

## **A case study on repackaging: understanding how to make a more effective bottle for Villa Oeiras brand**

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## **Abstract**

Casal da Manteiga is a winery that has launched a project of re-packaging of their fortified wine marketed under the Villa Oeiras brand. The aim is to relaunch their product on the market with a new look that could communicate more clearly its characteristics and historical and territorial roots. In particular, the winery has created a prototype bottle in transparent glass with a more original and distinctive shape respect to the one on the market. In order to gain the local consumer's opinions on the brand and obtain feedback on the new packaging, a qualitative survey was carried out, based on the focus group's methodology. In support of this analysis, a quantitative survey was conducted via an online questionnaire. The focus group revealed a lack of knowledge of the Villa Oeiras brand among local consumers. With regard to the new packaging, this has shown a strong attraction towards consumers of fortified, compared to the current one, thanks to the transparent glass that allows to appreciate the consistency and colour. The dataset obtained from the questionnaire was analysed with the technique of multiple correspondences analysis in order to identify the most significant correlations. The results obtained showed that some of the elements of the new bottle prototype showed a high correlation with consumers with a high spending power and a frequent consumption of fortified wine.

**Keywords:** Fortified wine, Carcavelos, Focus group, MCA, Packaging.

## **Resumo**

A Adega Casal da Manteiga detém de um projeto de renovação de imagem do vinho Generoso Carcavelos, marca Villa Oeiras, em que o objetivo se trata de relançar o vinho no mercado com uma nova imagem que transmita o seu carácter e passado histórico. Foi escolhido um protótipo de garrafa de vidro transparente, com uma forma distinta, caracterizada por ser mais larga e robusta do que a garrafa em circulação. O projeto Villa Oeiras recrutou uma empresa externa responsável pelo estudo de mercado, em que realizou um estudo qualitativo baseado na metodologia focal, de modo a adquirir a opinião do consumidor local acerca da marca e da nova apresentação de imagem. O estudo teve como base dois grupos focais consumidores de vinhos fortificados, incluindo vinho Generoso Carcavelos. O grupo focal demonstrou desconhecimento da marca Villa Oeiras pelos consumidores locais. A garrafa transparente foi escolhida por permitir apreciar a cor dourada âmbar intensa do vinho. De modo a obter mais informação, propôs-se proceder a um estudo quantitativo baseado num questionário on-line. Os dados obtidos foram analisados através do método de análise de correspondência múltipla de modo a relacionar o tipo de consumidor com as escolhas do tipo de garrafa. As garrafas transparentes, de rótulo transparente, cápsula dourada e rolha tipo "bartop" mostraram ser a preferência do tipo de consumidor habitual de vinhos fortificados e com maior poder de compra.

**Palavras-chave:** Vinho fortificado, Carcavelos, Focus group, MCA, Embalagem.

## Resumo estendido

O presente trabalho aborda o projeto de renovação de imagem do vinho Generoso Carcavelos, marca Villa Oeiras, explorado pela Adega Casal da Manteiga que atualmente pertence à Câmara Municipal de Oeiras. O projeto Villa Oeiras desempenha um papel fundamental na região vínica visto ser o único produtor de vinho Generoso Carcavelos, um dos mais antigos vinhos DOC do mundo e um dos quatro vinhos Generosos de Portugal, entre os quais: Carcavelos, Madeira, Moscatel de Setúbal e Porto. O valor histórico deste vinho DOC está intimamente relacionado com a influência de Marquês de Pombal, diplomata e estadista do séc. XVIII, que teve como objetivo promover tanto o vinho fortificado como a região vínica de Carcavelos. A Adega Casal da Manteiga nasceu de um projeto entre a Câmara Municipal de Oeiras e o Instituto Nacional de Investigação Agrária e Veterinária cujo principal objetivo é recuperar e promover a região demarcada e o vinho Generoso Carcavelos. Presentemente, a marca Villa Oeiras posiciona-se acima do preço médio de mercado dos vinhos generosos portugueses. A vinha tem uma dimensão de cerca de 13 hectares, beneficiando de um excelente *terroir* característico de solos argilo-calcários, e o vinho é produzido numa instalação que remonta desde o séc. XVIII.

Este projeto de tese assenta no conceito de um mercado altamente fragmentado e de níveis de conhecimento extremos onde as características extrínsecas do vinho, tal como a garrafa e os restantes elementos (rótulo, cápsula, forma da garrafa e entre outros) são objeto de grande peso na decisão de compra do consumidor final. Consequentemente, é de extrema importância a elaboração de uma imagem que seja atraente e promova a curiosidade do consumidor. No início do estágio, o projeto Villa Oeiras já tinha iniciado o estudo da nova apresentação e o objetivo tratava-se de relançar o vinho no mercado com uma nova imagem que transmitisse o seu carácter e passado histórico. Foi escolhido um protótipo de garrafa de vidro transparente, com uma forma distinta, caracterizada por ser mais larga e robusta do que a garrafa em circulação. Nesta etapa, foram fabricadas duas séries distintas com três garrafas cada. A primeira série consistiu em 3 garrafas com rótulos transparentes e letras de diferentes tons de cor e a segunda série consistiu em 3 garrafas com rótulos pretos e letras dos mesmos tons que a série anterior. De modo a averiguar qual dos protótipos seria mais bem aceite pelo consumidor, o projeto Villa Oeiras recrutou uma empresa externa responsável pelo estudo de mercado. O estudo teve como base dois grupos focais consumidores de vinhos fortificados, incluindo vinho Generoso Carcavelos, e foram apresentadas as duas séries de garrafas de modo a compará-las com a garrafa atual. Foi pedido aos dois grupos que exprimissem a sua opinião livremente e respetivas considerações. Os resultados obtidos demonstraram o desconhecimento da marca Villa Oeiras pelos consumidores locais enfatizando a necessidade de uma melhoria da estratégia de marketing de modo a garantir um

posicionamento mais assertivo no mercado. Relativamente à nova imagem, a garrafa de vidro transparente foi a escolhida unanimemente. Os grupos focais defenderam que a mesma se distingue das outras garrafas pelo carácter e pela capacidade de estimular a curiosidade do consumidor. Adicionalmente, a garrafa transparente foi escolhida por permitir apreciar a cor dourada âmbar intensa do vinho.

Devido à situação pandémica global da COVID-19, a colaboração com o projeto alterou-se para via remota. De modo a obter mais suporte de estudo acerca da renovação de imagem propôs-se proceder a um estudo quantitativo. Para tal, foi realizado um questionário on-line via Google Form em que se baseou num questionário de escolha múltipla dividido em 3 secções. A primeira secção teve como objetivo avaliar a variável social e demográfica (idade, nível de escolaridade, profissão, rendimentos anuais e entre outros). A segunda secção teve como objetivo avaliar o conhecimento do consumidor acerca de vinho e valor atribuído às características do mesmo (ano de colheita, região, casta e entre outros) e o grau de apreciação foi avaliado recorrendo a uma escala de Likert. A terceira e última secção baseou-se em quatro questões acompanhadas de imagens de modo a recolher informação imediata e objetiva das preferências do consumidor. As três primeiras questões foram estruturadas de modo a avaliar a forma da garrafa, rótulo e cápsula e cada questão incluiu cinco possibilidades em que uma delas era idêntica ao protótipo da nova garrafa Villa Oeiras. A última questão baseou-se na comparação entre três garrafas distintas, em que duas delas representavam a imagem dos dois protótipos para a nova garrafa (rótulo transparente e rótulo preto), e a terceira representava a garrafa em circulação. Os dados obtidos foram analisados através do método de análise de correspondência múltipla de modo a relacionar o tipo de consumidor com as escolhas do tipo de garrafa. As garrafas transparentes, de rótulo transparente, cápsula dourada e rolha tipo "bartop" mostraram ser a preferência do tipo de consumidor habitual de vinhos fortificados e com maior poder de compra. O tratamento estatístico comprovou os resultados obtidos e promoveu dados robustos para o desenvolvimento da nova imagem e embalagem da marca Villa Oeiras.

Palavras-chave: Vinho fortificado, Carcavelos, Focus group, MCA, Embalagem.

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## **LIST OF ABBREVIATIONS**

**OIV:** Organisation Internationale de la vigne et du vin

**DOC:** Denominação de Origem Controlada

**HI:** Hectolitres

**IVV:** Instituto da Vinha e do Vinho

**Ho.Re.Ca:** Hotellerie-Restaurant-Café

**INIAV:** Instituto Nacional de Investigação Agrária e Veterinária

**CMO:** Câmara Municipal de Oeiras

**MCA:** Multiple Correspondences Analysis

**CA:** Cluster analysis

**PCA:** Principal Component Analysis

## 1 Introduction

Nowadays, the wine market is highly fragmented, as in this category there are a large number of producers with different philosophies and wine-making styles. Thus, this increasingly crowded market generates confusion among wine consumers, as the vast assortment of wines that can be purchased is constantly increasing. In such an articulated market, planning a good marketing strategy becomes fundamental for a wine company (Roberto, M. A., 2003). Careful communication of the product allows to create a close connection with the customers and to transmit to the consumer what is behind every single bottle: passion, tradition, emotions, people, territory. Authentic and effective communication thus becomes a key element. In recent years the producers' attention has shifted from quantity to quality, following consumer trends more closely. Wine has changed its identity, moving from commodity to product increasingly rich in meaning (for example the territory, hedonistic pleasure, conviviality, culture, socialization, etc.), becoming in some cases a true status symbol. Therefore, considering the wide range of wines offered on shop shelves and also the growing interest of wine consumers, it is clear that it is not enough to focus only on quality. In this scenario it is necessary to create a packaging able to capture the attention and arouse the curiosity of the consumer; the label will be the "business card" of the winery.

This study focuses on a winery located in Carcavelos, a wine micro-region about 12 kilometres west of Lisbon. The Casal da Manteiga winery is a state-owned company, managed by the municipality of Oeiras and it is the only producer in the world of the fortified wine "Carcavelos". This DOC fortified wine is one of the oldest in the world and is closely linked to the history of this region. A wine, that in part takes its fame from the Marquis of Pombal, which today is produced in this winery by combining its centuries-old production with modern winemaking techniques. The winery sells this wine on the market with its brand "Villa Oeiras", trying to give an understandable indication of its strict connection with the municipality of Oeiras. The creation of this winery is the result of a partnership between the CMO and the Instituto Nacional de Investigação Agrária e Veterinária (INIAV). This winery born, from the beginning, with the purpose to restore the fame of the estate of Marquis of Pombal by converting it into a wine production area. All these efforts aim to protect and promote the history and tradition of Carcavelos wine, which represents the heritage of this region.

Also, for the fortified wine market, we have a wide range of products, and precisely in this context, Carcavelos wine has to compete for its niche of consumers. The winery, to increase its competitiveness, is working on a re-packaging plan. After a careful analysis of the company's status, several key problems emerged that should be considered. First, the lack of knowledge of DOC Carcavelos by the domestic and international market. Consumers are not familiar with this designation of origin and therefore tend to buy the fortified wines they recognise most. The company should invest in advertising and promotion, and carefully choose marketing strategies to increase brand awareness. Moreover, the winery, producing only one product, has a limited portfolio of wines, reducing the offer on the market and limiting it to a specific segment. For a successful result, it is necessary to identify the target consumer to carry out targeted marketing campaigns. Another important element is the high cost of their wine compared to other Portuguese fortified wines on the market. Among the possible choices, for example, they could maintain the current price by justifying its high cost through elements that can communicate its uniqueness to consumers (e.g. designation of origin, long ageing, historical prestige, etc.). Moreover, as the winery is a public company, more procedures are needed to make decisions and implement them, and the financial resources for possible investments are rather limited.

## **1.2 Thesis purpose**

At the start of the internship, the winery had already started a re-packaging project for the Villa Oeiras. The aim was to relaunch the wine on the market with a new look that would communicate more effectively its peculiarities as well as its historical and territorial roots. In particular, the winery had created a prototype bottle in transparent glass with a more original and distinctive shape (with a wider shoulder and body) than the one on the market. In an initial bibliographical review, the most interesting research on wine packaging was identified, with the aim of obtaining useful data for the optimization of the new bottle prototype. In order to collect information to support the re-packaging project, two surveys were conducted: a qualitative survey through focus groups, and a quantitative one through an online questionnaire. Thus, the final objective of the thesis was to provide the winery with feedback from the final consumer, so that it could predict in advance how the market will respond to the launch of the new Carcavelos wine packaging.

## **2 Background characterization**

### **2.1 Overview of the Portuguese wine sector**

Portugal, as a wine-producing country, is traditionally linked to its two most famous wines, Port and Madeira, which have made the country famous all over the world. Despite Portugal is very tied to its traditions of wine production and its two main wines, since the 1990s, it has amply demonstrated its undisputed value also as a producer of still table wines, in particular of red wines, making itself internationally renowned among the most important wine countries of Europe (Wines of Portugal, 2020).

Regarding wine production in Portugal, it is regulated by a system known as Denominação de Origem Controlada. The rules and requirements that constitute the production specifications are established by the IVV (Institute of Vine and Wine) assisted by the various local commissions that control and establish the norms of production of the individual designation of origin areas (DiWineTaste, 2020). The criteria on which the Portuguese production specifications generally include, in addition to the geographical definition of the area, the total area that can be cultivated with vines, the variety of grapes allowed, the maximum yields of the harvests, the method of vinification, the minimum periods of maturation of the wine before it can be released on the market and the general indications to be indicated on the labels.

The cultivation of grapevines in Portugal is certainly not one of the easiest. The torrid summer climate and the critical fertile soil conditions in certain areas make vine cultivation rather difficult. Moreover, in the Douro, the North-Eastern part of the country, the soil conformation is rather steep, characterised by steep slopes where vine cultivation is considered "heroic". As illustrated in Figure 1, the country includes 14 wine regions. Lisbon, where Carcavelos wine is produced, is the region of interest of this research. This is the region with the highest production of protected designation of origin wines, 9 in total.

