



Review

Sustainability in the winemaking industry: An analysis of Southern Brazilian companies based on a literature review



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ARTICLE INFO

Article history:

Received 31 July 2017

Received in revised form

20 April 2018

Accepted 27 April 2018

Available online 30 April 2018

Handling Editor: Yutao Wang

Keywords:

Sustainability

Winemaking industry

Tourist destinations

Enotourism

ABSTRACT

The implementation of the sustainability practices in the wine industry must meet some basic criteria that are directly related to the economic performance of the company, with the biodiversity conservation and social inclusion. The interest of consumers for environmental issues is recognized as one of the factors that justify doing these studies. Concomitant with this theme, the study of competitiveness in tourism destinations producers of wines has been considerable part in the work developed by professionals in the area. This research aims to analyze how the deployment of the sustainable management practices fosters the competitiveness of businesses located in tourist destination producers of wines from Southern Brazil. It has multiple case study. The data collection was performed based on structured interviews with entrepreneurs of these wineries. The results indicate that the use of the sustainability practices is perceived as a tool to increase competitiveness in the researched enterprises. Being the implantation of these, a worldwide trend in the wine industry.

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1. Introduction

The sustainability, especially in viticulture, has approached emerging themes, like: water use, air quality, energy use, the reduction of greenhouse gas emissions, and the human resources (Schimmenti et al., 2016). The wine industry is tied to activities guided by processes of sustainability (Lamastra et al., 2016). The International Organization of Vine and Wine (2004) defined sustainability as being a set of global strategies present in existing scales between the processing of grapes and the production systems by applying the concepts of sustainability and structural planning, with the goal of producing quality wines since the sustainability criteria as required by the companies cocktails, preserving the consumer's health, the environment, the historical and cultural heritage, as well as the wine and aesthetic (OIV, 2004).

The consumers of wine product introduced in their purchasing processes the criterion for the acquisition of drinks produced from sustainable practices (Benedetto, 2013). They are consumers of the product and services that engage in a chain aimed at reconciling the need for growth with the reduction of negative impacts that they may cause, when pursued without planning and care for the environment, with society and to the economy.

Ohmart (2008) points out in his studies that, increasingly, producers and consumers of wines are seeking a deeper understanding of the concept of global sustainability. This concept works by integrating people, planet, profit, the strategies of operations and the businesses processes involved in the segment. In the wine industry, this represents the cultivation of grapes for the production of wines through processes environmentally friendly, socially equitable, and economically viable (Pullman et al., 2010).

Few studies investigate how the deployment of sustainability practices contributes to improve the competitiveness of firms in particular in the wine industry (Gilinsky et al., 2015). There is the need of conducting research focused on sustainability practices and social policies, because these actions complement each other in the society in development, whereas the perceptions of performance of these within the agri-food supply chain (Pullman et al., 2009). Flores (2018) affirms that the works identified in the literature are focused on sustainable processes directed to the wine industry. This study aimed to analyze how the deployment of the sustainable management practices foster the competitiveness of businesses located in tourist destinations producers of ten wines from Southern Brazil, which features an emerging growth in the wine sector. This study found that this region does not have a totality of wine sustainable production, unlike South American countries like Argentina and Chile.

The main ideas that guide this research are represented by:

- The relevant contribution of the enotourism in strengthening the image of the destinations;
- The diversification in the provided product mix to the wine consumers;
- The implementation of the sustainability practices as a competitiveness factor of the wine industry;
- The representative studies on the competitiveness of the tourist destinations that have the wines as their main attractions;
- The diversifications of the investments made by the wine producers, which have as objective to ensure the efficiency of the sustainable processes in the Latin American wine industry.

The main results of the research regarding the use of sustainability in the environmental aspect point to organic viticulture use, waste treatment organic solids, thermal control with a focus in the treatment of pests, alternative sources of energy, and water reuse.

In the social and economic aspects the highlights are cooperativism, revenue generation, generation of jobs, and social responsibility actions, since the research points to the need for formal studies. The literature identifies some gaps that present frameworks that collaborate in the process of measuring the impacts of sustainability practices in the customer's perception.

