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Assessing the sustainability of the wine industry in terms of investment

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Abstract

The aim of this paper is analyzing sustainability from an investment perspective, in an area less approached: wine industry. The article shows a theoretical approach, at a microeconomic level. The current state of the more important initiatives regarding sustainable practices in the field, at an international level and the main academic approaches regarding the sustainability of wine industry show that sustainability has an important place in wine business. Starting from how eco-efficiency is measured and considering the aspects followed when analyzing eco-efficiency in wine industry, we built up a set of indicators of investments' eco-efficiency (IEEI).

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Keywords: wine industry; sustainable development; eco-efficiency; investment; indicator.

1. Introduction

“Environmental challenges and the continuous life quality depreciation have influenced humanity to comprehend and accept the necessity to adopt a sustainable development, defined as a multidimensional process that integrates economic growth, social issues and environmental protection” Radu et al., 2013. Having these three dimensions included in the concept of sustainable development is based on the fact that the next generations will also have to have access to all the needed resources for an increased quality of life and a clean environment. Therefore, the concept of sustainability included the following elements: depletion of resources, ecological and environmental aspects and quality of life; a sustainable development wouldn't make sense without aiming for the quality of living, and also quality of living without sustainability wouldn't have any perspective Van de Kerka and Manuel, 2008.

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Applying this concept requires a proper definition of its components in measurable terms and a clear way to evaluate the progress Prescott-Allen, 2001. We agree with these authors and we have to admit that for implementing this concept, we need methods, instruments and indicators for measuring, evaluation and monitoring.

Eco efficiency is one of the instruments that companies could use for achieving sustainable development. “The concept of eco-efficiency ... arrived as a result of the need for instruments that can translate sustainable development into working targets” Eik, 1998. Implementing eco-efficiency through all the stages of a business life cycle guarantees the business success and the profit of the investment.

The goal of this paper is analyzing sustainability from investment perspective in an area weakly approached, the one of wine industry. The article submits a theoretical approach, from a microeconomic point of view.

To accomplish this analysis, we have examined the current state of the more important initiatives regarding sustainable practices in the field, at an international level. We have studied the main academic approaches regarding the sustainability of wine industry and the eco-efficiency concept. In the next part of the paper, we have build up a system of indicators that can be used in measuring the investments’ eco-efficiency in this area. This set of indicators can be adapted according to different important factors which influence the investment project.

Approaching investment in terms of eco-efficiency comes from the need of materializing sustainable development and implementing this ambiguous concept through concrete measures. Implementing sustainability in winemaking industry consists in Environmental soundness, social Equity and Economic feasibility needed for implementation and maintenance SWP Workbook, 2013. So far, the sustainability in wine industry in terms of investments’ eco-efficiency is been less studied.

By the current paper, we try to encourage the theoretical and practical research of this domain from investment perspective. The paper is a continuation of previous studies regarding sustainability in wine industry Olaru and Marinescu, 2013.

2. Research method

To understand the current state of concerns on the sustainable development in the wine industry, we have made documentation regarding the most important initiatives at a global level. There was analyzed the organizations built up to serve this purpose and the programs these organizations have initiated to promote and implement sustainable practices. There was done an analysis of the literature, to identify the trends related to this subject. For this, it was consulted databases like: Science Direct, Emerald, SpringerLink, Taylor and Francis, EBSCO, JSTOR, but also other sources concerning this issue. The search was made by the following keywords, relevant to the studied topic: “wine industry”, “winegrowing”, “sustainable development”, “eco-efficiency”, “sustainable investments”, “eco-efficiency indicators”.

2.1. Sustainability initiatives in the wine industry

First practical attempts to approach the wine industry in terms of sustainable development are, mostly, coming from wine-producing countries from outside Europe. USA, Australia, New Zealand, South Africa are among the countries that have developed programs and founded organizations that have as a main task promoting sustainability in wine industry (Table 1). The first wine sustainable program (Integrated Pest Management) was launched in USA in the beginning of the '90, by Lodi Winegrape Commission from California and it marked the moment when the investments in sustainable practices started Ross and Golino, 2008. This program was a good starting point for other initiatives in the USA and in other countries.

