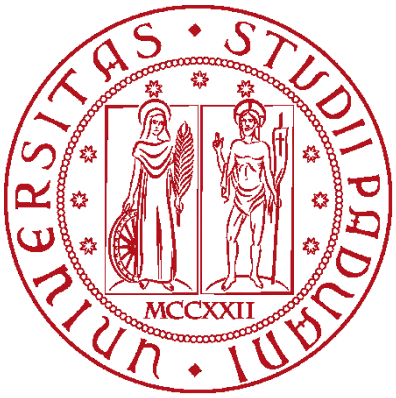

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Bag in Box Packaging for Wine:

An Analysis on Consumer Perception in Belgium

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Abbreviations

CAP	Common agricultural policy
WTO	World Trade Organization

Abstract

This study examines the intricate relationship between consumer attitudes, wine consumption habits, and environmentally friendly packaging using Belgium as case study. It reveals a diverse range of demographic traits, including age, gender, and education, that influence wine consumption. Wine consumption habits range from occasional to frequent, driven by specific motivations. The balance between value and quality is influenced by price preferences and willingness to pay for wine. Bag-in-box wines are increasingly seen as a viable choice for sustainable packaging, reflecting customer preferences for cost, accessibility, and environmental friendliness. The study also reveals consumer attitudes regarding wine quality, pricing, and the connection between certain packaging materials and environmental impact. Strong support for conservation and recycling is evident among respondents, indicating a growing awareness of sustainable living. The study's assessment of sustainable packaging practices is particularly noteworthy, with respondents expressing a preference for environmentally friendly alternatives like light glass bottles, recyclable materials, and biodegradable packaging. The study was conducted on 100 wine consumers aged between 18 and 54, residing in Belgium, and the demographic profiles and consumer behaviours influencing wine preferences and attitudes were analysis examined. The majority of respondents were aged 25-44, with males comprising 56% of the sample. The majority had bachelor's degrees, with income ranging from €35,000 to €49,999. Bag-in-box wines were popular due to their affordability and eco-friendliness. Taste preferences, price considerations, and brand loyalty were also influenced by respondents. 66% of respondents emphasized flavor, while 46% considered price an important factor. Brand loyalty was rated somewhat important. Environmentally friendly behaviors and attitudes were influenced by recycling and conservation, while 76% favored environmentally conscious wine packaging practices. Affordability was a significant factor, with 86% believing they could afford wines across a range of prices. Convenience was also a significant factor, with 94% emphasizing its significance. The study highlights the importance of affordability, quality perceptions, convenience, and environmental impact in wine choices.

Keywords: Wine consumption, sustainable packaging, environmentally friendly, bag-in-box.

CHAPTER 1

INTRODUCTION

1.1 Context and problem statement

Wine packaging with Bag in Box, glass, and plastic bottles is a material-intensive industry. However, the wine sector has demonstrated significant interest in and identified several uses for Bag in Box since its introduction. Similar to PET multi-layer bottles, BIB is made up of a resistant bladder (or plastic bag) that typically has many layers. The bag is kept safe inside a robust cardboard box. Glass bottles are commonly utilised for wine bottling, however, the demand for affordable, environmentally friendly, and alternative wine bottling methods is rising (Ghidossi, et., al. 2012). From clay amphorae to single-serving plastic bottles, the packaging of wine has undergone a significant transformation over time. Over the years, the notion that only expensive wine may be stored in glass bottles with a natural cork has been gradually eroding. Despite the fact that glass is an inert material, most consumers only age wine for a few months at a time, which leaves room in the wine market for alternate packaging. The industry is accepting the possibility that the product packaging could affect the consumer experience as it introduces alternative packaging solutions (Thompson et. al. 2021)

Jennings and Wood (1994) argue that packaging is an essential communication tool for brand managers, since it produces a distinct appearance for a wine, separates it from competitors, and offers better "shelf appeal". To influence the buyer's decision before and during purchase, the package design should convey a clear and consistent sense of the quality of the wine. They also believe that bad packaging design or corporate image may cause dissension in customer perceptions, putting the goods at a competitive disadvantage in the market. They also stress the necessity of retaining and strengthening the impressions obtained while drinking the wine after consumption.

Glass containers are the preferable material for bottling wine because of their impermeability to gases and vapours, long-term stability, clarity, and recyclability. However, the high cost of glass bottles is a significant disadvantage, particularly for low-priced table wines, leading to an increase in demand for low-cost packaging alternatives (Mentana et al. 2009).

The choice of packing material can still have a considerable impact on wine preservation, especially considering the passage of gases through the packing material as this is a key factor influencing wine preservation (Mentana, Pati, La Notte, & del Nobile, 2009). For example, one of the primary elements responsible for wine deterioration is oxygen. Hence, controlling oxygen levels and oxygen intake in wine during storage is essential to maintain wine quality. Indeed, wine oxidation causes major sensory changes in terms of flavour and colour (Barbe, Dubourdieu, van Leeuwen, & Pineau, 2010), such as loss of the floral and fruity notes, as well as an increase in distinctive aromas characteristic of aged wine, and typical aromas linked to the spoilage of the wine (Bueno, Culleré, Cacho & Ferreira, 2010).

Moutounet and Vidal (2006) highlight the importance of managing oxygen levels during wine production, storage, and packaging. They note that various studies have demonstrated that corks, a commonly used wine closure, are permeable to atmospheric oxygen. Customer engagement and packaging are inextricably linked since the purpose of the product determines the consumer's choice of wine and packaging. Buyers evaluate the product and packaging depending on their buying motivation, taking into account elements such as design, value for money, usability, and functionality (Capitello et al. 2012).

Bag-in-box (BIB) packaging, commonly referred to as "cask wines" or "box wines," has drawn attention for its usefulness and adaptability in sizes ranging from 2 to 20 litres (Fradique et al., 2011), but investigation, through this research, into the possibilities of this packaging innovation uncovers surprising discoveries. The association between packaging choices, client traits, and purchase and consuming behavior has, interestingly, received little research despite its promise. In addition, income levels are closely related to consumer preferences in the wine industry, with lower-income consumers displaying a larger preference for cask wine and higher-income consumers favouring bottled wine (Mueller and Umberger, 2009).

Additionally, the sale of cask wine is surging on the global wine market, especially in France, the United Kingdom, and the United States. This increase can be partly explained by the belief that cask wine has less of an impact on the environment (ElAmin, 2007). Indeed, the popularity of cask wine is being fuelled by this rising demand for environmentally friendly substitutes, emphasizing the necessity of sustainable packaging options in the sector.

It is interesting to note that a study by Buiatti et al. (1997) evaluated the efficiency of wine

packing in non-glass containers, such as multilayer cardboard, PET containers, and wine boxes. Their findings suggested multilayer cardboard stood out among them for having exceptional gas barrier qualities, making it a viable choice for wine preservation over an extended period of time.

His collection of observations highlights the dynamic changes in wine packaging as well as the potential market trends and customer behaviour that sustainable alternatives like bag-in-box could have. With a volume of 3.9 million hectolitres (mhl) and a total import value of 1.2 billion euros in 2021, Belgium saw significant gains in its wine imports. These numbers show a significant increase of 29% from the prior year (2020) in comparison. It is important to note that, with the exception of bulk wine, all categories of wine imported into Belgium saw large gains in both volume and value. This research aims to close the gap between packaging advancements, consumer characteristics, and how they affect the landscape of the wine industry as we further our investigation. The emergence of bag-in-box packaging represents a movement in the wine business toward more sustainable and eco-friendly methods (Squire, 2019). This study also aims to examine the effect of bag-in-box packaging on wine quality and lifespan by analysing elements such as oxygen exposure, temperature variations, and overall preservation. The importance of this research lies in its ability to educate both customers and wine producers about the advantages of this packaging technology, improving the whole wine-drinking experience. With this information, consumers can make better-informed wine purchases and have faith in the quality and taste of bag-in-box wines. Winemakers can utilize this research to improve their packaging procedures and ensure the preservation of their products for extended periods.

1.2 Aims & Objectives

The objective of this study is to evaluate the impact of bag-in-box packaging on wine quality, consumer preferences, and benefits for wine producers. It explores technological advancements, such as oxygen-absorbing technology and temperature-controlled packaging, and its environmental impact. In addition, this research aims to highlight the technical and technological advantages of bag-in-box wine packaging, such as sensory attribute retention and storage convenience. It recommends improvements in packaging design and preservation, and educates consumers and producers about its advantages and drawbacks. Finally, the purpose of this study is to promote sustainable wine industry practices by

highlighting the potential benefits of bag-in-box packaging in reducing waste and environmental impact.

Chapter 2

Literature review

2.1 Wine Production

Wine is a fermented fruit beverage prepared from grapes or other fruits. Wine has been enjoyed by cultures for thousands of years, with evidence of winemaking dating back to the Egyptians and Greeks. Wine has played an important part in religious rites, social events, and cultural customs throughout history. Its manufacturing procedures have developed throughout time, resulting in the wide diversity of wine styles (Hanson, 2013).

Today, wine is made in numerous places across the world, each with its own grape varietals and winemaking procedures. The industry has evolved into a worldwide phenomenon, with France, Italy, and Spain dominating wine production and consumption (Banks & Overton, 2010). Wine has also come to represent elegance and luxury, with connoisseurs and collectors looking for rare and aged bottles. Wine's popularity continues to rise, with new trends and innovations appearing in the business on a regular basis. Overall, wine is still an important aspect of human civilization, bringing people together and improving our culinary and social experiences (Kastenholz *et al.,* 2022).

Wine's worldwide importance and appeal continue to increase as additional nations enter the market and consumers acquire a taste for diverse varietals (Olsen et al., 2007). In recent years, places such as Australia, Chile, and Argentina have acquired notoriety for their high-quality wines, threatening European producers' longstanding supremacy (Zanni, 2004). Furthermore, the emergence of online platforms and wine clubs has made it simpler for people to discover and buy wines from all over the world, increasing the worldwide appeal of this cherished beverage (Gilmore & Pine, 2007). Wine has genuinely become a worldwide phenomenon that spans boundaries and cultures, whether sipped informally or honoured in sophisticated wine tastings. Wine has become a symbol of refinement and luxury due to its rich history and cultural significance (Van der Veen, 2003). Many wine lovers now see it as a type of art, with sommeliers and specialists meticulously researching its scents, tastes, and matching possibilities (Peynaud & Blouin, 1996). Vineyards from lesser-known places are gaining prominence as the desire for distinctive and uncommon wines develops, allowing

wine aficionados to uncover hidden treasures and broaden their palate. The worldwide wine community continues to thrive as the globe becomes more linked, promoting a feeling of shared love and respect for this timeless beverage (Young, 1998).

Grape growing is an important phase in the winemaking process since it entails meticulously caring for the grapevines to promote maximum grape growth and adequate maturity for different wine styles. Pruning, irrigation, and pest control are examples of such duties (Winkler, 1974). When the grapes are fully mature, they are picked by hand or machine, depending on the size and preferences of the vineyard. This process is critical in defining the final wine's quality and taste character. The grapes are carefully carried to the winery after harvesting to begin the next step of the process. They are sorted here to remove any damaged or underripe grapes. The grapes are then typically crushed and destemmed to extract the juice. This liquid, termed "must," is next fermented to turn the sugars into alcohol, which typically takes 1 to 2 weeks. The fermentation process is continuously monitored and managed to ensure that the proper tastes and smells emerge (Dokoozlian, 2012; De Castro et al., 2018; Sun et al., 2022).