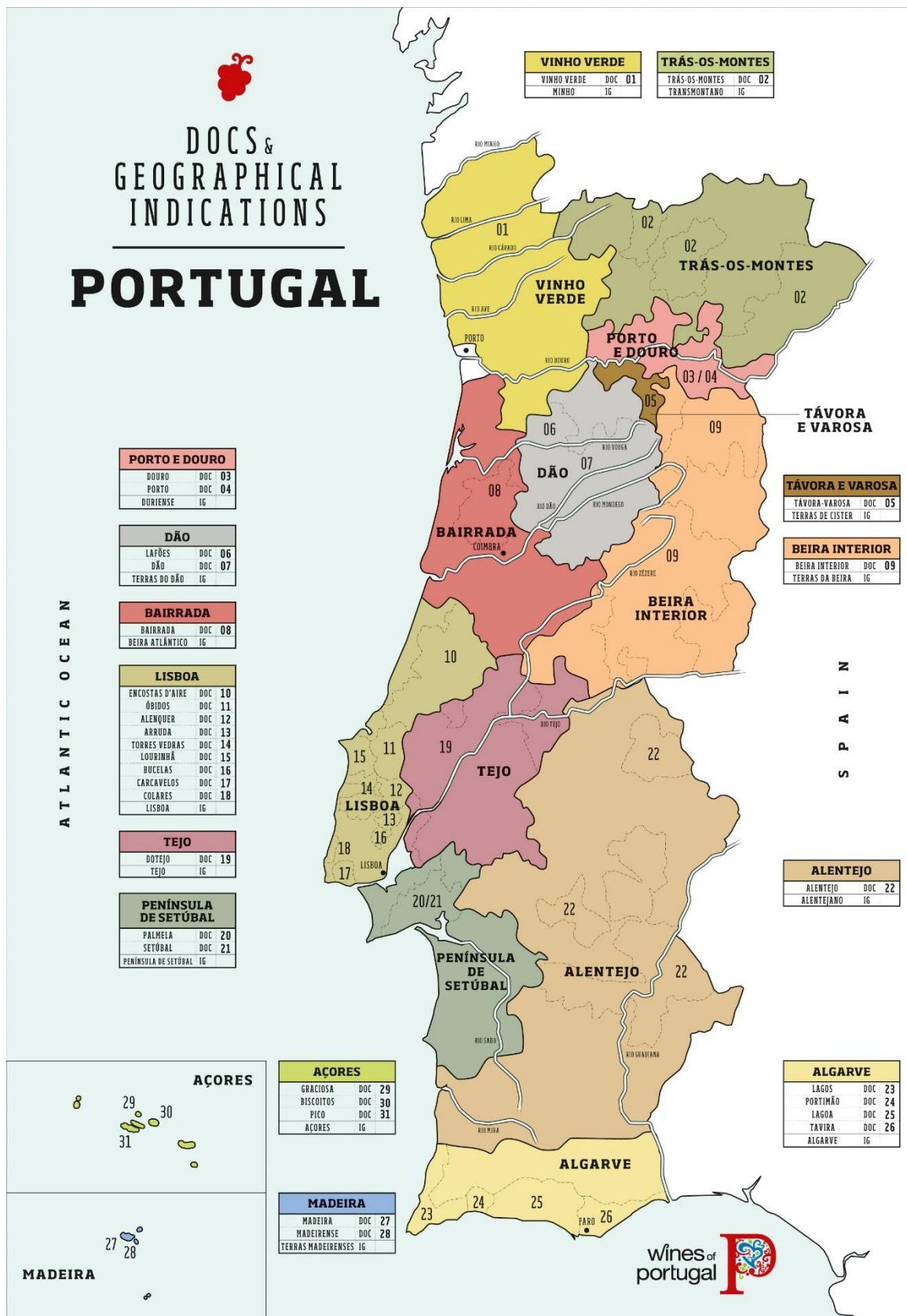


Figure 1: Wine regions of Portugal, Source: Wines of Portugal/ViniPortugal

Of these DOC, 8 designations are intended for wine production such as Encostas de Aires, Obidos, Torres Vedras, Alenquer, Arruda, Colares, Carcavelos and Bucelas. One denomination is for the production of brandy, Lourinha. The wine production in Lisbon is mainly for the production of table wines and has registered 1,170,068 hl of wine produced for the 2018/2019 harvest. This value shows a slight reduction compared to the volume reached 1,225,840 hl in the 2017/2018 season (IVV, 2019). In the small area of Carcavelos, slightly to the west of the capital, the production of fortified wine with Carcavelos DOC has achieved 179 hl in the 2018/2019 harvest (IVV, 2019).

According to the statistics provided by IVV, Portugal reported a total area under vines of approximately 192,743 hectares in 2019, indicating a slight increase compared to 190,322 hectares in 2018 (IVV, 2019). International grapes showed a reduced spreading phenomenon in Portugal, as here the production of wine is traditionally and strongly connected to local grapes, a rich heritage of this country (DiWineTaste, 2020).

It is important to report the most popular Portuguese varieties. Most famous white berried varieties are: Alvarinho, Bual, Códéga, Encruzado, Gouveio, Loureiro, Malvasia Fina, Pedernã, Rabigato, Sercial, Trajadura, Verdelho and Viosinho. Instead, the most notable black berry varieties are: Alfrocheiro Preto, Aragonez, Azal Tinto, Baga, Bastardo, Jaén, Periquita, Tinta Barroca, Tinta Negra Mole, Tinta Roriz, Tinto Cão, Touriga Francesa, Touriga Nacional, Trincadeira Preto and Vinhao (Wines of Portugal, 2020).

## **2.2 Production, consumption and wine exports in Portugal**

According to OIV estimates, Portugal, with 6.7 million hl in 2019, is the only EU country with a higher wine production than the previous year (+ 10% / 2018). For the other EU countries, adverse weather conditions had a significant impact, resulting in below-average production (OIV, 2019). These estimates are interesting, even considering production trends in previous years. In fact, contrary to what has been said for 2019, in 2018 weather conditions in some European countries were less favourable, and this was the case in Portugal, which had a production of 6.1 million hl in 2018. This was due to the adverse weather conditions that favoured the attacks of downy mildew and powdery mildew, with a consequent impact on production, which was seen reduced compared to 2017 where production was around 6.7 million hl (OIV, 2019). From the OIV report, Portugal results also the eleventh largest wine producer in the world in terms of quantity (OIV, 2019). In terms of national wine consumption, in 2018 it is estimated to be around 5.5 million hl, showing an upward trend compared to previous years. It is clear from the statistics that from 2014 (with consumption of 4.3 million hl) to 2018 the trend in wine consumption was positive, making Portugal the eleventh largest wine

consuming country in the world in the OIV's ranking. Despite this, the data showed that the country currently consumes less wine than it produces (OIV, 2019).

In terms of wine exports, Portugal is the ninth-largest wine exporter in the world (OIV, 2019). While in terms of volume, compared to 2017 there is no change, in terms of value, there is an increase in Portuguese exports of + 3.1% (OIV, 2019). Another important fact that emerges from the same report published by the OIV, is that Portugal is thirteenth among the main importers of wine in the world, by volume in million hl, but showing a decrease in the volumes of wine imported between 2017, with 2.1 million hl and 2018 with 1.9 million hl of wine (OIV, 2019).



### **2.3 Fortified wines overview**

Liqueur wines are characterized by high concentrations of alcohol and sugar. This style of wines differs in a certain amount of alcohol that is added during their production. This process, called fortification, is a delicate phase in which the quality of the fortifying agent (generally brandy) plays a fundamental role in the quality of the final product. The best-fortified wines are those in which the ethereal impact of the fortifying agent does not affect the primary organoleptic qualities of the wine (Branco, 1997).

The first advantage of the fortification is guaranteeing a better shelf life of the wine, ensuring greater longevity and reducing the risk of alterations. This advantage was well known to wine traders in the past, who often resorted to this "trick" to allow the wine to withstand the unfavourable conditions of the holds of ships to their destination. The second reason why fortification is used is linked to sweetness. In the production of many sweet wines, fortification is used during alcoholic fermentation to interrupt the action of the yeasts, thus retaining a certain amount of sugar which will give sweetness to the wine (Ribéreau et al., 2006).

The OIV defines fortified wines as "special wines with acquired alcoholic strength above or equal to 15% and below or equal to 22%." There are two categories of fortified wines:

1. Wines that receive only brandy during fermentation;
2. Wines to which must or concentrated mistelle are added in addition to brandy or alcohol.

In both cases, the natural alcoholic potential of grape juice must be at least 12% vol. and at least 4% vol of the alcohol in the final product has to come from fermentation (Ribéreau et al., 2006).

The subsequent stages of production vary according to the type of fortified wine. The high alcohol content makes these wines very resistant to oxidative phenomena. For some types, oxidation, which takes place during the ageing in cask, is a fundamental process as it allows to give specific characteristics to the product. Other fortified wines follow a short time in wooden casks, and then they are aged in bottle for long periods (Ribéreau et al., 2006).

The current consumption of fortified wines is rather small and not widespread, while in the past these wines were so important and famous, so much to determine a flourishing trade in those times. Some of the most famous, such as Jerez, Porto, Marsala and Madeira, were considered great wines and were highly appreciated by the upper classes. In recent years, producers have been re-evaluating the quality of these magnificent wines, trying to valorize

them again on the market: many enthusiasts are approaching the fortified for the first time with great interest.

However, it is encouraging to see that these glorious wines are once again gaining their credibility and fame thanks to the work of the producers who for years have been offering fortified wines of the highest level.

It should be recognized that fortified wines are not easy to understand and appreciate: they require greater attention and a sensory ability trained and ready to perceive aromas and flavours of extreme complexity, like in no other wine. This is why they are wines intended more for a consumer niche. Moreover, these wines have remarkable longevity which allows them to develop extraordinarily complex aromas and flavours, therefore they should not be consumed distractedly: they should be tasted slowly and in small sips, contemplating their complex aromatic and sensorial evolution.

Focusing on production in Portugal, here these special wines have a long and fascinating history that acts as a frame for the four national fortified wines: Carcavelos, Madeira, Moscatel de Setúbal and Oporto.

## **2.4 Carcavelos wine region**

Carcavelos is a Portuguese wine region, between the municipalities of Cascais and Oeiras, and is located about 12 kilometres west of Lisbon. Located at the end of the Extremadura region, the coast is washed south-east by the mouth of the Tagus River and south-west by the Atlantic Ocean. The production area recognized for the production of wine entitled to the Carcavelos Designation of Origin.

### **2.4.1 Terroir**

The vineyards for the production of DOC Carcavelos are planted in reddish-brown calcareous soil. The calcareous soils are warmer, favouring an increase in the sugar content of the grapes, which makes them particularly suitable for the preparation of liqueur wines (Brazão et al., 2005). In fact, the soils of the Marquês estate, representative of this region, are brown limestone, alluvial soils, calcareous clays, and Mediterranean red limestone. (Fernandes, 1978).

The wine region of Carcavelos has an oceanic climate. Its exposure to the south and the winds from the north (Bravo, 1979) exerts a protective action on the vineyards against the negative influence of the proximity of the ocean, thus providing a favourable climate for the production of quality must, because they favour good conditions of ripening of the grapes (Carneiro and Belchior, 1991).

Average winter temperatures are 11.6 ° C and average summer temperatures 23.2 ° C. With these temperatures the vines are not at risk of winter or spring frost. The demarcated region of Carcavelos has a rainy and mesothermic sub-humid climate, with great water shortages in summer. In this region, there is an average annual precipitation of 696 mm, with the average precipitation occurred in August and September of the order of 28 mm (Magalhães et al., 1995). Despite these seasons of water scarcity, the clayey soils in the area have a good capacity to retain water, which is extremely helpful during years with dry summers (IVV, 1994).

#### **2.4.2 History of Carcavelos DOC**

In the family of national fortified wines, Carcavelos is the least known. Although this wine is one of the oldest DOC of Portugal, today Carcavelos no longer has its great reputation of the past.

The first evidence dates back to the 14th century, where some documents with the royal seal refer to the "bem cuidados vinhedos de Oeiras". In the eighteenth century, with Sebastião José de Carvalho and Melo (1699-1782), first Earl of Oeiras and later Marquês of Pombal, Carcavelos wine gained notoriety (Confraria dos Enófilos do Vinho de Carcavelos, 2020).

He is also famous for the various socio-economic reforms attributed to him, for having encouraged the reconstruction of Lisbon after the devastating earthquake of 1755, and for having founded the first association that creates wine denominations, the "Companhia Geral da Agricultura das Vinhas do Alto Douro" (Larousse, 2020).

Marquês of Pombal was one of the main promoters of Carcavelos wine, motivated by the desire to own a property in the region, the "Quinta de Oeiras", and to be one of the largest wine producers in Carcavelos. The wine became so famous and its influence was so great that the "Quinta de Oeiras" managed to "export" a third of the annual production to Companhia Geral da Agricultura das Vinhas do Alto Douro, to be mixed with the Port wines to improve body and taste and give it a stronger colour, which demonstrates the excellence of Carcavelos wine (Branco, 1997).

However, according to Branco (1997), the great expansion of Carcavelos wine took place in the second decade of the nineteenth century with the conquest of the regional and foreign market, mainly the British market. The export of large quantities of this wine to England is the result of the prolonged permanence in this region of the English army commanded by the Duke of Wellington at the time of the Napoleonic invasions. In that period the English, deprived of the consumption of the renowned Port wine, because of the circumstances of the war, discovered Carcavelos wine, which they began to consume and appreciate. This is how the "Carcavelos" brand was born, also known in England as "Lisbon wine" (Brazão et al., 2005).

In 1852, with the invasion of powdery mildew, the vineyards of this region were almost destroyed (Carneiro and Belchior, 1991) and, consequently, also the English market was lost (Vasconcellos, 1938).

Subsequently, in 1876, the phylloxera attack further aggravated the situation, greatly damaging the production of such a famous wine (Vasconcellos, 1938). Unfortunately, since the 20th century, the growing urbanization of the suburbs of Lisbon led to the progressive disappearance of the vineyards (Carneiro and Belchior, 1991).

After years of inertia, a project was finally launched, in which the municipality of Oeiras and the National Agronomic Station collaborated in the recovery of the vineyard and cellar of the old farm of the Marquis of Pombal (Rota dos Vinhos, 2020).

Thus, thanks to the investment of huge funds for the conservation and maintenance of the vineyard already existing in the old Quinta de Cima, in 2001, the winery Casal da Manteiga was founded (structure of the eighteenth century integrated into that farm), and its production has reached 3,500 litres of Carcavelos wine (Confraria dos Enófilos do Vinho de Carcavelos, 2020).

After this project, the Confraria do Vinho de Carcavelos was created on April 15, 2009, to study, promote, disseminating, enhancing, and defending the production of the "Carcavelos DOC" wine. Initially, the municipality of Oeiras began selling wine with the brand "Conde de Oeiras". In 2014, the brand was changed to "Villa de Oeiras" (Município de Oeiras, 2014). To enhance and defend the historical heritage of Carcavelos, the Confraternity has founded the Museum of Vine and Wine of Carcavelos (Confraria dos Enófilos do Vinho de Carcavelos, 2020).

## 2.5 Casal da Manteiga

Casal da Manteiga (illustrated in Figure 2) is the winery born from a partnership between the municipality of Oeiras and the INIAV. This structure is dedicated to the production of Carcavelos wine "Villa Oeiras".



Figure 2: Winery Casal da Manteiga, Source: Rota dos Vinhos

The productive structure is located inside an eighteenth-century building, which was initially a stable, and currently has 12.5 hectares of vineyards. In this building all stages of the process, from fermentation to ageing, take place. For the bottling stage, the winery uses a bottling company. The wine is produced on the north side of the building and aged on the south side, where the oak barrels used for ageing are located.

The palace of the Marquis of Pombal is mainly used as an ageing area for the wine. Here the 225-litre oak barrels in which Carcavelos wine is aged have replaced the old large vats. This building presents optimal conditions for ageing thanks to the good level of humidity and the low temperature inside (Rota dos Vinhos, 2020).

### **2.5.1 Production requirements**

For the production of this fortified wine, the winery must comply with the rules defined in the Carcavelos DOC production disciplinary.

To conform with the rules laid down in the disciplinary, the training system used for vines intended for the production of Carcavelos wine must be “spurred cordon” or “guyot”. The first cordon must not be more than 60 cm above the ground. The density of vineyards must be at least 3,300 vines/ha. The maximum yield may not exceed 55 hl/ha (IVV, 1994).

Although both red and white berried varieties are cultivated in the vineyard, white berried varieties are the only ones used for the production of this wine: Galego Dourado, Arinto, and Ratinho.

Galego Dourado, a typical grape of this region, is the major variety for the production of Carcavelos. It allows the production of wines with good structure and aromaticity (IVV, 2011; Robinson et al., 2012).

