor.

For this competitiveness factor, the Brazilian cluster indicated a higher level of competitiveness because 241 companies have been incorporated into the cluster between 2001 and 2006, which represents a percentage of 2 percent in relation to the total companies in the cluster. The Chilean cluster exhibited a percentage lower than 0.54 percent. Although the periods analyzed are not the same, the result can be considered consistent because, despite there being only five years of analysis for the Brazilian cluster in contrast to ten years for the Chilean cluster, the Brazilian cluster reported a higher number of new companies.

4.1.8 Uniformity of the technological level. The two clusters exhibit differences in the technological level both in relation to grape-growing activity and in the winemaking process. Typically, areas with higher technology investments indicate a greater winemaking potential for the supplies.

In Valle del Maule, areas with modern winemaking, located in a large percentage of the area of irrigated land, are characterized by the high technology used, and supplies are allocated to the production of fine wines, whose main target is exports. In areas with traditional winemaking, located mainly in dry lands and meadow areas, technological investment is scarce and typically ordinary wines are produced (Muñoz *et al.*, 2004).

Similar to the Chilean cluster, the cluster of Serra Gaúcha indicates modernized areas and areas that were not involved in an organized and consistent manner in the modernization movement. As a consequence, the raw material in the areas lacking modernization has exhibited low winemaking potential (Protas and Camargo, 2011).

In addition to differences in production, the two clusters have differences in the winemaking processes, for which there are wineries with mechanized production and others with manual production.

Despite the evidence of significant technological differences of the companies in the clusters, it is important to note that these differences may be associated with the market of operation of the wineries, that is, the wineries in the segment of fine wines have more advanced technology than the wineries that produce ordinary wines. Therefore, in order to analyze this competitiveness factor, we considered the uniformity

Table VII.
Number of cooperatives, producers and wine production

Metric	Valle del Maule	Serra Gaúcha
Number of cooperatives	2	10
Information about cooperatives		
Producers	340	5,000
Wine production (fine and table wine)	34 million	63 million

Sources: Loncomilla (2014), Lomas de Cauquenes (2014), IBRAVIN (2004) and Fecovinho (2014)

Table VIII.
Selective replacement of companies

Metric	Valle del Maule	Serra Gaúcha
Percentage of new companies	From 2000 to 2010 – 29 new companies/5.396 = 0.54%	From 2001 to 2006 – 243 new companies/12.037 = 2%

Sources: Authors based on data from INE (2011), Macke *et al.* (2013) and IBRAVIN (2004)

of the technological level based on the market of operation of the wineries. From this perspective, we found no major technological differences.

This evidence suggests that the level of competitiveness for this factor is similar.

4.1.9 Community culture adapted to the cluster. With regard to the first metric "individuals in the region associated with the cluster," both clusters exhibited similar percentages; however, there was a slight advantage exhibited by the Brazilian cluster, which had 7.5 percent as opposed to the 6.75 percent in the Chilean cluster. These results are also similar to other studies that used this metric to evaluate the competitiveness factor, such as Siqueira *et al.* (2011), who found the value of 9 percent, which represented a high percentage of the population working in the cluster.

As for the second metric "earliest date of grape-growing activity," the Chilean wine production dates back to 1548 and has a close relationship with the Spanish colonization. The grape-growing activity was initially undertaken by monasteries and abbeys to provide wine for religious ceremonies, required in the Catholic liturgies of the time (Pszczólkowski, 2015).

Similarly, in the cluster of Serra Gaúcha, the grape growing also originated at the time of colonization. In the Brazilian cluster, the activity began in 1875 by Italian immigrants who had the habit of making wine and growing grapes (Fensterseifer, 2007).

Table IX displays the metrics used for the analysis of the competitiveness factor and the corresponding results.

Considering that the Chilean cluster indicated a better performance in the second metric, while the Brazilian cluster did so in the first metric, it is assumed that for this competitiveness factor, the clusters have similar levels of competitiveness.

4.1.10 Evolutionary nature due to the introduction of new technologies. Table X displays the institutions found in the clusters that develop activities related to technological research and development. As noted in competitiveness factor 8 – the uniformity of technological level – the companies integrating both clusters indicate important technological differences. These differences, although apparently associated with the consumer market, may indicate the need for a more consistent effort of local governance. Thus, it is considered that the institutions displayed in Table X have the potential to develop governance actions regarding the introduction of new technologies.

It was found that there are institutions focussed on research in both clusters; however, there was a slight advantage to the Chilean cluster, which had seven institutions, as opposed to the Brazilian cluster, which had six. This indicates that the level of competitiveness of the Chilean cluster is higher than the Brazilian cluster in terms of this competitiveness factor.

4.1.11 Cluster-oriented result strategy. Table XI displays the performance of the clusters for the cluster-oriented result strategy competitiveness factor.

