

Article

Consumer Knowledge and Preferences for Organic and Sustainably Certified Wines: Lessons from the DACH Region—Germany, Austria, and Switzerland

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Abstract: The DACH geographic region comprises three countries in central Europe: Germany, Austria, and Switzerland. This study seeks to both understand the motivations for purchasing organic and sustainably certified wines in this region and identifies which type of consumer should be targeted for the continued growth of this wine sector. Our methodology includes an online questionnaire resulting in a sample size of 4553 respondents, evenly broken down by country. Our analysis includes simple statistics and more advanced statistical analysis of the dataset. Our results indicate that there is a correlation between wine knowledge, environmental awareness, and the likelihood of buying eco-certified wines. We find that those who are self-proclaimed wine experts have a higher willingness to pay for organic or sustainable certified wines. These customers are generally middle aged, most often male, live in multi-person households, have pursued some level of higher education, and many are self-employed. We believe this study captures the growing trend of organic and sustainable wine certifications. It also identifies who is already convinced and who will need more marketing/education before they are ready to buy organic or sustainable wine.

Keywords: wine; organic; sustainable; consumer behavior; central Europe; willingness to pay



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1. Introduction

Consumers are becoming more aware when they purchase food and beverages, especially in the DACH geographic region. The DACH is a three-country region in central Europe which includes Germany (D for Deutschland), Austria (A), and Switzerland (CH for Confoederatio Helvetica). These three countries are at the crossroads of the European continent and, combined, are an international economic stronghold. While their wine production is not the largest in Europe, their consumption and purchasing power are strong (see Table 1). It is therefore important to understand what type of customer wants eco-certified wines in this region. Our study attempts to identify which type of consumer would most likely purchase organic or sustainable wine and has a willingness to pay for this type of certification in the DACH.

Table 1. Base data for DACH countries.

Country	Germany	Austria	Switzerland
Population (2022) [#]	84,080,000	9,043,000	8,777,000
GDP per capita (2022 USD) [#]	48,718	52,085	93,260
Vineyard surface area (2021 ha) [*]	103,421	44,912	14,629

Table 1. Cont.

Country	Germany	Austria	Switzerland
Wine production (2021 hl) *	8,448,000	2,460,000	609,000
Wine consumption (2021 hl) *	19,900,000	2,360,000	2,551,000
Wine exports (2021 hl) *	3,689,000	690,000	13,000
Wine imports (2021 hl) *	14,781,000	750,000	1,900,000

[1], * [2].

The eco-friendly food market is very successful in the DACH. Austria's organic market is growing continuously. Sales of organic food in 2016 were 1.64 billion euros, 1.84 billion euros in 2017, and reached a new high of over 2.3 billion euros in 2020. In Germany, organic food generated a market share of 6.8% in 2021 with sales of 15.87 billion euros. In Switzerland, the share in 2021 was over 10% and 4.11 billion euros. This healthy lifestyle, combined with a growth in the purchase of organic food and drinks, leads to increased sales [3–5]. Even though it is a small share of food and drink consumption, wine is also undergoing significant growth in the organic and sustainable market share.

Across the European Union, certified organic wine production has increased from around ten million hectares in 2012 to 14.7 million hectares in 2020 (from 5.66 to around 9% of the total EU agricultural area in eight years). In Europe, Austria is in first place when it comes to organic wine as a percentage. They have 25.33% of their planted wine grape area certified as organic [6]. Given this growth, this research seeks to understand which type of consumer will buy organic or sustainable wine, specifically in this region.

We achieve this by asking 4553 consumers about their purchasing behavior in Austria, Germany, and German-speaking Switzerland. We dissect the consumer respondent into three market segments: basic wine consumers (hereby known as segment 1), self-reported wine connoisseurs (segment 2), and price-conscious buyers (segment 3) and then attempt to correlate the purchasing behaviors with their attitudes and willingness to pay (WTP) for organic and sustainable wine.

Our hypothesis is that the consumers who believe they are most knowledgeable with respect to wine (segment 2) will be most educated, interested in, and have the highest willingness to pay for organic and sustainable wine in the DACH region. Before we analyze the data, we attempt to clarify what eco-labelled wine is, why people should care about sustainable wine consumption, and also discuss the existing literature about willingness to pay for eco-certified wines.

1.1. What Is Eco-Labelled Wine?

Eco-labelled wine can be described as wine that has been certified as sustainable, organic, biodynamic, or natural. Sustainability has the broadest definition. It seeks to balance the three pillars: the environment, the economy, and the social dimension [7]. Applied to the wine industry, sustainability means that environmentally harmful actions should be kept to a minimum, economic viability should be increased, and socially acceptable actions should be considered [8]. However, sustainability is not a legally defined term and often confuses the customer [9]. Nevertheless, there is a significant amount of research that has been conducted on sustainability in the wine industry [10–14]. Sustainability certifications tend to be more comprehensive than the requirements for organic labelling.