Arinto is a very versatile grape, cultivated in most of the wine regions of Portugal. It gives wines with good acidity, refreshing, pleasant minerality, with descriptors that remind apple, lime, and lemon. This grape is also excellent for the preparation of blends. The wines obtained from the Arinto variety are excellent when drunk young but show a good attitude to ageing (Wines of Portugal, 2020).

Ratinho, originally from the Carcavelos region, is one of the traditional varieties in the production of Carcavelos wine. It gives wines of low acidity and moderate alcohol content (IVV, 2011).

The harvest takes place at the end of August and mid-September. The grapes are manually harvested, and after careful sorting, the berries undergo the traditional processing stages until the fermentation of the must.

After a few days of fermentation, with a still high sugar level, the must undergo a fortification with a 77% vol. brandy. Following the specifications, a wine with a total alcoholic strength of at least 17.5% vol. must be obtained and the residual sugar content must not exceed 150 g/l. After fortification, the wine goes into new oak barrels for the ageing phase. To obtain the Carcavelos denomination, the barrel ageing process must last at least 2 years. After the period in casks, a minimum of 6 months of refinement in the bottle is required according to the criteria of the denomination. The estate produces approximately 50,000 bottles every year.

### **2.5.2 Features of “Villa Oeiras” wine**

The Carcavelos wine "Villa Oeiras" has a golden yellow colour. It is a very aromatic wine with notes of nuts, honey, vanilla, wood aromas. It has a high complexity, persistent on the nose. In the mouth has good acidity, medium sweetness, with hints of dried fruit, velvety on the palate. It can be paired with red fruit desserts and seasoned cheese or drunk as a digestive or as a meditation wine. It can be served at room temperature or cold.

This fortified wine may show different organoleptic characteristics depending on the length of ageing in wood, the type of wood and the level of toasting, the varieties used, and the vintage.

Adega do Casal Manteiga currently commercializes 3 types of Carcavelos wine:

- Carcavelos Villa Oeiras 7 years (75cl)
- Carcavelos Villa Oeiras Superior 15 years (75cl)
- Carcavelos Villa Oeiras Colheita 2005 (50cl)

Among these products, the main one is Carcavelos Villa Oeiras Superior 15 years which has a retail price around 30 €, an elevated price compared to the average of fortified wines. This wine received an award in 2016, winning the Portugal Wine Trophy gold medal.

Since 2012, the winery has received several awards and medals in various tasting competitions (Confraria dos Enófilos do Vinho de Carcavelos, 2020).

Given the high price and intrinsic characteristics of this special wine, the company needs to find potential niches to increase sales. Besides, one of the future goals for the company's marketing unit is to increase export to richer foreign markets.



## 2.6 Portuguese and international fortified wines market

The wine market refers to alcoholic beverages derived from fermented grapes. The market is generally divided into segments: Table wine or still wine, sparkling wine (including Champagne) and liqueur wine. By volume, it is the smallest segment of the spirits market in the global comparison.



Figure 3: Revenue in the Wine Market, Source: Statista, August 2019

Fortified wine represents a small share of the wine market. Figure 3 shows that, although revenues from wine sales have a positive trend, it can be observed that revenues from fortified wine remain relatively stable. In 2019, revenue from fortified wine sales amounted to €11 million, compared to a total of €327 million in the entire wine segment.

Revenue statistics should be compared with production volumes, and in agreement with Statista, total world production in the wine segment in 2019 is 27 million litres, while considering only fortified wines the volume produced is 846.840 litres.

The fortified wine segment includes wines that have undergone an addition of alcohol such as Sherry, Port or Madeira. In Portugal, the production of these special wines is particularly important in terms of revenue, as they have great importance in the wine-making tradition of the country. Portugal is one of the world's leading producers in the fortified wines segment, with revenue of €1.341 million in 2019, proving its importance in this specific wine sector (Statista, 2019).

## Volume in the Fortified Wine market

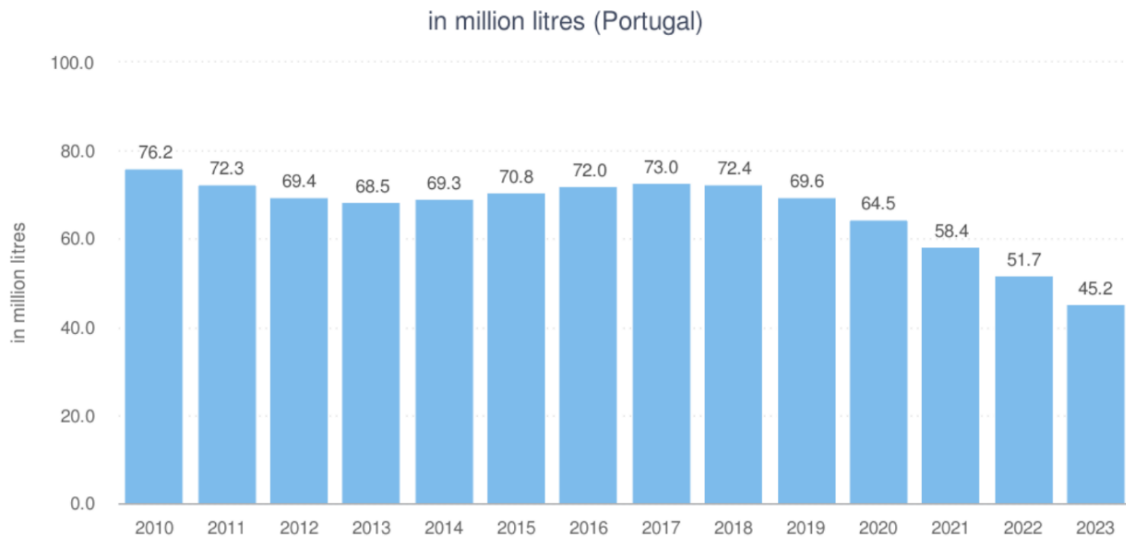


Figure 4: Volume in the Fortified Wine market, Source: Statista, August 2019

According to market analysis (Fig.4), the volume of fortified wine in Portugal will reach 45.2 million litres in 2023, indicating a significant decrease. In the same analysis, it can be observed that the "Revenue Growth %", that in 2019 is -1.8%, has decreased significantly compared to 2017 where instead it showed a positive growth value of 4.1%. It may be important to consider this value in terms of demand for this product.

Again, in the same market study, in Portugal, the average volume per capita in the fortified wine segment amounts to 6.8 L in 2019, and the volume consumed is expected to reach 4.5 L in 2023 (Statista, 2019). This negative trend could damage the wineries that produce fortified wines, and thus lead to a decline in profits. More studies are needed to understand the dynamics of this phenomenon. In any case, in this national scenario, it is important to focus on high quality and export.

Another important aspect of this research considers the volume consumed of fortified wine in two respects: "at-home" and "out-of-home", i.e. the former is the domestic consumption of wine purchased in retail sales, the latter considers consumption in HORECA channels (hotels, restaurants, catering, cafés, bars and similar establishments). This division has shown that the volume of fortified wine consumed outside the home is greater than consumption inside the home. In 2019 the average volume per person is respectively 4.5 L outside the home and 2.3 L inside the home (Statista, 2019). These statistics are interesting as they provide information on market trends and may help the company in choosing the right market strategy in a given historical period.

### **3 Literature review**

#### **3.1 Behaviour of wine consumers**

Wine has become a global business and wineries must be able to develop effective strategies to penetrate different markets. A company's marketing department needs to understand consumer behaviour, as the price of a wine or packaging design, for example, will be decided based on this information. This paragraph aims to provide the reader with an overview of wine consumer behaviour based on literature, as these are key elements for wine firms. Consumer purchasing behaviour is influenced by several different factors, leading to differences in the way consumers approach wines (Lockshin and Corsi, 2012).

As previously stated, wine consumption is now widespread throughout the world, so it is necessary to have a clearer idea of the variations in consumer behaviour in each country. In a cross-national study presented by Goodman (2009), the results suggest that previous wine tastings and recommendations are the two main factors in most countries, but in some of these countries specific elements are influencing the purchase of wine, such as brand (China and Brazil), food matching (France and Italy), origin (France) and grape variety (Austria). However, the main drivers of wine choice differ very little from one country to another (Lockshin and Corsi, 2012).

Despite there are differences about wine culture between Old World and New World countries, nowadays this knowledge is spreading both in countries that do not produce commercial quantities of wine (United Kingdom) and in the so-called New World producer countries (Australia or California). Consumers in these countries are increasingly interested in wine (Ritchie et al., 2010).

Other research has focused their attention on socio-demographic differences regarding wine consumers. Two studies have found that women are willing to use more sources of information in their wine purchasing decisions than men (Barber, 2009; Atkin et al., 2007). Barber (2009) found that men have both more objective knowledge than women but use more limited sources of information. Atkin et al (2007) found that women are more willing to ask information from store staff and rely more on medals and awards than men.

In general, wine consumers drink wine for the pleasure it confers, while younger consumers are motivated to drink wine for cultural identity reasons (Bruwer et al., 2011). However, the younger generation, called Generation Y, or Millennials, has a different perception of wine than the older generation, which generally has a better knowledge of wine characteristics (Agnoli et al., 2011).

Chironi and Ingrassia (2014) have found a high emotional involvement of young consumers in wine consumption, in fact, younger generations consume wine especially at particular events, and are inclined to drink it in a wine bar and get information about wine through social media.

Wine is a complex item that is available on the market with different types and characteristics (brand, region, sub-region, grape variety or blend, date of harvest, etc.) that can influence consumer choices (Martinez, 2006).

One of the unique aspects of wine is that it can vary depending on different factors such as climate, weather, producer, type of grape, soil composition, even if the brand and other extrinsic information remain the same (Johnson, 1989). As a result, quality becomes subjective and variable and is difficult to evaluate objectively (Oczkowski, 2001).

Moreover, since quality features are intrinsic and rarely can be assessed before consumption, consumers are forced to rely on the brand and the information reported on the bottle label (Lockshin and Jarvis, 2006).

Another factor influencing the consumer's decision is the perceived risk when buying a wine product. Consumers are faced with an enormous amount of changing information that has an impact on perceived risk and therefore they develop strategies to reduce the risk of buying an unpleasant wine (Speed, 1998).

To minimise uncertainty, consumers use various elements that help them perceive quality, mainly of an extrinsic nature, such as price, producer, brand, vintage, region, awards, evaluations and recommendations (Lockshin et al., 2000).

According to a study carried out by Lockshin & Hall (2003), the elements that convey quality signals to consumers can be divided into intrinsic and extrinsic. Extrinsic elements are low-level elements that can change without changing the content (e.g. brand name, price, packaging and labelling), while intrinsic elements are higher-level elements directly related to the wine in the bottle (e.g. grape variety, alcohol content and style of wine) (Lockshin & Hall, 2003).

An especially important element at the moment of purchase is the price. This becomes particularly relevant when there are no parameters available, when the product cannot be evaluated before purchase and when the risk of making a wrong choice is high due to the lack of other parameters (Spawton, 1991). Therefore, price is a primary element in assessing the quality of a wine (Ferjani, et al. 2010).

A wine's brand is an extrinsic element of significant importance for the consumer. From the perspective of the consumer, the brand acts as a risk-limiting agent according to Jacoby and Kaplan (1972) and provides the consumer with a promise of wine quality (Lockshin and Jarvis, 2006). Viot (2010) suggested that younger consumers, who have little knowledge of wine, are more influenced by brands. In contrast, wine connoisseurs are less sensitive to brands (Viot, 2010).

In a study conducted by Atkin and Johnson (2010), they found that information about brand and place of origin were the most important attributes in consumers' choice of wine, but these elements have a greater effect on regular and more informed consumers. Mccutcheon et al. (2009) suggested that the region of provenance is not the most important factor of choice since the quality, price and style of the wine scored higher. Conversely, Easingwood et al (2011) found that the origin of the wine was the third decisive variable in the consumer's assessment when buying wine. According to Skuras and Vakrou (2002), there is a close correlation between the region and the price of wine.

Wine knowledge means the level of personal awareness of wine. When buying a bottle of wine the level of knowledge is a significant factor (Gluckman 1990). Consumers with little knowledge rely more on extrinsic elements to assess wine quality, including price, while consumers with a high level of knowledge focus more on the intrinsic sensorial properties of wine (King et al, 2012). Involvement is indicated as the interest, enthusiasm, and excitement that consumers show for a category of products (Goldsmith, et al, 1998). Involvement influences the purchase of wine, and high and low involvement wine buyers have shown to behave differently (Lockshin and Spawton, 2001). According to Lockshin et al. (2006), low-involved consumers make greater use of price and awards and tend to simplify their choices in decision-making, while high-involved consumers give significance to the region and are more inclined to use more insights into a more structured decision-making process.

### **3.2 Packaging knowledge**

Since the main objective of this research is to support a project of re-packaging of a wine, a review of the literature on the packaging is useful to get useful cues.

As mentioned before, since the intrinsic elements of the wine are difficult to assess before purchase, consumers tend to rely often on extrinsic elements (Cohen, 2009).

From this perspective, it seems clear that packaging plays an important role, given that wine packaging consists of extrinsic elements such as the front label, the back label, the shape and colour of the bottle, the box, and the awards. Labels provide the image of a winery and help to define brands (Fowler, 2000). Awards and medals, expert scores and other information on packaging contribute significantly to increasing choice opportunities (Lockshin and Corsi, 2012). These findings are concordant with Corduas et al. (2013), that suggest the packaging, particularly the label, is essential for the sale of the wine as it establishes the identity of the product and provides buyers information on what to expect to find inside the bottle.

The two elements that provide the majority of information about the wine are the front label and the back label. In a study by Lockshin and Cohen (2011), it was found that both the front and back label have a strong significance, and the front label was found to be slightly more relevant. Another research revealed that labels are the second most important predictor of the intent of wine purchase, after price (de Mello and Gonçalves, 2008).

Each visual element of the label (such as colour, images, font and size, shape and material of the label) has an influence on the brand perception of a product. These elements can reinforce or reduce each other, so they need to work in harmony (Doyle and Bottomley, 2004).

Recent research has found that labels containing an image with text as compared to labels with text only, increase the acceptance of labels and purchase willingness, and seem to increase taste expectations. In the same study, it was suggested that the effects of different labels on consumer choice are caused by affective rather than cognitive fluidity. In other words, people tend to rely more on emotional reactions than cognition in the evaluation of a wine (Jaud and Melnyk, 2020). At the same time, due to their high cognitive fluidity, text-only wine labels could be more effective in situations where, for example, the consumer has limited time to purchase. Given the findings, Jaud and Melnyk (2020) suggested that companies can design wine labels more emotionally fluid; for example, by designing labels that contain artistic illustrations, or for text-only labels, they introduce different characters and/or colours.

In another interesting paper, the findings showed that the colours of wine labels, which are extrinsic insights into the product, influence consumers' expectations in terms of taste. From the evidence found, colours were found to be an important element of label design, which can enhance taste expectations created for example by text, grape variety, or images (Lick et al., 2017). Other two studies have reported interesting results. In the first, Boudreaux and Palmer (2007) noted that the label image, among the three dimensions of the visual design investigated (image, colour and layout), had the highest relevance on the purchase decision and that images related to wine such as grapes or chateaux graphics received the highest rating, while images of unusual animals were less appreciated. Besides, warm colours (red, orange) and neutral colours (white, black) received the highest positive feedback on the purchase intention.

