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How European consumers value wine credence attributes: a cross-country comparison of France, Greece and Italy

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Abstract

Several attributes can be used to differentiate wine products to meet consumer interest and thus increase producer visibility, attractiveness and revenues. Perception of the same attribute may depend on various factors that characterise the subjects, such as individual, behavioural and situational characteristics, like their country of origin. This study aims to identify which credence attributes and related levels motivate consumers the most to buying wine, by comparing the results obtained in three different European countries: France, Greece and Italy.

A conjoint experiment based on linear assumption was administered using price, production method, Geographical Indications (GIs) and wine origin as product attributes. The conjoint data were analysed in three steps: performing a model with the whole sample; performing three models using national data to compare results between the countries; and performing a cluster analysis using the Ward method to associate consumer characteristics with product attributes.

Results show that wine origin is the most valued attribute for choosing wine, followed by the production method. Cross-country evaluation reveals several significant differences among the attributes of the production method, geographical indication and origin. The cluster analysis identified three groups named: Higher-priced and nation-specific wine seekers; Certification seekers and Price-sensitive consumers.

This paper provides several implications for both academicians and enterprises. Indeed, it is the first evaluation comparing the role given by consumers to biodynamic certification in a cross-country evaluation. Several indications are also provided for producers who can help differentiate better wine production by earning a higher income.

Keywords: wine consumption, organic, geographical indications, biodynamic, conjoint analysis

1. Introduction

Producers adopt several strategies to differentiate wine production with the aim of reaching new market segments and gaining consumer attention. Among the strategies, communicating valuable credence characteristics of products can help producers mitigate asymmetric information by increasing consumer awareness and consequently obtain proper income from product sales [1,2]. Following this line, wineries have adopted various certification schemes, either related to product sustainability, such as organic certification, or to geographical indications (GIs), such as protected designation of origin (PDO) or protected geographical indication (PGI) [3].

Focusing on geographical indications, which are regulated by Regulation (EU) No 1308/2013 of the

European Parliament and of the Council, Europe has seen a greater spread of PDO wines compared to PGI ones [4]. In the literature, different aspects of GI wine consumption have been assessed, as well as the importance attached by consumers to these certifications [5]. In fact, a recent paper indicates that PDO certification provides positive utility to consumers and can be considered as a driving attribute of consumer decision-making [6]. PGI wines are preferred to ones without GIs, however these products are considered to be at an intermediate level compared to PDO products and consumption determinations may change, particularly those related to consumer habits, such as the purchasing channel [7].

The study of the importance of GI for consumer choice was also conducted in a cross-country analysis that showed the high relevance of this attribute for wine choice in the total sample, showing, however, heterogeneous perception when comparing selected markets (Italy, USA, UK) [8].

[9] conducted a study among Colombian wine consumers highlighting how appellation of origin, nutritional information, and health warnings are key aspects in conveying a positive perception of product quality. Although criteria related to the production system seem to be less important for consumer choice [10], organic certification plays a discriminating role in wine consumer decision-making [11].

Organic certification was first regulated by Council Regulation (EC) No 834/2007, later amended by Implementing Regulation (EU) No 203. Certification can be considered an effective differentiation tool; indeed, consumers show a positive attitude towards organic wine and are more willing to pay for it [12]. In addition, when the attribute is compared with other characteristics, it gains high importance and can be considered a discriminating driver of wine consumption [13]. A recent study showed that consumers have a heterogeneous attitude towards organic certification; although there is an important market niche willing to buy organic wine [14]. Sillani et al. [15] also showed that information on organic production methods, together with the grape variety, were two of the most important attributes, followed by price, for the heterogeneous sample of buyers considered. Among the certifications related to sustainability aspects, a recent study analysed consumer preferences for wine certified for sustainability, comparing the behaviour of US and Italian consumers and highlighting divergent attitudes between consumers in the two countries [16]. Demeter certification can be used in wine to indicate a product developed using biodynamic practices [17]. Biodynamic agriculture is based on the theory of anthroposophy and was founded by R. Steiner in 1924, who identified this method as a possible response to the increase in chemical inputs in agriculture [18]. Biodynamic agriculture also refers to philosophical concepts, a holistic approach to agriculture and agronomic practices that have not been scientifically verified; therefore, this method is considered more of a belief or spiritual approach than a cultivation technique [19]. In this paper, we do not wish

to delve into the claims and cultivation practices prescribed by the Biodynamic method of cultivation. However, given the objective possibility of applying Demeter certification to wines to differentiate products, it is necessary to assess whether there is a niche of interested consumers and what characteristics they have. To do this, a recent study [20] evaluated consumer willingness to pay (WTP) by comparing conventional, organic, and biodynamic certifications. The authors observed that consumers expressed a positive WTP for biodynamic wine, which was higher than for conventional and lower than for organic wine.