The main limitation of the study is that it was conducted in a single destination. However, the research was carried out in the region of the greatest Brazilian relevance and in the future it can be expanded into other Brazilian and Latin American regions.

This paper begins with its central theme and objectives and it identifies some gaps found in the literature about the proposed research, in addition to the relevance of academic research performance. Then it involves the theoretical foundation structured on the basis of the constructs determined by the systematic literature review. Next the paper introduces the methodological procedures that will be used in this research. In this section, it is possible to identify the method that will be used in conducting the research, the strategies used for data collection, the structuring of the case study, and the regions that will be investigated. Then the paper shows the results, as well as the discussions about them. Finally, the paper presents the conclusions, limitations of the study, and suggestions for future research.

2. Theoretical foundation

Next, the paper presents the themes that comprise this research.

2.1. Viticulture sustainability

Santiago-Brown et al. (2015) claim that the grape production for wine making results in the harvest of the fruits more valuable in the world. For the authors, the viticulture is part of a complex chain that contributes to the rural area development with the preservation of the landscape with the consolidation of tourist activity.

The world market of wines has undergone great transformations in the last thirty years. These changes have occurred due to the increase in the number of producers of wines in a global perspective, to the growth of the wine markets in the new world, and to the change in consumer behavior of wines at world level (Fiore et al., 2017).

Some approaches are used to explain the complexity of the international market of wines, like geographical, economic, and territorial approaches (Demossier, 2011). The international wine trade is a complex industry, since the quality standard of wine goes to meet specific standards (different in each region) and to be marketed must meet specific requirements (Fulconis et al., 2014).

Bonn et al. (2016) point to the growing number of consumers interested in consuming sustainable products. For the authors, this trend is justified by the growth of the concern with the sustainable issues. Thus, there is an increase of consumption of wines produced via processes of sustainability in some countries, like Germany, the United Kingdom, Switzerland, New Zealand, Japan, and the United States (Bonn et al., 2016). Gázquez-Abad et al. (2015) point out that, in view of vineyards, sustainability is perceived by consumers as an important source of competitive advantage.

Pullman et al. (2010) enumerate the main environmental practices identified in the wine industry, like: reduction of pesticides, fungicides, and herbicides, water reuse, soil management, and treatment of solid waste companies. Corbo et al. (2014) corroborate by stating that, in addition to the environmental practices, the wineries must have the commitment to carry out the soil management properly, to preserve the landscape, to ensure the health and safety of workers, and to minimize the production impact in the community.

Southern Brazil accounts for 90% of the total production of grapes and wines in the Brazil, where according to the data of the Brazilian Agricultural Research Agency - EMBRAPA, in 2016 were processed 70,066, 205 thousand kilos of grapes, which resulted in a total of 103,389,64 thousand liters of fine wines and table wines (Embrapa, 2017).

The implementation of sustainability practices in the wine industry must meet some basic criteria that are directly related to the economic performance of the company, with the conservation of biodiversity and social inclusion. In recent decades, investigations on the theme of sustainability have emerged in a significant way. The paper presents next the main sustainability practices identified in the literature and implemented by the wine industry.

2.1.1. Reducing the use of pesticides

The conventional viticulture corresponds to one of the agricultural systems that consume more pesticides. The use in excess of pesticides in vineyards results in the formation of a systemic resistance to pests, affecting directly the fauna and the flora (Provost and Pedneault, 2016).

The top researches that seek to study the reduction of pesticides of the wine industry turned specifically to the following processes: pressing, stocking, clarifying, and filtering (Doulia et al., 2017). The use of pesticides and chemicals in the production of grapes is a common practice (Pertot et al., 2016). These authors also identify some advantages obtained from the planning and the reduction in the use of pesticides in viticulture. In Brazil some wine industries are substituting the pesticides and fungicides by a technique known as thermal control of pests.