In the second paper, Orth and Malkewitz (2008) found that simple and fine designs were perceived as being of higher quality, while overly elaborate designs were strongly associated with cheaper, lower-quality wine. However, label designs need to be evaluated together with brand names, as they physically cover a considerable part of a label.

In other words, in agreement with what reported in these reports, the front label of the wine bottle should have the key function of stimulating the customer's interest (Rocchi and Stefani, 2006). Concerning the back labels, some research has concentrated on their effectiveness. These labels display different information in comparison to front labels. Certain types of this content include, for example, descriptions of flavours, statements about production, background information about the winery, company website details and suggestions for food pairing. From the results presented by Mueller et al. (2010), it was found that the indications on the history of the winery, sensory descriptions of the wine and suggestions on food pairings were those with the greatest positive impact on consumer choice, while information on ingredients had a notable negative impact. From another paper, it was found that the frequency of wine consumption showed an impact on the importance of back label attributes (Kelley Kathleen et al., 2015).

All these previous researches provide interesting knowledge. However, a market analysis published by Nielsen showed that it is very complex to predict how consumers will respond to the design of a new product. Therefore, to develop a new packaging design it is necessary to refer to the "*quantitative feedback*" from consumers and avoid personal bias. Furthermore, in this market analysis conducted by Nielsen, a label analysis of 20 wine brands where eye-tracking technology was used, found that 57% more consumers saw the more visible bottle than the less visible bottle within the first few seconds of its appearance. So, it is clear that strong design visibility is a key element (Nielsen, 2017).

## **4 Materials and methods**

In the course of this study two different survey methods were used, initially a qualitative approach through a focus group, then an online questionnaire to obtain feedback from consumers through a series of predetermined questions. The results obtained from the two different approaches were compared to provide a broader vision and guide the optimisation of packaging towards the most appropriate choices. The two methods are discussed in detail in the following paragraphs.

### **4.1 Focus group**

First, a focus group was conducted in the Lisbon area, working in close collaboration with Amint, a marketing consultancy firm operating in the region of Lisbon.

#### **4.1.1 Focus group: qualitative methodology**

Qualitative market research is a research method based on open questions. Among the various research approaches the focus group was the one used in this study. A focus group consists of a small group of carefully selected participants (a group of 6-10 people, usually 8) who participate in open discussions on a given topic. The host has to carefully select the participants to represent that part of the population targeted by the study. The group should generalize the reaction of the whole population (in this case consumers of Lisbon area). In the focus group method, the figure of the moderator is fundamental, since his task is to exploit the communication with the participants and the flexibility needed to modulate the discussion, with the purpose of extracting meaningful insights and opinions (Cornwall & Jewkes, 1995; Hayward et al., 2004; Morgan, 1996). The discussion guide used in a focus group is of the semi-structured type, which means that the guide is only indicative during the discussion, the conversation is fluid and the questions open (Bryman, 2008).



#### 4.1.2 Research design

Before the start of this investigation, the winery had already made a prototype of a transparent glass bottle with a more original and distinctive shape (with wider shoulder and body) than the one on the market. Different sets were made, of three bottles with different graphics each.

The focus group was developed in 4 main phases: research development, data collection, analysis, and communication of results. In the first phase, the research project for the new packaging of "Villa Oeiras" brand was created, based on the needs and approval of the Casal da Manteiga team. First of all, it was necessary to identify the main goal and define key research objectives for this survey.

The objectives set in the study were:

- Find the level of knowledge of the participants about the Villa Oeiras brand
- Evaluate the proposal of the new packaging of Villa Oeiras, through the immediate reactions, and involvement of the participants
- Comprehend the impact of the new packaging compared to competitors' brands in the market to the current bottle design

Subsequently, in the same step, the targeted participants of the survey were identified. This is a critical phase since this technique is largely based on group dynamics and synergistic connections between the participants (Kitzinger, 1994). The target group of the research were: individuals (both genders) from the age of 35 years, consumers of fortified wines, some of them also consumers of Carcavelos "Villa Oeiras" wine, responsible for the wine purchase decision, resident in the great area of Lisbon and belonging to the middle-high class. The "selection form" was a document used for the recruitment of participants, in essence, was the tool that allowed to identify consumers with the required characteristics.

The sample, reported in table 1, was divided into two groups of 8 participants each one. The first group consisted of younger people and the second group of older people. Both groups were constructed trying to balance the distribution of gender.

Age	Lisbon	Total
Younger (35 - 55 years)	8 participants (4 ♀ , 4 ♂)	16 participants
Older (+55 years)	8 participants (3 ♀ , 5 ♂)	

Table 1: Focus group samples

During the first phase was important to schedule the date and location of the two focus groups. They were set on two separate days: one group per day. The chosen location, where the surveys were conducted, was the Amint Operations Center, located in Lisbon. Both focus groups lasted approximately 2 hours. Based on the research objectives, a list of questions was prepared as a guide for the focus group discussion. This script was developed with the support of Team Amint.

The guide script was organized in 3 steps:

The first step: a brief presentation and explanation of the discussion rules, a short presentation by the moderator and participants, introduction to fortified wines and questions about their consumption, the introduction of the Villa Oeiras brand in the discussion to perceive the degree of knowledge about the brand, discussion about the comparison of the brand with other generous wines and opinions about the brand regarding its presence on the market.

In the second step: an evaluation of the new image for Villa Oeiras is carried out. Here was briefly explained Casal da Mantaiga's desire to change the packaging of their fortified wine. Two possible paths of experimental labels were proposed, in random order (the order will be exchanged in groups). Each proposal (set of 3 different bottles) was identified with a letter and a number (transparent label: M5; black label: X1). The proposals mainly refer to the 75 cl format, but references subsequently were made also to the 37.5 cl format.

The moderator presented the M5 and X1 (illustrated in Fig. 5 and 6) sets in sequence.



Figure 6: Transparent label M5



Figure 5: Black label X1

Following this, an individual written exercise was done, where each participant had to evaluate individually the two sets M5 and X1. For each label proposal, was asked to record general feelings with a comparison between the different choices in each set.

After this exercise, the two most voted options have been identified. The discussion focused on these preferred bottles. Then an impersonation exercise was proposed through the question, "If we think of this bottle as a person, what would you be like?". With this, it was interesting to see how the participants idealized the new packaging. After that, the various aspects judged important for each label proposal were explored in-depth during the two focus groups. In table 2 below, are presented some of the questions asked to the participants.

Questions about the new Villa Oeiras packaging	
	What are the immediate reactions, the impact and the involvement generated?
	Which elements of the bottle stand out most?
	What is the level of clarity in communicating brand identity?
	What are the strengths or weaknesses of the new design?
	How do you evaluate the various elements of the label (colour, font, graphics, illustrations)?
	What is your opinion about the messaging system, what it says about the brand, the product (organoleptic characteristics), the region and the history of Carcavelos?
	Does the label suggest it is a generous wine? Is it clear that it is a generous wine from Carcavelos? Is it clear that it is a DOC?
	Between the two sets of 3 bottles, which design has the most positive impact and why? and, on the contrary, the most negative?
	What are the advantages or losses compared to the current image in terms of quality, elegance, and modernity?
	What is your opinion on the new format and transparency of the bottle in the M5 proposal?
	What is your opinion on the back label and its aesthetics in the two proposals X1 and M5?
	What is your opinion on the new bottle closure?

Table 2: Questions about new packaging

Subsequently, the two new alternatives of packaging chosen by participants were compared to the current packaging of Villa Oeiras, and then, were compared to competitors' bottles. The moderator presented the competitors' packaging to the group, and they were asked to evaluate the differences compared to the new Villa Oeiras prototype. After clarifying which bottle was a favourite among attendees, the moderator introduced the 37.5cl format, exploring opinions on this smaller format. Finally, several alternatives of boxes (outer carton of the bottle) for the bottles were presented to gather opinions and suggestions for optimization. In the third and final stage, the most important points of the entire discussion were summarized. Each group was asked to give recommendations for the restyling of new Villa Oeiras packaging.

### **4.1.3 Qualitative data analysis**

The data, during the discussion of the 2 focus groups, were collected through audio recordings, handwritten notes, and observation of the non-verbal language of the participants. The discussion of focus groups provides qualitative and observational data, and the analysis of this type of data is quite challenging.

The analysis of the content is a fundamental step since it allows a systemic encoding of the data by organizing the information into categories to discover patterns that cannot be detected simply by listening to recordings or reading the transcripts.

In this case, ethnographic analysis, widely used in sociology, qualitative technique, allows obtaining key information from the group discussion. This system is based on the ability of the researcher to order the material and extrapolate the most important information while maintaining the integrity of the focus group. The ethnographic analysis allows a detailed interpretative account of the social processes that occur during the conversation within the focus group (Krippendorff, 2012).

The objective of such a focus group is not to quantify information, but to explore, to obtain insights. Therefore, there was no statistical treatment of the data, but an analysis of the content of group conversations from audio recordings. This analysis depends essentially on the experience of the technician, on his ability to interpret the participants' speech (manifest and latent). In the case of these two focus groups, Amint provided a team of psychologists, with more than 20 years of experience in qualitative studies and extensive experience in the spirit market, who gave a great contribution in the assessment of the material obtained from the focus groups.

## 4.2 Online survey

The following paragraph deals in detail the structure, purpose, methodology and tool used to analyze the data collected with the questionnaire developed on the Google Form platform.

### 4.2.1 Structure and purpose of the questionnaire

To obtain a significant number of responses, an online questionnaire was created to collect feedback on the new bottle proposals developed by Villa Oeiras. The online platform chosen was Google Forms. The questionnaire was distributed via link using personal contacts and social media such as LinkedIn, Facebook and WhatsApp. The survey was aimed at a wide number of people, and the only requirement to take part in the survey was a minimum consumption of wine from the participant. After one month the dataset was transferred on Excel and then analysed.

The questionnaire has been structured in three sections: The first section aimed at obtaining a socio-demographic profile of the respondent (from question Q1 to Q7). In the second section, the type of wine consumer was analysed through a series of questions aimed at understanding the degree of knowledge of the wine and the value that they attributed to certain characteristics of the wine (from Q8 to Q24). The questionnaire is composed of questions with multiple-choice answers and Likert scale (from 1 to 5), and many of these included images to simplify understanding and make the answers immediate and objective. So, the use of visual elements (see Fig.7) has ensured that participants in the questionnaire oriented their preference based on what was displayed at that moment.

Q16. How relevant to you are the awards received / mentions of famous wine guides when buying a bottle of wine? \*



Figure 7: Example of question with visual elements

In the third and last section (from Q25 to Q28) has been structured into four questions provided with images to collect consumers' preferences most immediately and objectively. The first three questions were formulated to detect the respondents' preferences about three elements of the packaging: bottle shape, label and closure (cap and capsule). Specifically, each question presented a set of five alternatives, one of which was the one used in the new Villa Oeiras packaging. Finally, the last question (Q28) asked the respondent to express a preference between three bottle variants, two of these (A and B) were the new proposals of transparent glass packaging, with transparent and black labels respectively, and the remaining one (C) represented the Villa Oeiras bottle currently on the market (see Fig.8).

28. Q28. Which of these bottle designs do you prefer? \*



Figure 8: Q28- options with 3 packaging of Villa Oeiras

Table 3: Overview of the survey questions

Q1. Indicate your gender	Q17. How relevant is the label on the packaging to you when buying a bottle of wine?
Q2. Indicate your age	Q18. How important is the price to you when buying a bottle of wine?
Q3. Please indicate your nationality	Q19. How relevant is the grape variety to you when buying a bottle of wine?
Q4. How many people are there in your household?	Q20. How relevant is the zone of origin of the wine to you when buying a bottle of wine?
Q5. What's your academic title?	Q21. How relevant is the certification of organic or biodynamic viticulture to you when buying a bottle of wine?
Q6. What's your employment status?	Q22. How important is wine/food pairing for you when buying a bottle of wine?
Q7. What is your monthly net household income?	Q23. How important is the wine vintage to you when buying a bottle of wine?
Q8. How do you consider your wine knowledge?	Q24. Are you familiar with fortified wine?
Q9. How often do you drink wine?	Q25. Which of these labels attracts you the most?
Q10. Which type of wine do you drink more frequently?	Q26. Which of these bottle shapes appeal you the most?
Q12. Where do you usually buy your wine? (you can tick more than one box)	Q27. Which of these closures attracts you the most?
Q13. How much do you normally spend for a bottle of wine?	Q28. Which of these bottle designs do you prefer?
Q14. How relevant is a known brand/producer to you when buying a bottle of wine?	
Q15. How relevant is a Denomination of Origin (DOCG, DOC, IGT) to you when buying a bottle of wine?	
Q16. How relevant to you are the awards received / mentions of famous wine guides when buying a bottle of wine?	

In Table n.3, presented above, all questions of the questionnaire are displayed.



#### 4.2.2 Methodology applied to the dataset

In this section, is presented the theory of the analysis of multiple correspondences, taken as a technique that allowed to illustrate from a multidimensional space all the information deriving from the questionnaire, in a two-dimensional space intercepted by the factorial axes. The Multiple Correspondence Analysis (MCA) is an extension of the Correspondence Analysis (CA) that allows us to analyze the relationship model of several categorical dependent variables. Then, it can also be seen as a generalization of the Principal Component Analysis (PCA) when the variables to be analyzed are *categorical* rather than quantitative. Technically, the MCA is obtained by using a standard matching analysis on a matrix of *dummy* indicators (i.e. a matrix whose items are 0 or 1). But first, is important to explain what is the CA. The Correspondence Analysis is one of the best known and most effective tools for the multidimensional treatment of qualitative data. It studies the relationships existing between the elements of two sets representing two characters, corresponding to the rows and columns of a contingency table. The most important contributions come from social science scholars such as Goodman, Haberman, Mosteller and Fienberg who come to describe a multifaceted approach to the problem. The objective of the CA is to study the structure of the interdependencies between variable X and a variable Y, analyzing the correspondence between the elements of the two sets. MCA, therefore, is the multi-dimensional dress, imagining a contingency table that extends to several modes of several variables at the same time (Van Kerm, 1998). Given the number of variables and these are belonging to different dimensions of the phenomenon to be investigated, as well as a "traditional" data analysis based on a descriptive approach, multidimensional techniques are usually used to synthesize the information that can be inferred from the entire data matrix. From here the MCA was introduced by the French Benzecri at the beginning of the '60s, it serves to provide a map of the existing relationships between variables and between modalities of different variables, relating them to illustrative variables external to the analysis itself (Van Kerm, 1998). It is particularly suitable for the exposition and synthesis of the relationships between variables typical of sociological research as most of the research carried out with questionnaires involves the presence of many "categorical variables". The researcher must identify among the set of variables observed, which should play the role of active and which should be used as additional (or illustrative).

The **active** variables are those that actively participate in the identification of the small space and therefore contribute to the determination of the factors considered.

The **additional** (illustrative) variables are instead those that are simply projected, at a later time, into the identified space, therefore they do not participate in the identification of the solution but simply help to better describe the phenomenon.