The origin of the product was also found to be able to guide consumer choices. In a conjoint analysis study, different wine origins provided different levels of utility; in particular, wine produced in countries known as typical producers was rated higher [21]. In Spanish regions, origin was considered an important attribute; however, by segmenting the original sample of consumers, a portion of individuals preferred inexpensive wine to locally produced wine, while consumers in Madrid rated locally produced wine higher [22]. In Italy, consumers were clustered, allowing researchers to identify different groups interested in specific wine characteristics, including local origin [23]. The origin of wine can be extremely important, since export may represent a significant share of producers' revenues [24].

Another important aspect of wine consumption is that consumer preferences towards product attributes can change depending on their origin. For example, in a cross-country analysis, [25] found that Italian consumers were the most interested in price, while US respondents were the least. Further indications of the importance of consumers origin were suggested by [26], who found that Nova Scotia respondents valued price and region of origin more than Canadians. These results are significant as they indicate that a considerable amount of the variability in consumers' choices arises from their origin. In another cross-country analysis conducted by Perrouty et al. [27] considering France, Austria, Germany and the United Kingdom, the region of origin emerged as the most important attribute for wine selection, both for expert and regular consumers in all the considered countries. Therefore, cross-country comparisons are needed to get a clearer picture of the role of wine attributes. Conversely, in the same study, comparing expert and regular consumers, the price perception changed between the two groups. In fact, moving on to price, this attribute can also be considered an important factor in consumer choices, as those concerned about price were less willing to pay for organic wine [28]. Regarding the quantification of the utility derived from price attribute levels, unlike other food products where price is predominant [29], in the case of wine it may also be a secondary attribute [30].

1.1 Objectives and research questions

Considering the importance of product valorisation and the need to market better products based on communicating the quality characteristics of wine, the general aim of this study is to identify which credence attributes and attribute levels are most valued by consumers in three different countries of the European Union and to compare the results across these countries. The wine attributes price, production method, geographical indication and product origin were chosen to be compared using a conjoint experiment.

The general aim was analysed in depth through the following research questions:

1) Which wine attributes and attribute levels are most valued by European consumers?

2) Are there differences in the perception of wine characteristics by consumers in different EU countries?

3) Is it possible to segment European consumers according to different wine attributes and attribute levels?

This study enables a better understanding of the factors that drive consumers towards wine consumption. In particular, by developing a cross-country evaluation, it will be possible to understand how preferences differ in various European countries and thus gain deeper insights regarding the role of the selected credence attributes in wine differentiation. Furthermore, to the best of our knowledge, this article is the first attempt to compare consumer interest in biodynamic certification as a production method in a cross-country evaluation. As for the other attributes, this is the first time they are combined, analysed and compared in a study involving France, Greece and Italy.

Following the introductory section, the article is organised into four parts: Methodology, in which data collection, conjoint experiment and inferential statistics are addressed; Results, in which the results are explained; Discussion, which aims to compare the results with the current literature; Conclusion, in which the main findings, implications, limitations and future perspectives of the research are summarised.

