

Article

Environmental Sustainability in Viticulture as a Balanced Scorecard Perspective of the Wine Industry: Evidence for the Portuguese Region of Alentejo

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Abstract: The traditional four-perspective Balanced Scorecard (BSC) model is suitable for a wide variety of organizations. Other dimensions of analysis can be carried out and other perspectives can be considered in each BSC, depending on the specific characteristics of each organization or industry. This paper presents evidence that justifies and validates the inclusion of a new perspective: ‘environmental sustainability in viticulture’ in a BSC that has been developed for the Wine Industry of the Alentejo Region (Portugal) for 2021–2030. The research was performed according to the exploratory sequential design method, which combines in vivo (interviews and questionnaires) and in vitro (literature review and secondary data) research. The content analysis technique, supported by the NVivo software, was used to treat and analyze the data obtained from the interviews, to discover the explicit meanings of the interviewees’ speeches. A principal component analysis and a set of statistical analyses were performed to support the identification of perspectives to be considered in this industrial BSC. The results suggest that environmental sustainability (in viticulture) should be considered as a new strategic perspective to be included in the BSC, with a focus on future certification of environmentally sustainable production (grapes, wine, and wineries). The new perspective represents the competitive challenge of environmental sustainability and enhancement of endogenous resources for the Alentejo Wine Industry, as well as for other wine regions that share the same challenges and concerns. The results also offer an opportunity for competitive benchmarking for companies, industries and governments that operate in similar situations.

Keywords: strategic management; Balanced Scorecard; wine industry; sustainability



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1. Introduction

Many organizations fail to implement their strategies [1–7], mainly due to the difficulty in translating the strategy into operational terms [1,2,8–11]. It is therefore necessary to create and improve the instruments and mechanisms that allow the strategy to be implemented and communicated correctly. The international literature widely recognizes that the management accounting and control system (MACS) is the main mechanism responsible for strategic implementation [5,11]. In this context, models and tools such as the Balanced Scorecard (BSC) have been adopted by most organizations to strategically manage their performance [2]. The BSC was initially presented as a performance measurement system with a preeminent role in the strategy implementation [12], later evolving to a strategic management system [13,14]. Nowadays, it is also recognized as part of MACS that supports the strategy implementation and facilitates their translation into goals and targets [3].

The BSC is a model that assists to translate strategy into operational objectives that guide behavior and performance, allowing for the identification of good management practices and guiding the management of organizational change in a continuous improvement

process. The four original perspectives of the model are: financial (mainly in the interests of shareholders, creditors and the State; interests are mainly of financial); customer (identifies the customer segments and markets in which the organization will compete and the attributes valued to achieve the desired financial performance); internal processes (identifies the processes at which you must excel to create value); and, learning and growth (building the fundamental competences for the organization to compete and create value in the future) [9]. Businesses, industry, government institutions, non-profit organizations, among others, use the BSC as a cohesive strategic planning system for performance measurement and aligning organizational actions to translate vision and mission into goals and targets. Moreover, it is a helpful tool to increase internal and external communications and to look after sustainable development [15]. Despite the potential and real contributions of the BSC for strategy implementation, the issue of sustainability needs to be better explored within the modern concepts of performance assessment systems, in line with [16–18].

Sustainability is increasingly recognized as a strategic theme for organizations and industries [7,19–22]. Sustainable development was defined in the United Nations Gro Harlem Brundtland Report [23] as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Therefore, joint efforts should be made as soon as possible to build a sustainable and safe future for all people and the planet as a whole. It is important to promote and support sustainable development by managing natural resources and ecosystems and the entire environment including people [24]. In Portugal, the 2014–2020 Rural Development Program states that the rural development strategy is based on three operational objectives, one of which is sustainability, to promote good practices and sustainable use of resources and valuing rural territories [25]. The Strategic Plan of the Organisation Internationale de la Vigne et du Vin (OIV) for 2020–2024 also considers the promotion of an environment-friendly viticulture as a strategic vector [26], highlighting the concern with the challenges of climate change, the production methods and the use of natural resources for the sustainability of wine-growing territories. In Portugal, this concern is also recognized by the Ministry of Agriculture.

Sustainable development and ecological security factors are key factors that play a particular role in implementing the concept of sustainable development in agriculture [24]. Viticulture is one of the most intensive agricultural systems. As intensive agriculture threatens the environment, there are growing interest in the concept of sustainability in the wine industry, as well as in new businesses opportunities, as customers begin to pay more attention to environmental and sustainability issues [27]. Sustainable viticulture corresponds to a global strategy in the scale of production and processing systems for grapes, which combines both the economic sustainability of structures and territories with the achievement of quality products, considering the demands of precision viticulture, the risks related to the environment, the safety of the product and the health of consumers and also the enhancement of heritage, historical, cultural, ecological and landscape aspects [28]. The term sustainability has already been accepted by a large number of winegrowers and will continue to become even more widely accepted, given the recognition that vineyards can both benefit from, and contribute to, biodiversity conservation and ecosystem service provision, as consumers increasingly appreciate wines produced under environmentally friendly farming practices [27,29,30].