The choice of the role to be attributed to the different variables strictly depends on the objectives of the survey, the nature of the characters considered. In other words, it is possible to state that the active variables subjectively describe the units while the illustrative ones determine groups of observations. The variability among the analysed entities, called Inertia, can represent a criterion for the choice of the size of the solution, so a threshold can be set and the first eigenvalues whose cumulated percentage (%) reaches this threshold can be chosen. The starting matrix is generally a matrix individual-variables  $R$ , of dimensions  $(n \times p)$  in which each column represents a variable that can assume values from 1 to the number of modes foreseen by the variable itself. The coding is called **reduced coding** and has the advantage of collecting the observed data in a compact and easily readable way:

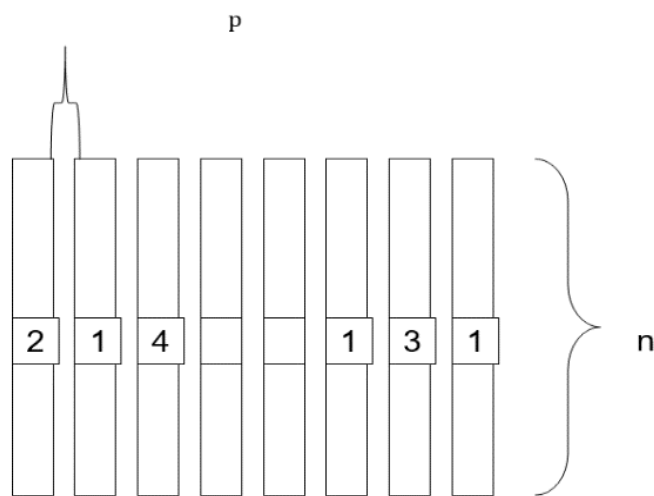


Figure 9: Matrix of individuals by variables

On the other hand, on the table thus defined the sum operations per row and per column would not make sense, at least from a statistical point of view it would not be possible to draw a measure of frequency. In fact, from a first transformation, we obtain a  $Z_{(n \times s)}$  matrix in which each variable will give rise to as many *dichotomous variables* (*dummy* of "0" and "1" values) as there are expected. This type of coding is called **complete disjunctive** because it provides only the *dummy* values (disjunctive) and because for each variable you will have one and only one of the modes referred to value "1", as there are no modes other than those considered (complete).

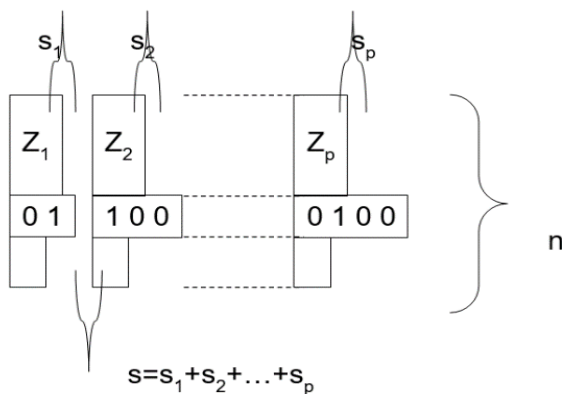


Figure 10: Complete disjunctive matrix Z

In the  $Z$  matrix, the sum per row is constant and equal to the number of  $p$  variables observed, while the sum per column shows the frequencies of each of the  $s$  modes, having indicated with  $s$  such that

$$s = \sum_{i=1}^p s_i$$

summation of all modes of  $p$  variables. From the  $Z$  matrix, it will then be possible to obtain Burt's  $B_{s \times s}$  matrix ( Fig.9) in which all possible intersections between variables are considered. This matrix obtained as

$$B = Z^T Z$$

is a matrix, by construction, made up of  $p^2$  blocks.

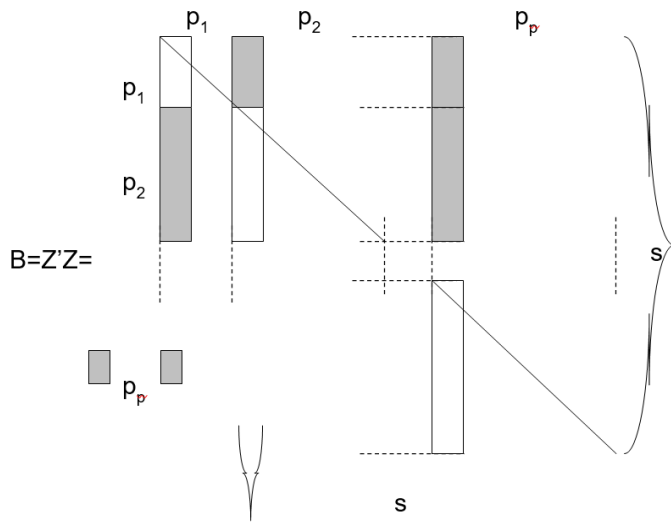


Figure 11: Burt's Matrix

Each diagonal block of the matrix in figure 9 is, in turn, a diagonal matrix of the order  $s_j$  whose elements show the frequencies of the modes of the variables  $p_j$ , while the non-diagonal blocks of dimension  $s_i \times s_j$  represent the contingency tables related to the modes of the variables  $p_i$  and  $p_j$ . Then from matrix  $B$  is possible to obtain diagonal matrix  $D$ , which is also a block matrix with non-diagonal blocks equal to "0" and diagonal blocks equal to  $B$ .

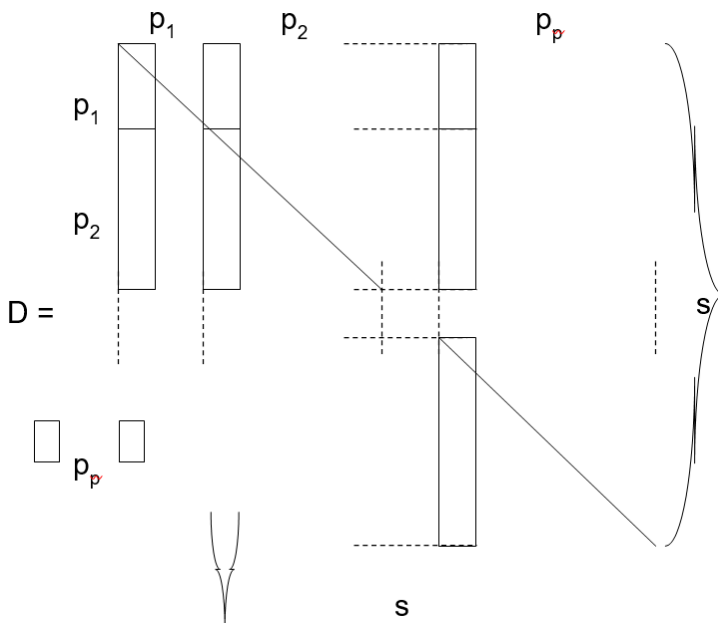


Figure 12: Matrix  $D$

The MCA can, therefore, be seen as correspondence analysis (CA) on the  $Z$  matrix or also, given the properties that bind the two matrices, as a CA on the  $B$  matrix. To identify the factors to be considered in the analysis, the number of non-trivial eigenvalues is determined, given by the difference between the number of modalities  $s$  and the number of variables  $p$ . For each solution (PCA) is equivalent to the diagonalization of the matrix:

$$\frac{1}{p} Z D^{-1} Z^T \phi_\alpha = \lambda_\alpha \phi_\alpha$$

The solutions expressed by the autovectors  $\phi_\alpha$  will express the coordinates of the line and column points as follows in the following diagram:

$$\hat{\phi}_{i\alpha} = \frac{1}{\sqrt{\lambda_\alpha}} \frac{1}{p} \left( \begin{array}{c} z_i \\ \boxed{0 \ 1 \ \dots \ 1 \ 0} \end{array} \begin{array}{c} \hat{\phi}_\alpha \\ \hat{\phi}_{\alpha 1} \\ \hat{\phi}_{\alpha 2} \\ \hat{\phi}_{\alpha s-1} \\ \hat{\phi}_{\alpha s} \end{array} \right) = \frac{1}{\sqrt{\lambda_\alpha}} \left( \frac{0 + \hat{\phi}_{\alpha 2} + \dots + \hat{\phi}_{\alpha s-1} + 0}{p} \right)$$

Figure 13: Coordinates Row and column points

Regarding eigenvalues in the previous formula, we should consider that all eigenvalues are less than 1. Therefore, the percentages explained are very low (as for PCA criterion, not directly applicable in this case), so we should use the absolute contributions, deriving from Benzècri's correction formula:

$$\lambda^* = \left(\frac{p}{p-1}\right)^2 \cdot \left(\lambda - \frac{1}{p}\right)^2$$

The number of eigenvalues is a function of the size of the matrix  $B$ , so it follows that as the size of the analysis increases the number of eigenvalues also increases and the size of the eigenvalues decreases accordingly.

### 4.2.3 Analysis tools and dataset processing

The *R software* was the tool chosen to analyse the data collected by the questionnaire. For the elaboration of the data set, some transformations and were necessary to prepare it for successive statistical techniques.

The necessary variables were arranged in labels to shorten them by graphic necessity. The ***FactoMineR*** and ***ade4*** packages were used. In order to find correlations between the different variables obtained from the questionnaire, it was necessary to perform the analysis of multiple correspondences (MCA) on the data set. The MCA is performed in the presence of categorical variables and functions as a multi-variety data analyzer (Gebeyaw, 2017; Le et al., 2008). Following, it was interesting to identify, the most significant clusters and discuss them.

## **5 Results and discussion**

### **5.1 Focus groups**

The topics covered in this qualitative survey have been divided into two parts, according to the purpose of this study, to make the reader's comprehension clearer.

#### **5.1.1 Perception and relationship with Carcavelos "Villa Oeiras" wine**

As mentioned in the previous chapter, in the first phase of the focus group, the first objective was to capture the knowledge about Villa Oeiras brand and its Carcavelos fortified wine by the participants in the study.

The discussions showed a tendency for Carcavelos wine to be distant from fortified wine consumers, in fact, some associate this wine to an extinct or almost extinct product. For those who do not know the product, this is an unknown wine and they do not even associate the name Carcavelos to a wine region. In general, even among those who are aware of the presence on the market of Carcavelos wine, the experience of consumption is very scarce or even inexistent in contrast with the popularity of other fortified wines such as Port, Madeira and Moscatel de Setúbal.

Moreover, the discussion clearly showed the perception of a lack of protagonism of Carcavelos wine in the local market. For most of the sample, the consumption of this wine is absent compared to other generous wines, and it is not integrated into the tradition of consumption. A lack of advertising was also reported by the participants. Moreover, it is absent in places where other generous wines are present such as large shops, restaurants, and bars. The consumers of Carcavelos confirmed that they discovered the product outside the usual "route", in a specific bar or situation, like some events or wine shops in Oeiras.

On the other hand, among those who know the product, but have never tasted it, the perception of a high price (about 40 euros) appears as an important factor of resistance to an initial consumption. This is because, on the market, other more well-known generous wines are sold at more affordable prices.

Despite this, among its consumers, Carcavelos wine is considered a significant player in the category of generous wines. Both in terms of product's characteristics and in terms of cultural heritage, in these consumers is rooted a good image of this wine. This product is associated with high quality and in its reference category (among fortified wines), it is not confused with other generous wines but maintains its identity. Among the various positive feelings, it is seen as a very historical wine, with a centuries-old tradition, dating back to the time of the Marquis of Pombal, linked to the history of the Carcavelos region.

These perceptions legitimise a high price, even though compared to non-consumers, Carcavelos wine consumers place their average price below 40 euros. Despite this good image, it seems that its consumers are not aware of two other important elements that characterize this wine: the fact that this is a DOC wine, and is never spontaneously indicated, and also that there is not the full awareness that this fortified wine comes from the smallest delimited region in the world. Apart from its consumers, Villa Oeiras brand showed to be little known, and it is not clear the connection with Carcavelos wine. Participants hardly associate this brand with Carcavelos. This happened since over time this wine has been sold with another brand, "Conde de Oeiras".

The brand "Villa Oeiras" was, for some participants, not very suggestive and does not convey its close link with the Carcavelos wine region. Moreover, most of the participants are unaware of the involvement of the municipality of Oeiras with the Villa Oeiras brand and the project behind this (campaign created for the recovery of Carcavelos wine production). The participants are not familiar with the winery or even with their wine assortment, and also about medals received by Villa Oeiras wine.

When presented, the information about the connection between Villa Oeiras brand and the Municipality of Oeiras had a positive impact on the entire sample. The project to recover the production of Carcavelos and its history has been appreciated. Given that this information obtained positive feedback among the participants, it could have a great impact on the future perception of the brand.



### 5.1.2 Perceptions of Villa Oeiras new packaging

The following section highlights the most important opinions about the new packaging. The most important statements of the participants about various components of the new bottles are reported. The discussions have shown that both proposals show a rather positive impact on the sample. Regardless of personal preferences for the label version, there is a unanimous appreciation of the new packaging style. The new look was considered very appealing as it suggested a superior quality wine, intended for demanding consumers.

These perceptions led participants to expect a price around €30-40, a cost that would also be accepted by non-consumers thanks to the charm of the bottle; for current consumers, the value of the new brand's packaging is such that even a slight price increase can be justified. Compared to the current one, the new packaging is always associated with a clear positive evolution, as it makes clear the perception of important characteristics.

The transparent glass helped to perceive that it is a fortified wine and generated a strong curiosity and desire for consumption. This new style was considered a good mix of history and modernity. Participants revealed that this design helps to distinguish Carcavelos from other fortified wines, thanks also to the bottle shape, as in this category other fortified wines use to have tall and dark bottles, such as those of Port wine.

Some important suggestions have been collected: it is necessary to emphasize the information about the designation of origin, for example, more visible DOC characters. Also, could be useful to include the vintage of the product, which helps to assess its value.

In this strong involvement, 3 features of the packaging were crucial:

The *transparency* of glass, that conferred modernity, and improved brand perception. This also allowed to appreciate the golden colour of the wine.

The *shape of the bottle* (low and wide) suggested the idea of a solid bottle, distinguishing it from other wines of the same category (a shape that recalled that of rum or whiskey)

The *new font style* was appreciated, as simple and objective, and with gold details that gave elegance to the bottle.

Other *details* reinforced the perception of the quality and value of this wine. The *weight of the bottle* suggested a greater investment of the brand in quality glass, able to better protect the product and its unique characteristics. The *high thick base of the bottle* improved the robustness and elegance of the bottle. The *wooden stopper* gave a sense of prestige at first sight and evoked the phase of ageing in cask.

Also, the alternative format of smaller 37.5 cl bottles has been positively valued by non-consumers as it allows them to buy a product they do not know and taste it at a more affordable price. Despite the general appreciation of both alternatives of the two sets of bottles, when compared, some preferences are influenced by the "age" variable:

The "transparent" proposal is preferred by younger participants (35-55 years old).

The "black background" proposal is preferred by older participants (over 55).

Regarding the considerations on the **"transparent label"**, first, the emphasis this label places on the region is something that everyone appreciates. Carcavelos appears at the top of the label and is one of the first elements to attract attention.



Figure 14: Transparent alternative label

On the other hand, the fact that it accentuates the transparency and lightness of the packaging does not generate the same enthusiasm in the participants: For younger participants, it improves the image of modernity and elegance, while older participants identify a certain loss of protagonism and charm because they feel that with transparent label the bottle becomes poor in detail.

In this transparent label prototype, the identification of some limitations in terms of reading, being mutually agreed, underlines in older participants the preference for the dark label alternative. On the front label, the chromatic contrast between the gold characters and the transparent background is not always immediate. Moreover, the intensity of the gold font seems dependent on the position of the bottle, specifically on the amount of light that intercepts the bottle. On the back label (Fig.15), the black font makes the text illegible on a transparent background and this makes almost impossible reading the description of the wine.