Grape crushing and fermentation are important phases in the winemaking process since they define the wine's final qualities. The grape crushing stage permits tannins and other chemicals from the grape skins to be extracted, which add to the wine's colour and structure. Yeasts metabolize the carbohydrates in the must during fermentation, producing alcohol and carbon dioxide as by-products. This process not only enhances the alcohol percentage of the wine but also generates diverse tastes and aromas that are unique to each wine variety (Swiegers et al., 2005; Goold et al., 2017).

Wine aging, bottling, and storage are critical phases in the winemaking process that improve and define the wine's ultimate qualities. The wine develops and matures as it ages, allowing tastes and aromas to merge and become more complex (Bakker & Clarke, 2011). The bottling method used can also have an effect on the wine since different bottle shapes and closures can alter the aging process and the overall appearance of the wine. Proper storage conditions, such as temperature and humidity management, are critical to maintaining the wine's quality and ensuring it reaches its full potential when consumed (Tao et al., 2014).

Winemakers use their knowledge at each stage to create one-of-a-kind and exquisite wines that appeal to a wide range of tastes and preferences. Winemakers select the finest grape varietals with care and regulate fermentation temperature to produce the highest quality wine (Boulton et al., 2013). The aging procedure is especially important because it allows the wine to age and acquire its own tastes and aromas. Whether it's the smoothness and vanilla aromas of oak barrels or the crispness kept in stainless steel tanks, the age vessel used has a significant impact on the final product. By the time the wine is bottled, it has undergone a transformation that captures the character of the vineyard while also showcasing the winemaker's artistry (Bruwer et al., 2011).

Wines have distinct qualities that are affected by grape variety, geography, and winemaking procedures (Liu et al., 2019). Red wines are often full-bodied and strong, with tastes ranging from dark fruits to earthy undertones (Parr et al., 2011). White wines are distinguished by their lively acidity and can range from crisp and lemony to creamy and buttery (Simon, 1987). Rosé wines have a light and fruity flavour character, with hints of berries and flowers (Wang et al., 2016). Sparkling wines are distinguished by their effervescence and can range in sweetness from dry to sweet (Buxaderas & López-Tamames, 2016). Finally, fortified wines have more alcohol and can range from sweet and creamy to dry and nutty (Epstein, 2019). Overall, there is a vast selection of wines to suit every palate and occasion, whether to enjoy the sturdiness of a red wine, the crispness of a white wine, the refreshing nature of a rosé, the effervescent allure of a sparkling wine, or the boldness of a fortified wine. Exploring the vast world of wines is an interesting and delightful experience, as is discovering new flavours and pairings that complement one’s eating or social activities (Grainger, 2009).

Terroir, which includes the climate, soil composition, and geographic location, adds subtleties to the wine's flavour, such as the mineral undertones seen in volcanic wines (Haeger, 2008). Finally, winemaking procedures, and blending contribute to the wine's overall quality and complexity (Parr et al., 2011). These characteristics, when combined, provide a plethora of options and make each bottle of wine a unique and delightful experience. The flowery fragrances of a Riesling are accentuated further by the terroir, with cooler locations providing brighter and warmer temperatures producing rich and ripe fruit flavours (Harrington, 2007). The soil composition, whether limestone, clay, or granite,

imparts its own distinct tastes, with limestone imparting a sharp and mineral character, clay imparting richness and depth, and granite imparting a delicate earthiness (Wilson, 1998; Maltman, 2008). Furthermore, the vineyard's geographical location, whether near a seaside region or farther inland, can impact the wine's acidity and overall balance. Winemaking procedures such as fermentation in stainless steel tanks may keep the wine fresh and fruity, while aging in oak barrels can add layers of complexity and improve the wine's structure (Boulton, 1999; Bakker, 2011). The yeast strains used during fermentation can also have an influence on the fragrance and flavour profile of the wine, with various strains presenting distinct characteristics like tropical fruit notes or spicy undertones (Beckner Whitener et al., 2016).

2.1.1 *Wine Regions in the World*

Around the world, there are various main wine regions, each noted for creating distinctive and remarkable wines. France's Bordeaux, Burgundy, and Champagne regions are well-known in Europe, while Tuscany, Piedmont, and Sicily are well-known in Italy (Cracknell et al., 1990). Spain's Rioja and Ribera del Duero wine areas are well-known, while Germany is well-known for its Riesling wines. Moving on to the New World, California in the United States is well-known for its world-class Cabernet Sauvignon and Chardonnay produced in the Napa Valley and Sonoma County regions. The Barossa Valley and Margaret River areas of Australia are well-known for producing rich and powerful Shiraz and exquisite Cabernet Sauvignon wines. South Africa is famous for its Stellenbosch and Franschhoek wine regions, which are home to rare grape varietals such as Pinotage and Chenin Blanc. Argentina's Mendoza area is known for its Malbec wines, while Chile's Maipo Valley and Casablanca Valley produce superb Cabernet Sauvignon and Sauvignon Blanc, respectively (Parr & Mackay, 2010; Glenn, 2014). Each of these locations exemplifies the diversity and quality of grape varietals that thrive in their own climates and terroirs, making them distinct and sought-after destinations for wine lovers (Goldstein, 2014). Wine lovers are drawn to the variety and complexity of flavours found in Chilean wines. There is something for every palate, from the powerful and robust Malbecs to the deep and nuanced Cabernet Sauvignons. Chilean wines provide a really distinct and pleasurable experience, whether sipping a glass of Malbec with notes of dark fruits and spice or savouring the crisp and refreshing Sauvignon Blanc with citrus and tropical fruit tastes. Each sip reveals the spirit of the area as well as

the talent of the winemakers who meticulously make these wines (Charters, 2006; Goldstein, 2014; Monterescu & Handel, 2020).

The high altitude and dry environment of Mendoza contribute to the powerful and robust flavours found in Malbec wines (Stoumen, 2013). The mild temperature and well-drained soils in the Maipo Valley provide perfect conditions for growing rich and nuanced Cabernet Sauvignon (Poyet, 2004). Similarly, Chile's Casablanca Valley's mild coastal breezes and marine influence yield vivid and delicious Sauvignon Blanc wines (Mitchell, 2020). These diverse geographical features contribute significantly to the distinct tastes and high quality of the wines produced in these locations (Alant & Bruwer, 2004).

2.1.2 Belgian Wine

Wine production in Belgium stretches back to Roman times when vines were first planted in the region. However, religious disputes and the Little Ice Age posed enormous hurdles to the business during the Middle Ages (Estreicher, 2006). After that the first record of grape growing in Belgium was in the 9th century in Wallonia. Monks would practice viticulture, and the wine they would make was mainly for celebrations. As the centuries passed, more cities had vineyards. For example, by the 14th century, the cities with vineyards were Tongres, Tournai, Louvain, Brussels, Dinant, Ghent, Bruges, Thuin, Huy, Namur, Hal, and Dinant. The Belgian wine industry only enjoyed a comeback in the late twentieth century, mainly due to advances in viticulture techniques and the introduction of new grape types (Meloni & Swinnen, 2013). Belgian wines are already receiving international acclaim for their distinct character and quality, drawing wine connoisseurs from all over the world. Since its early challenges, Belgium's wine sector has come a long way (Stranieri & Tedeschi, 2019). Winemakers across the nation have embraced contemporary technology and ecologically responsible procedures, resulting in wines that are both tasty and environmentally beneficial (Smith, 2013). Belgian wines have been sought after by sommeliers and wine aficionados alike due to an emphasis on small-scale production and a dedication to quality (Croce & Perri, 2017). Belgian wines are demonstrating that they can compete on the world stage, whether it's a crisp white from the Moselle area or a robust red from the Ardennes (Guides, 2018).

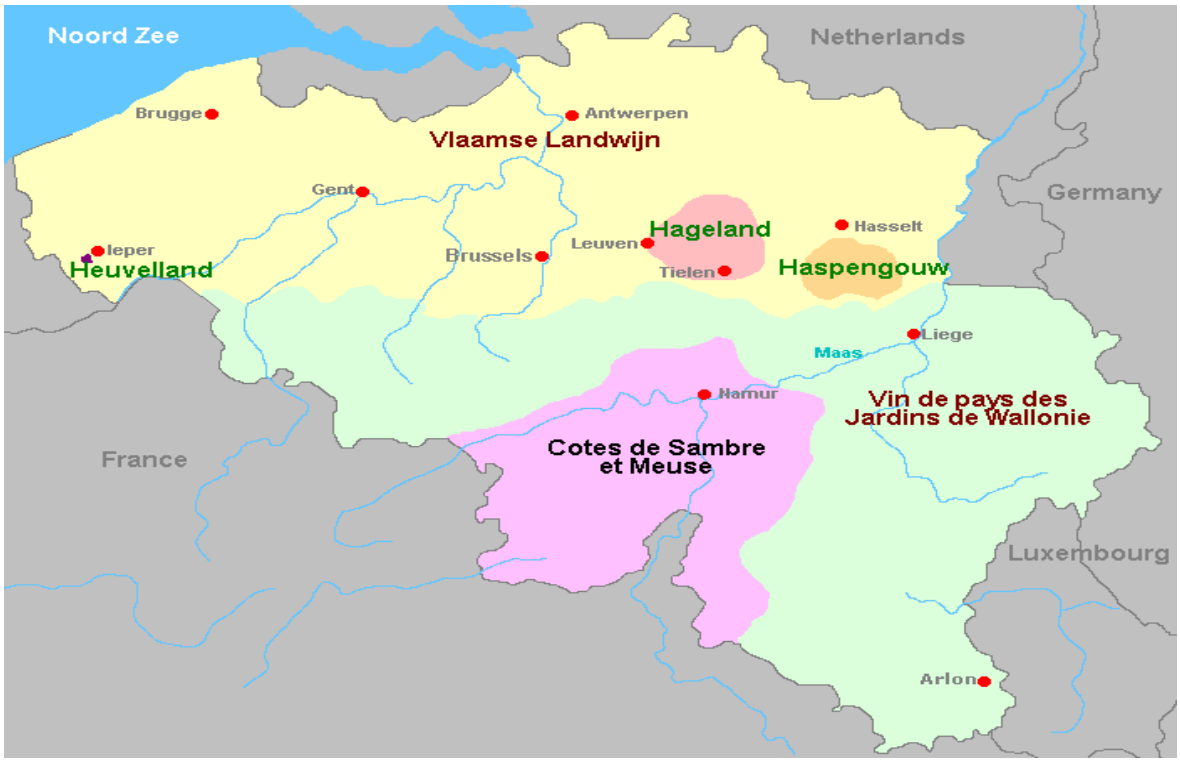

Figure 1 Map of Belgian wine Regions. Source: https://www.wineandvinesearch.com/belgium/wine-regions.php

Belgium is a tiny country, but it has numerous different wine areas that contribute to its increasing wine industry renown (Doutreloup et al., 2022). The Moselle area is noted for producing delicate and fragrant white wines due to its chilly temperature and limestone-rich soils (Wine Tourism Global, 2023). The Ardennes area, on the other hand, is recognized for producing full-bodied and strong red wines due to its mountainous topography and ideal microclimates (Scorrano, 2011). These different wine areas, together with the talent and passion of Belgian winemakers, contribute to Belgian wines' distinct and remarkable flavour (Vos, 2019). Belgium, in addition to the Moselle and Ardennes areas, also has the Flanders region, which is becoming known for its sparkling wines. This location is ideal for producing grapes used in the creation of high-quality sparkling wines due to its gentle slopes and warm temperature (Cohen et al., 2015). The confluence of these three unique wine areas demonstrates Belgian winemakers' adaptability and ingenuity, cementing Belgium as a rising star in the worldwide wine business (Balogh, 2019).