Organic wine in the European Union, according to Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 (revised version of 01/01/2022) requires that organic farming contributes to the protection of the environment and climate, maintains long-term preservation of soil fertility, encourages high levels of biodiversity, and contributes to a toxic-free environment [15]. The new regulation (EU) 2018/848 on organic production has been in effect since 1 January 2022 [15]. According to the regulation, organic viticulture is subject to the same regulations as processed ecological/organic food. Organic wine must be made exclusively from and with the help of organic grape material and

means of production. This requires the exclusion of fertilizers and synthetic and systemic pesticides. The wine can be declared organic only after a completed certification, after three years, and if compliance with the organic guidelines in grape production and wine processing are met. In this case, the bottled wine must be marked with the EU organic logo, the control body code, and the proof of origin. Therefore, it should be noted that organic viticulture requires additional time and costs for the producers. Organic certification has very different processes and requirements from those seeking a biodynamic label.

The Austrian founder of anthroposophy, Rudolf Steiner, developed the biodynamic concept in the 1920s. According to Rudolf, when growing wine grapes, three principles must be observed: first, the fertility of the soil and nutrients must be ensured; second, the plants should lead a healthy life to resist diseases and pests; and third, the highest quality of food should be achieved [16]. The focus is on a holistic view of the business (people, animals, plants), closed cycles through species-rich crop rotation, animal husbandry, as well as a sustainable, philosophical-ethical orientation. Cosmic influences are also considered [12]. In addition, the farm's relationship with oneself is important. The international brand Demeter connects members around the world who follow biodynamic principles. Recognition as a Demeter operation requires meeting the conditions, time, and money before the winemaker can sell the biodynamic product with the certificate [17]. Another biodynamic certification that focuses only on wine, is respect-BIODYN. Similar to Demeter, acquiring membership is a time-consuming and costly process that requires a lot of patience and energy [18]. While there are only a couple of certifications for biodynamic wine, there are no existing certifications for natural or raw wines.

Natural wines, raw wines, or traditionally produced wines are wines of today using processes of the past. Nothing is added and the wines are an example of that year's climate and the terroir [19,20]. While it is important to define the different types of eco-certification that are achievable, in this paper we focus specifically on organic and sustainable wines.

The DACH has one of twelve existing sustainability certifications found around the world [12]. In 2011, the Austrian Winegrowers' Association started a scientific and sustainable assessment for the Austrian wine industry and began offering a certification regime in 2015. All work in the vineyard and cellar is included in an online tool in Austria. Grape production, new vineyard planting, wine production, and preparation for sale can be easily evaluated. The program's focus is to quantify the effects of and reduce greenhouse gases. In addition, they seek resource conservation and social and economic measures. Scientists rate all indicators in nine sustainability categories (climate, soil, water, energy, biodiversity, material, quality, social, and economic) with a score between +10 and −10.

Interestingly, Austria is one of only two sustainable wine certifications worldwide that makes its information publicly available [12]. The results are summarized using a spider diagram to show the company's sustainability status [21]. Companies that only grow/make wine require certification every three years, while wine trading companies and cooperatives must be certified every year. The "Sustainable Austria" label on the wine bottle guarantees compliance with the three pillars of sustainability: ecology, economy, and social issues [22].

1.2. Consumer Concerns and Perceptions

Grape and wine production has a high burden on the environment. One of the greatest liabilities is the overall impact of greenhouse gas emission for the entire supply chain (production, bottling, and transport). One study found greenhouse gas emissions along the wine production supply chain (using an Austrian case study) to be dominantly because of the bottle. The breakdown was: bottle 47% (glass production), fertilizer 12% (about half of which is nitrogen), and fuel consumption 9% [23]. Insecticides, herbicides, and fungicides in grape production do create emissions but also affect workers, wildlife, and local water quality [24]. A study by the Zurich University of Applied Sciences and the Research Institute for Organic Farming (FiBL) identifies the use of synthetic and copper-based pesticides as the largest negative environmental factor in the life cycle of (Swiss) wine. Addition-

ally, the production and transport of the glass bottles have by far the greatest negative effects [25]. These concerns, among others, might have consumers wonder how they could buy sustainable wine. These notions fall into the sub field of sustainable consumption.

Ramos-Hidalgo, Diaz-Carrion and Rodríguez-Rad [26] define sustainable consumption behavior as consumption that includes an ecological and social concern. According to their study, consumer satisfaction is higher when shoppers have a good overall relationship with sustainability. In other words, they tend to purchase items that are more eco-friendly and live more consciously with respect to environmental impact. This underscores the value of generating positive emotions and avoiding potential negative feelings following a sustainable purchase decision (on the consumer side). However, consumers need information if they are to increase their confidence in buying sustainable alternatives.