Figure 15: Back label in the transparent label bottle

Regarding the bottle with the "**black label**", all participants generally agree that it benefits of an immediate reading because the black tone provides greater chromatic contrast with the golden fonts. Despite this, the "black background and gold font" combination was not evaluated in the same way. Discussions have shown that this dark label was very appealing to older people, who interpret it as an element of excellence, prestige and elegance. In contrast, for younger participants, it was more conventional and less astonishing style label. More specifically, they stated that black colour highlights the square shape of the label, reinforcing the idea of a more conventional label.



Figure 16: Black alternative label

Even the most enthusiastic of this dark label adaptation admits that the back label poorly matches into the packaging, in fact, the white back label contrasts too much with the transparent glass of the bottle and seems to cover too much space on the bottle.



Figure 17: back label in black background label

Regarding the *packaging boxes*, these new models highlighted the name of the region (information "Carcavelos") and reinforced the link between wine region and brand. It also gave a more elegant appearance, in line with the new image of the bottle.



Figure 18: Alternative boxes for Villa Oeiras

Black box version (compared to the white proposal) was considered more stylish and gave the idea of superior wine.

### **5.1.3 Discussion of Focus group results**

Considering the objectives set for this study, it is clear that to conquer the market, more efforts are needed to promote the Carcavelos region and increase the brand value. Appeared clear from the discussions that informing and disseminating the DOC Carcavelos, its great historical meaning, as well as the connection of the Villa Oeiras brand with Municipality of Oeiras is fundamental. From the group discussions, it appears that the sharing of the experience on wine and brand, as well as the contact with the new packaging proposals, has generated great curiosity in the participants.

To spread brand awareness could be useful to invest in advertisements and social media, with the possibility of increasing the potential number of customers and thus increasing recognition of Carcavelos wine. Also, regular promotion of tastings events will increase the link with local consumers costumers. It's important to adopt the strategy of 'open doors', meaning an investment in wine tourism, organized periodic visits to Quinta do Marquis and Casal da Manteiga, where the public will be able to know more directly the history and the place where Carcavelos wine was created. Moreover, will be necessary to ensure the presence of Carcavelos wine on the menu of many restaurants and bars that offer superior services at a good standard.

About the new packaging prototype, the transparent bottle was unanimously appreciated by the participants. The findings gathered during the focus groups confirmed the distinctive character of the bottle, capable of calling the consumer's attention to itself and differentiating Villa Oeiras from the other wines on the shelf. Also, the transparent glass was evaluated positively as it allows to immediately appreciate the intense golden colour of the wine and its dense consistency. The transparent label seems to offer some additional advantages thanks to its elegance and innovation appreciated from a more heterogeneous age group (35-55 years old) so that it can have a wider impact on the market.

In any case, both the two different labels require careful optimization: In the "transparent" version it is necessary to guarantee a good contrast between the fonts and the tone of the liquid, in particular on the back label. In the "black version", it is necessary to develop a back label that is more aesthetically pleasing. As seen in literature, the back label is an important element of the bottle, as generally, it informs about the history of the winery and the wine process description. So, the back labels represent a great opportunity to present important values to the consumers.

## 5.2 Results from the online questionnaire

The dataset presented multiple categorical variables, common in the data acquired from questionnaires. The method identified as the most favourable for the analysis of these data is the Multiple Correspondence Analysis. Before proceeding with this technique, some transformations on the dataset were necessary to prepare it for statistical analysis.

### 5.2.1 Dataset processing

Using the Google Form questionnaire, 326 respondents were collected. From the data set, there are not many missing data and the socio-demographic variables are a "weighting" factor of the information about the "core" variables that characterize the analysis, moreover, these will help us to eliminate from the sample answers due to "bias" from filling in the questionnaire and therefore it is not crucial for overall information. In our case, age and gender are important factors regarding participation in the study, which here is assumed to be completely random. To increase the external validity of the study, those units that are not classified by gender and age of the respondent will be excluded from the sample, as they cannot discriminate these statistical units concerning the "core variables" that characterize the analysis. The essential variables have been arranged in *labels* to shorten them for graphic necessity.

To facilitate the analysis, it was easier to use Q-x mapping. Table 4 below shows a brief example of this mapping, shortened for spacial reasons:

Table 4: Q-x mapping example

Codes	Descriptions
Q1	Indicate your gender
Q2	Indicate your age
Q3	Please indicate your nationality

To implement the analysis, we have transformed some quantitative variables into factors, in particular, all the variables expressed as votes and the age variable.

Starting from the variable that stratifies the age, below is reported its histogram:

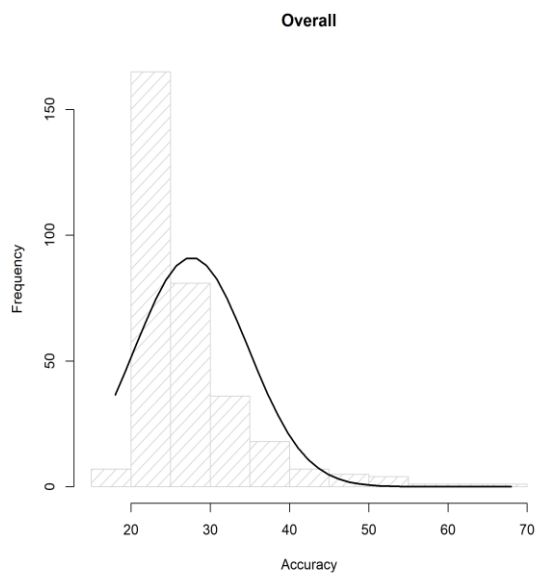


Figure 19: Histogram age Q.2

The age distribution is strongly asymmetrical with the tail on the right, so there is a strong prevalence of young people. However, analysing by deciles is possible to understand which disjunction points are useful to categorize the variable.

From this it resulted that the natural distribution could be identified as a group of very young people going up to the median 18, 25, 68, another group from the median to the 90th percentile as a group of young people equal to 18, 36.5, everything else has been categorized as less young. Segmental distribution of the age variable is shown in Fig.16.

Pie Chart Gruppo per eta anagrafica

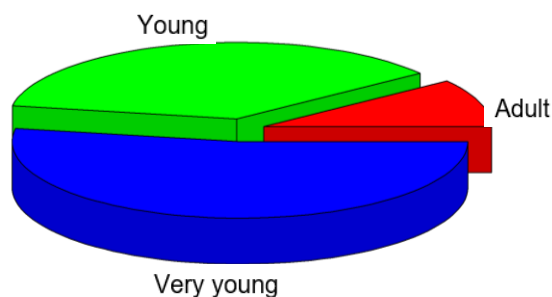


Figure 20: Pie Plot - Q2 - New variable Age



The following data have been transformed for each variable, from variable Q4 i.e. the variable that concerns “How many people are there in your household?”. We have those variables with a Likert scale from 1 to 5, so we will have to divide them necessarily into a few groups and efficiently, using statistical criteria. One of these is the automatic algorithm of cluster analysis, using the *K-means* method. This construction algorithm leads to the definition, based on a predefined number of clusters to be formed, of homogeneous and heterogeneous groups within them. Finally, those variables that have been given too long answers have been transformed into shorter tags for each mode.

All of these transformations were made to allow the final graph of the Multiple Correspondence Analysis technique can be read together with the other tags. We have used a criterion such that the answers with more than 7 characters have been shortened with initials equal to the initials of each word of which the answer is composed. Then, were arranged the variables for intervals, variables Q7 and Q13, concerning “What is your monthly net household income?” and “How much do you normally spend for a bottle of wine?”. Finally, we have transformed the variables related to the choice between different options concerning the bottles, from Q25 to Q27. Of these, we will take the initial of the string and the numerical choice. Finally, we removed the word “bottle” from variable Q28.

So, the final dataset is shown as follows in these tables below:

Table 5: Final Dataset transformation pt.1

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q12
Female	MG	WE	3	HSD	S	>=6k	B	MB	WW	SSWSGHTOOFAE
Female	MG	WE	4	HSD	S	2k-3k	B	OOSE	WW	SHFTPITC
Female	MG	WE	geq 5	HSD	S	>=1k	B	TPW	RW	SHFTPITC
Female	MG	EE	3	HSD	S	>=1k	B	MB	RW	SSWSGHFTPITC
Female	MG	NE	1	HSD	S	>=1k	A	TPW	RW	SSWSGH
Female	MG	WE	3	BD	S	1k-2k	B	OOSE	WW	SH

Table 6: Final Dataset transformation pt.2

Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23
10E-30E	C	A	C	A	B	C	C	A	B	C
5E-10E	B	C	C	B	B	B	C	C	C	A
3E-5E	C	C	B	A	B	A	C	B	C	C
5E-10E	C	C	C	B	B	C	B	C	C	B
5E-10E	B	B	C	A	B	C	A	A	B	B
5E-10E	B	C	C	B	B	B	C	C	A	B
Q24	Q25	Q26	Q27	Q28						
NIDKWII	L-3	S-3	C-5	C						
IHAIBINDI	L-3	S-3	C-5	C						
YICIS	L-3	S-2	C-3	C						
IHAIBINDI	L-5	S-3	C-2	C						
NIDKWII	L-3	S-4	C-2	C						
NIDKWII	L-4	S-5	C-2	C						

### 5.2.2 MCA application with descriptive analysis in support

After a long process of "classification" of the dataset, we opted for the Pearson  $\chi^2$  test. The most important connection operator representing the intensity of the relationship between two categorical variables is called "Chi-Square". This was useful because permitted to measure the statistical association index and test its significance. Through the formula, it is possible to carry out the Chi-square association test:

$$\chi^2 = \sum \frac{(n_{ij} - n_{ij}^*)^2}{n_{ij}^*}$$

And, given that, we calculate its *p-value* by responding to the hypothesis system:

$$H_0: \chi^2 = 0$$

meaning that there is no statistical association between the variable *i*-sima and *j*-sima for  $i \neq j$ .

So, it was applied for all the variables in the dataset. In the matrix that we have created *p\_val\_chi2test*, there is the *p-value* associated with each Chi-square test made in pairs between each variable of the final dataset and for the other variables. The *Heatmap* allows us to understand the dependency structure, before an MCA, if this dependency is strong or weak. The red areas in Figure 17 imply variables, two by two, which are very connected to each other.

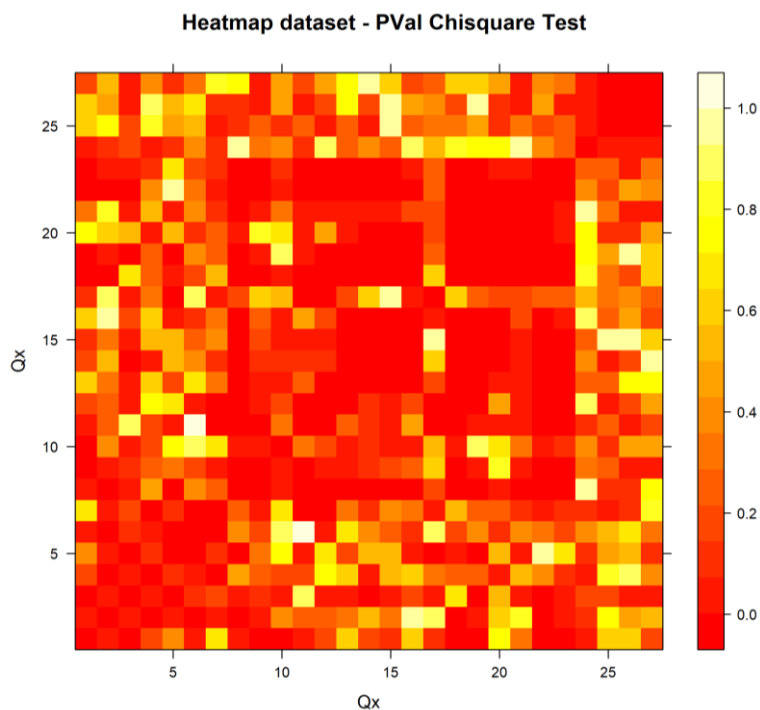


Figure 21: Heatmap Chi-Square test, p-value

In fact, in the "final" area of the questionnaire, there are strong connections between the answers given, when making the respondent choose according to what is observed in the illustrations. Also, the central body of the questionnaire shows strong statistical dependencies and therefore, these final findings suggest good expectation for the application of the MCA.

Before going into the analysis of the results, the percentage of variance explained by the method is visualized, in other words, the global information that the method can represent. The package used, "FactoMineR", presents the eigenvalues obtained from the method presented in the method about the diagonalization of the complete disjunctive matrix. Then, to be able to analyse this aspect, the same method was used but with another package, "ade4", to evaluate the eigenvalues.

Eigenvalues obtained are not "significant" (they are not as easy to read as in Principal Component Analysis). Applying to the eigenvalues the Benzecrì correction (1979); therefore, the new eigenvalues will be transformed by the following formula:

$$\lambda^* = \left(\frac{p}{p-1}\right)^2 \cdot \left(\lambda - \frac{1}{p}\right)^2$$

Applying this correction to our eigenvalues, the percentages of variability explained increase after the correction, this provides more information than the identified factorial axes can represent.

After these important considerations regarding data processing, it is possible to observe graphically, within each variable of the questionnaire, the composition of the modalities of our dataset.

We start analysing the variable *Q4*, which is presented in the table below:

Table 7: Q4 map

Q4	Q4. How many people are there in your household?
1	1
2	2
3	3
4	4
geq5	Greater equal to 5

As we can observe the composition within families is quite equal in the median, so the family composition, like all the other variables that have aligned medians, is not much to take into account for the interpretation of the graph and therefore it will be possible to design these variables in supplementary.

The variable *Q2* instead reports the gender, so we can identify a significant difference in gender proportions for which sex will be a discriminating variable.

Table 8: Q2- % of the sample

Q1. Indicate your gender	% value of the sample
Female	55.52%
Male	44.48%

Another interesting detail is the variable *Q7* reported in Table 9:

Table 9: Q7 map

Q7	Q7. What is your monthly net household income?
>=1k	Up to 1000 €
1k-2k	From 1001 to 2000 €
2k-3k	From 2001 to 3000 €
3k-4k	From 3001 to 4000 €
4k-6k	From 4001 to 6000 €
>=6k	More than 6000 €

This represents monthly income, and the most prominent income categories are the 4k-6k, 3k-4k high ones. Consequently, respondents can certainly stand out for this factor as well.

Following, we observe the nationality of the respondents, in Table 10 (variable Q3):

Table 10: Q3-nationality

Q3	Q3. Please indicate your nationality
AA	African Africa
AC	American Central
AS	American South
A	Australian
CA	Central Asiatic
EE	East Europe
EA	Eastern Asiatic
NZ	New Zealand
NA	North American
NE	Northern Europe
R	Russian
SA	Southern Asiatic
WE	West Europe
WA	Western Asiatic

From what we can observe, we have minorities (Russia and Central Asia) against majorities (Eastern Europe and South America); on these clusters, we can get some interesting conclusions regarding the proximity with the “core variables”.

Before examining the "core variables": from Q25 to Q28, first look at the variable Q24 in the table below:

Table 11: Q24-familiarity with fortified wine

Q24	Q24. Are you familiar with fortified wine?
IHAIBINDI	I heard about it, but I never drank it
NIDKWII	No, I don't know what it is
YICIS	Yes, I consume it sometimes
YIDIALO	Yes, I drank it at least once

According to what was observed, the sample is familiar with fortified wine, so this filter variable opens positively to the following variables.