The significance of Belgian wine in the worldwide wine business cannot be overstated. Belgian wine has acquired a reputation for its quality and originality while being a relatively modest participant in terms of production. Belgian winemakers have carved out a niche for

themselves by concentrating on small-scale, artisanal production and experimenting with unusual grape varietals. This has piqued the interest of wine aficionados and critics all over the world, further enhancing the prestige of Belgian wines in the international arena. As a result, Belgian wine has garnered countless medals and plaudits and has been featured in major wine contests (Styles, 2023; Belga News Agency, 2023). Belgian winemakers' devotion and enthusiasm have also led to cooperation with renowned winemakers from other countries, promoting an exchange of information and experience. Belgian wine continues to defy traditional conceptions of what a wine-producing area should be, creating a lasting effect on the global wine industry with its devotion to quality and innovation (Vissak et al., 2017).

Cool temperatures and a slight marine influence describe the climatic conditions in Belgian wine areas. The proximity to the North Sea has a moderating effect, reducing excessive temperature swings and producing a microclimate favourable for the cultivation of specific grape varietals. The combination of moderate temperatures and a lengthy growing season allows grapes to develop slowly and steadily, resulting in wines with lively acidity and refined flavours (Dunn et al., 2019). The cold temperatures in Belgian wine regions help to make wines with lower alcohol levels, making them more accessible and food-friendly. Furthermore, the modest coastal impact imparts a distinct minerality to the wines, which adds complexity and depth to their overall character. However, Belgium’s maritime climate results in moderate to heavy rainfall, which can lead to grape health issues like mildew and botrytis, affecting yields and quality. High humidity levels, especially in coastal regions, can hinder grape ripening, affecting sugar accumulation and flavor development. Proper canopy management and adequate airflow can help mitigate these effects. Belgium's low sunshine hours, particularly during critical grape development periods, can hinder photosynthesis and sugar accumulation (Smith & Davis, 2018; De Clerck, & Deloire, 2015; Van & Destrac-Irvine, 2017). Overall, the temperature conditions in Belgian wine areas provide a setting for producing high-quality, refreshing wines that are highly regarded by wine connoisseurs worldwide (Ashenfelter & Storchmann, 2016; Tiefenbacher & Townsend, 2020).

The distinctive terroir of Belgian wine regions impacts the qualities of the wines even more. Wines with bright acidity and unique flavours arise from the combination of well-drained, mineral-rich soils and a chilly environment (Ashenfelter & Storchmann, 2016). Terroir is

also important in the production of aromatic components, which give Belgian wines their trademark flowery and fruity flavours. Furthermore, the terroir contributes to the wines' overall balance and elegance, making them stand out in the worldwide wine market (Shepherd et al., 2023). The prolonged growing season lets the grapes mature gradually, resulting in full-bodied wines with well-integrated tannins (Hornsey, 2007). Furthermore, the effect of terroir on the microclimate of the vineyards offers excellent circumstances for the production of certain grape types, such as Chardonnay and Pinot Noir, which excel in making high-quality sparkling wines (Alikadic et al., 2019). These elements, along with the exquisite workmanship of Belgian winemakers, contribute to Belgian wines' rising reputation and success on the world stage.

As a result, the distinctive traits and possibilities of this growing wine area are shown when Belgian wine terroir is compared to that of other renowned wine regions. While the terroir of locations such as Burgundy and Champagne may have centuries of tradition and experience, Belgian winemakers are making their mark by utilizing their particular terroir to create wines that provide a fresh and intriguing alternative. The combination of a cool climate, mineral-rich soils, and the correct grape varietals helps Belgian wines stand out from their more established equivalents by showcasing their own particular tastes and character (Berkowitz, 2014).

Belgium's climate, situated between northern and southern Europe, offers a diverse climate suitable for grape cultivation. Winemakers are exploring various unusual grape varieties, including Müller-Thurgau, Dornfelder, Siegerrebe, and Solaris. Müller-Thurgau is known for its aromatic qualities, producing fragrant white wines with a pleasant floral character. Dornfelder, a deep, dark red grape variety, produces intense fruit aromas with moderate to high tannin levels, making it suitable for cooler regions like Belgium. Siegerrebe, known for its floral and perfumed notes, is often used to make sweet wines due to its natural sweetness and aromatic intensity. Solaris, a resilient grape variety, is appreciated for its adaptability to cooler climates and resistance to various diseases. Its wines often feature citrus and apple notes, along with hints of green herbs, making them crisp and refreshing. These grape varieties are suitable for regions with shorter growing seasons, like Belgium (Frison et al., 2014). Whereas, Chardonnay, Pinot Noir, Pinot Meunier, and Riesling are the traditional grape varietals cultivated in Belgium (Lacombe et al., 2011). Chardonnay is noted for its

sharp acidity and citrus and tropical fruit aromas (Reynolds et al., 2007), while Pinot Noir has a deep and velvety structure with red fruit notes and earthy undertones (Haeger, 2008). Pinot Meunier, which is widely used in Champagne production, offers depth and complexity to Belgian red wines (Wine Searcher,2022), while Riesling contributes with acidity and aromatics of lime and stone fruits (Rosamie, 2023). These grape types flourish in Belgium's chilly temperatures and specific terrain, contributing to the distinctive character and quality of Belgian wines (Boundby Wine, 2023). When Belgian grape types are compared to those used in adjacent countries, the peculiarity of Belgian wines is shown (Doutreloup et al., 2022). While neighbouring nations such as France and Germany are known for renowned grape types like Chardonnay and Sauvignon Blanc, Belgium's emphasis on Pinot Meunier and Riesling distinguishes it (Khan et al., 2020). This distinction enables Belgian wines to provide a refreshing and distinct taste experience, enticing wine connoisseurs who like discovering lesser-known grape varietals. (Gangjee, 2016).

In Belgian vineyards and wineries, the winemaking process is equally rigorous as that in traditional wine-producing areas. Modern technology is mixed with ancient ways in Belgian vineyards to provide the highest quality grapes (Campbell, 2006). Belgian winemakers devote rigorous attention to detail throughout the winemaking process, from carefully choosing and nurturing grape varietals to hand-harvesting the fruit at maximum maturity. This commitment to workmanship and quality distinguishes Belgian wines and helps them compete in the global arena (Lawther, 2010). Belgian wine production processes reflect the dedication and ingenuity that Belgian winemakers devote to their trade. Precision viticulture is one famous approach in which modern technology is used to monitor and regulate many elements of grape production, such as irrigation, canopy management, and pest control (Balafoutis et al., 2017). Furthermore, Belgian winemakers have adopted sustainable practices, employing organic and biodynamic farming methods to reduce their environmental impact while producing wines that reflect the region's distinct terroir (Jones & Grandjean, 2018; Nicli et al., 2020). Therefore, these approaches, together with the rich history and experience of Belgian winemakers, contribute to Belgian wines' particular flavour and remarkable quality (Carvalho et al., 2021).

The present situation of the Belgian wine business shows that both production and consumption are increasing. Belgium's winery population has gradually expanded

throughout the years, demonstrating a significant interest and investment in the business (Mariani et al., 2012). This expansion is further aided by increased demand for Belgian wines, both locally and abroad. The local and international markets for Belgian wines have shown consistent growth in sales and customer interest. This encouraging trend has inspired winemakers to increase output and experiment with new grape varietals as well as organic grape areas, resulting in a wide diversity of tastes and styles (Pyn et al., 2007; Pink, 2015; Thome & Paiva, 2020; Ohana-Levi & Netzer, 2023). Furthermore, the success of Belgian wines in international competitions, as well as the support of prominent sommeliers, have helped to solidify the country's status as a legitimate wine-producing area (Styles, 2023; Belga News Agency, 2023). As a result, investors are increasingly lured to the Belgian wine sector, supporting its expansion and ensuring its long-term viability.

Winemakers in Belgium have also implemented new winemaking procedures to improve the quality of their wines. Some producers, for example, have begun to experiment with prolonged maceration, a procedure that involves fermenting grapes with their skins for a longer period of time. More aromas and tannins are extracted from the skins during this procedure, producing wines with higher complexity and structure (Bestuli et al., 2022). Furthermore, some Belgian winemakers use concrete eggs for fermentation, which supposedly provides for improved oxygenation and the natural stability of the wine (Shackelford & Shackelford, 2021). These distinct techniques illustrate Belgian winemakers' ongoing growth and passion for producing great and memorable wines.

2.2 Wine’s Economic Impacts: Jobs, Trade & Global Growth

The wine business has a long and illustrious history that extends back thousands of years. Wine has long maintained a unique position in culture, from ancient civilizations like the Egyptians and Romans to the vineyards of France and Italy (Millon, 2013). The sector has grown significantly over the years, with new locations arising and innovative procedures being created. Today, the wine sector is a worldwide giant, producing and consuming millions of bottles each year (Banks & Overton, 2010; Mariani et al., 2012). Wine production has gotten more efficient and accessible as technology and transportation have advanced (Orth et al., 2007). Furthermore, the emergence of internet platforms and wine tourism has helped the industry's growth by allowing customers to explore and discover wines from all

over the world (Canovi & Pucciarelli, 2019). As the demand for wine grows, producers are continually adjusting and experimenting to match consumers' changing tastes and preferences (Anderson & Wittwer, 2013).

The wine sector is important in the worldwide economy since it creates considerable cash and job possibilities (Scott Morton & Podolny, 2002). Wine, with its rich history and cultural significance, has become more than simply a beverage; it has also become a symbol of elegance and sophistication (Thach & Olsen, 2004). The industry's influence goes beyond the production and sale of wine to include agriculture, tourism, and hospitality. Furthermore, wine exports contribute to international trade and strengthen economic ties between countries, making the sector an important component of the global economy (Hall & Mitchell, 2000). Furthermore, the wine business is critical to the protection of natural resources and the development of environmentally friendly practices. To protect the life of their vineyards, several vineyards use ecologically friendly techniques such as organic cultivation and water conservation strategies. This commitment to sustainability not only benefits the environment, but it also draws environmentally aware customers who want to shop at eco-friendly establishments (Romero et al., 2022). Overall, the wine business has a broad-reaching influence that extends far beyond the enjoyment of a glass of wine, making it an important contributor to economic growth, environmental stewardship, and cultural enrichment (Lopez-Sanz et al., 2021). Vineyards that use environmentally friendly procedures not only decrease their carbon footprint but also safeguard the surrounding ecosystems from toxic chemicals and pesticides. These sustainable approaches assist in protecting the region's biodiversity and the natural equilibrium of the soil (Ruiz-Colmenero et al., 2011). Furthermore, the wine industry's commitment to environmental stewardship serves as a model for other industries, inspiring them to prioritize sustainability and contribute to a more sustainable future for all (Flint & Golicic, 2009; Trigo & Silva, 2022).

The wine industry's key companies and regions are actively implementing sustainable methods to preserve the long-term survival of their vineyards (Santini et al., 2013). Winemakers in locations like Napa Valley and Bordeaux, for example, are embracing organic and biodynamic farming practices that avoid the use of synthetic fertilizers and pesticides (Guthman, 2000; Jones & Grandjean, 2018). To power their activities, these areas are also investing in alternative energy sources such as solar panels (Swinchatt & Howell,

2004). The wine sector highlights the need to balance economic expansion with environmental responsibility by leading the way in sustainability. This dedication to sustainability not only protects the land's integrity but also improves the flavours and character of the wines produced (Fiore et al., 2017). Grapegrowers are also employing water conservation measures, including drip irrigation systems, to cut water use and lower the environmental impact of their operations (Ene et al., 2013). The wine industry is setting an example for other agricultural sectors to follow by demonstrating that it is possible to grow while also maintaining the natural resources on which their company depends (Gilinsky Jr. et al., 2016).