Table 1. Organizations and programs regarding sustainable development in the wine industry

Country	Organization	Program	Year
USA	California Sustainable Winegrowing Alliance	Sustainable Winegrowing Program (CSWA)	2003
Australia	Australian Government - Department of Agriculture, Fisheries and Forestry and Winemakers Federation of Australia	Australian Wine Industry Stewardship Programme (AWIS)	2005
New Zealand	New Zealand Winegrowers	Sustainable Winegrowing New Zealand (SWNZ)	1995
South Africa	South African wine industry	Integrated Production of Wine (IPW)	1998
France	Association "Vignerons en Développement Durable"	Sustainable winegrowing concept	2012

Source: authors' work based on data from California Sustainable Winegrowing Alliance, Russell (2009), New Zealand Winegrowers, The Integrated Production of Wine, Les Vignerons en Développement Durable

There have been developed a few important international initiatives. One of these is the one proposed by International Federation of Wine and Spirits (FIVS), which elaborates in 2006 The Global Wine Sector Environmental Sustainability Principles (the "Principles") FIVS, 2006. Another similar action belongs to International Organisation of Vine and Wine (OIV) which prepares a guide for sustainability in wine industry, named OIV Guidelines for Sustainable Vitiviniculture: Production, Processing and Packaging of Products (OIV, 2008). Sustainability is defined in this document as a "Global strategy on the scale of the grape production and processing systems, incorporating at the same time the economic sustainability of structures and territories, producing quality products, considering requirements of precision in sustainable viticulture, risks to the environment, products safety and consumer health and valuing of heritage, historical, cultural, ecological and landscape aspects".

2.2. Academic approach regarding the sustainability of wine industry

Research of wine industry from a sustainable perspective has just recently started. The most of the academic research come especially from New Zealand, USA, Australia, South Africa, but also Germany, Italy, Spain. In this paper, we only mentioned few of them.

Hughey et al., 2005 analyzes sustainability from environmental perspective and compares three main environmental management systems from New Zealand: Sustainable Winegrowing New Zealand, ISO 14001 and Bio-Gro. Gabzdylova et al., 2009 examines the drivers that determine the applying of the sustainable practices in New Zealand. Sinha and Akoorie, 2010 explain in their paper that institutional pressure does not determine the adoption of sustainable environmental practices in the wine industry of New Zealand. Flint and Golicic, 2009, have conducted a qualitative study for New Zealand in which they try to find out what is the role sustainability plays within wine supply chains. Thomson and Forbes, 2011 investigated sustainable business practices in a small winery from Marlborough, New Zealand. They concluded that adopting the environmental, social and economic sustainability dimensions improve the business efficiencies.

Sipl, 2006 researched sustainability in wine industry in the area of Baden-Württemberg, Germany. The author concluded that the wine producers from the area and the stakeholders are lacking information related to the topic. The wine producers consider the high costs as an obstacle in the way of sustainable development. Her results also show that sustainability concept is associated with environmental protection. Another study case including several European countries (France, Spain, Italy, Germany, Hungary, Greece), but also USA, shows that small wine producers, certified as organic, associate sustainability with environmental aspects, while bigger companies take also into account economic and social aspects Szolnoki, 2013. Environmental sustainability seems to be one of the major concerns for the stakeholders involved in wine industry Forbes et al., 2009.

Loveless et al., 2011, Zucca et al., 2009, Forbes et al., 2009 have investigated the consumers' point of view regarding sustainability in wine industry. Corsi et al., 2011 have examined how different consumer countries perceive certain wine-producing countries in terms of the following product characteristics: environmental friendliness, taste profile and distinctiveness, type of wine, labelling, packaging, consumption occasion, safety and reliability. Loveless et al., 2010 show that "sustainability is less important to consumers than other credence characteristics like quality control", excepting Sweden and the west coast US, where sustainable production is also an important attribute to consumers. Zucca et al., 2009 emphasize in their paper that "customers like the concept of sustainable winemaking but they really do not have a clear idea what sustainability means in practice or what processes the wineries do to achieve it". The results of the study elaborated by Forbes et al., 2009 in Christchurch, New Zealand, show "that consumer have a strong demand for wine which is produced using "green" production practices". The consumers believe that a wine that is produced in a sustainable way is at least as good as or even better as quality than conventionally produced wine, and they are ready "to pay a higher price for this wine". It is obvious that sustainability has an important place in wine industry, but from investments point of view, sustainability has been less analyzed.