With more education, consumers will likely buy more certified wines. There is a positive correlation between consumer knowledge and their perception of organic wine. Environmentally conscious people value organic wine more [27]. However, just buying more organic or sustainable products does not necessarily mean they would be willing to pay more for the product [28]. Remember, the organic and sustainability process often comes with increased time and certification cost. Producers will want to recoup these costs to remain profitable.

1.3. Consumer Knowledge and Willingness to Pay

There are generally two types of knowledge: objective and subjective. Objective knowledge is the actual content and organization of knowledge stored in memory. Subjective knowledge is the perceived level of knowledge and confidence [29]. In consumption, this can be described as buyers' actual product knowledge and what they think they know. However, there is a third form of knowledge which comes from experience of use or familiarity. This can also influence consumer purchasing decisions based on previous product encounters [30]. These experiences can form cognitive structures in the brain to recognize the product and brand and encourage repeat purchases [31]. This forms an intrinsic experience. Customers will select wine based on intrinsic experiences and extrinsic product characteristics (external characteristics that exist without even tasting the wine) [32]. Extrinsic product attributes include price, brand, age, region of origin, and even certification. It can therefore be stated that knowledge contributes significantly to the decision-making process when buying wine [33], and that in general, wine is an information-intensive and complex product [34]. It is important to note that information about wine certifications is generally not well known or understood.

Consumers do not have great knowledge about eco-certification. Consumers often choose wine because of taste, aroma, label, value for money, and sometimes because the wine is locally grown. However, local wine does not automatically mean that it is sustainable or organic wine; rather, it refers to the proximity to the winemaker [35]. Even with organic wine there is a knowledge gap between attitudes and behavior. Accurately communicating the environmental, social, and health benefits could be the most influential approach to changing consumer attitudes and encouraging purchase [36–38]. Differentiating wine as local and sustainable is still a promising strategy for marketers and producers [39]. Nevertheless, price tends to be one of the largest indicators for purchasing [40].

Due to the variety of eco-certified wines available and their vague logo definitions, consumers often become confused [12]. Studies show that consumers choose to buy eco-certified wine when they have previously purchased eco-certified goods or wine. The willingness to pay more for eco-certified wines is not dependent on income, education, or any previous knowledge about wine [41]. Rather, those that are younger, have higher incomes, higher education, and greater wine knowledge with respect to certifications are more willing to pay more. Sometimes those with higher income and those that are male are more willing to pay, and at a premium [42].

Research has shown that 22% of consumers are willing to pay a premium of USD 5 to USD 16 for organic wines, while 19% would be willing to pay that same premium for

sustainable wines [43]. Certain countries also have a higher propensity. Consumers from countries classified as traditional wine producers (e.g., France, The Netherlands, Italy), compared to new wine producers (USA, Australia, South Africa) are more willing to buy organic wines and pay a premium for them [44,45].

However, there are still some challenges to overcome. A study in Italy found that there are prevailing prejudices towards organic and natural wines. There were some early defects with wine production when organic wines first appeared in the 1970s and 1980s, and this has created an unwillingness to pay more for some consumers. Nevertheless, more information can overcome this outdated and incorrect prejudice [46].

Given the differing results in understanding willingness to pay for eco-certified wines across consumer segments and geographic regions, this research attempts to fill the gap within the DACH region. Previous studies had significant variation with respect to target groups, backgrounds, and demographic characteristics of each study; therefore, it is important to continue the researching on this topic.

2. Materials and Methods

Our goal was to understand the consumers in Germany, Austria, and Switzerland (DACH region) to ascertain who is most likely to buy organic and sustainable wine. To accomplish this, we conducted a sample of convenience in Austria, Germany, and German-speaking Switzerland using an online questionnaire. This quantitative survey consists of forty-nine questions on wine consumption (1), wine behavior (16), knowledge of wine consumers (8), the subjective assessment of their own knowledge (2), their relationship to wine (4), willingness to pay (5), environmental awareness (1), and some screening questions (12). We asked these questions to satisfy a grant with Federal Ministry of Agriculture, Forestry, Regions, and Water Management in Austria and only part of the questions were used for this quantitative analysis.

The field work took place between 1 March and 15 March 2022 and was carried out by the market research institute Respondi AG (based in Cologne, Germany). The sample size was 4553 respondents broken down almost evenly by country: Germany (n = 1515), Austria (n = 1515), and Switzerland (n = 1523). In Switzerland, the predominantly German-speaking cantons were surveyed. The target group included men and women aged 18–74. It is important to note that only consumers who stated that they regularly buy and consume wine were able to take part in the survey.