Metric	Valle del Maule	Serra Gaúcha
Percentage of individuals associated with the cluster	67,000/991,542 pop × 100 = 6.75%	57,752/769,617 pop × 100 = 7.5%
Earliest initial date of grape-growing activity	1,548	1,875

Table IX.
Community culture adapted to the cluster

Sources: Authors based on data from INE (2009), IBGE (2012) and Protas and Camargo (2011)

Metric	Valle del Maule	Serra Gaúcha
Number of education and research institutions in the cluster	CTVV (Centro Tecnológico de la Vid y el Vino) CEVIUC (Centro del Vino UC) LECCC (Laboratorio Enológico de Certificación y Control de Calidad) (UC del Maule) CEVID (Centro de Estudio de la Vid) (U de Chile) GIE (Grupo de Investigación Enológica) (U de Chile) CITRA (Centro de Investigación y Transferencia en Riego y Agroclimatología) CTSyC (Centro Tecnológico de Suelos y Cultivos)	FTSG (Faculdade de Tecnologia da Serra Gaúcha) IFRS (Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Sul) EMBRAPA (Empresa Brasileira de Pesquisa Agropecuária) EMATER (Associação Riograndense de Empreendimentos de Assistências Técnica e Extensão Rural) Fepagro (Fundação Estadual de Pesquisa Agropecuária) e ICTA (Instituto de Ciência e Tecnologia de Alimentos)

Sources: Authors, based on Lobos (2006) and Wilks (2006)

Table X.
Evolutionary nature due to the introduction of new technologies

Metric	Valle del Maule	Serra Gaúcha
Geographical indication	Since 1995[a]	Since 2012 – Vale dos Vinhedos[b] 2010 – Pinto Bandeira won the indication of origin (IO)
Number of exporters	70 companies[c]	23 companies[d]

Sources: Authors, based on [a]Decreto 464, (1995), [b]Dalmoro (2012), [c]Lobos (2006) and [d]Wines of Brazil (2012)

Table XI.
Cluster-oriented result strategy

For the first metric, Valle del Maule exhibited a better performance than the Brazilian cluster because it has had the Registration of Designation of Origin since 1995, a registration that, according to Decreto 464 (1995), covers the cluster as a whole. Conversely, the certification initiatives regarding the GI in the Brazilian cluster seem to be carried out in isolation because the registration of the DO, granted to the cluster in 2012, has a scope restricted to *Vale dos Vinhedos* rather than the Serra Gaúcha as a whole.

Similarly, for the second metric, Valle del Maule appears to be potentially more competitive because the number of companies that export its products is greater than in the Brazilian cluster. It is worth noting that the initiative to internationalize Brazilian wineries is still a recent process. Dalmoro (2012) highlights the creation of the inter-organizational group Wines of Brazil in 2002. The group is an initiative from the Federation of Industries of the State of Rio Grande do Sul supported by the Brazilian Agency for Export Promotion, initially formed by six wineries from Rio Grande do Sul, aiming to promote Brazilian wines in the global market (Dalmoro, 2012).

Due to these results, the cluster with the highest level of competitiveness in this competitiveness factor was the Chilean cluster, with the oldest record of GI and the largest territorial coverage, as well as a larger number of exporting companies.

4.2 Comparison of the competitiveness of the clusters

Table XII displays the metrics adopted in this research, the analysis of the clusters studied, as well as the comparison of the competitiveness. For a better visualization,

	Metrics adopted	Analysis of clusters: Valle del Maule	Analysis of clusters: Serra Gaúcha	Comparison: Maule	Comparison: Serra Gaúcha
1	Number of municipalities involved in the cluster Demographic density of wineries	Present in lesser extent	Present	−	+
2	Number of activities in the wine chain that are part of the cluster	Present	Present with low intensity	+	−
3	Number of parts of the production chain that are outsourced	Partly present	Partly present	=	=
4	Coefficient of variation of hectares planted by the companies of the clusters	Present	Present with low intensity	+	−
5	Number of initiatives to recycle wastes	Present	Present	=	=
6	Number of cooperatives formed by members of the cluster	Present with low intensity	Present	−	+
7	Percentage of new companies	Present with low intensity	Present	−	+
8	Presence of differences in the technology level	Present	Present	=	=
9	Percentage of individuals associated with the cluster Earliest initial date of grape-growing activity	Present	Present	=	=
10	Number of education and research institutions in the cluster	Present	Present with low intensity	+	−
11	Geographical indication: oldest record and largest territorial coverage Number of exporters	Presence of governance	Partly present	+	−

Table XII.
Comparison of the competitive of clusters

we used the equal sign (=) for the competitiveness factors for which the clusters appeared to be equivalent; the plus sign (+) for the cluster with a competitiveness factor that is more evident; and the minus sign (−) for clusters with a lower performance in the competitiveness factor in question.

It is worth noting that for the analysis of a few competitiveness factors, two metrics were used. In this case, the result is the average performance of the cluster for the two metrics used.