International literature points out that the integration of strategic information of a social and environmental nature in the BSC can be carried out in several ways: (i) through strategic measures of results or performance drivers focused on sustainable aspects, above all from the perspective of internal processes; (ii) integrated into traditional perspectives, by including environmental indicators focused on topics related to sustainability; (iii) including an additional perspective focused on sustainability and environmental management; or, on a specific scorecard of a department with environmental attributions and competences (e.g., Brignall [31]; Butler et al. [32]; Pravdic [33]; Quesado et al. [34]; Fulop et al. [35]; Hansen & Schaltegger [36]; Monteiro & Ribeiro [37]; Rafiq et al. [38]). However, the empirical results obtained on the subject are inconsistent and/or inconclusive, leading

to the formulation of criticism or the absence of theorization. Moreover, there is a research gap on the use of the BSC integrated with sustainability, especially because little is known about this perspective from a sectoral (industrial) point of view.

In this way, the main objective of this paper is to present evidence that justify and validate the inclusion of a new perspective: 'environmental sustainability in viticulture' in a BSC that has been developed for the Wine Industry of the Alentejo Region (Portugal) for 2021–2030.

Besides contributing to reducing the gap mentioned above, this study highlights the effective integration of sustainability as a sector performance indicator, opening new avenues for future investigation. The inclusion of this perspective comes from the need to increase the added value of the Alentejo Wine Industry (AWI), preserving natural resources for future generations and focusing on future certification of environmental sustainability in viticulture, simultaneously disclosing the effective integration of sustainability as an industry performance indicator and thus, offering an organizational and competitive alternative for evaluating business and industrial development on a sustainable basis.

The structure of the paper is as follows: the next section presents a summary of the state of the art of the BSC, with a focus on its application to other realities (such as an industry) and the inclusion of additional perspectives. The research methodology is presented in Sections 3 and 4 presents and discusses the results. Finally, Section 5 presents the conclusions, the main limitations of the study and the avenues for future research.

2. Previous Research and New Directions on Balanced Scorecard

The analysis of previous research reveals that the BSC evolved from a performance assessment system to a strategy assessment system and, later, to a strategy management system, a strategy communication and alignment system and a change management system. New concepts emerge ('strategy focused organization', 'strategic map' and 'strategic management department') making the BSC saw as just a performance and strategy assessment system, but rather as a strategy and change management communication system, focused on communicating strategy and aligning individual and team goals with corporate strategy. The last update of the model appears in 2008 with its diffusion as an integrated management system, emphasizing the integration of the operational and strategic plans, thus linking operations to strategy [2,9,39–41].

The scope of application of the BSC has been expanded in recent years and the model has been adapted to specific contexts: the Brazilian industry [42], the economic strategy of a country [43], the Protocol Training Centers of the Employment and Professional Training Institute in Portugal [44], or cities such as Charlotte (USA) [39,45,46] and Newcastle City Council (UK) [47]. Perhaps the greatest advantage of using the BSC is that it places strategy, structure and vision at the center of the concerns of management teams, compelling them to think beyond the short-term financial perspective, grouping into a document a set of financial and non-financial measures that provide a comprehensive, fast and accurate view of the organization's performance from different perspectives. Several authors point to other merits, such as the explanation of the strategy; the improvement of communication, strategic alignment, planning and allocation of resources; the development of feedback and strategic learning; and the flexibility of the model so that it can be adapted to the specific requirements of each organization [3,8,9,38,39,48–51]. Thus, opening up possibilities for adaptations to new realities and competitive demands of companies or even industries.

The four traditional perspectives of the BSC should constitute a reference for its construction and are suitable for a wide variety of companies and organizations from various sectors of activity (including public organizations). Other dimensions of analysis (perspectives) may be included in the development of the BSC, depending on the specific characteristics of each organization (or a sector of activity) and the strategy that was outlined [9,52–54], such as perspectives related to the community and workers, and more recently to the environment and sustainability [33–37,55,56]. It should be noted that most environmental and social issues are not supported in a financial dimension, but influence

the long-term performance of organizations (and sectors of activity), which justifies that several authors point to the BSC as an adequate tool to explain and relate issues in the field of sustainability (e.g., Hansen & Schaltegger [36]; Rafiq et al. [38]; Epstein & Wisner [57,58]; Rohm & Montgomery [59]).

In this context, several models emerge that enable the integration of environmental information in a BSC: the Environmental Performance Management and Assessment System developed by Campos and Selig [60], in which this methodology is used to promote the integration between environmental and critical and strategic issues, highlighting the environmental issue as critical to organizational success; the Sustainability Balanced Scorecard, which is an approach focused on improving the integration of environmental, social and economic aspects of measuring and managing the sustainability of organizations (cf. Möller & Schaltegger [61]; Schaltegger & Wagner [62]; Hristov et al. [63]; Ferber Pineyrua et al. [64]); the theoretical model of Gimeno et al. [65], focused on the pursuit of financial goals without neglecting sustainable development goals, with the purpose of creating global value and improving economic, social and environmental performance; and, the theoretical model of Claver-Cortés et al. [66], in which the BSC appears as an instrument that allows providing environmental information for the development of internal activities and for knowledge of the requirements of the society, allowing the definition of the organization's environmental vision and mission.