Our analysis includes simple statistics to better understand our respondents (using Microsoft Excel) and more advanced statistical analysis of the quantitative dataset is carried out using SPSS (Statistical Package for Social Sciences v28, IBM, Armonk, NY, USA). For the advanced statistics, we first employ an exploratory factor analysis based on a principal component analysis (Varimax rotation). The Kaiser–Meyer–Olkin measure and Bartlett’s test of sphericity are used to investigate the appropriateness of the EFA results. Following the EFA, we perform a hierarchical cluster analysis to describe buyer segments, using Ward’s method with squared Euclidean distances. This includes ANOVA analyses using Scheffe post hoc tests to examine multiple comparisons.

We break down the respondents based on demographics. The respondents consist of roughly equal numbers of men and women. With respect to age, approximately twenty percent of respondents are in 26–35, 36–45, 46–55, and 56–65 age groups; approximately 10% are in the 18–25 and 66–75 groups, respectively (see Table 2).

In the online survey, the participants were asked about their place of residence. The majority stated that they lived in a rural area. In total, 61.37% of those surveyed live in rural areas, followed by 34.88% who live in urban areas. The rest (3.45%) live in a combination of rural and urban and other places of residence. With regard to profession, the majority of those surveyed (48.54%) stated that they were housekeepers, followed by non-employed people (17.90%). The remaining respondents are self-employed, in training, employees, workers, civil servants, retired, or other (sorted in descending order from 8.41% to 1.47%). Most respondents live in 2 person households (53.96%), followed by people who live alone

(27.34%). Another 17.2% live in 3–4 person households, 1.36% in 5–9 person households, and 0.13% in households with more than ten people.

Table 2. Base data of respondents.

	Germany	Austria	Switzerland	Total
Men	751	754	756	2261 (49.66%)
Women	760	758	762	2280 (50.08%)
18–25 yrs.	171	187	172	530 (11.64%)
26–35 yrs.	297	267	287	851 (18.69%)
36–45 yrs.	289	249	290	828 (18.19%)
46–55 yrs.	292	304	312	908 (19.94%)
56–65 yrs.	295	317	280	892 (19.59%)
66–75 yrs.	171	191	182	544 (11.95%)

From an education perspective, the respondents primarily have a university or technical college degree (26.36%), and people who had completed an apprenticeship (25.68%). In addition, 19.9% of those surveyed have completed their Abitur or Matura, and 15.55% have completed a vocational school. The remaining respondents state that they have completed a general secondary school, compulsory school, college, or university course (down from 7.53% to 1.74%). Only 0.18% of the respondents do not have a compulsory school degree.

3. Results

3.1. Exploratory Factor Analysis (EFA) Results

The principal component analysis (Varimax rotation) analyzing wine purchasing behavior identifies three key factors in the decision-making process when buying wine. In total, 56.2% of the variance can be explained using the three-factor solution with initial eigenvalues greater than one. The factor with the highest eigenvalue (3.0) accounted for 30.14% of the total variance. The second (1.5) and third (1.1) factors accounted for a further 15.0% and 11.1% of the variance, respectively. The Kaiser–Meyer–Olkin measure of sampling adequacy is 0.774. Bartlett’s test of sphericity is also statistically significant ($\chi^2(45) = 8457.241, p < 0.001$), which consequently indicates that it is appropriate to proceed with the factor analysis. Results of the factor analysis and the three-factor solution are displayed in Table 3.

The three key factors identified through the EFA are “wine characteristics and production method”, “quality and reputation”, and “wine labels and pricing”. Factor 3 (wine labels and pricing) achieved the highest mean value (3.23) on a scale from 1 (not applicable at all) to 5 (totally applicable); however, it also had the lowest percentage of the variance explained. However, we still believe this to be one of the most important factors when buying wine. Ratings related to factor 1 (wine characteristics and production method) achieved a mean value of 3.14. Factor 2 (quality and reputation) scored the lowest with a mean value of 2.82. This already suggests that aspects related to quality and reputation might only be important to specific (niche) target groups.

Table 3. Exploratory factor analysis results.

Factor	1	2	3
Scale item: “When deciding which wine to buy...”			
Factor 1: wine characteristics and production method			
... I pay attention to the region.	0.819	0.074	0.069
... I pay attention to the grape variety.	0.813	0.032	−0.031
... I pay attention to the vintage.	0.673	0.377	−0.032
... I pay attention to organic production.	0.456	0.425	0.125

Table 3. Cont.