2.1.2. Soil management

In addition to controlling the land, biological, hydrological, and geochemical cycles, soil management plays an important role in providing water and mineral nutrients to natural and agro ecologic ecosystems (Comino et al., 2016). In the vineyards, the soil interferes directly in the quality and quantity of grapes produced. Southern Brazil has a diversity of soils that allow the cultivation and the development of the vine (Fensterseifer, 2007).

Soil management corresponds to the implementation of various activities, which aim to prevent the degradation of its natural characteristics, enabling its exploitation on the basis of sustainable procedures (Embrapa, 2017). Ramos et al. (2015) argue that the erosion constitutes one of the greatest threats to wine production, once that cause a major loss of soil nutrients, resulting in economic losses and, consequently, in the degradation of the soil being that a socioenvironmental prejudice (Comino et al., 2016).

2.1.3. Practices for water reuse and reduction of water use

The researches that address the misuse of water in the wine industry have been the object of studies of Lionello et al. (2014). There is a gap in the literature cited by Costa et al. (2016), which indicates the need for investigations that provide strategies to optimize the resources within the wine supply chain. Costa et al. (2016) explain that, in particular in irrigation cases, water consumption in the vineyards will depend on weather conditions, so that the hotter and drier is the locality, the greater will be the consumption of this natural resource. Carrasquer et al. (2017) contribute in studies that show that the management of water resources becomes the big challenge encountered by the producers of wines (Laurenson et al., 2011).

2.1.4. Alternative energy sources

Mariani and Vastola (2015) explain that the processes of vinification absorb a great amount of energy. The authors suggest some alternatives that have been used by companies in the segment, with

the aim of reducing the amount of energy consumed, among them is the use of bottles produced with recycled glass, strategy that reduces the energy expenditure at the time of bottling of the wine. However, despite its proven efficiency, using this type of material becomes infeasible when identified high values of investments necessary for its implementation.

The use of clean energy is an alternative considered to reduce environmental impacts within a proposal for sustainable consumption (Yong et al., 2016). These authors confirm the importance of more detailed studies about the use and benefits of energy use and clean fuels.

Urbaniec et al. (2017) claim that several studies have evaluated the economic, energetic, environmental, and sociological aspects of replacing fossil fuels with renewable energy. There is an understanding on the part of some investigators that fossil fuels have a negative environmental impact (Urbaniec et al., 2017).

2.1.5. Effluent treatment

Hirzel et al. (2017) explain that the reuse of wastewater from processes carried out in vineyards represents the company's commitment to contribute to the reduction of environmental impacts within and outside the establishment. The need to prioritize the wastewater sustainable management from winery processes has been recognized by the companies in the segment and it is being widely discussed in the literature (Domínguez et al., 2014).

The systems of collections of waste waters are planned and managed with a focus on improving the quality of life of people, as well as in reducing the spread of disease. The creations of these sanitation systems have direct impacts on the society and environment (Cuppens et al., 2013), because the wine industry tends to produce a large quantity of wastewater that, in general, contains high concentrations of organic matter, which is difficult to degrade biologically (Wu et al., 2015).

2.1.6. Solid waste treatment

Stems or stalks, peels of grape containing pressed skins and seeds, cells of dead yeast and sediments, and soils of filtration are considered solid wastes for the wine industry elements. These residues can be recovered for the production of compost with high added value (Oliveira and Duarte, 2016). Toscano et al. (2013) identify a few studies which demonstrate the characteristics of various products that can potentially be produced from waste from the wine industry.

The use of composted organic in soils that grow the vine increases soil organic matter and, consequently, its structure, in addition to providing nutrients that directly interfere in the quality of the grapes produced, like nitrogen, potassium, and phosphorus (Melo and Garrido-Morgado, 2012). The sustainable development of the landscape, irrigation in agriculture, and especially the wine industry should be planned, taking into account the safe use of waste produced by the winery.