Both academics and practitioners consider the BSC an appropriate tool to account for sustainable issues, since the use of sustainability indicators could contribute to the survival and growth of a company in the long term, improving its performance [63]. More than that, the international literature (e.g., Jordão et al. [5]; Jordão et al. [11]; Ferreira & Otley [67]; Lueg & Radlach [68]) widely recognizes not only the central role of MACS in strategic implementation; or the relevance of management, performance assessment and control strategies for the organizations' sustainability and healthy (e.g., Jordão et al. [11]; Gupta et al. [69]), as well as the contribution of the BSC as an important MACS tool capable of supporting the integration of sustainability in the implementation of strategies for different types of organizations and sectors (e.g., Curado & Manica [70]; Butler et al. [32]; Bohm et al. [54]; Epstein & Wisner [57,58]; Hristov et al. [63]; Bieker [71]). Therefore, this issue not only opens up the possibility of adapting the BCS to new realities, in line with what was originally proposed by Kaplan and Norton [12–14], but also offers the basis for the proposal outlined in this paper.

3. Research Methodology

The research followed the exploratory sequential design method [72–75], which is a multi-method approach that articulates qualitative and quantitative analysis of an applied, descriptive and exploratory nature regarding the objectives and procedures used. The use of mixed methods is common in social sciences as the selection of just one method is often insufficient to guide all the procedures to be developed during the research [76]. According to Borowski [77], mixed methods have been adopted, accepted and used in management sciences and across the broad spectrum of social sciences for several years. It is assumed that the use of a combination of qualitative and quantitative methods provides the possibility of greater flexibility in undertaking research, generating better supported arguments based on research data and greater importance for a wider range of stakeholders. In this study, the collection of qualitative data (interviews) preceded the collection of quantitative data (questionnaires). Methodologically, two sequential approaches are considered:

Qualitative research. In the present study, an interview was carried out with nine stakeholders who were identified through prior stakeholder analysis. AWI Stakeholders have a lot of influence (direct and/or indirect) and interest in the functioning and pursuit of the AWI's global vision, acting as partners that politically frame the action, are complementary in the execution of policies and interventions and/or intervening in the wine value chain (producers, processors, distributors, traders or final customers/consumers). In this sense, the interviewees were selected according to their main attributions, competences and

influence in the Wine Industry of Portugal and interest in the pursuit of the AWI's global vision. The sample included high-level representatives from the Institute of Vine and Wine, Alentejo Wine Commission (AWC), Alentejo Wine Growers Technical Association, Ministry of Agriculture Planning, Policy and General Administration Office and ViniPortugal. The sample also includes representatives from two winemaking cooperatives and two private producers (whose identities are not revealed here to preserve anonymity). The sample is non-probabilistic, as it includes members of the population who were chosen according to specific research criteria.

Thus, on the one hand, the interview had an exploratory nature, to obtain different but complementary data on the topics under analysis and to better understand the problem under study. On the other hand, it supported the development of a quantitative instrument (questionnaire) to be applied to the different EAs. The interview was individual, face-to-face, semi-structured and in depth, with a pre-test to the interview script. Data were analyzed using content analysis, using the NVivo software (version 12), to discover the explicit meanings of the interviewees' speeches.

- Quantitative research. In the present study, data were collected through a questionnaire survey. The questionnaire was developed based on the literature review and the strategic diagnosis of the AWI, as well as on the information collected from the interviews that were carried out and the subsequent qualitative content analysis. The questionnaire was sent electronically after its structure had been validated through a pre-test to a group of experts. The questionnaire was answered by 102 EAs, representing 25.56% of the target population. To identify the perspectives to be included in the BSC, a principal component analysis (PCA) with Varimax orthogonal rotation was performed using the SPSS (version 24.0). The quantitative analysis was complemented with other statistical analyzes.
- The application of the PCA to question 14 of the questionnaire (What strategic themes/areas should be assessed in the AWI?), sought to support the identification of perspectives to consider in the development of the BSC for the AWI. That is, the items that constitute this question were included in the PCA to determine the components that would correspond to the perspectives to be considered in the BSC for the AWI. This is why there is an equivalence of the factors of the final PCA solution (five factors) to the BSC perspectives (five perspectives) considered in the development of the Strategic Map for the AWI.

The option for the mixed research methodology, namely the use of the sequential exploratory method, also considered the possibility of data triangulation (use of two or more independent data sources), allowing to increase the validity and credibility of the research results. The use of this research methodology is original, since studies applying the BSC methodology usually use a single method—qualitative (based on interviews) or quantitative (based on questionnaires). The research is thus reinforced as different but complementary perspectives on the same topic are obtained, providing greater robustness to the results. Nevertheless, before the field study, the state of the art on the subject was mapped, seeking to raise the most relevant studies on the topic in recent decades.

It is important to mention that, in 2016, the International Federation of Wines and Spirits (FIVS) in conjunction with the OIV published the 'Global Wine Producers Environmental Sustainability Principles' (GWPESP), a document that encourages the implementation of environmental sustainability plans that are financially viable and simultaneously aligned with the requirements of environmental and social sustainability [78]. In the world context, several viticulture sustainability plans have been developed. These plans are the result of national or regional initiatives from pioneering countries in the approach to sustainability in viticulture and have adopted the guiding principles of GWPESP aligned with the strategic objectives of increasing wine exports, which are disclosed as good sustainability practices on the FIVS website.