2.2.1 Market Analysis and Trends

It is critical to examine customer preferences and trends while doing market research. There is currently an increasing interest in unusual and lesser-known grape types, as well as organic and sustainable wines (Alonso & Kok, 2020). Wineries that can respond to these demands and create unique products will likely have a commercial edge (Fountain et al., 2008). Furthermore, the advent of internet wine sales and direct-to-consumer models has created new avenues for wineries to reach a larger audience and enhance sales. Wineries may now readily present their products and communicate with clients directly by embracing technology and e-commerce platforms, circumventing traditional distribution routes (Gebauer & Ginsburg, 2001). Not only does this give wineries more control over branding and price, but it also allows them to acquire vital data on consumer preferences and purchase habits (Taghikhah et al., 2021). Additionally, the option to distribute wine straight to consumers' homes minimizes the need for actual retail premises, decreasing overhead expenses and enhancing profitability. Overall, wineries will be better positioned for long-term success in the ever-changing wine industry if they embrace these developing trends and modify their business models accordingly (Burrell and Richardson, 2023). Furthermore, the direct-to-consumer strategy allows wineries to provide tailored and unique experiences for their clients. Wineries may establish a devoted consumer base and foster a sense of community by offering exclusive wine clubs, virtual tastings, and instructional content (Krishen et al., 2023). This direct engagement with customers also enables wineries to obtain rapid feedback and make real-time changes to their goods or marketing tactics. Wineries may prosper in an increasingly competitive market and secure their position in the wine

industry's future by staying ahead of the curve and embracing technology (Karagiannis & Metaxas, 2020).

The European wine business is currently expanding rapidly, with worldwide sales expected to reach $456 billion by 2028, with a growth rate of 4.3% from 2021 to 2028 (Fortune Business Insights, 2022). This rise is being driven by the expanding popularity of wine drinking, particularly among millennials and the emerging middle class in emerging nations (Hansen, 2020). Furthermore, the growing popularity of premium and organic wines is fuelling market growth. Wine consumption is rising as the younger population, particularly millennials, embraces it as a social and lifestyle option. Furthermore, wine is becoming more popular as a symbol of elegance and prestige among the expanding middle classes in emerging nations such as China and India (Banks & Overton, 2010). As people grow more health-conscious, there is a greater demand for premium and organic wines, which are a better alternative to regular alcoholic drinks (Rojas-Méndez et al., 2015). These forces will likely drive the wine business ahead, generating profitable possibilities for both established firms and new entrants. In order to meet the desires of the burgeoning middle class, wineries and vineyards are extending their production capacity and broadening their offerings in response to rising demand (Banks & Overton, 2010). Additionally, wineries are investing in marketing and distribution tactics in order to effectively reach this new client base. As a result, the wine market is experiencing a rise in innovation, with new flavours and mixes being produced to suit customers' changing tastes. Overall, the wine industry's future is bright, with several potentials for expansion and profitability (Viviani, 2008).

Emerging wine market trends, such as rising demand for organic and sustainable wines, are also propelling the sector ahead. Consumers are increasingly concerned about their health and the environment, prompting them to seek out organic and sustainable wines (Linton, 2012). This movement is impacting not just wineries' production processes but also customer tastes and purchase decisions. Wineries that adopt these principles and begin producing organic and sustainable wines are more likely to attract a larger client base and gain market share (Szolnoki, 2013). Furthermore, this tendency is creating new opportunities for wine industry innovation and distinction. As more customers become aware of the benefits of organic and sustainable wines, demand for these products is likely to rise, boosting the industry's profitability and sustainability (Baiano, 2021). Wineries may help preserve the

environment and safeguard the surrounding ecosystems by using organic and sustainable techniques. This dedication to sustainability not only appeals to environmentally concerned consumers but also allows wineries to identify with the rising worldwide sustainability movement (Joy & Pea, 2017). Furthermore, organic and sustainable wines are frequently produced with minimal chemical intrusion, resulting in a purer and more genuine taste that connoisseurs love. As a result, wineries that prioritize these principles are more likely to position themselves as industry leaders and achieve long-term success (Pea Moreno, 2022).

2.2.2 Challenges and Opportunities in the Wine Industry

The wine business has been battling with the growing consequences of climate change in recent years. Rising temperatures and uncertain weather patterns endanger grape production and wine quality in general (Teslić, et al., 2019). These challenges, however, can also provide opportunity for creativity and adaptability. Winemakers might explore new grape varieties that are more tolerant to shifting climates by investing in research and development (Nicholas & Durham, 2012). Furthermore, foreign rivalry can be considered as a source of growth and expansion. To stand out in the global wine sector, producers might enter new markets, diversify their goods, and improve their marketing tactics (Banks & Overton, 2010). Furthermore, adopting technology breakthroughs like precision viticulture and sustainable production practices will assist reduce the industry's environmental effect and maintain its long-term survival (Bernardo, et al., 2018). The wine business can adapt and survive in a changing world by aggressively tackling these difficulties. Collaboration among growers, scientists, and politicians is critical in developing novel ways to tackle climate change while preserving wine quality and character (Mowery, et al., 2010). Implementing sustainable practices improves not just the environment but also the industry's reputation and consumer trust. The wine business can continue to be a symbol of craftsmanship and history while also embracing the opportunities given by a globalized marketplace by staying ahead of the curve and accepting change (Kim & Mauborgne, 2014).

Growth and innovation opportunities in the wine business, such as new markets and technology, allow for ongoing development and expansion. The wine business may tap into new customer tastes and expand its worldwide reach by exploring developing markets and leveraging innovative technology like as precision viticulture and sustainable packaging

solutions (Thomas, et al., 2013). Taking advantage of these opportunities not only protects the industry's survival, but also opens the door to new collaborations and partnerships, promoting a culture of innovation and creativity within the wine community (Conto, et al., 2014). Furthermore, sophisticated technology may assist the wine sector in optimizing manufacturing processes, reducing waste, and improving product quality. Precision viticulture, for example, enables vineyard managers to track and adjust variables like soil moisture, temperature, and nutrient levels, resulting in healthier plants and higher-quality grapes (Arnó Satorra, et al., 2009). Sustainable packaging solutions, on the other hand, not only appeal to environmentally concerned customers but also lower the carbon footprint of the sector. By embracing a variety of technology breakthroughs and strategic initiatives, the wine industry has the chance to take the lead in innovation, draw in new client segments, and significantly contribute to a more sustainable future. These technologies can include eco-friendly manufacturing techniques, sustainable packaging advancements, and precision viticulture techniques. By implementing these technologies, wineries may improve their competitiveness while simultaneously fostering a wine business that is more ecologically conscious and customer-focused. (Flint, et al., 2011; Montalvo-Falcón, et al., 2023)

The influence of global events (for example, the COVID-19 pandemic) on the wine business has also been highlighted, emphasizing the significance of integrating technology and sustainable methods. The epidemic shook supply networks and prompted wineries to adjust to new customer behaviours including increased online sales and contactless delivery (Sheffi, 2020). Wineries may improve their e-commerce platforms and overall consumer experience by leveraging technology. Sustainable practices like biodynamic viticulture and organic farming have gained popularity in recent years within the wine business. These methods are frequently recognized for their capacity to lessen environmental effect and improve vineyards' long-term survival. It's crucial to note, though, that there is continuous discussion over how much sustainability measures alone can guarantee the wine industry's long-term viability. (Montalvo-Falcón, et al., 2023). These environmentally friendly approaches not only improve the environment but also appeal to an increasing number of environmentally concerned customers. Some wineries have looked into organic farming methods as a way to lessen their reliance on chemical pesticides and fertilizers, which could improve the health of their vineyards and the flavor of their grapes. (Delmas, 2010). The use of biodynamic viticulture techniques in some wineries has been linked to potential

improvements in the terroir and flavor profiles of wines, perhaps providing a distinctive selling factor in a competitive market. These techniques involve working with natural forces and moon cycles (Lanier & Hughes, 2021).

Regulations are also beginning to acknowledge the significance of sustainable viticulture techniques. Many nations have created certification and labelling systems to inform customers about the environmentally friendly techniques employed in wine production (Delmas & Gergaud, 2021). Wineries may demonstrate their commitment to sustainability and attract environmentally concerned consumers by following to these laws and receiving the relevant certifications. The use of biodynamic viticulture methods, according to their supporters, can also help wineries cut costs by encouraging natural pest control methods and reducing their reliance on chemical inputs. It is crucial to remember that the effect on grape production might differ depending on a variety of elements, including vineyard techniques, climate, and the degree of commitment to biodynamic principles. While some wineries have claimed success in terms of sustainability and grape quality, others have encountered yield variations that call for more investigation and thought (Döring, et al., 2019). Overall, the combination of biodynamic viticulture and sustainable practices may help wineries improve their reputation and profitability in a competitive market. Wineries may lower their carbon footprint and environmental effect by using sustainable methods (Niccolucci, et al., 2008). This might involve employing renewable energy sources, conserving water, and practicing responsible waste management (Khandaker, et al., 2021; Winans, et al., 2021). These activities can help vineyards differentiate themselves from competition and appeal to environmentally conscious consumers (Nowak & Washburn, 2002).

2.2.3 Innovations in Wine Industry

The introduction of new ideas, processes, technologies, or products into the wine business causes substantial changes and advances in numerous elements of wine production, distribution, marketing, and consumption (Spawton, 1990). These breakthroughs might vary from advances in viticulture and winemaking processes to creative packaging solutions and digital wine sales platforms. In the dynamic and competitive wine business, they play a critical role in generating growth, improving quality, and satisfying changing customer tastes (Strickland & Williams, 2022). The wine business has seen a huge development in new

approaches in recent years, which have altered the way wine is made, sold, and consumed (Goode, 2021). Precision viticulture techniques that optimize grape growing conditions, as well as the application of artificial intelligence in wine analysis and prediction, have not only enhanced efficiency and output but have also assured consistent quality throughout vintages (Tardaguila et al., 2021). Furthermore, the introduction of online wine markets and tailored subscription services has made it simpler for customers to discover and purchase their favourite wines while simultaneously supplying wineries with important data that allows them to adapt their products to specific consumer interests. As the wine market evolves, these innovations will definitely change and reinvent the industrial landscape (Davenport et al., 2007).

The significance of wine industry advancements cannot be overemphasized. These innovations have not only changed the way consumers discover and buy wines but have also enabled wineries to better understand and respond to their customers' tastes (Benjamin & Podolny, 1999). Wineries may now reach a larger audience and provide customized experiences by embracing internet platforms and personalized subscription services, eventually boosting development and success in the business (Weinman, 2015). Furthermore, advancements in winemaking procedures have resulted in higher quality and consistency. Winemakers are able to produce wines of higher flavour and character by utilizing current viticultural approaches as well as improved fermentation and aging procedures (Pretorius, 2000). These advancements have also aided the industry's sustainability efforts, with wineries embracing eco-friendly techniques such as organic and biodynamic cultivation (Martnez-Falcó et al., 2023).

The introduction of stainless-steel fermenting tanks was a historical milestone for the wine industry. This breakthrough transformed winemaking by creating a more sanitary and regulated environment for fermentation, resulting in higher wine quality and consistency. Furthermore, stainless steel tanks are less difficult to clean and maintain than conventional wooden barrels, lowering the danger of contamination and spoilage (Montalvo et al. 2021).