It is observed that the clusters have similar characteristics in many of the competitiveness factors. The difference between them is observed in the competitiveness factors 1, 2, 4, 6, 7, 10 and 11, and the Chilean cluster exhibits better performance in the competitiveness factors 2, 4, 10 and 11. Thus, the superior level of competitiveness of the Chilean cluster can be explained by the competitiveness factors "scope of viable and relevant business," "balance with no privileged positions," "introduction of new technologies" and "strategy focussed on cluster development."

There is evidence of the presence of governance in both clusters. However, the Chilean cluster exhibited a higher level of competitiveness for both competitiveness factors that analyze the governance issue in the cluster (competitiveness factors 10 and 11). This result indicates that governance is an important factor to justify the higher competitiveness of the Chilean cluster, which adhered to the theoretical proposition of Zaccarelli *et al.* (2008) that the advent of governance complements the evolution of the cluster, promoting enhanced quality of the overall business of the cluster and increasing the business results.

4.3 Implications for future studies

First, it is important to point out that some of the competitive factors can be analyzed with generic metrics, no matter what is the cluster industry. These are the cases of the competitive factors "geographical concentration," "complementarity through the use of byproducts" and "selective replacement of companies."

Nevertheless, there are other factors that require specific metrics to meet the particularities of each industry. These are the cases of the competitiveness factors "cooperation between companies," "community culture adapted to the cluster," "evolutionary nature due to the introduction of new technologies" and "cluster-oriented result strategy."

In this sense some metrics developed in this study can be generically used to analyze clusters of any industry, while others metrics are specific to agribusiness clusters. The generic metrics are "number of parts of the production chain that are outsourced," "number of cooperatives formed by members of the cluster," "number of education and research institutions" and "number of exporters." The specific metrics for agribusiness clusters are "GI – oldest record and largest territorial coverage," metric developed to analyze the competitive factor "cluster-oriented result strategy" and the metric "earliest initial date of grape-growing activity."

Regarding the results, two considerations can be made. The first is regarding the competitive factor "1 – geographical concentration." According to the Zaccarelli *et al.* (2008) this factor refers to the geographical proximity of companies and institutions of the group, and the ideal concentration is the largest possible. In addition, the authors highlighted that, preferably, a cluster must be located within only one city. However, the clusters analyzed in this study are located in more than one municipality (30 municipalities in Valle del Maule and 18 municipalities in Serra Gaúcha). In addition, the concentration of companies in both clusters was smaller than other studies that used the same metric, such as Siqueira *et al.* (2011) who found the demographic density of companies of the 9.05 in Franca and 3.87 in Birigui. Our study presented only 0.0044 in Valle del Maule and 0.015 in Serra Gaúcha.

The second consideration is regarding the competitive factor "3 – specialization of companies." According to the Zaccarelli *et al.* (2008) developed clusters are usually comprised of small specialized companies dedicated to a few or a single operation. However, the clusters studied presented a tendency to vertical integration, in which companies performed various stages of the production process. This result seemed to suggest the opposite from the proposal by Zaccarelli *et al.* (2008).

Considering these two points, future studies can analyze if these characteristics are presents in other clusters and which types of the clusters.

In addition, we suggest for future studies first, the analysis of the clusters from a longitudinal perspective, with an emphasis on the evolution of the competitiveness factors evidenced; second, on-site evaluation aiming to improve the analysis of the competitiveness factors; and third, the application of the proposed metrics in other agribusiness clusters for the purpose of testing their consistency.

5. Final considerations

The purpose of this study was to compare the level of competitiveness of the Brazilian wine cluster located in Serra Gaúcha with the competitiveness of the Chilean cluster in Valle del Maule, adopting as the theoretical framework the model of Zaccarelli *et al.* (2008).

We sought to identify the competitiveness factors of the model that helped to explain the increased competitiveness of the Chilean cluster in relation to the Brazilian counterpart.

The competitiveness factors that helped to explain the increased competitiveness of the Chilean cluster were the "scope of viable and relevant business," "balance with no privileged positions," "introduction of new technologies" and "strategy focussed on cluster development," and particularly the last two ones, which demand governance.

The model allows for a more detailed analysis of the factors that explain the increased competitiveness of the Chilean cluster vs the Brazilian cluster. However, the metrics suggested by Zaccarelli *et al.* (2008) are not universal and often need to be adapted to suit the peculiarities of the cluster studied. As a result, this study brings a methodological contribution by proposing metrics that can be used for the analysis of clusters in agribusiness.

In addition to the methodological contribution, this study brings a practical contribution; through the comparison of two wine clusters, it was possible to identify the aspects that can be improved to increase competitiveness, especially in the Brazilian cluster. These aspects include first, the need for bottle manufacturers in Serra Gaúcha, which would have a positive impact on production costs; second, the expansion of the registration of GI for the entire Serra Gaúcha, resulting in an enhanced image of Brazilian wine abroad; and third, greater incentives for exports, which would result in an increase in market share.

The limitation of this study is that the analysis used only secondary data, making it impossible to study certain metrics in the same time period. In addition, because the study uses a qualitative approach, it is not possible to make generalizations.

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