The Alentejo Wine Sustainability Plan (AWSP) was developed in 2015, adopting many of the sustainability guidelines of the OIV and FIVS, as well as the initiatives of

the Sustainability Plans mentioned above. AWSP is a pioneering initiative in Portugal promoted by AWI whose content was developed by winegrowing specialists belonging to several entities in Alentejo (the University of Évora, Technical Association of Alentejo Winegrowers and EAs), representing a collaborative effort for innovation in the Alentejo Region (and in Portugal). The program started with 91 members and by December 2020 had reached 428 members [79]. It is aimed at grape and wine producers in the Alentejo Region and works in a network with research and higher education institutions and with various regional and national bodies. The objective of the program is to increase the competitiveness and ensure the sustainability of Alentejo wines, providing its members with self-assessment tools as well as recommendations aimed at increasing best practices in Alentejo winemaking.

Similarly to other regions of the world, the viticulture activity in Alentejo (Portugal), has a high economic, social and cultural importance. With eight sub-regions entitled to Controlled Designation of Origin (CDO), Alentejo is one of the largest Portuguese wine regions, with 23.3 thousand hectares of vineyards, corresponding to about 12.30% of the total Portuguese wine-growing area. Alentejo is the second-largest wine production region, considering the volume production criterion, taking the lead in the national market, both in terms of market share in volume and in value, in the category of bottled wines with CDO classification. In the 2020 campaign, wine production reached a volume of 113 million liters, although the sales of 'Wine from Alentejo' have decreased by 15.9% (−5 million liters), amounting to 53 million euros (−28.4%). Total sales in 2019 amounted to 74 million euros −25% of production was exported, mainly to non-EU countries [80,81]. As for its business structure, three quarters of the companies in this industry are micro-enterprises and 70% of small and medium-sized companies generate 70% of the turnover [82,83]. These characteristics reinforce the importance of the studied context and highlight the results and conclusions obtained.

4. Results and Discussion

The importance of vines and wine in Alentejo (and in Portugal) is not limited to their economic dimension. In recent decades, the AWI has been modernized, creating stricter regulations to guarantee the typicality of wines, adopting more environmentally-friendly cultural practices and more controlled wine-making technologies, which significantly improved the quality of the wines. The AWI has defended and adopted environmental practices that contribute to the preservation of the environment and the conservation of resources (water, soil, grape varieties, energy) and a more sustainable and competitive agricultural production. It has contributed to boosting the socio-economic development of an entire region. It has also focused on differentiation, implementing the AWSP in recent years and disseminating the guiding principles of its Environmental Management System [84].

The 2021–2030 Strategic Map for the AWI, whose structure and cause-effect logic are shown in Figure 1, was built based on a methodological procedure that included the following steps: (i) literature review, (ii) content analysis of interviews conducted with the main AWI stakeholders, (iii) PCA applied to question 14 of the questionnaire, and (iv) analysis of the responses to the questionnaire.

Two axes of orientation and strategic action were identified: (i) increase the capacity to generate added value in the industry (valuing the product and internationalizing the wine, in close articulation with the territorial brand 'Alentejo') and (ii) efficient management and protection of natural resources (improving the efficiency in the use of resources, protecting the region's specific natural resources, acting on climate change and valuing the winegrowing territories of Alentejo—resources that can underpin product differentiation and strengthen the brand 'Alentejo Wines'). There is a need to develop support actions, which include the qualification of human resources and convergence of scientific knowledge systems of economic units to generate more knowledge and innovation in the industry (in terms of grape production, wine production and wineries).

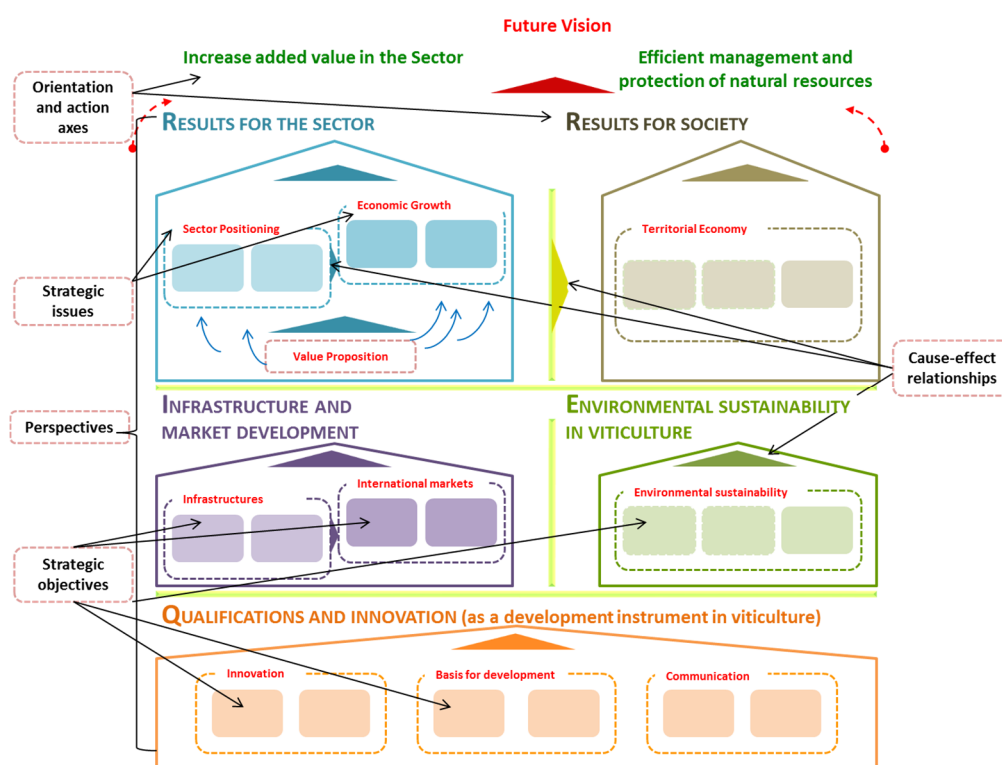


Figure 1. Structure of the 2021–2030 Strategic Map for the AWI.