Another notable breakthrough in the wine business was the implementation of temperature-controlled fermentation. This gave winemakers complete control over the fermentation process, ensuring that the grapes fermented at appropriate temperatures. As a consequence, wines with more nuanced tastes and aromas, as well as superior overall balance, were

produced (Unterkofler et al., 2023). Temperature-controlled fermentation also reduced the growth of undesirable bacteria and yeast, enhancing wine quality and lowering the danger of spoilage (De Orduna, 2010).

Another notable improvement in the wine business was the development of mechanical harvesting devices. These devices transformed the harvesting process by picking grapes effectively and rapidly, lowering labour expenses, and improving production. Mechanical picking also reduced grape damage, ensuring that only the best fruit made it through the winemaking process. Furthermore, these technologies enabled winemakers to pick grapes at their ripest, resulting in wines with excellent taste profiles and attributes (Jenster & Jenster, 1993; Pu et al., 2018).

Precision viticulture techniques have transformed the way vineyards are handled. Winemakers can now monitor and regulate soil moisture, temperature, and nutrient levels in real time thanks to modern sensors and data processing. This improves grape quality while also promoting sustainable farming techniques by lowering water and chemical use. Furthermore, precision viticulture allows winemakers to customize their growth methods to individual grape types, opening up new avenues for producing unique and extraordinary wines (Burini, 2009; Goode, 2021).

Winemakers may collect data on plant health, canopy density, and grape growth patterns by using remote sensing technology for vineyard management. This knowledge enables them to make more educated decisions regarding watering, pruning, and pest management, resulting in healthier plants and higher-quality grapes (Mathews & Jensen, 2013). Furthermore, remote sensing technology can identify early symptoms of illness or stress in the vineyard, allowing winemakers to take proactive actions to avoid crop losses (Costa et al., 2016; Dressler & Paunovic, 2021).

The use of artificial intelligence in winemaking operations can improve the efficiency and accuracy of data processing. Winemakers may enhance vineyard management tactics by analysing huge volumes of data acquired from diverse sources, such as weather patterns and soil conditions, using machine learning algorithms. Furthermore, based on past data, AI may help anticipate wine quality and taste characteristics, allowing winemakers to make more

exact judgments during the manufacturing process (Tardaguila et al., 2021; Linaza et al., 2021).

2.2.4 Sustainability Innovations in Wine Industry

In recent years, the wine industry has acknowledged the importance of sustainability, which plays a critical role in environmental preservation, long-term profitability, and addressing customer desires for eco-friendly goods. Sustainable methods not only reduce the carbon footprint of the sector but also encourage biodiversity, water conservation, and social responsibility (Fiore et al., 2017). With growing worldwide worries about climate change and environmental degradation, wineries must implement sustainable solutions to remain competitive and contribute to a more sustainable future (Glantz, 1999). Wineries may lessen their reliance on toxic chemicals and pesticides by employing sustainable techniques, resulting in healthier soil and grapes (Dodds et al., 2013). As a result, the quality of the wines produced improves, enticing environmentally conscious consumers to pay a premium for eco-friendly products (Muça et al., 2021). Furthermore, sustainable vineyards frequently engage with local communities and groups to support environmental projects and promote eco-tourism, cementing their position as responsible industry firms. Finally, adopting sustainability helps not just vineyards but also the planet's general well-being (Black & Cherrier, 2010).

The creation and implementation of innovative practices, technologies, and tactics with the goal of minimizing negative environmental consequences while maximizing social and economic advantages are referred to as sustainability innovations (Cillo et al., 2019). These breakthroughs are critical to solving the world's serious issues of climate change, resource depletion, and social inequity (Leichenko & O'Brien, 2008). Businesses may minimize their carbon footprint, preserve resources, increase efficiency, and boost their reputation among environmentally sensitive customers by using sustainability technologies (Dey et al., 2011). These inventions can spur good change across industries and motivate others to join in the effort to create a more sustainable future. The development of renewable energy technology, for example, not only aids in the fight against climate change but also contributes to job creation and economic growth in the clean energy industry (Haines et al., 2007). Furthermore, by encouraging fair trade, supporting local communities, and ensuring ethical

material sourcing, sustainable business practices may promote social equality. And thereby, a greener and more fair society can be created for future generations by adopting sustainability advances (Gilinsky Jr. et al., 2016; Pan et al., 2018). By incorporating environmentally friendly procedures into their daily operations, wineries can support this more general sustainability goal. These practises include biodynamic or organic farming to limit the use of chemicals, waste management and recycling programmes, conservation efforts to maintain biodiversity, cutting-edge packaging ways to lower carbon footprints, and environmentally friendly transportation options (Sogari, et al ., 2017;Jia, et al., 2018).

Wineries that are committed to sustainability may look into using alternative energy sources, such solar or wind power, to run their businesses. These resources can lessen dependency on traditional energy grids and cut down on the carbon footprint that comes with using electricity. To turn organic waste into energy that is sustainable, certain wineries might utilize other forms of energy like biogas or anaerobic fermentation systems. This method produces clean energy in addition to less waste. Even though it isn't directly related to energy, protecting biodiversity in vineyards can help achieve alternative energy objectives. For instance, planting native trees that may serve as potential biomass sources for the creation of renewable energy may be necessary to sustain wildlife habitats. Wineries that are committed to sustainability may look into using alternative energy sources, such solar or wind power, to run their businesses. These resources can lessen dependency on traditional energy grids and cut down on the carbon footprint that comes with using electricity. To turn organic waste into energy that is sustainable, certain wineries might utilize other forms of energy like biogas or anaerobic fermentation systems. This method produces clean energy in addition to less waste. Even though it isn't directly related to energy, protecting biodiversity in vineyards can help achieve alternative energy objectives. For instance, planting native trees that may serve as potential biomass sources for the creation of renewable energy may be necessary to sustain wildlife habitats (Garcia, et al., 2018).

Vineyards have implemented a range of sustainable strategies such as carbon offset programs sustainable agriculture practices, integration of technology to monitor and optimize resource usage in vineyards, investment in research and development for sustainable winemaking techniques to lessen their carbon footprint and encourage environmental responsibility, such as the use of lightweight glass bottles and other programs.

Since its lighter weight results in less fuel being consumed during shipment, lightweight glass bottles are acknowledged for their contribution to reducing emissions caused by transportation. Additionally, the wine sector as a whole has made a commitment to adopt eco-friendly procedures and fully address sustainability (Cleary, 2013; Gierling & Blanke, 2021).

Additionally, the wine business is supporting a variety of sustainability projects that collectively work to lessen environmental effect and promote eco-friendly behaviors. These programs include strategies to improve biodiversity and habitat protection within vineyards, the use of renewable energy sources, efficient water conservation through sophisticated irrigation systems, efficient waste management and recycling programs, and the adoption of environmentally friendly packaging materials Renewable energy sources, water saving measures, cutting-edge irrigation technologies, and waste management and recycling programs are all contributing to the sustainability of vineyards. These practices not only reduce the carbon footprint but also promote responsible resource management, biodiversity, and ecosystem preservation. Additionally, the use of environmentally friendly packaging materials reduces the environmental impact of wine goods, supporting sustainability goals and attracting environmentally conscious customers. These practices contribute to social equality and environmental stewardship (Reeve, et al., 2005; Döring, et al., 2019).

2.2.5 Use of Environmentally-friendly Packaging Materials

As people become more conscious of the environmental effects of traditional packaging materials, there is a rising desire for greener alternatives. These products are designed to decrease waste, cut carbon emissions, and encourage sustainability across the supply chain (Peattie & Charter, 1992; FuiYeng & Yazdanifard, 2015). Businesses are realizing the necessity of using environmentally friendly packaging materials to fulfil market demands and contribute to a greener future as consumer awareness and government requirements grow (Bhatia & Jain, 2013; Lewis et al., 2017). Plant-based plastics and biodegradable packaging are becoming attractive options for firms seeking to connect with environmental aims (Hahladakis & Iacovidou, 2018; Charlebois et al., 2022). Furthermore, recyclable materials such as cardboard and paper are increasingly being used in package design, minimizing dependency on non-renewable resources (Petersen et al., 1999). Companies that embrace these alternatives not only fulfil the needs of environmentally concerned customers,

but they also take a step toward decreasing their own ecological impact (Porter & Van der Linde, 1995; Van Hoek, 1999).

Environmentally friendly packaging refers to packaging materials and designs that have a low environmental impact throughout their lifespan. This includes things like using renewable or recyclable materials, using less energy during production, and using effective waste management procedures (Davis & Song, 2006; Boesen et al., 2019). Packaging should target decreasing greenhouse gas emissions, limiting water consumption, and supporting sustainable sourcing and manufacturing practices in order to be deemed ecologically friendly (Cosimato & Troisi, 2015). Meeting these standards enables businesses to not only fulfil customer expectations for sustainability but also to contribute to the general protection of natural resources and ecosystems, resulting in a greener and more sustainable future (Sheth & Parvatiyar, 1995; Rondinelli & Berry, 2000). Companies may demonstrate their environmental commitment and differentiate themselves from the competition by integrating eco-friendly packaging strategies (Polonsky & Rosenberger III, 2001; Ginsberg & Bloom, 2004). Furthermore, by decreasing waste and maximizing resources, sustainable packaging may help firms save money in the long term. Overall, promoting ecologically friendly packaging benefits both businesses and the environment (Shrivastava, 1995; Tsoulfas & Pappis, 2006).

According to Fu et al. (2009), glass bottles have traditionally been the most frequent type of wine packaging. Other packaging formats, such as bag-in-box (BIB), multi-layer plastic bottles, and laminated cartons, have gained recognition in various markets during the past few decades. BIB packaging, in particular, has been crucial because it improves distribution efficiency, end-user convenience, and cost-effectiveness. The product is packed in a bag made of one or more plies of high-barrier flexible films supported by an exterior paperboard carton, and the product is dispensed through a valve fitting connected to the bag.

Sundell et al. (1992) state that the most frequent bag used for bag-in-box (BIB) wines is a double-welded bag. The outer bag is often constructed of a plastic laminate and metallized polyester (Met.PET), which acts as an oxygen barrier for the wine.

2.2.6 Bag-in-Box Wine Packaging in the Wine Industry

Bag-in-box wine packaging is made out of a resistant bladder (or plastic bag), which is commonly made up of numerous layers, similar to PET multi-layer bottles.

Figure 2 Examples of Bag-in-Box packaging. Source: https://www.verpackungsteam.at/Verpackungsmaterial/Kartons/Getraenkeversandkartons/Bag-in-Box-1-5-Liter-Karton-und-Beutel-im-Set::5486.html

The bag is encased in a strong cardboard box for safety (Rapp, 2005; Ferrara & De Feo, 2020). This packaging approach allows wine to be readily kept and distributed while retaining its freshness and quality. The bag works as an oxygen barrier, preventing oxidation of the wine, while the box provides stability and protection during shipping and storage (Thompson-Witrick et al., 2021). Furthermore, bag-in-box wine packaging is cost-effective since it eliminates the need for traditional glass bottles and corks, making it a more sustainable solution for both producers and consumers (Wagner et al., 2023). The bag-in-box style is popular for bigger volumes of wine, such as boxed wines containing several litres, making it an ideal choice for parties and celebrations (Brostrom & Brostrom, 2008). Additionally, the bag-in-box design facilitates wine distribution by including a built-in tap

or spout. This removes the need to open and reseal bottles, making it a convenient way to serve and enjoy wine in social settings (Russell & Kellershohn, 2018). Furthermore, the bag-in-box model reduces waste by allowing consumers to utilize only the quantity of wine they require at any given moment without the risk of deterioration or oxidation (Roongruangsri & Bronlund, 2015).