2.1.7. Organic production

The International Federation of Organic Agriculture Movements (IFOAM) conceives organic agriculture as a production system that protects the health of human beings, as well as seeking to preserve soil and ecosystems, eliminating from its processes the use any type of chemical. Organic agriculture is based on the optimization of the resources that contribute to the reduction of water, air, and soil pollution (Lobo et al., 2014). There is a need for more in-depth studies involving consumer perceptions about the consumption and production of organic wines, as well as studies that investigate the correlation between purchasing decisions and attributes that motivate the consumption of organic wines (Pomarici and Vecchio, 2014).

Studies show Brazil as the fifth largest organic producer of food and beverages, with significant growth of 20% in the last four years and moving approximately \$27.5 billion (Brasbio, 2017). Serra Gaúcha, south of Brazil, is the largest producer of organic grapes from Brazil. Between 2009 and 2013, its organic viticulture had a growth of 600%, being characterized by an activity of family farming and that currently has more than 500 families residing (Britto et al., 2016).

2.1.8. Cooperativism

Currently, the cooperativism is considered an economically viable alternative to the marketing of agri-food products like wine (Navarro et al., 2008). The cooperativism currently accounts for 21% of the production of grapes grown in South Brazil and ensures the processing of approximately 5000 families through the deployment of family farming, corresponding to 1/4 of the total production of grapes and wines produced in this region (Fecovinho, 2017).

Fonte and Cucco (2017) indicate lack of research showing the profile and the objectives of agri-food cooperatives of contemporaneity. These models of cooperatives, according to these authors are closer to the community and committed to social issues. Britto et al. (2016) argue that the cooperatives have specific characteristics that set them apart from the venture capital. With the objective of ensuring its competitiveness, cooperatives operate in order to provide products that suit the needs of the consumer. This marketing strategy is widely used in the industry in wine (Fonte and Cucco, 2017).

2.1.9. Enotourism

It is one of the segments that involve the tourism in regions where there is the production of wines. It is not a new practice in the world, but for Brazil, there is little more than two decades (Carrà et al., 2017). Its professionalization is, above all, in the search for sustainability of the sector and ways to produce the wine, a practice that tourists can follow when you visit the regions (Carrà et al., 2017). Enotourism can be recognized as a factor of sustainability that enables further economic socioenvironmental development of rural places. In Brazil, this activity has its largest index for the southern region (Barbosa et al., 2017).

To Hall and Mitchell (2001), the enotourism is an activity that involves visits to wineries, wine cellars or festivals of wines that offer visitors the opportunity to experience the attributes of the region where they are produced. Cho et al. (2014) claim this tourism became an important tool for economic development for rural localities.

Fig. 1 presents the main sustainability practices adopted by the wine industry identified from systematic literature review.

3. Methodology

The research uses a qualitative approach. It is an exploratory study of multiple cases with a systematic literature review. Voss et al. (2002) affirm that the use of the case study is indicated in investigations in which their detailing was not fully exhausted, being one of the most relevant search methods used in operations management. In addition, the case study allows the formulation of hypotheses, as well as the implementation of new research or research projects (Sellitto, 2018). The field research included ten companies. The companies of the cases are from a wine sector located in a wine producing region from Southern Brazil. These companies were chosen based on two criteria. The first criterion examined the economic representation of these companies for the region in which they are located. The second criterion took as a basis the choice of wineries accredited to the APROVALE - Association of Producers of Fine Wines from the Vale dos Vinhedos. Fig. 2 illustrates the methodological procedures planned for this research.

This study consists of site visits, following a semi-structured interview research protocol guide with 25 open and closed questions prepared from the constructs identified from the systematic literature review (viticulture, sustainability, competitiveness, and tourism). This review was conducted in order to identify gaps related to the theme presented in this research. The keywords were used in the English language; their goal was to relate to sustainability with the wine supply chain (Table 1) (see Table 2).

Two managers for each company were interviewed, totaling twenty respondents. The interviews were carried out in the period between December 2016 and March 2017. However, a pilot test was applied previously to three companies participating in the study, randomly chosen. This test aimed to make adjustments in the research protocol before the completion of the official visits for data collection. The data collection for this research made also use of the documentary analysis. Yin (2010) argues that the documentary analysis in case studies corroborates by enlarging the evidences that arise from other sources during the investigation.

