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# **A Structural Equation Modelling Approach to Explore Consumers' Attitude Towards Sustainable Wine**

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## **Abstract**

This paper investigates how environmental and socio-economic beliefs affect consumers attitude towards sustainable wine, and the main drivers during wine purchase. Data were collected with online questionnaire in 2013 from 513 Italian wine drinkers. The results of a structural equation model show that attitude towards sustainable wine is driven by both environmental and quality beliefs of sustainable wine, while is not affected by the economic dimension. Attitudes and quality beliefs affect consumer's importance of sustainable aspects during wine purchase. This paper suggests that communication strategies should focus on sustainable issues to meet the need of environmentally-conscious consumers.

**Keywords:** Structural Equation Model (SEM), Sustainability, Wine, Attitude.

## **1. Introduction**

Over recent years, much research has found evidence that consumers are interested in buying more “green” and sustainable products. Sustainable practices are becoming increasingly recognized and adopted over the whole agro-food sector, and sustainability has become a key issue also in the global wine business (Klohr et al., 2013). There is a large body of literature addressing consumers perceptions of organic wine and eco-friendly labelling (see, e.g., Barber et al., 2010; Olsen et al., 2012). However, to our knowledge, no studies have investigated how environmental and socio-economic beliefs drive the attitude towards sustainable labelled wine so far. The objective of this study was to explore variables which influence consumer attitude towards sustainable labelled wine and, at the same time, to examine to what extent sustainable aspects are important during wine purchase. An on-line questionnaire was submitted to 513 Italian wine consumers and the data were analyzed by means of structural equation modelling (SEM).

## **2. Method**

A model was developed that includes environmental values, socio-economic beliefs about the sustainable wine certification and attitude. The age of respondents was also included in the model. Based on background research and literature review, ten hypotheses are put forward to be tested:

- H1. People with a stronger value of environmental protection will pay more attention in sustainable aspects during the wine purchase.
- H2. People with a stronger belief that self-sacrifice is needed to protect the environment, will show a higher belief that sustainable products provide benefits for the environment.
- H3. People with a stronger belief that self-sacrifice is needed to protect the environment, will show a more positive attitude towards sustainable labelled wine.
- H4. People who believe that sustainable products provide benefits for the environment will show a more positive attitude towards sustainable labelled wine.
- H5. People who believe that sustainable products provide benefits for the environment will give more importance in sustainable aspects during the wine purchase.
- H6. People who believe that sustainable wine labelling certification gives economic support to the producers will show a more positive attitude towards sustainable labelled wine.
- H7. People who believe that sustainable labelling certification gives high quality standards at the product will show a more positive attitude towards sustainable labelled wine.

- H8. People who believe that sustainable labelling certification gives high quality standards at the product will pay more attention in sustainable aspects during the wine purchase.
- H9. People with a positive attitude towards sustainable wine will give more importance in sustainable aspects during the wine purchase.
- H10. Younger people will have a more positive attitude towards sustainable wine than older consumers.

Following similar studies (Olsen et al., 2012; Pomarici and Vecchio, 2013), data were collected from an online survey passing during September to November 2013 to a random sample of Italian population. The questionnaire aimed to explore: I) wine consumption and purchase habits; II) variables such as values and beliefs about the environment and attitude towards sustainable labelled wine; III) respondents' demographic and socio-economic characteristics commonly used for market segmentation.

Respondents were asked to state their level of agreement with each statement presented in the questionnaire. All replies were measured on a 5-point scale from 1 to 5 (from completely negative response to a positive agreement).

First, an exploratory factor analysis was carried out with principal component analysis and varimax rotation. Using Cronbach's alpha, which gives the internal consistency of the constructs, reliability was estimated. Then, the SEM technique was employed to test the causal link specified in the model. The model was tested to verify the goodness-of-fit of the hypothesized (restricted) model and the observed data. The fit indices used to assess the model fit were  $\chi^2/\text{degrees of freedom}$  ( $\chi^2/\text{df}$ ), comparative fit index (CFI) and root mean square error of approximation (RMSEA). The analysis was performed using Amos 20.0 (Byrne, 2010).

### 3. Results

#### 3.1 The sample

Respondents who stated they were non-wine drinkers, and those who stated they drink wine only a few times per year, were excluded. The final sample was composed of 513 respondents (62% male), the mean age was 39 and almost 80% of the sample were under 50 years old. The educational background of the respondents was high (62.6%: first or second cycle university degree; 13.3%: Ph.D). The respondents were grouped into three geographic areas of Italy: Northern (62%), Central (15%) and Southern (23%).