This is especially useful for individuals who do not want to consume an entire bottle in one sitting. The bag-in-box packaging also helps to protect the wine's quality and freshness by preventing exposure to air and light. This implies that even if the box has been open for a time, the last glass of wine will taste just as excellent as the first (Thompson-Witrick et al., 2021). Furthermore, the bag-in-box packaging's compact and lightweight form makes it easy to transport and store, making it a popular choice for outdoor activities such as picnics or camping vacations (Niskanen & Wallsten, 2013).

The popularity of bag-in-box packaging for wine has been steadily increasing in recent years. This is due to its numerous advantages, such as its convenience and cost-effectiveness (Santini et al., 2007). Additionally, this packaging method is more environmentally friendly compared to traditional glass bottles, as it reduces the use of materials and energy required for production and transportation (Ferrara & De Feo, 2020). Furthermore, bag-in-box packaging helps preserve the quality and freshness of the wine for a longer period as it minimizes exposure to oxygen. Moreover, the bag-in-box structure reduces the chance of shattered glass, resulting in a safer and less stressful experience for both customers and event organizers (Wakeland et al., 2011). The use of less packing material, as well as the ability to simply recycle the cardboard box, helps reduce waste and carbon emissions. Bag-in-box wine is thus a sustainable solution for individuals concerned about the environment. Overall, bag-in-box packaging provides a handy, safe, and environmentally responsible method for serving and enjoying wine in a variety of situations (Cleary, 2013; Thompson-Witrick et al., 2021).

Bag-in-box packaging has long had technical issues maintaining seal integrity and limiting oxygen exposure. However, technological improvements have significantly enhanced the longevity and efficacy of these seals, ensuring that the wine remains fresh and unharmed for longer periods of time (Coles & Kirwan, 2011; Kirwan et al., 2011). Bag-in-box packaging has been increasingly popular in recent years as a result of its reliability, practicality, and

affordability. As consumer and manufacturer preferences change, wineries are increasingly implementing this cutting-edge packaging option. The wine sector is poised to further establish itself as a reliable and respected alternative in the market as it continues to embrace bag-in-box packaging for its practical benefits (Ferrara & De Feo, 2020). Bag-in-box packaging is set to transform the wine business and become a staple choice for wine connoisseurs worldwide due to its mix of durability, convenience, cost-effectiveness, and eco-friendliness (Wanderlust Wine, 2023). Bag-in-box packaging is appealing to both casual wine consumers and connoisseurs due to its user friendliness (GmbH, 2023).

2.2.7 Advantages of Bag-in-Box Wine Packaging

2.2.8 Preservation of Wine Quality and Taste

Bag-in-box packaging enhances wine quality and flavor by preventing oxidation and spoilage due to oxygen exposure. This keeps the wine fresh for weeks or months, allowing consumers to enjoy a glass without worrying about waste. Bag-in-box packaging also contributes to a greener future by being recyclable and reducing environmental impact. Companies can tap into the growing demand for sustainable packaging solutions and attract environmentally conscious consumers (Ferrara et al., 2020; Thompson-Witrick et al., 2021).

The article published in Wine Spectator (2023) states that bag-in-box wine is the most common non-glass wine product since it is convenient and inexpensive. Black Box is a major brand in the boxed wine industry, with production continuously expanding since 2015. The bag-in-a-box mechanism of boxed wine keeps the wine fresh for up to three weeks after opening.

Revi et al. (2014) reported that packaging white wine in bag-in-box (BIB) containers influenced quality indicators such as titratable acidity, total and free SO_2, color, and volatile components' concentration. The LDPE lined bag shown the greatest potential for sorption, whereas glass proved to be the most inert wine packaging material. According to sensory examination, wine remained of acceptable quality for 90 days in plastic bags and at least 180 days in glass containers. The researchers are also attempting to collect and quantify the adsorbed volatiles from both LDPE and EVA polymeric films.

Moreira et al. 2016 found similar results that wines stored in BIB containers had greater levels of specific carbonyl compounds and worse sensory characteristics after 12 months of storage than wines housed in glass bottles with natural cork stoppers. The sensory evaluation supported the analytical findings. Wines stored with natural cork stoppers included greater levels of components associated with freshness and fruitiness, indicating that their sensory quality was retained better than wines stored in BIB containers.

The authors Thompson-Witrick et al. 2009 notes that despite their environmental effect, glass bottles are still better to alternative packaging methods such as BIB, PET, OxSC-PET, cans, and TetraPak® when it comes to keeping the chemical and sensory qualities of wine during the aging process.

According to the research conducted by Ghidossi et al. (2012), white wine deteriorated quickly in PET bottles, especially in PET mono-layer bottles due to oxidation, while there were no significant differences in the O_2, CO_2, and SO_2 levels of red wines in various packaging configurations. The findings highlighted the crucial role of packaging in wine preservation and suggested that choosing the appropriate packaging materials and sizes should depend on the wine type and distribution method.

Mentana et al. (2009), found that after 7 months of storage, red table wine samples did not alter substantially, suggesting that PET packaging is effective in substituting glass bottles for the storage of the tested table wine.

According to Fradique et al. (2011), malfunctioning BiBs exhibiting symptoms of demetallization around the tap and edges after some periods of storage have been seen. Depending on the degree of dementalization, this loss of barrier may have a significant influence on wine shelf-life.

2.2.9 Cost Effectiveness and Environmental Benefits

Bag-in-box approach saves companies money on materials and shipping, which contributes to higher profitability (Reddy & Joshi, 2021Furthermore, the bags used in this packaging are frequently composed of recyclable materials, which reduces waste and promotes a circular economy (Shogren et al., 2019). Overall, the use of bag-in-box packaging increases durability of wine and also helps to make the business more sustainable and ecologically

conscientious (Fredriksson, 2011). The popularity of bag-in-box packaging is also influenced by cost-effectiveness and environmental benefits. The materials utilized in these bags are frequently less expensive than standard packaging solutions, making them a cost-effective option for enterprises (Göktepe, 2000).

A vineyard, for example, may choose bag-in-box packaging for their products. Instead of sending heavy glass bottles, they may convey lightweight bags, avoiding repeated journeys and lowering their carbon impact (Dahle & Nyflt, 2021). Furthermore, the bags may be simply flattened and recycled after use, reducing waste and maximizing resource utilization (Waite, 2013). This example demonstrates how bag-in-box packaging may improve product quality while also supporting sustainable practices in the wine sector. Furthermore, bag-in-box packaging has substantial environmental benefits (Ferrara et al., 2020).

Bag-in-box packaging, according to Capitello et al. (2012), provides various technical and technological advantages in addition to being ecologically beneficial. These benefits include superior material and closure performance as compared to TetraBrik packaging, the retention of sensory attributes of wine for longer periods of time than glass bottles when opened, convenience of storage, and recyclability.

For example, it has overtaken the bottle in Norway and in Sweden, partly because of the lower taxation than glass bottle. In France, it is one of the few growing areas in the declining domestic market. In Australia, the role of bag-in-box is evolving in a completely different way. For many years it has been one of the most important packaging options in the domestic market, qualifying the wine as a commodity However, the decline in its popularity can be attributed to consumers' shifting tastes for expensive wines (Mueller and Umberger, 2009).

In the 1970s, people in Australia were noticing that their bag-in-box wine started to taste oxidized as well as to have lower free SO_2 values only three months after packaging. Bag-in-box at that time had an approximate shelf life of about six-months. It was unclear if the decrease in shelf life was associated with the permeation of O_2 into the wine or permeation of SO_2 out of the wine. Researchers determined that the permeation of SO_2 out of the wine was negligible, but the true culprit that caused the wine to deteriorate was the O_2 into the wine. The oxygen was able to permeate through the valve and bag's seal. As a result of these findings, bag-in-box wines have greatly improved. They are currently being made with O_2-

barrier for the bag, spout, and closure. Today's bag-in-box design consists of a single piece, flexible valve, which opens and closes when a lever is activated keeping it fresh for two–three weeks after it has been opened.

2.2.10 Challenges and Limitations of Bag-in-Box Packaging

Bag-in-box packaging may face perceptions and stigma associated with non-traditional packaging. When compared to traditional packaging methods, some consumers may still see it as a lower-quality or less sophisticated alternative (Nuebling, 2015). Furthermore, buyers may be concerned about the quality and freshness of the contents due to the lack of visibility of the goods within the bag (Varley, 2014). These problems, however, may be solved with proper marketing and education, and bag-in-box packaging can be recognized as a viable and sustainable option (Poças et al., 2022). Consumers may be taught about the benefits of bag-in-box packaging by emphasizing its convenience and environmental friendliness (Baiano, 2021). Furthermore, emphasizing the durability and extended shelf life of the items contained within the bag might help relieve freshness worries. Collaborating with well-known businesses and influencers to promote the usage of bag-in-box packaging may also help to boost its image and present it as a stylish and environmentally responsible option for customers (Dahle & Nyflt, 2021). Overall, bag-in-box packaging has the potential to change the business and acquire customer acceptability with the appropriate techniques (Ferrara et al., 2020).

One of the potential constraints in the premium wine industry is the idea that bag-in-box packaging is connected with poorer-quality wines (Spawton, 1990). To address this constraint, businesses may educate customers about the enhanced technology and preservation procedures employed in bag-in-box packaging, emphasizing its capacity to preserve the quality and flavour of premium wines (Capitello et al., 2012). Furthermore, delivering premium and well-known wine brands in bag-in-box packaging might aid in changing customer attitudes and increasing acceptability in the premium wine industry. Companies may assist customers in linking bag-in-box packaging with high-quality wines by presenting reputable and well-established wine brands (Mora, 2019). Bag-in-box packaging has the potential to overcome its bad impression and become a preferred alternative for premium wine customers with focused marketing efforts and an emphasis on

quality and sustainability (Spawton, 1990). Wine producers may reassure consumers about the quality and freshness of the wine within by emphasizing the benefits of bag-in-box packaging, such as its capacity to prevent oxidation and spoilage (Nuebling, 2015). Furthermore, emphasizing the eco-friendliness of bag-in-box packaging, which decreases the usage of glass and the total carbon footprint, might appeal to ecologically aware customers. Bag-in-box packaging has the potential to change the wine business and become a symbol of luxury and sustainable wine consumption with the correct marketing techniques and a dedication to quality (Poças et al., 2022). Bag-in-box packaging may overcome these challenges and acquire widespread acceptability in the wine business by solving these concerns and consistently developing (Capitello et al., 2012).

2.2.11 Consumer Perception and Acceptance

Consumer preference and attitude studies and surveys on bag-in-box packaging have yielded encouraging findings. Many customers choose bag-in-box packaging since it is simple to store, transport, and pour (Deliaga et al., 2022). Furthermore, the eco-friendliness of this packaging solution appeals to environmentally aware consumers looking for sustainable solutions (Nguyen et al., 2020). Consumer adoption of bag-in-box packaging is anticipated to rise in the wine sector as awareness and education about its benefits grow (Capitello et al., 2012). Furthermore, the adaptability of bag-in-box packaging allows for a variety of sizes and forms to meet a variety of customer preferences, thus increasing its attractiveness in the wine sector. This adaptability has led to increased interest among wineries. As a packaging solution that can cater to diverse consumer needs, bag-in-box packaging continues to gain attention in the industry (Sajilata, 2007). With these advantages, it is not a surprise that bag-in-box packaging is gaining appeal among customers and becoming a wine industry standard.