To examine whether the deployment of sustainability practices fosters the competitiveness of businesses located in wine tourist destination producers, the qualitative data analysis was conducted using the previously determined constructs as drivers of this step.

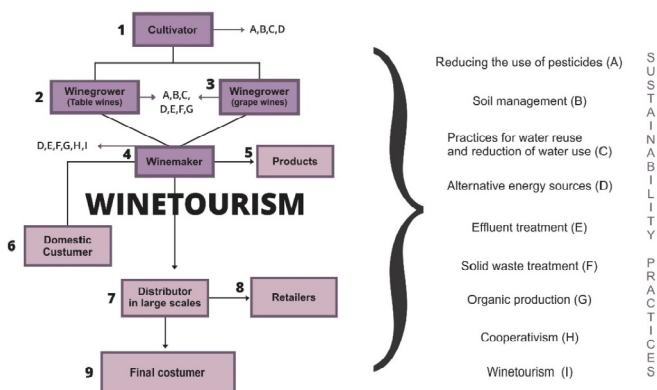


Fig. 1. Sustainability practices in the production chain of wine. Source: Adapted from Pullman et al. (2010).

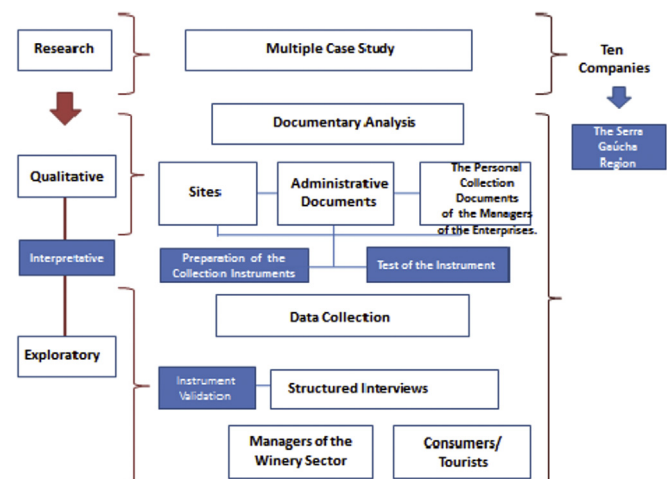


Fig. 2. Methodological procedures.

Table 1
Used terms in the literature review.

Used terms	Period
Wine Supply Chain and Sustainability; Wine Supply Chain and organic grapes; Wine Supply Chain and wastewater treatment; wine supply chain and Soil management; Wine Supply Chain and Alternative sources of energy; Wine supply chain and Water reuse; Wine Supply Chain and Cooperatives; Wine Supply Chain and soil management; Wine supply chain and Wine tourism.	From 2007 to 2017.

Source: Data from the research. The databases used were Science Direct, Emerald, and EBSCO. Table 1 presents the results obtained from the literature review.

4. Results and discussion

The interviewees recognize the potential of the region for development of tourist activity, as well as its relevance in some operations of their companies. The Company A executive director stated that in 2016 the company received approximately 100,000 tourists on the occasion of the enotourism activities. Company B counts in 2016 around 150,000 visits in its facilities. As small business, Company C receives visitors groups only previously scheduled and it does not have the focus of its activities in tourism, since the principal activity of the company is focused on organic production. However, they had about 6000 tourists in 2016.

Company D in 2016 received approximately 174,000 visitors to perform activities related to tourism. According to the supervisor of tourism of the company, there is an expectation to increase this public for 2017. The Company E executive director explained that currently the company works toward consolidating a market positioning by means of products and differentiated services. The company is looking for consumers of the classes A and B. On the basis of the strategies developed the company received in 2016 around 15,000 visitors.