Factor 2: quality and reputation			
... I rely on recommendations of experts.	0.018	0.782	0.003
... I pay attention to a high rating/medal.	0.320	0.672	0.157
... I rely on the public awareness of the brand/the winemaker.	0.142	0.593	0.092
Factor 3: wine labels and pricing			
... I pay attention to the price.	0.015	−0.264	0.755
... I rely on the information on the label.	0.126	0.247	0.660
... I pay attention to the label design.	−0.097	0.354	0.648
Percentage of variance explained	30.137	15.000	11.073
Eigenvalue	3.014	1.500	1.107
Average inter-item correlation	0.394	0.347	0.238
Mean	3.14	2.82	3.23

Note: 5 point scale (1 = not applicable at all to 5 = totally applicable).

3.2. Results of the Cluster Analysis

Following the EFA, a hierarchical cluster analysis was carried out using SPSS 28.0 to describe buyer segments. Ward's method with squared Euclidean distances was applied here. A three-cluster solution was found to be the most discriminatory. Figure 1 displays the dendrogram showing the hierarchical relationship between objects based on their (dis)similarity. When investigating the clades shown in this dendrogram, it confirmed our decision to proceed with a three-cluster solution.

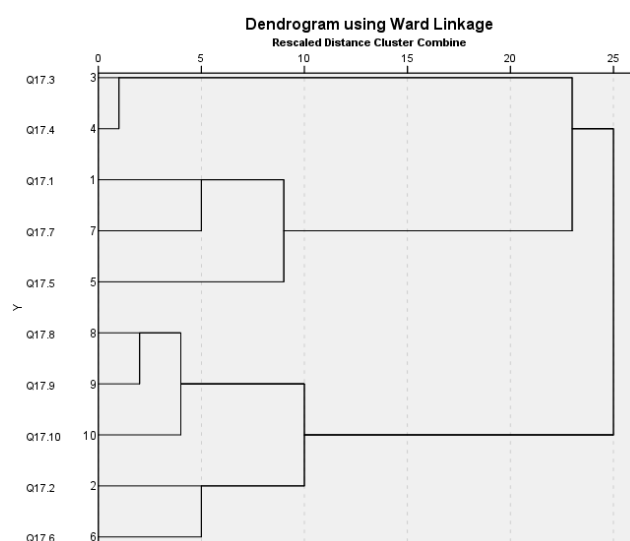


Figure 1. EFA results.

Next, ANOVA analyses using Scheffe post hoc multiple comparisons were performed to study the three segments and their differences. These results are presented in Tables 4–7 and will focus on the demographic structure, wine drinking/buying behavior, perception/attitudes, and willingness to pay for our three consumer segments, respectively.

Table 4 focuses specifically on the demographic structure of the three segments. First, we find respondents in segments 2 and 3 show a similar mean age (48.65 and 47.89), while segment 1 (basic wine buyers) are significantly younger with a mean age of 38.27 years. Next, there is an interesting breakdown between countries. While the segments of connoisseur wine buyers (segment 2) and price-conscious buyers (segment 3) are the predominant types in all three countries, interestingly, Germany and Austria have much higher percentage of price-conscious buyers (segment 3) compared to Switzerland, where a higher share of basic wine buyers (segment 1) and connoisseur wine buyers (segment 2) can be found. Furthermore, almost half of the male respondents can be classified as price-conscious

buyers (segment 3), while the distribution among females is more balanced. Furthermore, when we investigated how environmentally conscious consumers self-identified, it was interesting to see that connoisseur wine buyers (segment 2) claim to be more eco-friendly than price-conscious buyers (segment 3) and basic wine buyers (segment 1). Given these results we further analyzed the wine drinking and buying behavior of these three segments in the DACH region (Table 5).

Table 4. Market segments based on hierarchical cluster analysis—demographics.

Variables	Segment 1 Basic Wine Buyer (B) N = 1070	Segment 2 Connoisseur Wine Buyer (C) N = 1582	Segment 3 Price-Conscious Buyer (P) N = 1901	Sig. Level	Group Differences
Age	38.27	48.65	47.89	<0.001	B < P = C
Country					
Switzerland	25.6%	37.0%	37.4%		
Germany	21.8%	34.3%	43.9%		
Austria	23.0%	33.0%	44.0%		
Gender					
Male	17.2%	36.6%	46.2%		
Female	29.6%	32.9%	37.4%		
<i>Personal identification as an environmentally conscious consumer:</i>					
I am an environmentally conscious consumer.	3.35	3.82	3.26	<0.001	P < B < C
I am interested in sustainable consumption.	3.54	3.91	3.25	<0.001	P < B < C
I buy eco-friendly products because I feel it is more sustainable.	3.48	3.91	3.22	<0.001	P < B < C

Notes on scales and measurements: personal identification as an environmentally conscious consumer—"1" does not apply at all—"5" totally applies.