2. Methodology

2.1 Data collection

To collect data on European consumer interests in different aspects of wine consumption, a multi-section survey was developed using Google Forms. The questionnaire consisted of four sections as follows: (1) Conjoint experiment; (2) General wine consumption habits and characteristics; (3) Consumer beliefs regarding intrinsic and extrinsic characteristics of wine; (4) Socio-demographic features of the respondents. Data collection took place in early 2020 by sharing a link generated by Google Forms on several social networks and specialised wine consumption forums found in Greece,

France, and Italy. The choice of specialised forums was made to boost the likelihood of collecting data from current wine consumers and thus improve the reliability of the responses. The study focuses on the data of the conjoint experiment and the socio-demographic characteristics that are required to meet the research questions. Regarding the conjoint experiment, a detailed explanation will be provided in a specific methodology sub-section; while in the other sections, questions were asked using binary questions (yes/no) and on a 5-points Likert scale. A total of 506 questionnaires were collected and used for statistical processing after a consistency check of the answers. Indeed, as a preliminary step to data analysis, a data cleaning process was performed in which variables were coded and missing values and inconsistent values, defined as out-of- Likert scale values, were searched for. In fact, responses presenting inconsistent values were dropped because they were considered unreliable due to the possible low cognitive effort used by the respondent. Missing values were also discarded. A total of 592 records were present in the first database from which 86 responses were removed, representing approximately 14.5%. The socio-demographic characteristics of the respondents located in the cleaned database are shown in Table 1. Details on the composition of the sample are described in the Annex 1, which shows an equal distribution across countries, gender and age; also reporting a comparison with the 2020 Census of the population of the three countries, which highlights the limitations of socio-demographic representativeness of the sample, considering the difficulty of interviewing consumers in a pandemic period.

Tab.1 Characteristics of the sample (n = 506)

Variables	Items	Frequency	Percent
Gender	Male	279	55.14
	Female	227	44.86
Age	18-35	293	57.91
	36-50	122	24.11
	over 50	91	17.98
Family members	1-2	208	41.11
	3-4	241	47.63
	>4	57	11.26
Education	Middle school	14	2.77
	High school	95	18.77
	University degree	212	41.90
	Postgraduate	185	36.56
Income	Up to 1000€/month	54	10.67
	1001-2000	131	25.89
	2001-3000	108	21.34
	3001-4000	69	13.64
	>4000	62	12.25

	No answers	82	16.21
Countries	Italy	178	35.18
	France	184	36.36
	Greece	144	28.46

2.2 Conjoint analysis

A conjoint experiment based on the linear hypothesis was chosen to assess the value given by consumers to different wine attribute rankings. The study included four wine credence attributes with different levels indicated in table 2. Concerning the selection of price levels, this attribute was selected by direct market analysis conducted in large retail chains and specialized stores in the countries under study: the average price observed during the data collection period was chosen as the central value, while the range was determined with a percentage deviation of 20% [25]. No substantial differences were found between the three considered markets, so it was chosen to use the same price in the survey in the three countries. Another aspect to contemplate concerning the choice of attributes is the introduction of Geographical indication as a general presence of PDO and PGI certifications. This approach aims to derive an average level of utility not specific for these certifications. This choice was developed based on two closely related considerations. The first is a methodological constraint. As noted by [31] , to maximize the reliability of estimates and obtain dependable responses, the number of cards in conjoint ranking experiments should be limited to facilitate the classification task for consumers. In fact, the orthogonal design has proven to be a useful tool for minimizing the number of cards, thereby preserving the reliability of responses and, consequently, the estimates [32]. However, if the GI attribute had been considered with three levels, the minimum number of cards would have increased, thus making the classification task more challenging for consumers. The second consideration is related to the novelty of the product. Given the model constrictions in terms of number of cards and considering the novelty derived from the introduction of the biodynamic certification, GIs were treated as an attribute with two levels, while the production method had three, facilitating comparison among conventional, organic, and biodynamic.

The model yields a variety of valuable insights into consumer preferences, including the mean relative importance for food attributes as a weight of attribute values [33,34] and part-worth utilities for attribute levels [30]. Moreover, when the linear model is adopted, the part-worth utilities that can be considered as regression coefficients, can be interpreted as marginal probabilities [35]. In this context, the econometric model enabling the estimation of part-worths can be formalised as indicated in Equation 1.

$$y_k = \sum_{j=1}^{J} \beta_j \, x_{jk} \quad (1)$$

Where y_k is the utility perceived by consumers for *k*-th stimulus represented by the number of cards ($k = 1,\ldots, k$). β_j the coefficients of the regression that in the ranking conjoint are also considered as utility levels. Finally, x_{jk} represent the variables adopted in the model or the attributes levels as a matrix of dummy variables [36]. Similarly, to other studies [31,37] goodness of fit of the model was evaluated using Person's *R* and Kendall's Tau which are indicators of the correlation between observed and estimated preferences. Considering the high values obtained, the models were deemed robust for analysing the results.