#### 3.2 The structural model

The constructs resulted from the factorial analysis are reported in Table 1. The Cronbach's alpha values, over 0.70 except for construct C2 which is above 0.65, indicate a high reliability and an overall acceptability of the constructs.

The hypothesized model shown in Figure 1 is well fitting, as indicated by the goodness-of-fit statistics (Byrne, 2010). The explained variance ( $R^2$ ) in the endogenous (dependent) variables is 42% for the belief that sustainable products provide benefits for the environment, 63% for the attitude towards sustainable labelled wine and 56% for the importance attached to sustainable attributes during wine purchase.

Results show that valuing environmental protection is strongly related to the importance that consumers give to sustainable aspects during wine purchase ( $\gamma_1=0.54$ ), which confirms

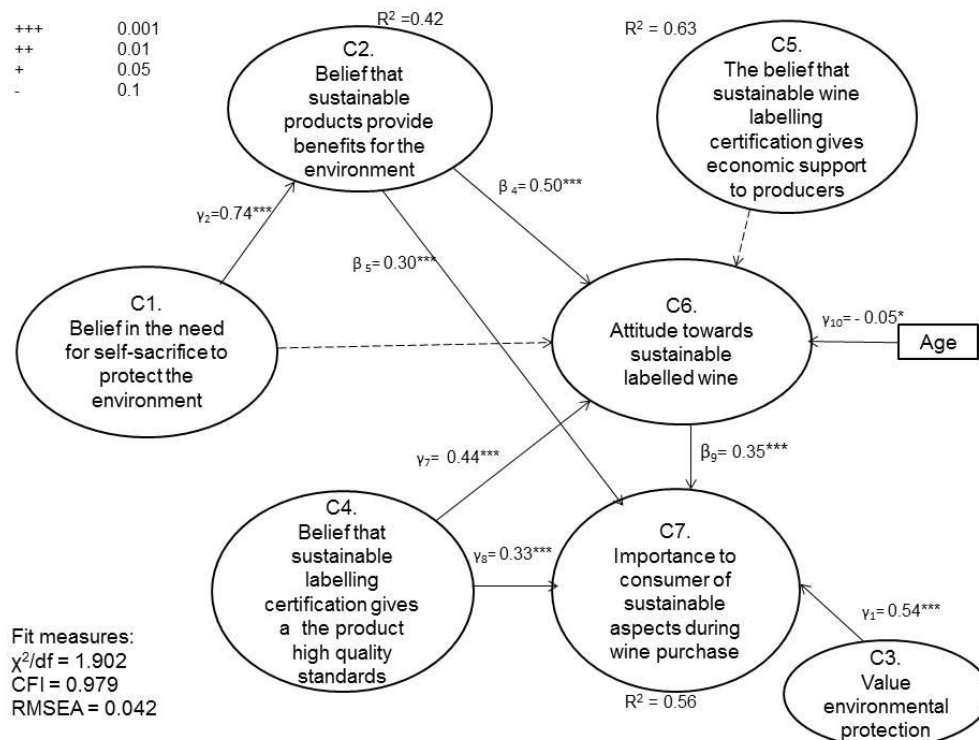
H1. In line with H2, the belief that self-sacrifice is needed to protect the environment is very strongly and significantly linked to the belief that sustainable products provide benefits for the environment ( $\gamma_2=0.74$ ).

**Table 1. Tests for construct validity.**

Constructs	Measurement items	Mean ( <i>sd</i> )	Alpha
C1 Belief in the need for self-sacrifice to protect the environment	X1. I am willing to make personal sacrifice for the sake of the environment	4.15 (0.7)	0.87
	X2. I would be willing to change my behaviour to help protect the environment	4.28 (0.7)	
C2 Belief that sustainable products provide benefits for the environment	X3. I feel that purchasing sustainable products helps protect the environment	4.19 (0.8)	0.67
	X4. Purchasing sustainable products does not really do much to help the environment	4.24 (1.0)	
C3 Value environmental protection	X5. I think that protecting the environment is a worthwhile goal	4.83 (0.3)	0.81
	X6. It is important to me to preserve the environment for future generations	4.85 (0.4)	
C4 The belief that sustainable wine labelling certification gives a product high quality standards	X7. It is a guarantee of high product quality	2.85 (1.2)	0.81
	X8. It is a guarantee of high hygiene standards	2.72 (1.1)	
	X9. It is a guarantee of the origin of raw materials	3.32 (1.1)	
C5 The belief that sustainable wine labelling certification gives producers economic support to	X8. It is a guarantee of economic support for local producers	2.81 (1.2)	0.80
	X9. It encourages employment in the area	3.09 (1.1)	
	X10. It is a guarantee of the respect of working conditions	3.26 (1.1)	
C6 Attitude towards sustainable labelled wine	X11. If it is a sustainable wine label, sustainability might be an important factor	3.73 (0.9)	0.78
	X12. Sustainable wine label could be a good tool to grow the Italian wine market	3.86 (0.9)	
	X13. Sustainable wine label could help me to understand sustainable winegrowing issues	3.81 (1.0)	
	X14. I could be interested in buying a bottle of wine with a sustainable label (showing environmental, economic and social aspects)	3.84 (0.9)	
C7 Importance to consumer of sustainable aspects during wine purchase	X15. Environmental aspects (e.g., low energy consumption)	3.82 (0.9)	0.79
	X16. Social-ethical aspects/certification (i.e. Fair Trade)	3.17 (1.1)	