The Companies F, G, H, I, and J by having the structure of small businesses, as well as of family-run companies, don't realize many investments which main objective is to capture visitors to enotourism activities. The focus of these companies is the marketing of the wines produced in their wineries. The number of visitors received in the year of 2016 was 3000 in each one of the mentioned establishments. Other relevant data identified in this research are

that these companies, even considered small businesses, are seeking to make investments to ensure that the deployment of sustainability practices is a reality in their establishments. This premise is similar to the literature reviewed of this study.

All of these companies operate in partnership with agencies and tour operators and they consider important the partnership. However, the Company B marketing analyst stresses that many tourists who visit it or purchase its packages are clients that go there through word of mouth. The Company B is considered the largest wine cooperative of Brazil. It has around 1300 members and it is economically the second highest revenue of the city of Bento Gonçalves, staying behind only the furniture industry.

According to the managers of the Companies G, H, and I, the year 2017 was marked by the implementation of the organic production in their establishments. The large investment made in these vineyards to viabilize the organic production generated a great expectation in these managers, who estimate introduce wines and organic juices in their mix of products in the year 2019. For the manager of the Company H, the deployment of organic farming is a reality. In addition, the next wine investments meet the deployment of sustainability practices geared to the production of biodynamic wines. The biodynamic industry is a reality in the countries of the Old World, where France was the pioneer in this process. In Brazil the number of wineries that develop the biodynamic production is still considered to be reduced.

All respondents pointed the importance of the relationship established between businesses and communities in the places where they are inserted. The Company A director stated that this relationship is the essence of the company as part of its institutional values. The Company B marketing analyst stated that the company operates together with the community to encourage tourism in the region. The Company C manager stated that the company operates together with the community by promoting actions that encourage the strengthening of awareness toward practice environmentally correct.

The Company A operates in the market in order to develop sustainable practices in its three dimensions: environmental, economic, and social. The company operates in the market with organic production. It was the first winery in Brazil to use natural gas as an energy source. It reuses water, has effluent treatment station, and performs the treatment of organic solid waste. All grape marc leftover are processed and transformed into environmental ration. Economically, the company operates in order to

Table 2
Summary of the results of the literature review.

Used Terms	Number of selected articles	Number of selected articles after reading the titles	Number of selected articles after reading the abstracts	Number of selected articles after reading the titles and the abstracts
<i>Wine Supply chain + Sustainability.</i>	5185	157	92	92
<i>Wine Supply chain + organic grapes</i>	1232	53	19	19
<i>Wine Supply Chain + wastewater treatment</i>	1936	51	25	25
<i>Wine Supply Chain + Soil management</i>	1159	31	10	10
<i>Wine Supply Chain + Alternative sources of energy</i>	2506	24	9	9
<i>Wine Supply Chain + Water reuse</i>	511	15	19	19
<i>Wine Supply Chain + Cooperativism</i>	12	5	4	4
<i>Wine Supply Chain + Wine Tourism</i>	1023	88	37	37
Final results of the systematic review	13,564	445	215	215

Source: Data from the research.

strengthen the brand image and to ensure economic growth in the region, regarding the social perspective. With the generation of jobs, the company ensures its commitment with the correct practices, with the accounts properly audited, and with payments of taxes, which guarantee it the second place in gatherings of taxes of the municipality.

The Company B marketing analyst explained that, in addition to the organic products produced, the company has infrastructure to capture solar energy in the hospitality of the enotourism. The interviewee also indicated that there is an organic garden with the majority of vegetables used in the kitchen of the restaurant of the enotourism. The Company C owner explained that almost all production processes carried out in the company are tied to sustainability. The company produces vegetables, wines, sparkling wines, juices, jams, and sauces all free of pesticides. Because of legal requirements to work with agroecology, it uses effluent treatment and it transforms the waste organic solids into fertilizers.

According to the Company D management system supervisor, a large part of the sustainability actions implemented by the company meets the social dimension, considered by the interviewee as the major concern of the company. The company operates in order to offer its employees and members benefits like health plan and study grants. Another concern of the company is directed toward the generation of jobs in its locality. Currently, the company employs 440 people in Bento Gonçalves. The company assumes the responsibility of promoting environmental education together with the community, it performs the proper management of waste, and it promotes community involvement in the separation and collection of agrochemical packaging.