Tab. 2 Attributes and levels adopted in the conjoint analysis

Attributes	**Attribute levels**
Price	Low (4.00€/bottle); middle (6.00€/bottle); high (8.00€/bottle)
Production method	Conventional, organic, biodynamic
PDO/PGI	None; yes
Origin	Local, national, imported

To determine the best conjoint model to administer, two important issues must be addressed: maximising both the efficiency of the model and the consumer responses [32]. When ranking conjoint analysis based on ordinary least squares (OLS) is used, as in this study, these issues are solved using an orthogonal design [32]. The orthogonal design can be considered the principal experimental design for maximising the information obtained from product profiles, while avoiding cognitive overload for consumers [31]. An orthogonal design can be derived from a full factorial design, which cannot be used in data collection since the number of profiles represents all possible combinations of attribute levels, generating a defined number of cards that are difficult for consumers to manage [38]. This strategy allows the experiment to be administered to consumers, reducing the cognitive effort required for the task assigned to them, i.e., to rank the cards or products profiles compared to a full factorial design [31,37]. Moreover, generating an orthogonal design produce uncorrelated product profiles, avoiding overlap among attributes levels, preserving model efficiency and solving multicollinearity issues [29]. Based on these considerations, an orthogonal design was applied in the study to the attributes and attribute levels, resulting in nine conjoint cards shown in Table 3. To improve readability, a visual representation of the conjoint cards is presented in Annex 2.

Tab.3 Card profile used in the conjoint experiment

Card	Price	Production method	PDO/PGI	Origin
1	High	Organic	None	Local
2	High	Biodynamic	None	National
3	Mid	Conventional	None	National
4	Mid	Biodynamic	Yes	Local
5	Mid	Organic	None	Imported
6	Low	Biodynamic	None	Imported
7	Low	Conventional	None	Local
8	High	Conventional	Yes	Imported
9	Low	Organic	Yes	National

We chose not to describe the attributes used in the experimental design to minimize biases like social desirability and cognitive bias [39]. By avoiding detailed explanations, respondents are more likely to provide genuine evaluations based on their impressions and experiences. This approach is especially relevant for credence attributes, such as the "local" attribute, which underscores the wine's connection to its origin—encompassing terroir, climate, soil, and winemaking traditions. The interpretation of "local" can vary widely, from wines produced within a small village to those from a broader wine region, depending on the individual's knowledge and experience [40]. Local wines are often appreciated for their authenticity and reflection of regional heritage.

The conjoint analysis was performed twice: the first on the entire sample, to answer the first research question, and the second by dividing the responses according to country of origin, to answer the second research question. The second analysis produced results for each country in which data was collected. To determine whether there were significant differences between the part-worth utilities of the attribute levels, according to the origin of the consumers, the ANOVA model was applied [29].

2.3 Cluster analysis

To answer the third research question, the Conjoint analysis was further explored by applying a cluster analysis based on the Ward method, which enables the development of groups with high within-group homogeneity [41] using squared Euclidean distances between observations [42]. Indeed, the first analysis provides a personal utility pattern for each consumer that can be considered as an individual preference towards the level of attributes employed in the design [30]. These utility patterns can be clustered, obtaining homogeneous groups of consumers [31,34,43]. When cluster analysis is applied, one question should be addressed: which cluster solution should be used? Different strategies can be adopted, but in this study the best cluster solution was evaluated using the Dunn index, which assesses separations among cluster and internal compactness [44]. The highest index value was found for the three-clusters solution. Once the clusters were obtained, the ANOVA

model was applied to evaluate significant differences among the utility patterns [30,43]. In addition, the chi-square test was chosen to assess differences in the frequencies of socio-demographic characteristics among clusters [45].

All analyses were performed using IBM SPSS 27, except the best cluster solution, which was performed using the R package NbClust [46].