Convenience and sustainability, two factors that influence customer perception, are also contributing to the surge in popularity of bag-in-box packaging. Customers love the simplicity of use and the freedom to pour a glass of wine without fear of spoilage or oxidation. Furthermore, the ecologically favourable aspect of bag-in-box packaging correlates with the rising trend of eco-consciousness as more individuals seek out environmentally friendly solutions in their purchase selections (Wang et al., 2014). Bag-in-

box packaging helps not just customers but also the wine business due to its ease and durability. As the need for environmentally friendly packaging grows, the future of bag-in-box packaging appears bright, providing a win-win scenario for both wine connoisseurs and the environment. For example, a California winery has begun employing bag-in-box packaging for their famous wines (Santini et al., 2007). They have saved money on shipping by switching to this packing solution since they can accommodate more boxes in each shipment. Furthermore, the bag-in-box packaging has helped them broaden their distribution reach since they can now send their wines to more remote locations without fear of breaking. This has raised company revenues while also lowering their carbon impact by removing the need for several shipments.

Understanding the potential market for this sustainable packaging alternative requires a comparison of bag-in-box packaging adoption across different populations. According to research (Santini et al., 2007; Capitello et al., 2012), bag-in-box packaging is more popular among younger populations, who are more environmentally concerned and appreciate convenience. However, older generations, who may be more conventional in their wine consumption habits, may be slower to accept this type of packaging. As a result, focused marketing and education initiatives can help increase the acceptability and adoption of bag-in-box packaging across all demographics (Aqueveque, 2023). Furthermore, emphasizing convenience features such as longer shelf life and ease of transportation might help attract this group. For older groups, who may have established preferences for conventional wine bottles, educational ads should focus on refuting myths about bag-in-box packaging and demonstrating its quality and flavour. Ultimately, by tailoring marketing strategies to address the specific concerns and preferences of each demographic, wider acceptance and adoption of bag-in-box packaging can be achieved (Nesselhauf et al., 2017).

Packaging is one of the wine quality indications for consumers, and not just novices. Past research has found that intrinsic features are more essential than extrinsic attributes for utilitarian items, while that extrinsic signals such as brand name and packaging outperform intrinsic cues for image products (De Chernatony and Knox, 1990).

Charters and Pettigrew (2007) investigated how marketing materials, including packaging, are evaluated for quality and how they contribute to quality. They claim that packaging's role varies based on the customer category. Packaging, including labels, conveys an image

that is directly related to pricing to low-involved customers. The authors suggest a "triadic link" between packaging, pricing, and reputation, which is especially important in scenarios involving personal success and sociality. In contrast, customers with a medium or high level of involvement see the marketing package as "integral to the notion of quality".

2.2.12 Market Analysis and Growth Potential

The bag-in-box wine industry is experiencing a rapid increase in popularity due to its ability to maintain the quality and freshness of wine for extended periods, making it a viable alternative for both wine experts and casual consumers (Jackson, 2008; Nuebling, 2015).

An article published in the website of ProWein (2023) highlighted the packaging revolution of wine business. Screw caps and light-glass bottles have already acquired popularity, and there is now increased interest in bag-in-box and other non-glass packaging choices. The growing cost of energy has raised the cost of creating glass bottles, resulting in a scarcity and logistical difficulties. This, combined with the environmental effect of glass bottles, has caused a rethinking of wine packaging.

The bag-in-box wine business has potential for market development and expansion as more customers seek convenient and eco-friendly solutions. The price of bag-in-box wines makes them appealing to budget-conscious consumers who want to taste high-quality wine. The adaptability of bag-in-box packaging allows for numerous sizes and types, appealing to a wide variety of consumer preferences. Bag-in-box wines have various advantages in terms of protecting the wine's quality and freshness, such as their airtight shape, ease and longevity, and eco-friendliness (Vinchiovaglio, 2023).

Bag-in-box wines have rapidly expanded their market share in recent years, surpassing alternative packaging methods like glass bottles and tetra packs. This can be attributed to the multiple benefits provided by bag-in-box packaging, such as the capacity to keep wine fresh for extended periods of time, cost-effectiveness, and convenience (Robertson, 2016; Poupart, 2022).

According to the CBI article (2016), the Bag-in-Box (BiB) is widely used in Belgium. As per the article, as BiB.

Sajilata et al. 2007 mentioned that Scholle Corporation, a global provider of wine bags, has created DuraShield, a new transparent, high-barrier film that provides better oxygen protection for wine packaged in bag-in-box wine casks. This film, which substitutes the typical metallized PET film used in the wine business, effectively doubles the shelf life of the wine, resists puncturing and flex-cracking, and can withstand the harsh transportation conditions necessary for export. DuraShield, which employs cutting-edge polymer technology, is utilized in wine-producing nations across the world to decrease taste scalping. Flextank, a business that employs PE for wine aging, claims that food-grade PE of any density will retain its porosity in the presence of wine for several years, preventing clogging by wine components and taste extraction from the wine.

An article published in Wine Spectator (2023) states that boxed wine remains the most popular non-glass wine product due to its convenience and affordability. A 3-liter box of wine equals four regular bottles, and the bag-in-a-box technology keeps the wine fresh for up to two to three weeks after opening. Smaller, more portable versions, such as 1.5-liter cartons and 500ml Tetra Pak containers, are also available from manufacturers.

In conclusion, the bag-in-box wine industry is poised to take a significant portion of the wine market in the near future (Draskovic et al., 2011). By focusing on the benefits of bag-in-box packaging, consumers can make informed decisions about their wine purchases and enjoy a more enjoyable and rewarding wine-drinking experience. Understanding the science underlying bag-in-box wine packaging allows customers to appreciate the convenience and benefits it provides (Chrysochou et al., 2012).

The literature overview discusses bag-in-box (BIB) wine packaging, which has gained popularity in some countries due to its convenience, cost-effectiveness, and eco-friendliness.

Chapter 3

3.1 Research Methodology

This study employs a qualitative research approach to investigate its objectives. Data is gathered through an online survey from 100 respondents, utilizing purposive sampling. The collected data is analyzed using a Likert and rating scale, with subsequent processing through SPSS. The research design focuses on exploring nuanced preferences and opinions regarding wine, adopting a cross-sectional approach to capture a snapshot of participants' perspectives on various aspects of wine within their natural setting.

3.2 Sampling

A purposive sampling technique is employed to select participants who have consumed wine within the past year. This has ensured that respondents possess relevant experience to provide informed insights into their preferences. In fact, purposive sampling is often used when researchers want to study a specific subgroup of the population or when they seek to gather information from individuals who possess certain characteristics or knowledge that are relevant to the research question (Campbell et al., 2020). Researchers use their judgment and expertise to select participants or elements that will provide the most meaningful and relevant data for their study. Thus, we also adopted a purposive sampling technique for this study.

3.3 Data Collection

An online survey questionnaire was developed to collect qualitative data. The questionnaire has combined Likert scale questions such as (Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree Strongly Agree) and rating scales to assess participants' preferences (Rasmussen, 1989). Likert scale questions measure the strength of agreement or disagreement, while rating scales will allow participants to assign ratings to different wine

characteristics.

3.4 Data Analysis

The quantitative data was analyzed using SPSS utilized to perform tabulation of responses from Likert scale and rating questions. Additionally, pie charts are used to generate to visually represent the distribution of preferences.

3.5 Ethical Considerations

The study has adhered to ethical guidelines by obtaining informed consent from participants before they take the survey. Participant anonymity and confidentiality were upheld, and the collected data was used strictly for research purposes.

Chapter 4

Results and Discussion

4.1 Respondents' Demographic characteristics

Table 4.1 illustrates the distribution of respondents' ages in various categories. The majority of respondents (70.0%) fall within the age range of 25 to 44 years, while the youngest and oldest categories (18-24 and 45-54) make up smaller proportions of the total respondents.

Table 4.1: Respondents Age (n = 100)

		Frequency	Percent	Valid Percent[1]	Cumulative Percent
Age Categories	18-24	14	14.0	14.0	14.0
	25-34	32	32.0	32.0	46.0
	35-44	38	38.0	38.0	84.0
	45-54	16	16.0	16.0	100.0
	Total	100	100.0	100.0	

Table 4.2 shows that the majority of respondents (56.0%) identify as male, while the remaining portion (44.0%) identifies as female. The cumulative percentage reaches 100.0%, indicating that these are the only two gender categories considered in the survey or study.

Table 4.2: Gender of the Respondents (n = 100)

		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Female	44	44.0	44.0	44.0
	Male	56	56.0	56.0	100.0
	Total	100	100.0	100.0	

Table 4.3 illustrates the distribution of respondents' education levels. The majority of respondents (58.0%) have a bachelor's degree, while smaller proportions hold a master's degree (32.0%) or a high school degree or equivalent (10.0%). The cumulative percentage

[1] Valid percent usually refers to the percentage of valid responses or cases within a dataset. This means the proportion of responses that are complete, accurate, and meet the criteria set by the researchers for inclusion in the analysis. It excludes invalid or incomplete responses.

reaches 100.0%, indicating that these are the only education level categories considered in the survey or study.

Table 4.3: Education Level of the Respondents (n = 100)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Level of Education	Bachelor's degree (e.g. BA, BS)	58	58.0	58.0	58.0
	High school degree or equivalent	10	10.0	10.0	68.0
	Master's degree (e.g. MA, MS, MEd)	32	32.0	32.0	100.0
	Total	100	100.0	100.0	

4.2 Household Level of Income

Figure 3 indicates the distribution of respondents across different household annual income levels. The majority of respondents fall within the €35,000 to €49,999 income range (38.0%), followed by the €20,000 to €34,999 range (28.0%). Smaller proportions of respondents have income levels between €50,000 to €74,999 (14.0%), less than €20,000 (16.0%), and the highest bracket of €75,000 to €99,999 (4.0%). The total percentage adds up to 100.0%, representing the entirety of the respondents in the study.

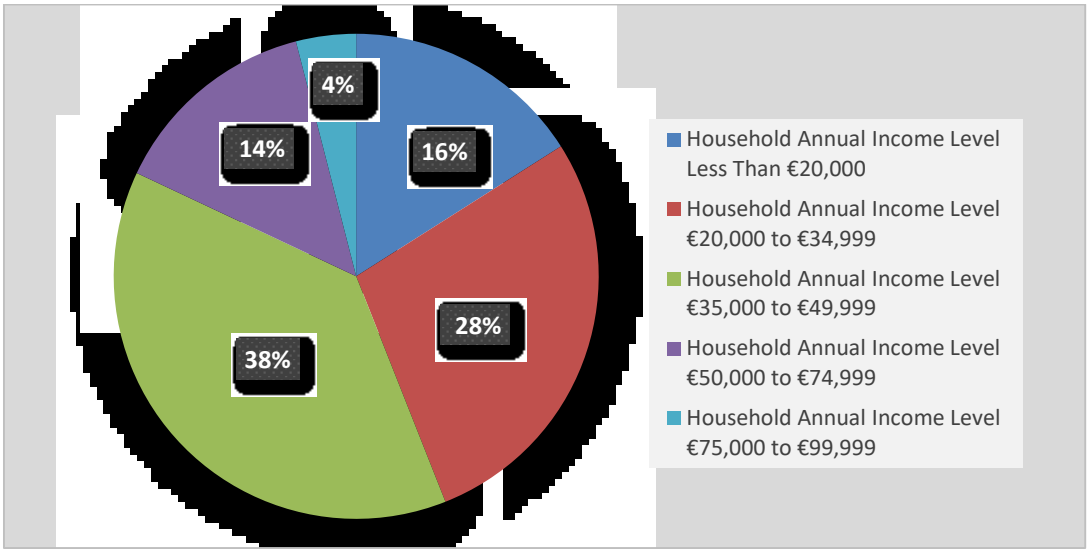

Figure 3 Household Annual Income Level of respondents (n = 100)

4.3 Respondents Wine Consumption Behaviour

Figure 4 shows percentages responses of the respondents at which they consume wine. In fact, the findings revel that 20% of the respondents consume or drink wine once a month, 32% of the respondents consume wine at least once in a week. Similarly, around 20% of the respondents consume wine once in 2 weeks. And, around 10% of the respondents reported that they consume rarely (once in 3 months). On the other hand, 18% of the respondents reported that they consume several times during the week. All in all, majority (32%) consume once in a week.