According to the Company E director, it was a pioneer in Brazil in the deployment of the thermal control of pests in viticulture. The interviewee affirmed the company's concern with the deployment of social policies to help their employees. The company offers houses in its property to all its employees who have an interest to reside there together with their family members. The director stressed the importance of the company for the municipality of Pinto Bandeira once the winery is the largest generator of taxes of the city. The company's community commitment is ratified through the generation of jobs that it provides in the region.

All respondents said they do not have mechanisms to assess how sustainable practices developed by their companies are perceived by customers. However, there is a consensus among interviewees that there is a growing trend of environmental awareness on the part of consumers, as well as a major concern in the consumption of healthy products. The wine industry in the recent decades has sought to adapt to different transformations required by this market, in particular those that are directly linked to environmental issues, which are currently inserted in the pre-requisites considered by a new profile of consumers, when they decide to buy a particular type of wine or visit a winery. This new profile of consumers is presented in the studies of the authors [Benedetto \(2013\)](#).

The pursuit of these consumers for sustainable goods and products is based on the pursuit of values, benefits, and results as is pointed out in the researches of [Bond et al. \(2012\)](#). In this sense, [Cho et al. \(2014\)](#) (2014) suggest that tourism wine, in addition to creating a positive image of the brand, is also responsible for motivating visitors to observe, to assess, and to preserve the nature.

Among the sustainability practices that could be implemented in future projects were mentioned: the production of seed in the company itself and the production of snacks made from the leftover food that is not traded for not being within the pattern of consumption. This food represents up to approximately 30% of what is produced. The greatest limitation of the project was the financial aspect. Other factors of limitation were quoted as follows: the

technology, human and cultural resources, and the climate that interferes directly in the grape quality that is planted.

Companies A, D, and E have a store structured to receive visitors. In this shop the enotourists can purchase the main products of the companies, in addition to make a tour and to taste wines, sparkling wines, and juices. The wineries also receive groups for visitations in production areas with prior scheduling.

Among the mix of products related to tourism, Company B offers activities of enogastronomy, tours, and visitations to the grapevines in the harvest. The Company C owner stated that the great attraction of its property is organic farming. From this interest arises what the literature has drawn up as ecoenotourism, which corresponds to sustainable practices in tourism. The Company C guests can visit the vineyards, participate in the harvest, and know the processes of production of wines, juices, and organic sparkling.

The Company E directors explained that the activities related to the tourism occur during the whole year, having a greater movement during the period of the grape harvest between January and March. The interviewees stated that the company is available during the whole year to receive groups of visitors interested in knowing the property, as well as its products. The enotourism is recognized by the interviewees as a determinant factor in the process of economic and regional development of [Vale dos Vinhedos](#).

The interviewees reported that with the increase of public policies it is possible a magnification of sustainability practices, as described by [Berghoef and Dodds \(2011\)](#). From this perspective, the wine industry has sought tools that increase its competitive advantage. [Garcia et al. \(2012\)](#) argue that the deployment of sustainable management practices in this segment follows in ascending curve, consolidating itself as a strong tendency in this supply chain. The results of the research showed the main sustainability practices that have been adopted in the wine industry: the use of organic culture and the treatment of waste organic solids and its reuse, sometimes being transformed into fertilizers and at other times being reused as organic feed. These practices meet the studies of [Berghoef and Dodds \(2011\)](#) who identify as being the main sustainability practices in a global perspective.

The researched companies are worried about the possibility of using alternative sources of energy in their processes. One of the companies studied has been making use of natural gas and another has used solar energy in part of the infrastructure for the practices of tourism. These results confirm the research studies of [Urbaniec et al. \(2017\)](#) that suggest the need of using alternative sources of energy in the process. The processes that involve the use of water also appear in the list of the main sustainability practices used in the wine industry. One of the companies studied performs the reuse of rain water to perform the irrigation of vineyards.