3. Results

3.1 Conjoint analysis outcomes

Table 4 shows the results obtained from the Conjoint Analysis performed on the whole sample of consumers. In terms of the mean relative importance calculated for each attribute among European consumers, wine origin was the most valued, followed by the production method. Price was considered as the third most important attribute, while certification of origin was the last attribute. To gain insights into the role of the attribute level, the evaluation of utility estimation coefficients is required. Starting with price, the results suggest that European consumers prefer higher prices. As for the production method, conventional production results in negative utility, while organic production is preferred by the surveyed sample. Compared to the biodynamic method, the coefficient is close to 0, indicating that this certification is irrelevant. The presence of PDO/PGI certifications is considered an important factor for consumers, as the coefficient is quite high and positive. Finally, imported wine provides negative utility, while national and locally sourced products are appreciated by consumers, especially local wine.

Tab.4 Conjoint results based on whole sample (n=506)

Attributes	Attribute levels	Utility estimate	Mean relative importance
Price	Low price	-0.232	22.48
	Middle price	-0.047	
	High price	0.279	
Production method	Conventional	-0.630	27.40
	Organic	0.617	
	Biodynamic	0.013	
PDO/PGI	None	-0.713	20.66
	DOP/IGP	0.713	
Origin	Local	0.634	29.47
	National	0.283	
	Imported	-0.916	

Constant		5.238
Goodness of fit of the conjoint analysis	Pearson's R	0.998
	Kendall's Tau	0.944

Moving on to the second conjoint analysis, which concerns differences between countries, the results are shown in Table 5. Several significant differences were observed, indicating that various credence wine attributes may be valued differently, depending on the origin of the consumers. Regarding price, the results indicate that Italian consumers are the most interested in this attribute in terms of mean relative importance. However, no significant differences in utility estimates were observed.

Focusing on the production method, consumers from France valued this attribute the most. Significant differences were observed between conventional and organic production. In fact, French consumers are the least interested in conventional production while being the most interested in organic production. Biodynamic production was not significant, but slight differences can be observed where Italian consumers perceived a negative utility from this certification and French consumers perceived the most positive utility.

The presence of a geographical indication is the most valued by Greek consumers, both in terms of mean relative importance and utility estimate. Finally, several significant differences were observed for each level of origin attribute. Local production was preferred by consumers in France, who obtained the highest utility coefficient. Interestingly, Greek consumers are the only group indifferent to local production, obtaining the highest utility from national wine. With regard to imported wine, French consumers considered this attribute as a negative indicator of wine quality more than respondents in other countries, based on the negative utility obtained.

Tab.5 Conjoint results based on country preferences

Attributes	**Attribute levels**	**Utility Italy**	**Mean**	**Utility France**	**Mean**	**Utility Greece**	**Mean**
Price	Low price	-0.129	24.76	-0.226	21.71	-0.366	20.63
	Middle price	-0.120		-0.031		0.023	
	High price	0.249		0.257		0.343	
Production method	Conventional***	-0.328	26.38	-0.870	29.43	-0.697	26.06
	Organic**	0.468		0.755		0.623	
	Biodynamic	-0.140		0.114		0.074	
PDO/PGI	None *	-0.583	20.93	-0.747	19.90	-0.832	21.28
	DOP/IGP*	0.583		0.747		0.832	
Origin	Local ***	0.781	27.93	1.051	28.96	-0.081	32.03
	National ***	-0.088		0.034		1.058	
	Imported ***	-0.693		-1.085		-0.977	
Constant *		5.194		5.249		5.277	

Goodness of fit of the conjoint analysis	Pearson's R	0.996	1.000	0.997
	Kendall's Tau	0.944	1.000	0.944

*,**,*** significant results according to one-way ANOVA. P-value <0.01;0.05;0.001, respectively.