It is still necessary to improve individual communication (the effort that each EA has to make to promote their brands and the quality of their product nationally and internationally), as well as institutional communication (improving communication at the level of the Alentejo region, promoting Alentejo as a region that offers a diversity of quality products; improve communication and sales techniques aimed at international markets; improve internal communication between the various players that make up the AWI; and associate brands with the development of the territory).

The content analysis performed on the interview responses was microscopic, that is, line by line, in the search for meanings and interpretations of the data. After the emerging categorization of the data, it was possible to carry out a set of procedures (word frequency distribution, word cloud, most frequent word cluster and word similarity cluster), which allowed the identification of a strategic concern on the part of the AWI Stakeholders with sustainability, whether directed towards aspects related to the adequacy of production methods, the efficient use and protection of natural resources, and the emerging issue of climate change (environmental sustainability); or related to the sector's development and positioning, such as the enhancement of wine and the 'Alentejo Wines' brand and internationalization (business sustainability). Environmental and business sustainability must be developed harmoniously, considering the aspects of quality, innovation, communication and exports in the industry. Specifically, the words 'sustainability' and 'work' appear as one of the most frequent words in the respondents' narrative (and stand out in the cloud model of the 50 most frequent words); the words 'sustainability', 'communication' and 'working' appear in the same subgroup, showing similarity in the interviewees' speeches (cluster of the 25 most frequent words); additionally, the cluster analysis by word similarity, using the Jaccard Coefficient as a criterion, show strategic lines to be adopted in the AWI in the short and medium term, with emphasis on the need to improve the exploitation of the region's natural resources by mobilizing the EAs to the new paradigm of sustainability (especially environmental in the face of climate change). The results of the qualitative content analysis therefore show a growing concern on the part of industry players for the need to consider the integration of environmental issues into industry strategies. Results

that can contribute to the construction of an integrated territorial and systemic vision in the AWI for the period 2021–2030 aimed at the perspective of environmental sustainability in viticulture.

We believe that the main issue that should guide AWI's performance in the short and medium term was identified: 'how to sell more and better?'. To address this issue, four axes of guidance and strategic action emerge that must be worked on by 2030:

- Improve communication (between players, for national and international markets, more and better promotion to recruit new consumers and markets and a strong connection to the territory and the 'Alentejo' brand) and quality (especially of certified products, working in the dimension of quality perceived by consumers);
- Increasing exports through internationalization (in volume and value), and improving the internationalization process, exploring new markets and products (diversifying the offer, differentiating the product and identifying global consumption trends);
- develop sustainability in Alentejo viticulture (mobilizing producers throughout the industry to adhere to the AWSP and adopt strategies that ensure sustainability, highlighting a potential 'environmental and social contract' for future generations in this industry), with growing concern for climate change;
- increase the average value of 'Alentejo Wineshor (better valuation of the product and the territorial brand).

The result of the PCA includes an adaptation of the original structure by Kaplan and Norton. The perspectives of the BSC are grouped differently and with specific adaptations (content and name different from those commonly used) considering its application to an entire industry. Two new perspectives were considered, in line with several authors: one on aspects of environmental sustainability (in Viticulture) [31–37,42,56,71,85,86] and other concerning results for society [31,33,52,87].

The traditional financial and customer perspectives gave rise to the 'Results for the Sector' perspective, which consists of two strategic themes ('Sector Positioning' and 'Economic Growth')—and is adjusted to the value proposition for customers and the objectives of the AWI, reflecting the objective of the EAs operating in the industry to consolidate their leadership in the segment of certified wines in the national market, and thus increase their competitiveness and profitability. The perspective of 'Infrastructures and Market Development' (consisting of two strategic themes—'Infrastructures' and 'International Markets') focuses on improving infrastructure, boosting and exploiting the region's wine heritage, as well as processes related to the increase in export capacity that leads to a generalized increase in sales. The 'Qualifications and Innovation' perspective, consisting of three strategic themes ('Innovation', 'Bases of Development' and 'Communication'), highlights the importance of innovation, education, training and communication for the sustainable development of the industry.

Finally, two new perspectives are added: 'Environmental Sustainability in Viticulture', consisting of a single strategic theme ('Environmental Sustainability'), as a result of the need to increase added value in the industry while preserving natural resources for future generations and focusing on future certification of sustainability in viticulture (grapes, wine and wineries); and, a perspective focused on 'Results for Society', consisting of a single strategic theme ('Territorial Economy'), which emphasizes the importance of efficient management and protection of natural resources to promote the socio-economic development of the AWI (and a systemic development of the entire Alentejo region).

As a result, the proposed model consists of five perspectives: 'Results for Society'; 'Results for the Sector'; 'Infrastructures and Market Development'; 'Environmental Sustainability in Viticulture'; and, 'Qualifications and Innovation' (see Figure 1).