2.3. Eco-efficiency concept

Defined as a ratio between an environmental indicator and an economic one, the eco-efficiency concept has been introduced by Schaltegger and Sturm, 1989 as a "business link to sustainable development" Schaltegger and Sturm, 1990. Other authors that have approached and studied this concept are Klostermann, 1998, Desimone, 1997, Seiler-Hausmann et al., 2004, Huppel and Ishikawa, 2010.

The most vehiculated definition of this concept is that proposed by World Business Council for Sustainable Development (WBCSD). According to WBCSD, "Eco-efficiency is achieved by the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life-cycle to a level at least in line with the earth's estimated carrying capacity" WBCSD, 2000a.

"In simple terms, eco-efficiency means doing more with less. The concept of eco-efficiency is internationally recognised as the way business can contribute to the sustainability of our society" (EPA). "It is about more efficient use of materials and energy in order to provide profitability and the creation of added value" Glavic and Lukman, 2007.

Elements that define eco-efficiency are: reduction of material and energy intensity, reduction of dispersion of toxic substances, enhancing of recyclability, maximizing sustainable use of renewable resources WBCSD and UNEP, 1996. "Eco-efficiency will become more important in the context of sustainability to show which process is more favourable than other alternatives" Saling et al., 2002.

In eco-efficiency analysis of the wine industry, it is followed: energy consumption, water use, material use, emission of pollutants, and quantity of materials/waste EPA and DTFTWID, 2006.

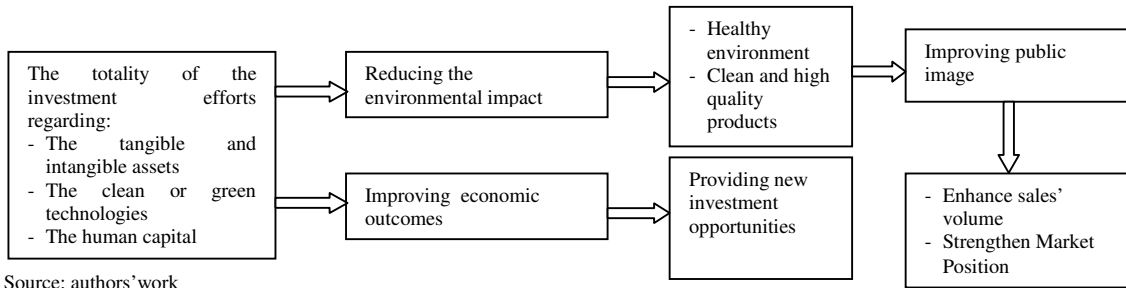
Eco-efficiency indicators are established by each company, according to the decisional level and the communication process. WBCSD, 2000b proposes a number of general indicators for measuring eco-efficiency. There are also handbooks that explain how to measure the eco-efficiency NRTEE, 2000; JEMAI, 2004; UN, 2004; UN, 2009.

3. Eco-efficiency analysis in the wine industry in terms of investment

An investment can be made in many ways. Each of these ways is based on a project characterized by multiple information regarding the efforts and the different type of effects. Investments' eco-efficiency refers to the complete amount of investment efforts, made, with the needed resources, for decreasing or eliminating the

impact on the environment and getting the maximum economic effects. For choosing the best option is used a system of indicators which puts all these information in a quantitative manner.

Figure 1 expresses the main investment efforts and resulting effects by including the environmental dimension.



Source: authors' work

Fig.1. Presentation of the main investment efforts and resulting effects by including the environmental dimension

In investments' eco-efficiency analysis, it is recommended to determine first the eco-efficiency for each equipment, installation, machine that is going to be purchased. Eco-efficiency of each equipment is estimated as a ratio between its capacity (volume) and energy consumption for a given time JEMAI, 2004. The higher value will be chosen. The same will be done for storages and halls.