305

306 *3.2 Cluster analysis outcomes*

307 Cluster analysis was performed on the consumer part-worth utility pattern to achieve a deeper
308 understanding of European consumers based on similarity in attribute preferences and socio-
309 demographic characteristics. ANOVA and chi-square tests, performed on the utility patterns and
310 socio-demographic frequencies respectively, revealed several significant differences. Table 6 shows
311 the results of the cluster analysis in terms of mean relative importance and utility estimates, while
312 Table 7 shows the distribution of socio-demographic data among the clusters.
313 Starting with cluster 1, the results indicate that these consumers are most interested in the price and
314 origin attributes, when considering the indicator of mean relative importance. They perceive the
315 highest utility for medium- and high-priced wine, indicating that the attribute could be considered as
316 a quality indicator for this group. In addition, this cluster places the highest importance to nationally
317 produced wine. Finally, consumers in this group do not consider the geographical indication
318 certification and perceive a slight utility for organic production. Based on these considerations, this
319 cluster can be named **"High price and nation-specific"**. In terms of socio-demographic
320 characteristics, this group includes middle and older age consumers with a high school diploma and
321 an income of over €4000 per month.
322 The second group obtained the highest mean relative importance for the PDO/PGI certification
323 attribute and the second highest for the production method and origin. Considering utility terms, these
324 consumers are very attentive to PDO/PGI certifications: in fact, the coefficient is the highest among
325 the clusters. In terms of production method, the cluster perceived the greatest utility from organic
326 certification. Interestingly, biodynamic certification is also considered in this cluster, and respondents
327 who appreciate local production and high-priced wines can also be found. Given these characteristics,
328 the cluster can be called **"Certification seekers"**. Focusing on socio-demographic characteristics,
329 the group contains mainly young consumers with a university degree and with an income of €1000-
330 2000 and 3000-4000 per month.
331 The last group has the highest mean relative importance for the production method. Remarkably, this
332 is the only group that appreciates conventional wine. Regarding the price attribute, these consumers
333 are interested in low-priced wine, while a low positive utility is obtained by organic and local products
334 in the other attributes. On the basis of these characteristics, this group can be called **"Price-sensitive**
335 **consumers"**. Analysing the socio-demographic characteristics, this cluster grouped mainly young

consumers with a high level of education and a low-intermediate level of income in the range of €1000-2000 per month.

Tab.6 Conjoint results based on cluster analysis

Attributes	Attribute levels	Utility Cl 1 (n = 80)	Mean	Utility Cl 2 (n = 301)	Mean	Utility Cl 3 (n = 125)	Mean
Price	Low price ***	-1.321	30.82	-0.348	18.78	0.744	26.05
	Middle price ***	0.642		-0.259		0.024	
	High price ***	0.679		0.607		-0.768	
Production method	Conventional***	-0.271	17.26	-1.220	27.81	0.563	32.91
	Organic***	0.208		0.849		0.317	
	Biodynamic ***	0.063		0.371		-0.880	
PDO/PGI	None ***	0.047	14.31	-1.065	22.61	-0.354	20.01
	DOP/IGP ***	-0.047		1.065		0.354	
Origin	Local ***	-0.392	37.61	1.060	30.81	0.264	21.04
	National ***	1.313		0.162		-0.085	
	Imported ***	-0.921		-1.221		-0.179	
Constant ***		4.984		5.355		5.118	
Goodness of fit of conjoint analysis	R di Pearson	0.995		1.000		0.997	
	Tau di Kendall	0.944		1.000		0.944	

*** significant results according to one-way ANOVA. P-value <0.001

Tab.7 Frequency analysis on cluster results

Variables	Items	Cluster 1	Cluster 2	Cluster 3	p-value
Gender	Male	0.63	0.53	0.55	0.328
	Female	0.38	0.47	0.45	
Age	18-35	0.45	0.59	0.62	0.067 *
	36-50	0.28	0.23	0.24	
	over 50	0.28	0.17	0.14	
Family members	1-2	0.41	0.44	0.35	0.507
	3-4	0.48	0.46	0.50	
	>4	0.11	0.10	0.15	
Education	Middle school	0.04	0.03	0.02	0.020**
	High school	0.32	0.17	0.14	
	University degree	0.30	0.45	0.42	
	Postgraduate	0.34	0.35	0.42	
Income	Up to €1000/month	0.11	0.12	0.15	0.055*
	1001-2000	0.25	0.35	0.26	
	2001-3000	0.30	0.20	0.37	
	3001-4000	0.15	0.18	0.12	
	>4000	0.18	0.15	0.11	

*,** significant results according to the chi-square test. P-value < 0.1;0.05 respectively

4. Discussion

The results obtained from the adopted models allow the research questions to be addressed, suggesting that different credence attributes and attribute levels influence the behaviour of wine consumers differently, also considering the different countries of origin of the individuals.