The perspective of 'Environmental Sustainability in Viticulture' was defined in light of the result of the PCA. The 102 responses to question 14 of the questionnaire (Which strategic themes/areas should be evaluated in the AWI?) evidence the growing concern of the industry EAs with the promotion of the rational use of natural resources and

their preservation, corresponding to the environmental sustainability strategy that is also outlined in the AWSP.

One of the five factors in the final PCA solution (factor 3) identifies three areas to be assessed in the AWI, all related to the environmental sustainability of Alentejo wines: (i) promoting the rational use of natural resources (variable Q14.6); (ii) aligning production methods with the preservation of natural resources and biodiversity (Q14.5); and, working on the sustainability certification process (Q14.31). More than 51% of respondents to the questionnaire reported that they fully agreed with these three issues as strategic areas to be assessed in the AWI (see Table 1).

Table 1. Areas to be assessed in the AWI according to the EAs.

Strategic Areas to be Assessed	Absolute and Relative Frequency					Total
	1	2	3	4	5	
Aligning production methods with the preservation of natural resources and biodiversity [Q14.5] (ii)	0	1	3	43	55	102
	0	0.98%	2.94%	42.16%	53.92%	
Promoting the rational use of resources [Q14.6] (i)	0	0	4	32	66	102
	0	0	3.92%	31.37%	64.71%	
Working on the sustainability certification process [Q14.31] (iii)	0	1	11	37	53	102
	0	0.98%	10.78%	36.27%	51.97%	

Notes: 1—Strongly disagree; 5—Strongly agree.

When interviewed, stakeholders identify environmental sustainability as a fundamental dimension for the industry to achieve medium and long-term goals. Eight stakeholders (89%) referred to objectives directly related to the promotion of the sustainable use of natural resources. Five respondents (55.5%) advocate a certification of sustainability in viticulture for Alentejo wines. The objective of ensuring the adherence of producers to the AWSP (variable Q13.4) was indicated by 45.10% of respondents to the questionnaire, while 96.08% of respondents agree that it is necessary to evaluate the implementation of production methods that contribute to the conservation of natural resources and preservation of biodiversity (variable Q14.5). Thus, this variable (Q14.5) was converted in the objective ‘Implement and develop the AWSP’ (ii.a) to simplify the construction of the strategic map and to consider the relevance that the WASP has in the transformation of the AWI towards an environmentally sustainable viticulture [88] (see Figure 2).

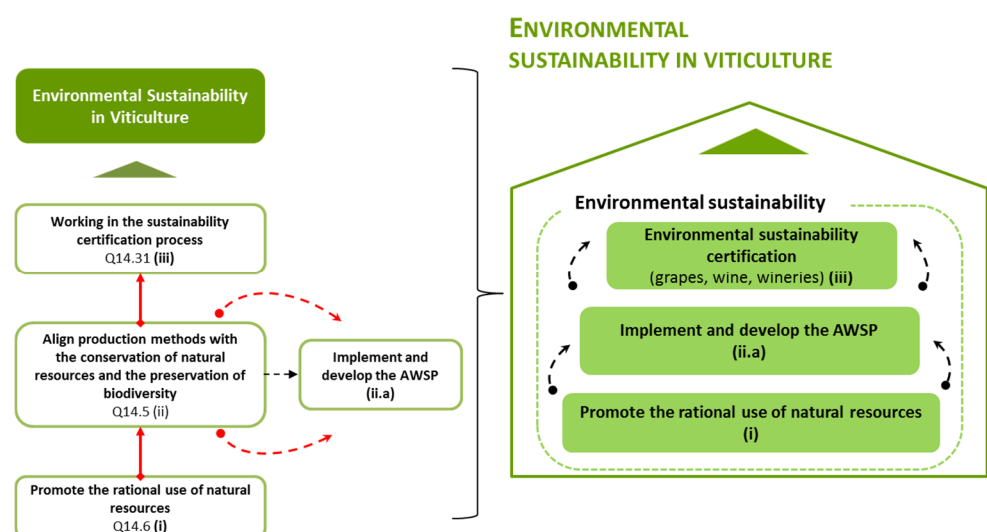


Figure 2. Environmental sustainability in viticulture.

The three objectives of this perspective were organized under a single strategic theme—‘Environmental Sustainability’—and corresponding cause-effect relationships were defined

(see Figure 2). In general, sustainability comprises three major objectives: environmental protection, economic profitability and social equity [89]. For this author, the wine industry has been fundamental in the implementation of sustainable practices, assuming a leadership role in sustainable agriculture. Like other wine regions in the world, the AWC have decided to develop a sustainability plan for Alentejo Wines [90], providing members with an instrument to assess how they currently develop their activities, making recommendations to increase competitiveness and the sustainability of 'Alentejo Wines' [91]. The issue of communicating sustainability, in different channels, is crucial to promote involvement and to evaluate sustainable strategies and practices [92]. Given the results obtained in the study, it is possible to conclude that the inclusion of a perspective of environmental sustainability in viticulture in the Strategic Map is fully aligned with the concerns of the EAs working in the AWI and with guidelines issued by the AWC, the Ministry of Agriculture, the OIV and by the United Nations [23,25,26,93]. Figure 2 outlines the objectives mentioned above, structured in this cause-effect relationship.