Following are the encodings for the "core variables". The purpose of this is to facilitate the readability of the data by the software.

Table 12: Set of core variable encoding

Q25	Q25. Which of these labels attracts you the most?
L-1	Label n.1
L-2	Label n.2
L-3	Label n.3
L-4	Label n.4
L-5	Label n.5

Codification	Description
S-1	Shape n.1
S-2	Shape n.2
S-3	Shape n.3
S-4	Shape n.4
S-5	Shape n.5

Codification	Description
C-1	Closure n.1
C-2	Closure n.2
C-3	Closure n.3
C-4	Closure n.4
C-5	Closure n.5

Codification	Description
A	Bottle A
C	Bottle B
B	Bottle C

A first analysis shows a cluster in which the majority of respondents preferred bottle B, shape number 5, closure 1 or 3, label 4.

### 5.2.3 General interpretations

As shown before, some transformations of the dataset were necessary to allow a correct ACM, and thus obtain an understandable graph. Before observing the results, the variables Q6, Q13, Q12 have been eliminated because they are too scattered for the number of modes presented, while the variables Q4, Q5, Q7 have been projected in supplementary because they are constant in median frequency, and therefore with low discriminating power. At this point, is possible to show results of MCA through the two figures below:

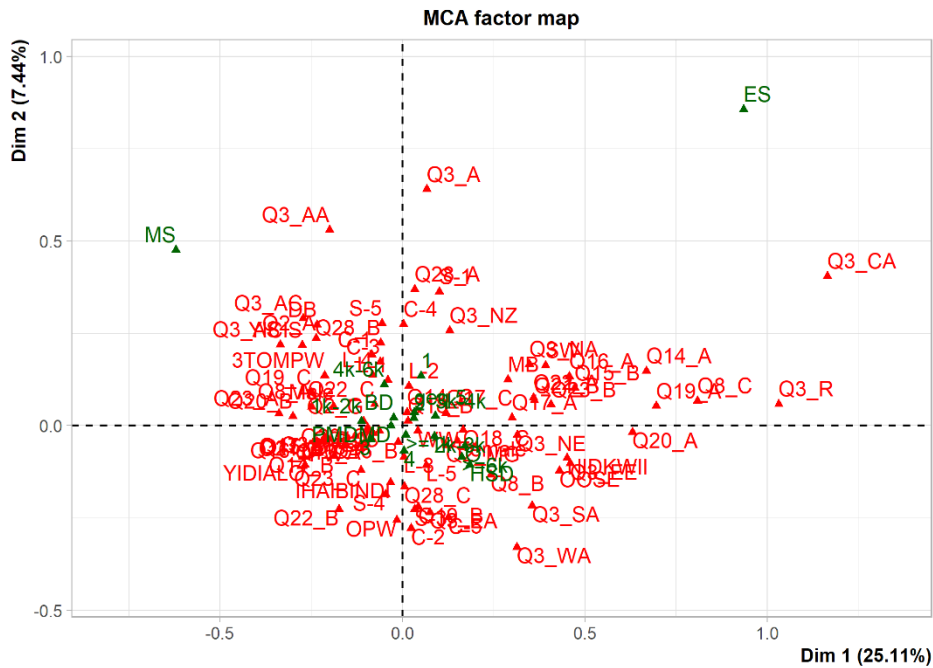


Figure 22: MCA factor map

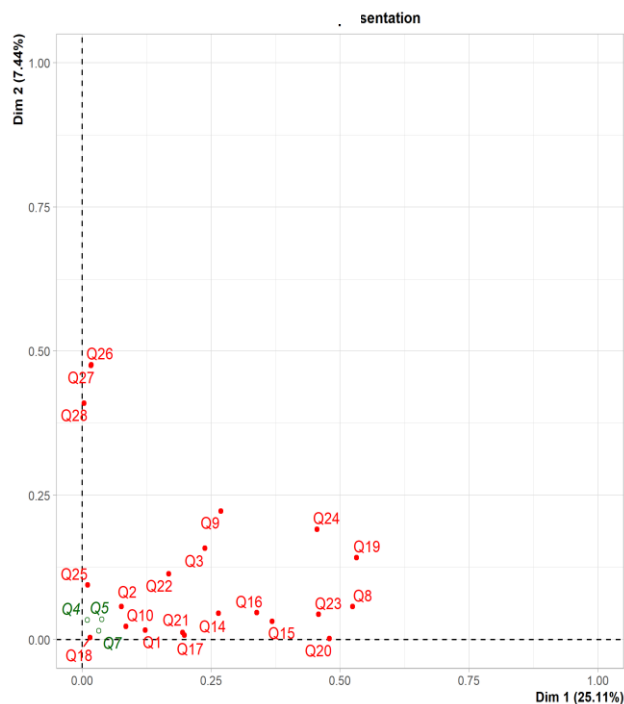


Figure 23: Variables representation



From the analysis of the two graphs presented above, taking into consideration the "*variables coding map*" presented in Table 13, it is possible to draw some considerations.

Table 13: Variables coding map

Codes	Descriptions
Q1	Indicate your gender
Q2	Indicate your age
Q3	Please indicate your nationality
Q4	How many people are there in your household?
Q5	What's your academic title?
Q6	What's your employment status?
Q7	What is your monthly net household income?
Q8	How do you consider your wine knowledge?
Q9	How often do you drink wine?
Q10	Which type of wine do you drink more frequently?
Q12	Where do you usually buy your wine? (you can tick more than one box)
Q13	How much do you normally spend for a bottle of wine?
Q14	How relevant is a known brand/producer to you when buying a bottle of wine?
Q15	How relevant is a Denomination of Origin (DOCG, DOC, IGT) to you when buying a bottle of wine?
Q16	How relevant to you are the awards received / mentions of famous wine guides when buying a bottle of wine?
Q17	How relevant is the label on the packaging to you when buying a bottle of wine?
Q18	How important is the price to you when buying a bottle of wine?
Q19	How relevant is the grape variety to you when buying a bottle of wine?
Q20	How relevant is the zone of origin of the wine to you when buying a bottle of wine?
Q21	How relevant is the certification of organic or biodynamic viticulture to you when buying a bottle of wine?
Q22	How important is wine/food pairing for you when buying a bottle of wine?
Q23	How important is the wine vintage to you when buying a bottle of wine?
Q24	Are you familiar with fortified wine?
Q25	Which of these labels attracts you the most?
Q26	Which of these bottle shapes appeal you the most?
Q27	Which of these closures attracts you the most?
Q28	Which of these bottle designs do you prefer?

The ACM has made it possible to identify the redundant variables to describe groups with common characteristics. The distance between the points of the modes and the origin measures the quality of these categorical variables, the greater the distance, the greater the quality, and therefore the level of interpretation of the observed phenomenon. It has been seen that:

It was found that the variable Q25, which corresponds to the question: "Which of these labels attracts you most?", was associated with the variables Q7, Q5, Q4, which correspond respectively to the questions: "What is your monthly net household income?", "What is your qualification?", "How many people are there in your household?". In particular, those who have shown a preference for labels with a simple and elegant style (L3) or portraying historical personalities (L1) are influenced by their income, their academic qualifications, and the composition of the household.

The variable Q23, or "How important is the vintage of wine for you when you buy a bottle?", was seen associated with the variables (Q8, Q19, Q20) that represent the questions: "How do you consider your knowledge of wine?", "How important is the variety for you when you buy a bottle of wine?" "How important is the area of origin of the wine for you when you buy one?". This showed that those who have the propensity to prefer a well-aged wine are on average influenced by the grape variety, the area of origin and their general knowledge of wine.

The variables Q26, Q27, Q28, relative to the type of bottle and the different elements of the bottle that the interviewees preferred, including information on the shape and closure, are not connected with all the other variables under study, this is positive because they are far from the origin in the graph allowing significant interpretations.

### 5.2.4 Research highlights

Observing the graph (Fig.20) of the active variables (in red), i.e. those that actively participate in the identification of the reduced dimensions of the space and contribute to the determination of the factors considered, it is possible to identify interesting relationships:

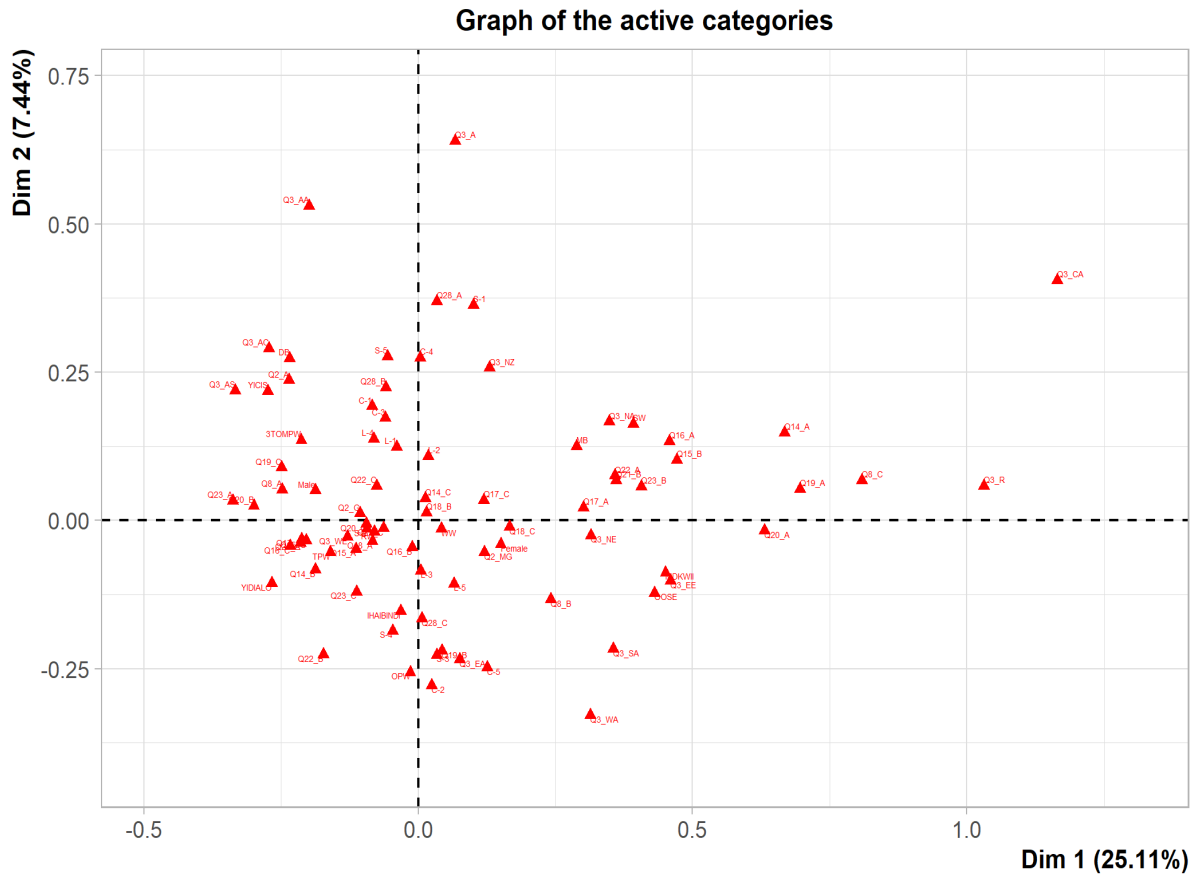


Figure 24: Final MCA results-modalities of the active categories

Among the "core variables" of the survey, an important association was observed between those who preferred a bottle with a transparent label and glass (bottle B) and those who chose the golden capsule closure (C1).

Again, among the "core variables", an important association was observed among those who preferred the bottle with a regular shape and dark glass (option C in question Q28), a label representing the image of a vineyard (L5), and who replied that they considered the grape variety unimportant and never tasted a fortified wine despite having heard about it.

To reinforce these observations, additional variables (in green) have also been projected on the same graph helping in a better description of the phenomenon. Therefore, we see that:

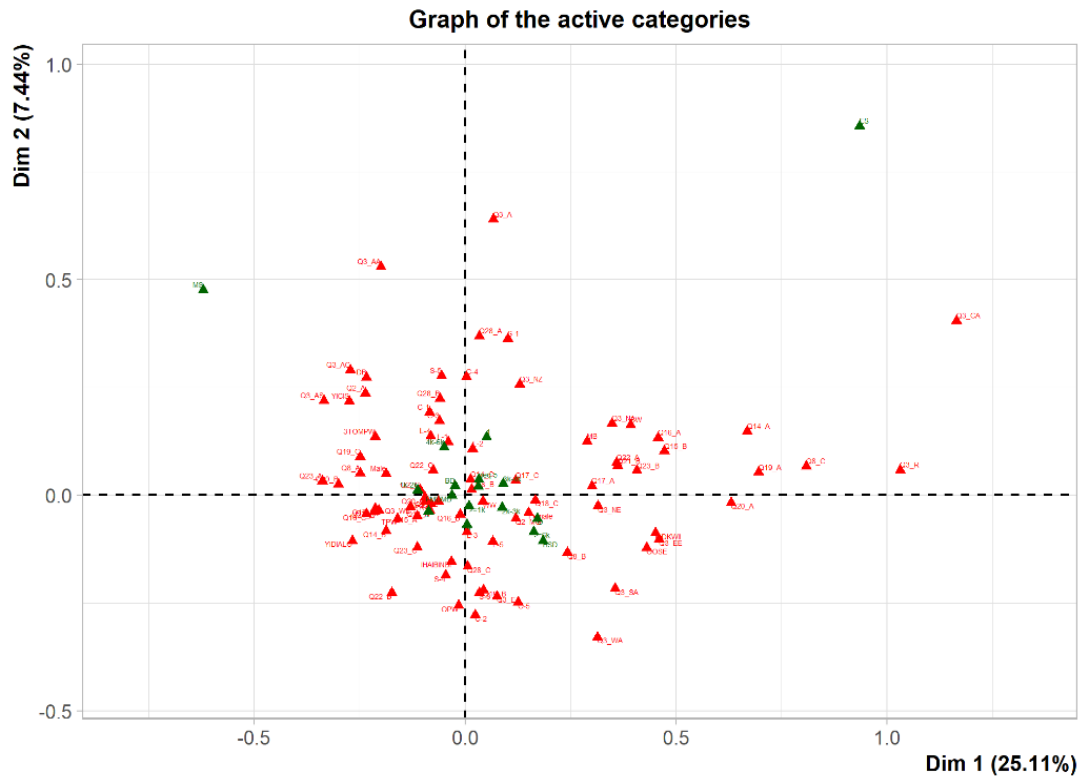


Figure 25: Final MCA results-active and supplementary variables

Among the "core variables" of the survey, an important association was observed between those who preferred a bottle with a transparent label and glass and the closure with a golden capsule, and in particular, male respondents with a high spending power stood out for this choice. Successively, depending on what was observed, a post-MCA cluster analysis was carried out to identify any centroids within the "core" variables.

A cluster analysis (Fig.26) has been performed to identify possible correlations within the "core" variables. From the graph, it is possible to observe, that in questions Q24 to Q28 different clusters have been identified for each modality. For example, in question Q28, we have the clusters for the three modalities (A, B, C), corresponding to two bottles with a wide transparent glass body, respectively with a black label (A) and transparent label (B), while the third (C) represents a regular shaped bottle, dark glass and black label (the Villa Oeiras packaging currently on the market). Concerning the position of the clusters in the graph and the distance between them, it was possible to identify the connections that exist between them. Also, in Q24 the different abbreviations correspond to the different modes of consumption with which respondents drink fortified wine. For example, YICIS corresponds to the respondents who usually consume fortified wine, meaning those with the highest frequency of consumption.