Table 5. Market segments based on hierarchical cluster analysis—wine drinking/buying behavior.

Variables	Segment 1 Basic Wine Buyer (B) N = 1070	Segment 2 Connoisseur Wine Buyer (C) N = 1582	Segment 3 Price Conscious Buyer (P) N = 1901	Sig. Level	Group Differences
<i>Wine buying behavior:</i>					
Average number of wine bottles bought per month	2.67	4.56	3.95	<0.001	B < P < C
Average frequency of drinking wine per week	1.51	2.18	1.95	<0.001	B < P < C
Frequ. of buying wine in supermarkets	3.85	3.54	3.52	<0.001	P = C < B
Frequ. of buying wine in wine shops (on-/offline)	1.80	2.49	1.92	<0.001	B < P < C
Frequ. of buying wine directly at the winery (on-/offline)	1.77	2.53	2.09	<0.001	B < P < C
<i>Wine drinking behavior:</i>					
At the end of the week/day	15.9%	17.5%	21.5%		
Together with a dish	20.1%	31.7%	25.8%		
On special occasions/festivities	23.6%	15.2%	15.9%		
Spending time with family/friends	39.3%	34.8%	35.9%		
<i>Knowledge on wine production methods:</i>					
Organic wine	3.05	3.63	2.85	<0.001	P < B < C
Sustainable wine	2.45	3.05	2.15	<0.001	P < B < C
Conventional wine	3.57	3.97	3.50	<0.001	P = B < C

Notes on scales and measurements: frequency of buying—"1" never—"5" very frequently; knowledge on wine production methods: "1" not known—"5" very well known.

Table 6. Market segments based on hierarchical cluster analysis—perception, importance, and attitude ratings.

Variables	Segment 1 Basic Wine Buyer (B) N = 1070	Segment 2 Connoisseur Wine Buyer (C) N = 1582	Segment 3 Price Conscious Buyer (P) N = 1901	Sig. Level	Group Differences
<i>Perceptions of wine production methods and their importance:</i>					
Reduction of CO ₂ emissions.	3.67	3.92	3.39	<0.001	P < B < C
Biodiversity to allow less use of pesticides.	3.41	3.81	3.43	<0.001	B = P < C
Resource-saving through sustainable production.	3.79	4.04	3.63	<0.001	P < B < C
Social standards (e.g., employee welfare).	3.42	3.63	3.15	<0.001	P < B < C
No fertilization to ensure higher quality of wine.	3.25	3.49	3.08	<0.001	P < B < C
Organic wine tastes more acidic.	2.65	2.61	2.50	<0.001	P < C = B
<i>Importance of specific aspects when buying wine:</i>					
When buying organically produced wine, I am sure that the environment has been spared.	3.36	3.65	3.06	<0.001	P < B < C
When buying sustainably produced wine, I have the feeling that I have promoted regionality.	3.59	3.83	3.29	<0.001	P < B < C
When buying wine, it should be clear whether the wine is organically, sustainably, or conventionally produced.	4.07	4.27	3.85	<0.001	P < B < C
Clear labeling of whether herbicides such as Glyphosate have been used.	4.10	4.36	3.95	<0.001	P < B < C
It should be clearly shown that there is a low greenhouse gas balance (CO ₂ footprint).	3.64	3.88	3.25	<0.001	P < B < C
Indication that no sulfur (sulfites) has been added to the wine.	3.92	4.23	3.91	<0.001	P < B < C
During production, attention was paid to the well-being of the employees.	3.58	3.79	3.29	<0.001	P < B < C
<i>Importance of label specific aspects when buying wine:</i>					
Lightweight bottle to conserve resources.	3.10	3.25	2.69	<0.001	P < B < C
Hand-picked grapes.	3.06	3.58	2.90	<0.001	P < B < C
Use of renewable energies and green energy.	3.43	3.74	3.08	<0.001	P < B < C
Supporting the wine-growing region.	3.93	4.23	3.77	<0.001	P < B < C
Well-being of the employees beyond legal obligation.	3.58	3.83	3.31	<0.001	P < B < C
No herbicides (weed killers) were used.	3.97	4.29	3.83	<0.001	P < B < C
Indication of the CO ₂ footprint.	3.31	3.66	2.96	<0.001	P < B < C
Production method (organic, sustainable, conventional).	3.87	4.23	3.66	<0.001	P < B < C
Indication of the allergy-causing content of histamine.	3.61	3.84	3.35	<0.001	P < B < C
Nutritional value (calories).	2.61	2.79	2.31	<0.001	P < B < C
<i>Knowledge related to organically grown wine:</i>					
Compared to an average person, I know a lot about sustainable wine.	2.13	2.81	2.10	<0.001	P = B < C
I know a lot about how to evaluate the quality of sustainable wine.	2.00	2.73	1.97	<0.001	P = B < C
People who know me would say that I am well versed in sustainable wine.	1.81	2.56	1.79	<0.001	P = B < C
<i>Attitudes towards organically grown wine:</i>					
I am very interested in sustainable wine.	2.62	3.32	2.38	<0.001	P < B < C
Sustainable wine plays an important role in my life.	2.25	2.98	2.00	<0.001	P < B < C
I enjoy drinking sustainable wine.	2.93	3.45	2.56	<0.001	P < B < C
Buying sustainable wine makes me feel like I am contributing to sustainability.	3.53	3.81	3.02	<0.001	P < B < C
Buying sustainable wine makes me feel like I am acting ethically correct.	3.49	3.74	2.94	<0.001	P < B < C
A person buying sustainable wine acts responsibly.	3.28	3.63	2.90	<0.001	P < B < C
Purchasing sustainable wine has a positive connotation.	3.66	3.90	3.27	<0.001	P < B < C