Figure 2 outlines what was discussed above, in which the efficient management and protection of natural resources is one of the strategic objectives of the industry with a view to a future certification of environmentally sustainable production of Alentejo wines. Sustainable environmental development in this industry requires long and hard work. The first step is to make all EAs aware of the rational use of natural resources in the Alentejo region. The AWSP's sustainability strategy [90] is aligned with the concept of circular economy [91], a strategic concept based on the reduction, reuse, recovery and recycling of materials and energy. Replacing the end-of-life concept of the linear economy with new circular flows of reuse, restoration and renovation in an integrated process, the circular economy is seen as a key element to promote the decoupling between economic growth and increased consumption of resources. The focus continues to be on enhancing the product, incorporating more and more attributes of environmental sustainability in 'Alentejo Wines' and associated services, looking for differentiated products to attract new market segments. Thus, environmental sustainability must be seen as a medium/long term strategy for the industry, linking the environment, heritage, culture, economy and society. In short, wine companies must implement a development strategy focused on the company's co-evolution: on the environment and on the consumer [94]. The perspective of Environmental Sustainability in Viticulture should guide the EAs of AWI in the implementation of such strategies that meet the requirements of sustainable development.

The objectives of the strategic theme for the perspective of Environmental Sustainability in Viticulture, as well as the indicators proposed for each objective, are presented in Appendix A. It should be noted that the objectives and performance indicators from the perspective of Environmental Sustainability in Viticulture are not limited to the examples presented in Appendix A, and may not be suitable for all EAs in the industry. Industry players can adapt objectives and indicators to individual strategies (ensuring alignment with the organization's mission, policies, objectives, goals and structure), selecting those they recognize as strategic to define the criteria for environmentally sustainable performance (in viticulture).

Considering the above, we may assert that contribution of this research is threefold. From an economic and social point of view, the research presents evidence that justifies and validates the inclusion of the new perspective—'environmental sustainability in viticulture'—in the BSC that was developed for the AWI. The suggestion to include a new perspective on environmental sustainability in viticulture results from the importance that economic agents who participated in the study attribute to this topic as a strategic area to be evaluated in this industry. This evidence is based on the results of the PCA which was carried out to support the identification of perspectives to consider in the development of the Strategic Map for the AWI for the period 2021–2030. Under the theoretical lens, besides contributing to reducing the gap mentioned above, this study highlights the effective integration of sustainability as a sector performance indicator, having as its conceptual basis a model widely recognized and used in the literature, the BSC—which beyond originality

of the proposal, presents significant contributions to economic and managerial theory, opening new avenues for future investigation. The results obtained, which pointed to the need to include this new perspective, are in line with the implementation of the innovative AWSP under the responsibility of the AWC.

5. Conclusions

The paper discusses from a theoretical and practical point of view the importance of including a new perspective—Environmental Sustainability in Viticulture—in the BSC developed for the AWI. The results of the content analysis of the interviews carried out with the main AWI stakeholders (stakeholders of high influence and high interest in pursuing the AWI global vision) reveal that all industry players should guide their actions in the short and medium term to face the challenge of how to sell more and better. The strategic line of action, among the four that have been identified, that will support the achievement of this challenge points to the need to develop environmental sustainability in the viticulture of this region, so that every effort must be made to mobilize producers and all industry EAs to adhere to the AWSP and an environmentally sustainable production strategy. The result of PCA results in an adaptation of the original structure of Kaplan and Norton. Five BSC perspectives were identified, which were named and grouped differently from the traditional BSC model. Two of these perspectives are clearly unconventional: one concerning aspects of 'Environmental Sustainability' (in Viticulture) and the other concerning 'Results for Society'.

The perspective of 'Environmental Sustainability in Viticulture', consisting of a single strategic theme (Environmental Sustainability) and three strategic objectives, reflects the concerns of the EAs regarding this dimension and represents the strategic challenge of sustainability and the valorization of endogenous resources that should be considered in the short and medium term in this industry. This perspective is associated with the need to increase the added value of the industry, preserving natural resources for future generations, with a focus on future certification of environmental sustainability in viticulture, which can induce different stakeholders to add value to the product. For agents (companies/winegrowers/distributors) who process and sell products from grapes, certification is a way to demonstrate their commitment to the responsible use of resources (water, soil, climate, energy, etc.). For retail and large distribution, certification is a guarantee that the products sold come from environmentally responsible productions that support the conservation of the wine heritage.

No research paper is without limitations. In this study, the largest one refers to the context in which the investigation was carried out, making indiscriminate generalizations impossible. However, what is expected to generalize are the research contributions to the theoretical and practical understanding of the theme and not the results themselves. In this sense, it is expected that further studies are carried out on the subject, in the form of cases or on a large scale, in different environments and contexts, to broaden and solidify the understanding of the originally presented proposal and its application in different companies, industries, regions, and even some countries.

From a theoretical point of view, several authors propose changes to the traditional BSC model through the inclusion of new perspectives that allow the integration of strategic environmental information. New BSC models emerge with the objective of managing, measuring and monitoring environmental aspects in organizations (and in an entire industry), which integrate new complementary perspectives, objectives and environmental indicators. The theoretical field of this methodology is thus open to new contributions, namely concerning to the structure of the BSC, integrating a new perspective in the field of sustainability (of companies/organizations and/or of an entire industry). The focus on an entire industry also extends the theoretical relevance of this research. Although the BSC is an extensively debated topic in the literature, there are very few contributions regarding the applicability of the BSC methodology to an entire economic

sector in a region. On the other hand, there is also a lack of studies aimed at evaluating sustainable development in the wine industry.