H3 was not supported by preliminary testing of the model and was not considered further. The belief in the need for self-sacrifice to protect the environment does not appear to have a significant effect on attitude towards sustainable labelled wine, unless it is mediated by the belief that sustainable products benefit the environment. This finding suggests how important it is for consumers to believe that sustainable wines truly benefit to the environment in order for them to have a positive attitude about towards such products. As hypothesized by H4 and H5 respectively, the belief that sustainable products provide benefits for the environment influences both the attitude towards sustainable labelled wine ( $\gamma_4=0.50$ ) and the importance that consumer attaches to sustainable aspects when purchasing wine ( $\gamma_5=0.30$ ).

**Figure 1. Complete model of consumer attitude towards sustainable labelled wine.**



**Notes:** The terms in ellipses represent latent constructs; the “Age” factor (in rectangle) is an observed variable. The solid arrows indicate the structural paths (i.e. regression coefficients), and the dashed arrows represent non-significant relationships.

H6, which hypothesized that the belief that sustainable wine labelling gives producers economic support influences the attitude towards sustainable labelled wine, was not supported by evidence. Indeed, the overall goodness of fit deteriorates significantly when this link is included in the model. In addition, the explained variance ( $R^2$ ) in the endogenous variables would show lower values: 59% (instead of 63%) for the attitude towards sustainable labelled wine and 46% (instead of 56%) for the importance to the consumer of sustainable aspects during the wine purchase. Finally, the regression coefficient between these two constructs was not significant ( $p=0.180$ ). For these reasons, H6 was rejected and this link was not included in the final model.

In line with H7 and H8, the belief that sustainable labelling certification gives a product high quality standards is positively and significantly related both to the attitude towards sustainable labelled wine ( $\gamma_6=0.44$ ) and importance to the consumer of sustainable aspects during wine purchase ( $\gamma_7=0.33$ ). This suggests that sustainable certification might be a good predictor in assessing whether a positive attitude towards sustainable labelled wine exists. Sustainable certification might become a powerful tool to promote sustainable wine as a high quality product, and help to give a positive perception of sustainable wine.

As hypothesized by H9, attitude towards sustainable labelled wine affects the importance attributed by the consumer to sustainable aspects during wine purchase ( $\gamma_8=0.35$ ). This means that consumers who have a positive image of sustainable wine will actively search for it and give importance to sustainable aspects when making their choice. Finally, H10 was partially confirmed. In fact, age appears to have a slightly significant negative effect on attitude ( $\gamma_9=-0.05$ ).

#### 4. Discussions and conclusions

The results show that consumers who give more importance to sustainable aspects during wine purchase are mainly those who have a higher interest in sustainable wine and in environmental protection. In addition, young wine drinkers who are interested in environmental conservation and who believe that sustainable products help to achieve this appear to look for a trustworthy system of sustainable certification labelling.

The structural equation analysis yielded results useful for the interpretation of the following points. Sustainable claims on the label can be a tool to characterize wine, but consumers value sustainable certification only if the message can be trusted. The wine market in fact suffers from information asymmetry (Corduas et al., 2013), so there is an overall need to increase the general awareness of sustainable certification in order to reduce information asymmetry in this sector.

Moreover, given that involvement and consumption of wine increase with age (Mueller et al., 2011), young consumers' environmental values and beliefs need to be taken into account by both producers and marketers. Wine producers who wish to promote their wine as sustainable should pay detailed attention to consumer attitude, and whether the certification logo on the label might be effective. Age and environmental concerns of consumers need also to be taken into account.

Since our sample mainly consisted of the younger generation and people having some knowledge and interest in wine, it might be more useful to analyze the effects of sustainable labelling of wine on other targets, such as middle aged consumers, and to extend this research abroad. Finally, the absence of a measure of actual behaviour is a limitation. One of the next steps will be to test whether the attitudes toward sustainable wine might help to forecast scenarios for actual decision-making processes, and investigate whether a sustainable certification on wine labels might have a positive impact on price.

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