Table 6. Cont.

Variables	Segment 1 Basic Wine Buyer (B) N = 1070	Segment 2 Connoisseur Wine Buyer (C) N = 1582	Segment 3 Price Conscious Buyer (P) N = 1901	Sig. Level	Group Differences
Buying sustainable wine is smart.	3.56	3.85	3.21	<0.001	P < B < C
The purchase of sustainable wine is an important contribution for future generations.	3.63	3.91	3.26	<0.001	P < B < C

Notes on scales and measurements: perceptions of wine production methods and their importance—“1” does not apply at all—“5” totally applies; importance of wine production specific aspects when buying wine—“1” does not apply at all—“5” totally applies; importance of label specific aspects when buying wine—“1” not important at all—“5” very important; knowledge related to organically grown wine—“1” does not apply at all—“5” totally applies; attitudes towards organically grown wine—“1” does not apply at all—“5” totally applies; personal identification as an environmentally conscious consumer—“1” does not apply at all—“5” totally applies.

Table 7. Market segments based on hierarchical cluster analysis—willingness to pay.

Variables	Segment 1 Basic Wine Buyer (B) N = 1070	Segment 2 Connoisseur Wine Buyer (C) N = 1582	Segment 3 Price Conscious Buyer (P) N = 1901	Sig. Level	Group Differences
<i>Willingness to pay:</i>					
Optimum price for a bottle of organic wine (in EUR)	10.96	12.35	9.99	<0.001	B = P < C
Too high for a bottle of organic wine (in EUR)	27.64	26.95	21.64	<0.001	P < B = C
Too low for a bottle of organic wine (in EUR)	5.19	5.84	4.97	<0.01	B = P < C
<i>Willingness to pay more for organic wine:</i>					
I am willing to pay more for sustainable wine.	3.52	3.76	3.16	<0.001	P < B < C
... if there is an organic label on the bottle.	3.19	3.48	2.62	<0.001	P < B < C
... if I know that the CO ₂ load has been reduced.	3.26	3.56	2.78	<0.001	P < B < C
... if it was produced regionally.	3.70	3.98	3.45	<0.001	P < B < C
... if I know the winemaker/winery.	3.59	3.95	3.47	<0.001	P < B < C
... when I know that the wine contains less or no sulfur.	3.35	3.8	3.12	<0.001	P < B < C
... if there is a sustainability label on the bottle.	3.26	3.59	2.74	<0.001	P < B < C
... if the grapes grow in a special location.	2.99	3.73	2.96	<0.001	P = B < C

Notes on scales and measurements: willingness to pay more for organic wine—“1” does not apply at all—“5” totally applies.

When investigating wine buying and drinking behavior (Table 5 above), it was found that there are big differences in buying and drinking behaviors between the three segments. Basic wine buyers (segment 1) buy and consume significantly lower amounts compared to price-conscious buyers (segment 3), who in turn buy and consume significantly lower amounts compared to connoisseur wine buyers (segment 2). Where they buy wine also differed. Basic wine buyers (segment 1) buy wines in supermarkets more frequently. Price-conscious buyers (segment 3) tend to purchase wine in wine shops and directly at the winery. Connoisseur wine buyers (segment 2), seem to buy wine throughout all methods evenly.

With respect to knowledge about eco-certified wines, our findings identify that the connoisseur wine buyers (segment 2) have the highest self-reported knowledge of organic

and sustainable wine production methods. The price-conscious buyers have the lowest reported knowledge. Furthermore, while all consumer segments drink wine primarily to spend time with family and friends, the connoisseur (segment 2) prefers to have wine with food, while the basic wine buyer (segment 1) will drink on a special occasion. The previous data identify the reason for drinking and purchasing wine, and the knowledge about eco-certification (specifically organic and sustainable), so we were interested to learn how the different consumer segments differ with respect to perceptions and attitudes towards environmental indicators (Table 6).