From a practical point of view, the results of the study corroborate the importance of environmental sustainability and highlight the need to include a new perspective—‘Environmental Sustainability in Viticulture’—in the BSC for the AWI for the period 2021–2030. Its construction was supported by a PCA, considering the responses (102) to a questionnaire by several EAs working in the Alentejo wine industry, and a content analysis of interviews (9) with opinion makers from the Alentejo wine industry, in addition to a literature review. The perspective ‘Environmental Sustainability in Viticulture’ highlights the need to increase the added value of the sector through the preservation of natural resources for future generations, with a focus on future certification of environmental sustainability in viticulture. It is expected that the research results can be used by managers, analysts, legislators, policymakers and other decision-makers in the creation, analysis and monitoring of strategies and policies that encourage the integration of sustainability as a performance indicator. Therefore, offering an organizational and competitive alternative for evaluating business and industrial development on a sustainable basis.

In summary, the BSC model that was developed for the AWI regarding the period 2021–2030 differs from the traditional architecture of the BSC in that it explicitly recognizes the objectives related to environmental sustainability and the corresponding performance indicators, which are part of the perspective of ‘Environmental Sustainability in Viticulture’. Considering this proposal, EAs can plan and implement strategies adapted to the external environment in which they operate and to their resources and capabilities. Environmental sustainability in viticulture can be understood as a visionary dimension of this strategy.

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Appendix A

Table A1. Strategic objectives and indicators for the perspective of Environmental Sustainability in Viticulture.

Objective	Indicator	Purpose
Environmental Sustainability Certification (iii)	Environmental Sustainability Certification Document for 'Alentejo Wines'	Compile the main rules needed to obtain the seal of environmental sustainability certification for 'Alentejo Wines'.
		Date of submission of the Manual to the EAs
	Adherence of EAs to AWSP (%)	Identifies the mobilization of EAs to the AWSP (%).
		$(\text{Number of adherents} / \text{Total EAs working in the AWI}) \times 100$
	Area of vineyard registered with the AWC that is covered by the AWSP (%)	Identifies the percentage of vineyard area in the Alentejo region registered in the AWSP.
Implement and develop AWSP (ii.a)		\sum vineyard area included in PSVA
	Wine production volume included in AWSP (%)	Inform the percentage of Alentejo wine production that is covered by the AWSP (volume).
		$(\text{Production volume entered in the AWSP} / \text{Production volume (total)}) / 100$
	Number of EAs visited by the AWC to support the self-assessment defined in the AWSP	Inform the number of visits made to the EAs who joined the AWSP and who are in the self-assessment phase, in a given period.
		\sum number of EAs visited to support self-assessment
	Number of EAs visited for validation of the self-assessment defined in the AWSP	Inform the number of visits made to the EAs to validate the self-assessment, in a given period.
		\sum number of EAs visited for self-assessment validation
	Number of EAs participating in workshops on AWSP topics	Inform the number of EAs participating in the AWSP-related workshops, in a given period (includes other partners).
		\sum number of EAs participating in working sessions
	Number of AWSP adherents by category	Identify the number of AWSP members by category (pre-initial, initial, intermediate, developed).
Promote the rational use of natural resources (i)		\sum number of members per category
	Number of initiatives to promote the preservation of natural resources and biodiversity	Inform the number of EAs participating in initiatives aimed at promoting and preserving natural resources and biodiversity. These initiatives can be broken down into topics: Sustainability and environment; AWSP; Effects of climate change; Use of phytosanitary products; Energy efficiency in wineries, etc. This indicator can evolve to 'number of sustainable processes'.
		\sum number of EAs participating in working sessions
	Record of alternative energy consumption by EAs	Inform the consumption of alternative energy used by EAs in the production process. It allows, in association with the other indicators, to assess the industry's contribution to the promotion of environmental management in wine-growing activities (greater efficiency in the use of resources).
		\sum alternative energy consumption
	Water recycling (%)	Present the relationship between the water recovered and the water consumed in the production process by the EAs. It allows, in association with the other indicators, to assess the industry's contribution to promoting the environmental management of wine-growing activities (greater efficiency in the use of resources).

Table A1. Cont.

Objective	Indicator	Purpose
		Σ water recycling (m ³)/ Σ water consumption (m ³)
	Quantity of recovered waste	Present the quantity of solid waste that is recovered through reuse, recycling or incineration in waste incineration facilities with energy recovery. It allows, in association with the other indicators, to assess the Sector's contribution to the promotion of environmental management of wine-growing activities (greater efficiency in the use of resources).
		Σ quantity of recovered waste
	Environmental costs	Present the total environmental costs concerning the management of energy, water, waste and gaseous emissions. Allows EAs to identify the most sustainable processes for their activity, maintaining their competitiveness. Energy (costs associated with consumption); Water (treatment costs, fees, etc.); Waste (costs of transportation, disposal, treatment, etc.); Gaseous emissions (treatment costs, etc.).
		Σ environmental costs related to treatment, transport, taxes, disposal, etc. (energy, water, waste and gaseous emissions).

Sources: Own elaboration based on the responses of the interviewed stakeholders, the respondents to the questionnaire, institutional literature; Silva et al. [55]; Barroso [90]; CVRA [79,88]; Ferreira et al. [91].

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