Starting from how eco-efficiency is measured NRTEE, 2001 and considering the elements followed in eco-efficiency analysis in the wine industry EPA and DTFTWID, 2006, we have built up the following indicators for investments' eco-efficiency (IEEI):

$$EE_{invEnergy} = \frac{I.M.U.}{\frac{\text{Cost of Energy consumed within the project boundary all sources}}{\text{Monetary value of a Unit of production or service delivery}}} \tag{1}$$

$$EE_{invWaste} = \frac{I.M.U.}{\frac{\text{Cost of Total material (direct + indirect) entering the project boundary – material that ends up in the product and co – product}}{\text{Monetary value of a Unit of production or service delivery}}} \tag{2}$$

$$EE_{invWater} = \frac{I.M.U.}{\frac{\text{Cost of Water consumed in the production process}}{\text{Monetary value of a Unit of production or service delivery}}} \tag{3}$$

$$EE_{invCO_2} = \frac{I.M.U.}{\frac{\text{Cost of Total CO}_2 \text{ emissions resulted from production process}}{\text{Monetary value of a Unit of production or service delivery}}} \tag{4}$$

$$EE_{invChemicals} = \frac{I.M.U.}{\frac{\text{Cost of Total Chemicals consumed in the production process}}{\text{Monetary value of a Unit of production or service delivery}}} \quad (5)$$

where:

- I.M.U. means one invested monetary unit.
- $EE_{invEnergy}$ expresses the investments' eco-efficiency related to the use of energy. It shows the ratio between one invested monetary unit and the value of energy costs to produce one unit of the product reported to the monetary value of a delivered product or service.
- $EE_{invWaste}$ expresses the investments' eco-efficiency related to the resulted waste. It shows the ratio between one invested monetary unit and waste costs to produce one unit of the product reported on the monetary value of a delivered product or service.
- $EE_{invWater}$ expresses the investments' eco-efficiency related to the use of water. It shows the ratio between one invested monetary unit and water costs to produce one unit of the product reported to the monetary value of a delivered product or service.
- EE_{invCO_2} expresses the investments' eco-efficiency related to CO₂ emissions. It shows the ratio between one invested monetary unit and CO₂ emissions costs to produce one unit of the product reported to the monetary value of a delivered product or service.
- $EE_{invChemicals}$ expresses the investments' eco-efficiency related to the use of chemicals. It shows the ratio between one invested monetary unit and chemical use costs to produce one unit of the product reported to the monetary value of a delivered product or service.

Considering the complexity of the investment process, for getting a preliminary image on the efficiency of the project, it is recommended to measure also other indicators (Vasilescu et al., 2000; Vasilescu et al., 2009) adapted to wine industry.

4. Conclusions

Sustainable development has an important place in wine businesses. Implementing this concept suppose environmental soundness, social equity and economic feasibility. There is a certain connection between sustainable development and investment, to be more specific, investments in green constructions, clean technology and organic products are considered investments for sustainable development. This article analyzes the sustainability of wine industry from an investment perspective. The aim of this theoretical approach is to measure the investments' eco-efficiency in wine industry. Starting from how eco-efficiency is measured and considering the aspects followed in eco-efficiency analysis in the wine industry, we built up a set of indicators of investments' eco-efficiency (IEEI). It is recommended to integrate these indicators in to the evaluation of an investment project in wine industry. We hope, through this paper, to encourage theoretical and practical research of sustainability in wine industry from an investment perspective.