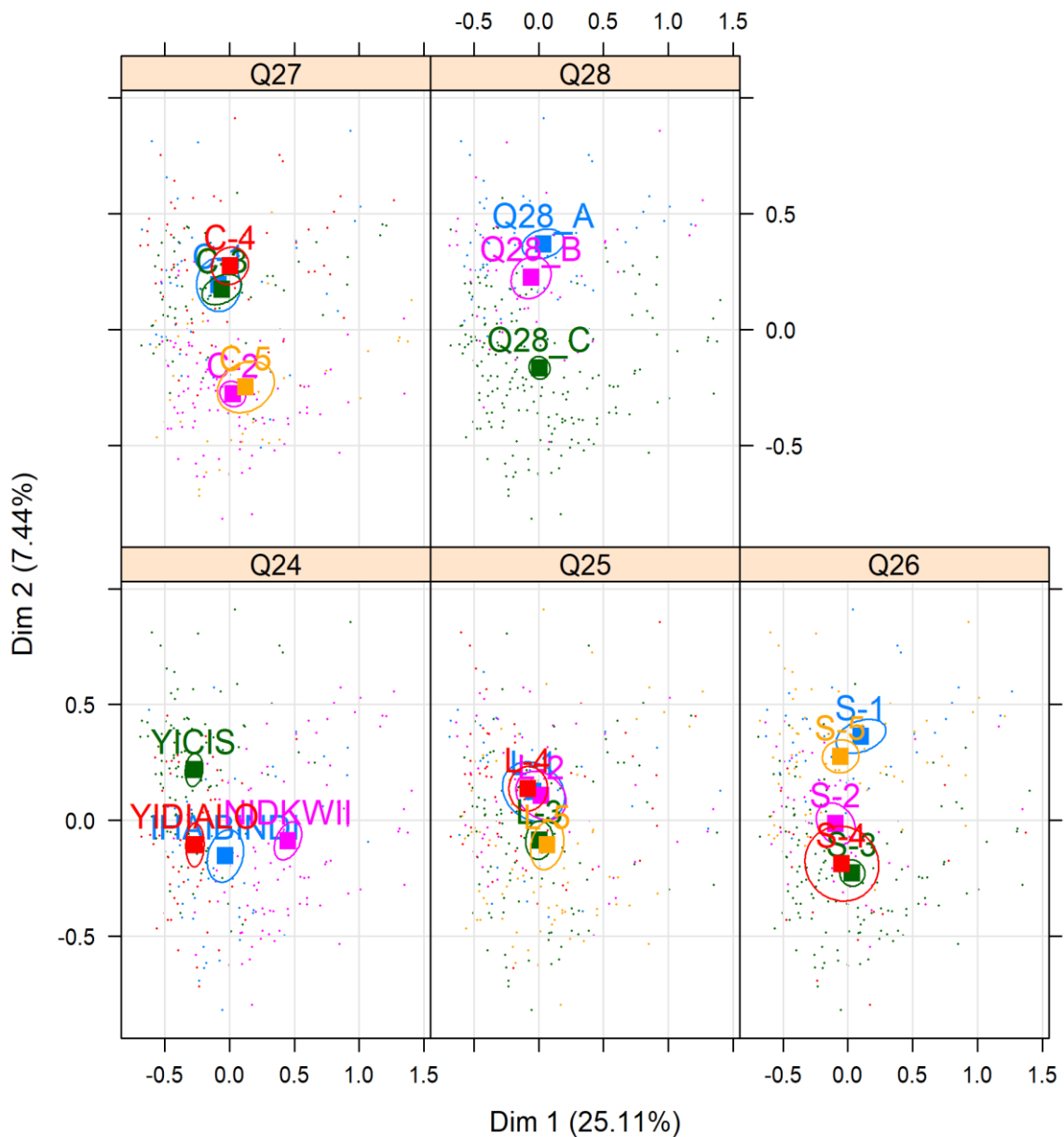


Figure 26: MCA results-evident centroids of Cluster Analysis

In particular, it is noted that the clusters corresponding to the transparent glass bottles (A and B), which correspond to the new packaging prototypes of Villa Oeiras, are very close, and therefore are associated clusters. Moreover, these bottles are correlated with the consumer clusters that have chosen in Q26 the bottle shapes with wider body and shoulder (S1 and S5), identical to the new prototype of Villa Oeiras, and again, with the consumer clusters that in Q27 have chosen the golden (C1) and black (C3) closures, and with wooden cap (C4). At this point, it is interesting to observe graphically, that all these clusters are related to individuals who replied to consume fortified wine sometimes (YICIS). Instead, it can be observed that for the labels (Q.25), there are no interesting evidences in the graph because the clusters are very close and do not allow any interpretation, i.e. they are equivalents.

#### **5.2.4 Discussion of online survey results**

In this paragraph, we report the relevant aspects of the investigation. The purpose was to collect feedback to support the optimization of the new bottle design for Villa Oeiras fortified wine. Despite the small number of responses collected, 326, interesting results were obtained. To give a general overview before are presented the results from Google form analysis tool, and then, results from the statistical analysis obtained via MCA method.

From a first direct analysis of the survey, the Google Form platform provided a first graphic presentation of the answers, and from these, it was possible to observe interesting information that provided descriptions of the sample. First interesting element obtained by Q.5 shows that 46.6% of the respondents own a Postgraduate degree (Master, Doctorate, Master's Degree) and that 40.2% have a Bachelor's degree. This suggests that the majority of respondents are highly educated and this may have somehow positively influenced the responses, as these people are expected to have higher incomes in the future. It was observed from the results of question Q.8, how the level of knowledge of wine is distributed in a nearly balanced way, but it was evident a slight trend on the left, most of the respondents were people with a low level of knowledge of wine. This data faithfully represents the population as, in the real market, the level of wine knowledge tends to be lower than average.

Other interesting results can be found in the Q.10 question where the sample showed a clear trend to prefer red wine (54%), and it was seen in Q.12 that the wine is mostly purchased in Supermarkets / Hypermarkets (70.6%), and Specialized shops (49.1%). Finally, in Q.13 it was seen that almost half of the sample (43.3%) tends to spend in a range of 5 and 10 € bottles, 33.7% tend to spend between 10 and 30 €, while only 4.9% are in the 30 - 100 € range. These are interesting aspects, given that Carcavelos fortified wine on the market costs around €30 per bottle and is usually sold more in wine shops and restaurants.

Other interesting aspects were seen. In question Q.14 it is clear that consumers attach great importance to a renowned brand or producer, and this is perfectly in line with the Villa Oeiras brand's necessity to improve its positioning in the fortified market and its brand communication. Another evident trend was found in question Q.15 where a good part of the sample gives great importance to the Denomination of Origin, so it is important that on the bottle of Carcavelos this element is evident and comprehensible.

An important aspect, and in line with the bibliographic references presented in the previous part of the thesis and with the re-packaging project, is the strong tendency to give great importance to the label of the bottle of wine, this resulting from the answers to question Q.17. Another element in line with the studies examined in the bibliographic research is the clear

importance of the price for the wine consumer, which can easily be seen from the results of question Q.18.

Other interesting findings are the importance that the consumer gives to the region of origin of the wine, and this is in line with the importance of the DOC. Also, the respondents showed a negative trend for organic and biodynamic certification relevance. And, finally, the evident tendency to give importance to food and wine pairings at the time of purchase. This brings to mind the significance of the back label, where many producers provide interesting suggestions for pairing their wine with certain food and dishes.

To complete this first general overview is important to consider results obtained from a direct analysis of Google Form about "core" questions (from Q.25 to Q.28). In question Q.25, where 5 different labels were illustrated, the most appreciated ones were, label n.3 (33.1%), label n.5 (23.9%), and label n.4 (19.3%). The fact that label n.3 was the more appreciated is in agreement with what we have seen in the bibliography, where several studies showed that simple, elegant labels, with a neutral background colour (white or black), have positive feedback with the wine consumer. Also, for label n.5, agrees with what seen in the bibliography references labels representing images of vineyards and Château (wineries' estates) have a great influence on consumers. As for label n.4, its good positioning in this survey is not surprising, since Graham's, a powerful competitor among producers of Port and therefore of fortified wine, presents itself with a label with a white background, elegant, and with gold elements that give to their wine a feeling of prestige.

25. Q25. Which of these labels attracts you the most? \*



Figure 27: Labels displayed in the online survey

In question Q.26, was asked to select the preferred bottle shape, but it must be specified that in addition to the shape all other elements were visible, and therefore influenced the respondent's choice. Here the purpose, was quite simple, i.e. to evaluate the shape with more votes, to get interesting insights from it. The bottle shape with more votes is the n.3 (with 43.3%). The other most preferred are n.5 (21.8%). Making some considerations, the n.3 was the most chosen perhaps because its shape and colour are similar to a normal bottle of table wine, so this type was the most popular for participants. The shape n.5 is one of the typical shapes used for Tawny Port wines, with a wider shoulder and body of the bottle. Anyway, the

transparent glass may have influenced the participants' choice, as it allowed to observe the amber colour of that Tawny Port.

26. Q26. Which of these bottle shapes appeal you the most? \*



Figure 28: Bottle shapes displayed in question 26

In question Q.27, the aim was to assess which of the 5 bottle closures (capsules included in some options) was the most voted. Once again, the aim was to provide to Casal da Mantaiga winery useful insights. Among these, the one with the highest percentage of choices was n.2 (31.6%), followed by n.4 (20.9%) and n.3 (20.6). Closure n.2 was the most chosen closure, with a classy black capsule, typical closure of a Port wine. In this case, the wooden cap closure n.4, an element of the new Villa Oeiras packaging, has obtained a good number of preferences. This positive feedback opens interesting considerations for the optimization of the new bottle.

27. Q27. Which of these closures attracts you the most? \*



Figure 29: Bottle closures showed in Q27

Finally, in question 28, three bottles were compared, the first two, A and B, are respectively the two new packagings of Villa Oeiras. Bottle A, with black label and golden font, and bottle B, with a transparent label with golden font too. The third bottle C is the current bottle with which the Carcavelos wine is sold. Bottle C is a dark black glass, with a regular shape, closure with the black capsule, and a black label with the golden font. The results provided by Google Form, revealed that: bottle C was the most chosen (64.4%), while option A (18.4%) and option B (17.2%) were chosen in this order. The results clearly show that C was the most chosen option.



After illustrating these first results obtained from Google Form, it is important to present the salient information obtained from the analysis of the dataset through the multiple correspondence analysis, to combine this first evidence displayed before, with results with a strong statistical significance. MCA was fundamental as it allowed to analyze the correlation among several categorical dependent variables present in the dataset. The MCA showed that there is a correlation between the label chosen in question Q.25 and the variables regarding monthly income, educational qualification, and household composition. It was seen that a great part of respondents had the propensity to choose label n.1 or n.3, influenced by these variables.

Among the "core variables", a strong association was noted between those who chose bottle B with the transparent label and closure n.1. and the respondents who preferred these options are those with high income (4k-6k) and are mostly male individuals. And again, another strong association between the "core variables" was seen among the respondents who preferred bottle C (the current Villa Oeiras bottle), label n.5, and shape n.4, and these are individuals who responded to give little importance to the grape variety and who never drank fortified wine despite having heard about it. So, this demonstrates that bottle C was preferred by participants that do not correspond to the target market segment of the winery. From what observed from the Cluster Analysis, the new bottles of Villa Oeiras (A and B) showed a strong association with the respondents that usually consumed fortified wine. Other bottle components were associated with this type of consumers. These evidences provided useful suggestions that increase the pool of information for the development of the new packaging of Villa Oeiras.

## 6 Conclusion

The two focus groups and the online questionnaire were the surveys carried out in support of Casal da Manteiga's repackaging project. The results of the focus group highlighted a lack of awareness of the Villa Oeiras brand among local consumers, highlighting the need to review marketing strategies to strengthen the brand image and build customer loyalty.

Concerning the new packaging, the transparent bottle was unanimously appreciated by the participants. The evidence gathered during the focus groups confirmed the distinctive character of the bottle, capable of calling consumers' attention to itself and differentiating Villa Oeiras from the other wines on the shelf. The transparent glass was also positively evaluated as it allows to immediately appreciate the intense golden color of the wine and its tear-like consistency. Furthermore, the transparent label could be a character of originality in the launch of the new packaging on the market, considering that it was more appreciated by the younger segment of the participants.

The results of the questionnaire showed that consumers attach good importance to the brand of wine and tend to choose simple and elegant labels or those depicting images of estates and vineyards. The results obtained from the matching analysis showed that the variables "bottle with transparent label and glass", "golden capsule closure" and "wooden cork" showed a high correlation with the clusters of consumers with a high spending power, which is interesting considering the high average cost of a bottle of Carcavelos wine. Moreover, it was seen that the current packaging of Villa Oeiras (bottle C) was associated with those respondents who place little importance on the grape variety and who have never drunk liqueur wine. Therefore, it would seem to be a distant solution from fortified wine consumers. Furthermore, the results showed that the new transparent glass packaging of Villa Oeiras, in both transparent and black label alternatives, had a high correlation with the clusters of regular fortified wine consumers. The statistical analysis, therefore, confirmed the results of the focus groups and provided further valuable indications for the creation of a packaging capable of meeting the expectations of a segment of customers of primary interest to the winery.

In conclusion, many elements were obtained from these surveys on which the company has a wide margin of choice, particularly those that have attracted consumers of fortified wines. One of my suggestions to the winery is to develop a light beige label that goes well with the golden tone of the wine. This could be enriched with an image of the Marquis of Pombal's estate, to strengthen this historical link with this character, or even introduce a representation of the estate and their vineyards. In addition, it would be interesting to create a single label that would also include the back label, with the relevant information about the history of the winery and the descriptions of the wine. This would give the bottle a different aesthetic

impression, making the new packaging more original and distinguishing it from other fortified wines on the market.

### **6.1 Future perspectives**

Certainly, the winery needs further research to achieve its goals. As we have seen, the design of a bottle and its label are important elements, and since they have great potential to influence purchases, their design must be done scrupulously and must be based on consumer feedback. Further market research could help the company find new ideas for this repackaging project and other needs. As seen from the online questionnaire survey, this tool has great potential. It could be used again in the future, extending the survey to more countries and over a longer period, and using more powerful tools to get more valuable information.

Also, a socio-demographic analysis to identify the most interesting segments in the Portuguese and international market should be considered. Apart from Portugal, other markets should be studied to find new potential buyers. Last but not least, the company needs to strengthen its presence on the most important social networks and develop an attractive website and a possible e-commerce channel. This aspect is important in the current socio-economic era, where digital is now rooted all over the world.

### **6.2 Research limitations**

Although the results obtained are positive for the purposes of the project, the study has some limitations. First of all, the sample obtained through an online questionnaire was the result of sharing through personal contacts and social platforms of various kinds, so it is not a random sample. In addition, the sample was quite homogeneous, which probably limited the ability to identify differences that might exist in age, income, and gender. In fact, many respondents were university students or people at the end of their academic career. This may have influenced the final results, so it may be useful for future research to try to obtain a heterogeneous random sample that can best represent a larger segment of the market. However, despite these limitations to the study, the results provide some clear managerial implications for winery marketing managers.

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