Starting with the first research question, it emerges that wine attributes are valued differently by consumers. Among the evaluated attributes, the origin of the product is considered the most important for European wine consumers. This result is partially in line with current literature suggesting the importance of wine origin [47]. In fact, various studies suggest that the origin of wine is a critical information for consumers [48].

Moreover, our study confirms the negative utility derived from imported wine [49,50], highlighting the strong impact of the cultural and national identity on wine choice [51]. The results are also consistent with the study of [26], who found price and origin as the most important attributes for wine selection.

Production methods represent the second most important attribute, confirming the current trend among wine consumers who consider this characteristic extremely important for product choices [49]. The attribute levels provide different utility scores; in fact, an organic label is preferred over biodynamic certification, which seems to be indifferent for consumers. This result confirms current literature indicating that biodynamic certification may only interest to a limited portion of consumers. In fact, consumers are less willing to pay for biodynamic wine than for organic wine [20].

The study highlights that price is an important driver of wine consumer choices [24,26]; in particular, a higher price provides greater utility, suggesting that consumers consider price as a sign of quality, as observed in Barcelona [22] or in Germany [52]. This result is also supported by consumer literature, since the importance of price as a sign of quality is typical of consumer science and can also be found in other products [34,53,54]. Moreover, when compared with other wine characteristics, price can also represent a secondary driver of consumer preferences [5]. However, in many cases, a high price doesn't guarantee high quality. Factors such as branding and scarcity can inflate the price of a wine without necessarily reflecting its intrinsic quality, and in the presence of limited knowledge, wine prices act as information tool to evaluate the quality [7,55]. Furthermore, the relationship between price and quality can vary depending on the wine market, region, and grape variety [55,56]. In some cases, lesser-known wineries may produce high-quality wines at relatively affordable prices, while well-established brands may command higher prices based on reputation rather than quality alone [57].

It is interesting that the geographical indications, such as PDO and PGI, obtained the least mean relative importance score. This result indicates that when certification of origin is compared with

other attributes, it might have secondary importance in consumer choices. However, the results do not contradict the literature when adopting the multi-attribute evaluation method as an estimation tool [14,58]. The utility estimate for certification is very high, indicating that consumers positively value such characteristic [5].

Proceeding to address the second research question, this study reveals regional differences among wine consumers, affirmatively answering the question. These findings constitute a significant novel aspect of this paper. Notably, to the best of our knowledge, no study has compared Italian consumers with Greek or Greek with French wine consumers. Conversely, only a couple of studies have conducted cross-country analyses between Italian and French consumers [59,60]. Starting with the price attribute, no significant differences were found between countries, suggesting that this attribute is perceived similarly by consumers. This outcome can be explained by the high importance given by wine consumers to price, as indicated in studies conducted in different European countries [52,61,62]. The conventional production method provided the least utility to French consumers. This outcome, coupled with the highest perceived utility of organic and PDO certification, suggests that French consumers are particularly attentive to wine quality certification. These results partially confirm existing literature on cross-country analyses, where French consumers are attentive to wine quality [47] and interested in organic production [60]. An important outcome is related to the utility perceived by biodynamic certification, which provides a slightly positive utility only to Greek consumers, suggesting that market opportunities are mainly in this country. Regarding local production, these products are mainly appreciated by French consumers, followed by Italian consumers, confirming the interest in this attribute [60,63]. French and Italian consumers have a strong cultural emphasis on traditional foods and beverages, including wine. They are often more familiar with local wine varieties, grape cultivars, and winemaking techniques than with wines from other regions or countries. This familiarity breeds a sense of comfort and trust in local products, making them a preferred choice [64,65].

Moreover, a remarkable result emerged: Greek consumers exhibit a greater interest in national wine rather than in products from specific territories. An indirect explanation may lie in the Greek wine market's export-oriented nature, thereby reducing the importance of local production [66].