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References

- A Manual for the Preparers and Users of Eco-efficiency Indicators. United Nations (UN) Conference on Trade and Development, New York and Geneva, 2004.
- Best Practice Guide for Water and Waste Management in the Queensland Wine Industry. Environmental Protection Agency (EPA) and The Department of Tourist, Fair Trading and Wine Industry Development (DTFTWID), Queensland, May 2006.
- Businesses Eco-efficiency. The Environment Protection Authority (EPA), South Australia. Retrieved august 10, 2013 from <http://www.epa.sa.gov.au/businesses/eco-efficiency>
- California Code of Sustainable Winegrowing Workbook (SWP Workbook), 3rd edition. California Sustainable Winegrowing Alliance (CSWA), January 2013.
- Christ, K. L., Burritt, R. L., 2013. Critical environmental concerns in wine production: an integrative review, *Journal of Cleaner Production*, 53, p. 232-242.
- Corsi, A., Lockshin, L., Mueller, S., 2011. "Competition between and competition within: the strategic positioning of competing countries in key export markets". In: 6th AWBR International Conference. Bordeaux, France.
- DeSimone, L. D., Popoff, F., 2000. *Eco-Efficiency: The Business Link to Sustainable Development*, Cambridge, Mass., Mit Press.
- Eco-efficiency and cleaner production: Charting the course to sustainability, 1996. The World Business Council for Sustainable Development (WBCSD) and United Nations Environmental Programme (UNEP) <http://oldwww.wbcsd.org/DocRoot/aFQps2TRHhw5tFsl5oZP/eeCleanerprod.pdf>
- Eco-efficiency and Factor Handbook for Products - Creation of Indicator for a Sustainable Society - Toward greater value and reduced environmental load. Japan Environmental Management Association for Industry (JEMAI), October 2004.
- Eco-efficiency: creating more with less impact. World Business Council for Sustainable Development, p. 4, October 2000 a.
- Eco-efficiency indicators: workbook. National Round Table on the Environment and the Economy (NRTEE), 2001.
- Eco-efficiency Indicators: Measuring Resource-use Efficiency and the Impact of Economic Activities on the Environment. United Nations (UN), ESCAP, 2009.
- Eik, A., 1998. Eco-efficiency: state-of-the-art. Retrieved august 10, 2013 from <http://urn.kb.se/resolve?urn=urn:nbn:no:ntnu:diva-1441>
- Flint, D. J., Golicic, S. L., 2009. Searching for competitive advantage through sustainability: A qualitative study in the New Zealand wine industry, *International Journal of Physical Distribution & Logistics Management*, 39 (10), p.841 – 860.
- Forbes, S. L., Cohena, D. A., Cullena, R., Wrattenb, S. D., Fountain, J., 2009. Consumer attitudes regarding environmentally sustainable wine: an exploratory study of the New Zealand marketplace, *Journal of Cleaner Production*, 17, p. 1195–1199.
- Gabzdyllova, B., Raffensperger, J.F., Castka, P., 2009. Sustainability in the New Zealand wine industry: drivers, stakeholders and practices, *Journal of Cleaner Production*, 17, p. 992-998.
- Glavic, P., Lukman, R., 2007. Review of sustainability terms and their definitions, *Journal of Cleaner Production*, 15, p. 1878.
- Hughey, K.F.D., Tait, S.V., O'Connell, M.J., 2005. Qualitative evaluation of three "environmental management systems" in the New Zealand wine industry, *Journal of Cleaner Production*, 13, p. 1175-1187.
- Huppés, G., 2007. Realistic Eco-Efficiency Analysis. Why We Need Better Eco-Efficiency Analysis From Technological Optimism to Realism, *Technikfolgenabschätzung – Theorie und Praxis* Nr. 3, 16, p. 38-45.
- Huppés, G., Ishikawa, M., 2010. *Quantified Eco-Efficiency: An Introduction with Applications*, Dordrecht, Springer.
- Integrated Production of Wine (IPW), 1998. Retrieved august 10, 2013 from <http://www.ipw.co.za/index.php>
- Klostermann, J. E. M., Tukker, A., 1997. Product innovation and eco-efficiency: twenty-two industry efforts to reach the Factor 4, pp. 13-25, Dordrecht, Kluwer Academic Publishers.
- Les Vignerons en Développement Durable (2012). Retrieved august 10, 2013 from <http://v-dd.com/en/>
- Loveless, K., Mueller, S., Lockshin, L., Corsi, A., 2010. "The relative importance of sustainability, quality control standards and traceability for wine consumers: a cross-national segmentation". Proceedings of the 13th Australian and New Zealand Marketing Academy (ANZMAC) Conference, Doing More with Less. Christchurch, New Zealand.
- Measuring eco-efficiency - a guide to reporting company performance. World Business Council for Sustainable Development, p. 7-15, June 2000 b.
- OIV Guidelines for Sustainable Vitiviniculture: Production, Processing and Packaging of Products. International Organisation of Vine and Wine (OIV), June 20, 2008.
- Olaru, O., Marinescu (Pirlogea), C., 2013. "A regression analysis of the effect of important determinants on wine production", Proceedings of the 13th International Multidisciplinary Scientific Geoconference SGEM 2013, Vol. II : Ecology, Economics, Education and Legislation. Albena Co., Bulgaria, p. 3-10.
- Prescott-Allen, R., 2001. *The Wellbeing of Nations: A Country-by-country Index of Quality of Life and the Environment*. Washington, D.C.: Island Press.
- Radu, A. L., Olaru, O., Dimitriu-Caracota, M., Banacu, C. S., 2013. "Ecological Footprint Analysis: towards a Projects Evaluation Model for Promoting Sustainable Development", Proceedings of The 21st International Business Information Management Association Conference (IBIMA). Vienna, Austria, p. 399.
- Ross, K., Golino, D.A., 2008. Wine grapes go green: the sustainable viticulture story. *California Agriculture*, 62 (4), p. 125-126.
- Russell, A., 2009. Australian Wine Environmental Stewardship demonstrates commitment to sustainability. Retrieved august 10, 2013 from http://www.oiv2007.hu/documents/law_economics/410_paper_c111_3_1_2_russell.pdf
- Saling, P., Kicherer, A., Dittrich-Krämer, B., Wittlinger, R., Zombik, W., Schmidt, I., Schrott, W., Schmidt, S., 2002. Eco-efficiency analysis by BASF: the method, *The International Journal of Life Cycle Assessment* 7 (4), p. 203–218.