The results confirm the studies of [Gabzdyllova et al. \(2009\)](#) that suggest that the success of the deployment of sustainable practices in wine depends on processes of irrigation of good quality and that, in general, the vineyards typically use a lot of water to make irrigation, cleanliness, and sanitation of the vineyard. For the authors, the reduction of water consumption is one of the most important in the wine industry.

The wine industry in recent decades has sought to adapt to different transformations required by this market, in particular those that are directly linked to environmental issues, which currently are inserted in the pre-requisites considered by a new profile of consumers, when they decide to buy a particular type of wine or visit any specific winery. This new profile of consumers is presented in [Benedetto \(2013\)](#).

The practices that involve soil management are carried out in all the researched companies. These practices are demanded by the Brazilian law for companies that work with organic production. The

units researched have various certifications which attest their commitments to sustainable production and the environment. McEwan and Bek (2009) claim that the certifications given to companies become competitive advantages for the same and that tend to be recognized by consumers.

The research identified organic production as the main practice of sustainability adopted by companies researched. All the companies that participated in this study produce wines, fruit juices, and organic sparkling. Stolz and Schmid (2008) point out in their research that organic wine is regarded by consumers as being the healthiest in the world; in this sense the organic production in viticulture becomes an important tool for competitiveness.

Finally, the research found that the enotourism emerges as an important economic activity promoter of economic and regional development in various locations. All companies who participated in this research work in order to promote, encourage, and develop the enotourism. The enotourism stimulates tourism, contributes to the retention of relations between company and customer, strengthens the institutional brand, and facilitates the marketing of products of companies involved (Hall et al., 2002), which directly contributes to a sustainable development process. The enotourism is recognized worldwide as an economic activity that allows the economic and regional development of locations with potential for tourism or not, which have the wine production as their only attraction. This premise is confirmed by the research studies conducted by Carlsen and Boksberger (2015). This study demonstrates the need for a constant environmental socioeconomic joint in the processes of wine supply chain, because this is predominantly given by a family farming and cooperatives, which depend on this production for subsistence of their small enterprises and that the set of actions has an impact on sustainability.

5. Conclusions

This research presented the study of sustainable practices in the wine industry. The viticulture has been considered a green industry at the world level; therefore, the literature has presented several studies that seek a better understanding of the use of sustainable practices in this segment. This research analyzed the various sustainable practices developed in companies related to the wine industry located in Southern Brazil.

The main contributions of the study corroborate the theoretical framework presented in this research, when they point the main sustainability practices employed in the wine industry, regardless of the size of the enterprise. Another contribution of this study points to the need for formal studies that present frameworks that collaborate in the process of measuring the impacts of sustainability practices in the customer's perception. The research contributes in managerial level showing to the wine industry managers a study about the implementation of sustainability practices and their contributions to the increase of the competitiveness of the segment. Finally, the study contributes by presenting recent figures regarding the number of travelers received by the region of Vale dos Vinhedos in search of activities linked to enotourism. The figures obtained corroborate the importance of the economic activity in the process of regional and local development.

To generalize this research, future studies with the theme sustainability in the wine industry could involve a larger number of companies, as well as comparative studies between companies located in different wine regions in the south of Brazil and later expanded to other countries with similar environmental factors.

The limitations of this study are connected to the difficulty of obtaining primary data from the enterprises researched since a large part of the surveyed companies does not have mechanisms that control, store, and provide these data. Another limitation

identified in research meets the difference in infrastructure and in production capacity of the companies enrolled in the study, which makes more difficult the comparison and analysis of the data relating to these companies. The lack of sustainability specialists working in specific sectors of the wineries is also considered a limitation. Many times it is difficult to find professionals who can contribute to the process of data collection. Finally, Brazil has a very big territorial extension and the wineries are located mostly outside the urban areas, requiring a large amount of time for researchers to conduct travel.

Acknowledgements

The authors would like to thank the ten companies that participated in this study.

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