European consumers were effectively clustered, facilitating an answer to the third research question. The first identified group, called "Higher-priced and nation-specific seekers" displayed a connection between high price and higher income, consistent with existing literature. High-income consumers may perceive expensive wines as being of higher quality or prestige due to their higher price points. They may be willing to pay a premium for wines that are perceived as luxurious or exclusive, regardless of their actual intrinsic quality [67]. Furthermore, the link between older consumers and

high price is reaffirmed, as these respondents are more willing to pay for wine [28]. The connection between national wine and income could be attributed to variety-seeking behaviour [57]. In fact, opting for national wines over local ones may broaden choices, given the availability of numerous products.

The "Certification seekers" cluster was identified, in which the connection between younger consumers and different certifications was highlighted. This result is in line with current literature, in which younger people show a higher attitude towards certified wine [48] and confirms the results obtained by Capitello and Sirieix (2019) [60], who found that the organic attribute needs a high level of education to be properly appreciated by consumers. In addition, this paper confirms the importance given by younger generations to the Geographical Indications of wine [6].

Finally, our results suggest that consumers with high incomes are also interested in wine quality certification [65]. However, it is also possible that individuals with average incomes are interested in organic and PDO wine.

The last cluster was called "Price-sensitive consumers" and groups younger generations with low-intermediate incomes. The results are in line with current literature, since younger generations may have lower incomes, making them primarily price-driven, and thus price-sensitive consumers [6,65]. Low-income individuals often have limited disposable income, making affordability a primary concern when choosing wines. Price-sensitive consumers are more likely to opt for lower-priced wines that fit within their budget constraints [68]. This peculiar attitude was also found in other agri-food products, suggesting the importance of this cluster in consumer science [69,70].

5. Conclusion

5.1 Main findings

This study sheds light on some important information from the conjoint ranking experiment, which enables the role of different wine credence attributes among consumers in Greece, France and Italy to be estimated. Based on the conjoint model performed on the overall sample, origin appears to be the most important factor in terms of mean relative importance and the local origin of the wine provided greater utility than the national or imported product. Among the production method levels, organic wine was the most valued by consumers, while biodynamic was considered indifferent as the coefficient was close to zero. Concerning price, consumers were mainly interested in high-priced products. Finally, the geographical indication was the least important attribute in terms of mean relative importance. However, the high estimated utility coefficient for the presence of GIs suggests that this attribute is highly valued by consumers.

Differences between countries were observed, particularly in terms of the utility derived from the

organic method, which was higher for French consumers, as well as the importance attached to GIs. Regarding the origin of the product, French and Italian consumers were mainly attracted by the local product, while Greek consumers by national wine.

Three distinct groups were identified and named: High price and national wine seekers; Certification seekers and Price-sensitive. Inferential tests suggest that age, income and education can be used to characterise wine consumers.

5.2 Implications

This work provides several implications for both academics and business. It represents the first evaluation comparing consumers perceptions of biodynamic certification across multiple countries. On the producer side, several indications emerge that can aid in differentiating wine production and achieving higher income. The role of certifications such as GI and organic is reaffirmed confirmed as effective tools for enhancing wine marketing. Indeed, in France and Italy, consumers are more interested in local production that can be enhanced by organic, PDO or PGI indications. Finally, biodynamic was found to play a marginal role in each country, suggesting its limited effectiveness.

5.3 Limitations and further research

The study has a number of limitations that are worthy to be discussed to help readers to interpret the results. The first limitation is related to the sample; in fact, since the sampling was carried out online, a limited selection of consumers in terms of gender, age group and income was possible, which is more easily done in the case of face-to-face interviews. Therefore, the sample could be unbalanced for certain socio-demographic aspects, limiting the possibility of inferring the entire population. These limitations in data collection are mainly due to the need to collect data online for the limits imposed in the pandemic period by COVID-19 in 2020.

The second limitation is attributable to the methodology itself. While conjoint analysis is a valuable tool in marketing analysis, the number of attributes that can be included is limited, potentially influencing the importance derived from the combination of attributes used in the analysis. Additionally, the use of Geographical indications (PDO, PGI) in the orthogonal design with two levels (presence or absence) may have resulted in an average utility level, rather than a specific one for these certifications.

Future steps in the analysis may include evaluating the willingness to pay for different attributes, including biodynamic, in a cross-country evaluation, covering the same countries evaluated in this paper or others. In addition, the effectiveness of other combinations of attributes as wine differentiators can be tested.

Declaration of interests

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