All three segments have divergent responses when it comes to perceptions of wine production methods and their importance, the importance of specific aspects when buying wine, the importance of label-specific aspects when buying wine, knowledge related to organically grown wine, and attitudes towards organically grown wine. With only a few exceptions, our findings indicate that the connoisseur buyer (segment 2) has the greatest self-reported environmental consideration. Next, we find the basic wine buyers (segment 1) and, finally, the price-conscious buyers (segment 3) having the lowest consideration when compared amongst the segments. These findings indicate and support some of the literature previously mentioned that those with the highest environmental awareness and knowledge will buy organic and sustainably certified wines. Given this, it is interesting to see the divergence among willingness to pay for organic and sustainable wines (Table 7).

The results are indeed different between all three segments when it comes to willingness to pay for organic and sustainable wines. While the optimal price for a bottle of organic wine is similar among basic wine buyers (segment 1) and price-conscious buyers (segment 3) (EUR 10.96 and EUR 9.99), connoisseur wine buyers (segment 2) are willing to spend a higher amount (EUR 12.35). Likewise, connoisseur wine buyers (segment 2) are more willing to pay more for organic wines if they receive related information (e.g., related to CO₂ loads, regional production, sustainability issues, etc.) compared to basic wine buyers (segment 1), who in turn have a higher willingness to pay when receiving such information compared to price-conscious buyers (segment 3). This further highlights another important discussion point. Producers and marketers need to spend more time on education about their wine and the certifications they have achieved. Aside from the certification seal and a small amount of information on the label, there is not enough room to educate consumers merely on the bottle. Producers, marketers, and distributors that employ certification schemes need to find novel ways to educate the consumers in the shops, online, with QR codes, and more. Our data indicate that education will lead to more sales of organic and sustainable wine and at a higher price.

4. Discussion

In this study, we focused specifically on wine that has achieved an organic certification or comes from a winery certified as sustainable. In general, the goal of the certification is to allow the wineries to make wine while preserving the quality of the land and minimizing the impact on society. We believe that this requires a certification process, and subsequently a label, so that consumers know and trust what they are buying is good for the environment and society [47]. However, we recognize there is variation in certifications and, until there is a globally unified system of measurement, that this will continue to confuse consumers [48].

Through our survey and analysis, we do find that there is a correlation between environmental awareness and the likelihood of buying eco-certified wines. Given the breakdown of environmental awareness and demographics of our respondents in Austria, Switzerland, and Germany, we show that in these countries, consumer groups will consider the eco-label and price when making purchasing decisions. This is important because producers who are questioning whether to become certified can now confidently know there is demand. Also, wineries that may be certified, but are uncertain if they should be using a label, now have the data to put the label on the bottle and on their brand.

In addition, this research identifies a certain type of customer to target with organic or biodynamic certified wines. We find that those who are self-proclaimed connoisseurs are

more knowledgeable about and have a higher willingness to pay. These connoisseurs tend to be of middle age (average 48 years), are more often male, and Switzerland has more of them compared to Austria or Germany in the DACH. They live in multi-person households and have pursued a higher level of education and/or self-employment. Interestingly, this is contrary to other research that has found that women or younger populations (in The United States) are more interested in eco-certified wines and are willing to pay for them [49] and that education, age, and wine knowledge does not positively influence WTP for eco-certified wines in Australia [41]. Nevertheless, we strongly encourage marketers to target those wine connoisseurs (segment 2) with greater organic or sustainable wine marketing education and strategies. This will result in greater sales and higher financial returns given they are willing to pay more. This can help to recoup some of the expense (both time and money) that comes from the certification processes.

However, we recognize limitations to our study. Since respondents are self-reporting their knowledge and behavior, we believe there could be a bias in our results, known as the attitude–behavior gap [50,51]. People may inherently view themselves as experts or more environmentally cognizant than they are. We recognize that there is a lot of emotion and psychology that goes into this self-evaluation, and it could impact our results and analysis. It is very possible that the stated willingness to pay is much higher than the actual willingness to pay. In addition, our regional study of only the DACH countries may not be attributable to other regions of the world, given the cultural homogeneity and above average national GDP of this region. Furthermore, we recognize that a high majority of respondents worked in the household. While they are available to answer questionnaires, they may not be the best representation of the general workforce/population. They were merely a sample of convenience. We would encourage further research demonstrating the correlation between consumer segmentation, environmental awareness, and purchasing of eco-certified wines regionally. Also, it would be particularly interesting to see if other areas of the world will have similar results with the same type of analysis, or if these results are specific only to the DACH region of the world.

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