- Schaltegger, S., Sturm, A., 1994. *Ökologieorientierte Entscheidungen in Unternehmen. Ökologisches Rechnungswesen statt Ökobilanzierung. Notwendigkeit, Kriterien, Konzepte*, Berne, Haupt.
- Schaltegger, S., Sturm, A., 1990. *Ökologische Rationalität (German/in English: Environmental rationality)*. *Die Unternehmung* 4, p.117–131.
- Seiler-Hausmann, J.-D., Liedtke, C., von Weizsäcker, E. U., 2004. *Eco-efficiency and Beyond: Towards the Sustainable Enterprise*, Greenleaf Publishing Limited, Sheffield.
- Sinha, P., Akoorie, M.E.M., 2010. Sustainable environmental practices in the New Zealand wine industry: an analysis of perceived institutional pressures and the role of exports, *Journal of Asia-Pacific Business*, 11 (1), p. 50-74.
- Sippl, D., 2006. *Nachhaltiges Wirtschaften im Weinbau, Grundlagen, Umsetzungsmöglichkeiten, Leistungsbewertungskonzept*. Berlin: Dissertation.de.
- Sustainable Winegrowing New Zealand, 1995. *New Zealand Winegrowers*. Retrieved august 10, 2013 from <http://www.nzwine.com/sustainability/sustainable-winegrowing-new-zealand/>
- Sustainable Winegrowing Program, 2003. California Sustainable Winegrowing Alliance. Retrieved august 10, 2013 from http://www.sustainablewinegrowing.org/sustainable_winegrowing_program.php
- Szolnoki, G., 2013. A cross-national comparison of sustainability in the wine industry, *Journal of Cleaner Production*, 53, p. 243-251.
- The Global Wine Sector Environmental Sustainability Principles (GWSESP), International Federation of Wine and Spirits (FIVS), October 6, 2006.
- Thomson, D., Forbes, S.L., 2011. „Going “green” to find “gold” in wine: a case study of a sustainable New Zealand wine producer”. In: 6th AWBR International Conference. Bordeaux, France.
- Van de Kerka, G., Manuel, A. R., 2008. A comprehensive index for a sustainable society: The SSI — the Sustainable Society Index, *Ecological Economics*, 66, p. 229.
- Vasilescu, I., Românu, I., Cicea, C., 2000. *Investiții*, Editura Economică, p. 110-130.
- Vasilescu, I., Cicea, C., Dobrea, C., Bușu, C., Gheorghe, A., 2009. *Managementul investițiilor*, Editura EfiCon Press, p. 145-161.
- Zucca, G., Smith, D. E., Mitry, D. J., 2009. Sustainable viticulture and winery practices in California: what is it, and do customers care? *International Journal of Wine Research* 2, p. 189-194.