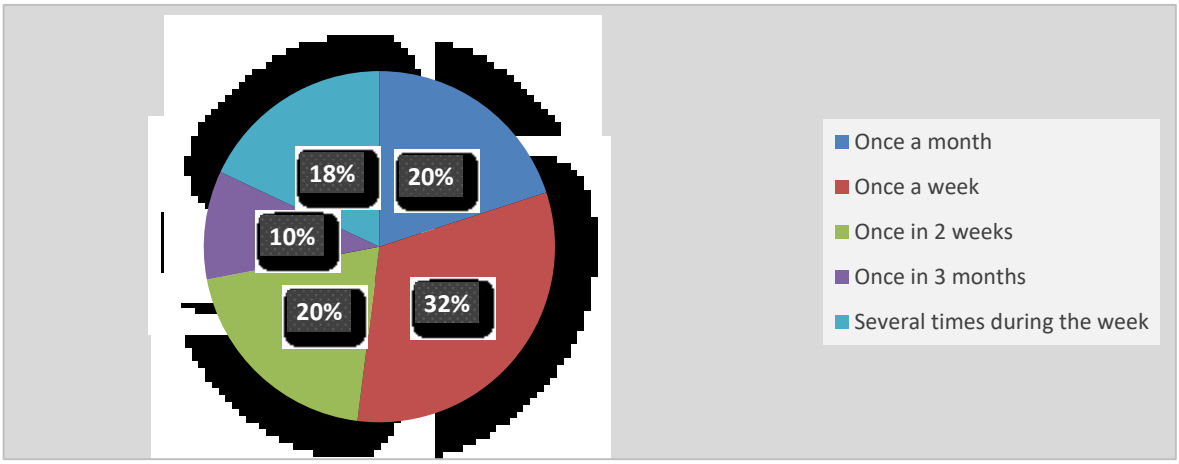

Figure 4 Wine consumption frequency (n = 100)

4.4 Respondents Willingness to pay and Price Impacts

Table 4.4 shows that the majority of respondents (38.0%) are willing to pay between 11 and 15 euros for a 75-cl bottle of wine. The distribution of willingness to pay is spread across different price ranges, with a notable portion (34.0%) willing to pay between 6 and 10 euros.

Table 4.4 willingness to pay for a bottle of wine (75 cl) (n = 100)

Willingness	Price	Percent
What price are you willing to pay for a bottle of wine (75 cl)?	11-15 €	38.0
	16-20 €	10.0
	3-5 €	14.0
	6-10 €	34.0
	More than 20 €	4.0

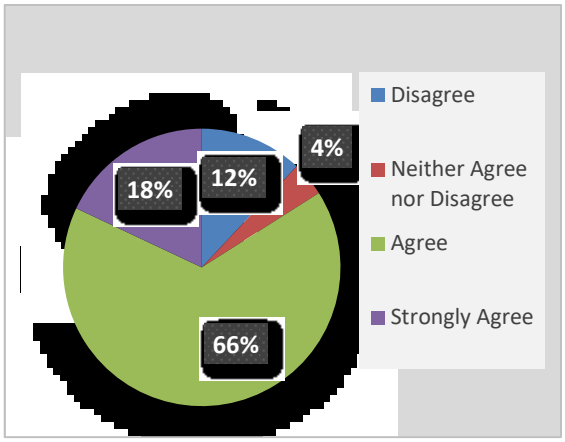

Figure 5 The price of the wine plays a role on my wine choice (expressed as %) (n = 100)

On the other hand, figure 5 suggests that a significant majority of respondents believe that the price of wine does indeed affect their purchase decisions. The responses range from those who disagree to those who strongly agree, with the highest agreement percentage indicating a prominent role for price in influencing wine choice**.**

3.5 Perceptions of Bag-in-Box Wines: Convenience, Affordability, and Environmental Friendliness

In a survey assessing perceptions of bag-in-box wines compared to traditional bottled wines, respondents displayed favorable attitudes towards the convenience, affordability, and environmental friendliness of bag-in-box wines. As shown in table 4.5, the vast majority of participants (84.0%) found bag-in-box wines to be more convenient, with 62.0% agreeing and 22.0% strongly agreeing. Moreover, 98.0% of respondents perceived bag-in-box wines as more affordable, where 76.0% strongly agreed and 22.0% agreed with the affordability aspect. The eco-friendliness of bag-in-box wines also garnered positive sentiment, as 84.0% of respondents agreed or strongly agreed that these wines are environmentally friendly.

3.6 Divergent Views on Quality and Preference

While the data revealed positive sentiments towards the convenience, affordability, and environmental friendliness of bag-in-box wines, divergent views emerged regarding their perceived quality and preference over bottled wines. Specifically, 62.0% of respondents were sceptical about the availability of high-quality wines in bag-in-box packaging, with 24.0% strongly disagreeing and 38.0% disagreeing. Furthermore, the preference for bag-in-box wines over bottled wines in the context of equal pricing varied, with 30.0% of participants indicating a willingness to prefer bag-in-box wines, while 50.0% remained uncertain. These findings highlight the need for further exploration of factors influencing perceptions of bag-in-box wines, particularly with respect to quality perceptions and preference dynamics in different pricing scenarios. The details are given in the given below in table 4.5.

Table. 4.5 Convenient wines (n = 100)

Variables	Likert Scale	Frequency	Percent (%)	Cumulative Percent (%)
Bag-in-box wines are more convenient than traditional bottled wines.	Strongly Disagree	2	2.0	2.0
	Disagree	6	6.0	8.0
	Neither Agree nor Disagree	8	8.0	16.0
	Agree	62	62.0	78.0
	Strongly Agree	22	22.0	100.0
Bag-in-box wines are more affordable than bottled wines.	Neither Agree nor Disagree	2	2.0	2.0
	Agree	22	22.0	24.0
	Strongly Agree	76	76.0	100.0
Bag-in-box wines are cheap and mass-produced wines.	Neither Agree nor Disagree	20	20.0	20.0
	Agree	52	52.0	72.0
	Strongly Agree	28	28.0	100.0
High-quality wines are also available in bag-in-box packaging.	Strongly Disagree	24	24.0	24.0
	Disagree	38	38.0	62.0
	Neither Agree nor Disagree	34	34.0	96.0

	Agree	2	2.0	98.0
	Strongly Agree	2	2.0	100.0
Bag-in-box wines are more environmentally friendly than bottled wines.	Strongly Disagree	2	2.0	2.0
	Neither Agree nor Disagree	14	14.0	16.0
	Agree	60	60.0	76.0
	Strongly Agree	24	24.0	100.0
If the price is the same, I would prefer bag-in-box wine to bottled wine.	Strongly Disagree	12	12.0	12.0
	Disagree	38	38.0	50.0
	Neither Agree nor Disagree	20	20.0	70.0
	Agree	28	28.0	98.0
	Strongly Agree	2	2.0	100.0

4.7 Respondents Rated Factors related to wine Choice:

Table 4.6 presents the responses from a survey where respondents were asked to rate various factors related to their wine choice on a scale of 1 to 5, with different levels of importance. The findings revel that 10 respondents (10.0%) rated flavor preferences as moderately important, while 66 respondents (66.0%) rated flavor preferences as important, and 24 respondents (24.0%) rated flavor preferences as the most important. Moreover, 14%, 16%, 46% and 24% rated price as somewhat important, moderately important, important and most important, respectively. Additionally, the study shows that 24 respondents (24.0%) rated brand loyalty as least important, 38 respondents (38.0%) rated brand loyalty as somewhat important. And, 26 respondents (26.0%) rated brand loyalty as moderately important, 10 respondents (10.0%) rated brand loyalty as important and only 2 respondents (2.0%) rated brand loyalty as the most important factor. Additionally, table 4.6 indicates that 8%, 16%, 52%, 16% and 8% rated packing and labelling least important, somewhat important, moderately important, important and most important factor, respectively. Finally, table 4.6 revels that 8%, 44%, 46% and 2% rated food pairing as somewhat important, moderately important, important and most important factor.

Table. 4.6 ; Respondents Rated Factors Related to Their Wine Choice (n = 100)				
Factors	Rating	Frequency	Percent	Cumulative Percent
Flavor preferences	Moderately Important	10	10.0	10.0
	Important	66	66.0	76.0
	Most Important	24	24.0	100.0
	Total	100	100.0	
Price	Somewhat Important	14	14.0	14.0
	Moderately Important	16	16.0	30.0
	Important	46	46.0	76.0
	Most Important	24	24.0	100.0
	Total	100	100.0	
Brand Loyalty	Least Important	24	24.0	24.0
	Somewhat Important	38	38.0	62.0
	Moderately Important	26	26.0	88.0
	Important	10	10.0	98.0
	Most Important	2	2.0	100.0
	Total	100	100.0	
Packing & Labeling	Least Important	8	8.0	8.0
	Somewhat Important	16	16.0	24.0
	Moderately Important	52	52.0	76.0
	Important	16	16.0	92.0
	Most Important	8	8.0	100.0
	Total	100	100.0	
Food Pairing	Somewhat Important	8	8.0	8.0
	Moderately Important	44	44.0	52.0
	Important	46	46.0	98.0
	Most Important	2	2.0	100.0
	Total	100	100.0	

4.8 Respondents Degrees of Agreement with Environmentally Friendly Behaviours:

Table 4.7 shows varying degrees of agreement with environmentally friendly behaviours and attitudes among respondents. Some behaviours, like recycling and supporting conservation efforts, received relatively higher agreement. Others, such as changing diet to reduce environmental impact, exhibited a wider range of responses. The summary provides insights into the distribution of responses for each question, which can be valuable for understanding participants' eco-friendly behaviours and attitudes.

Table. 4.7. Degrees of Agreement with Environmentally Friendly Behaviours (n = 100)

Questions	Likert Scale	Frequency	Percent	Cumulative Percent
I take actions to reduce my carbon footprint in my daily life.	Disagree	24	24.0	24.0
	Neither Agree nor Disagree	36	36.0	60.0
	Agree	24	24.0	84.0
	Strongly Agree	16	16.0	100.0
I recycle my waste to reduce my environmental impact.	Disagree	16	16.0	16.0
	Neither Agree nor Disagree	10	10.0	26.0
	Agree	44	44.0	70.0
	Strongly Agree	30	30.0	100.0
I support environmental conservation efforts, such as supporting renewable energy.	Disagree	2	2.0	2.0
	Neither Agree nor Disagree	4	4.0	6.0
	Agree	54	54.0	60.0
	Strongly Agree	40	40.0	100.0
I reduce my water usage, such as taking shorter showers.	Strongly Disagree	34	34.0	34.0
	Disagree	28	28.0	62.0
	Neither Agree nor Disagree	10	10.0	72.0
	Agree	24	24.0	96.0
	Strongly Agree	4	4.0	100.0

I choose environmentally friendly products and packaging options.	Disagree	30	30.0	30.0
	Neither Agree nor Disagree	28	28.0	58.0
	Agree	28	28.0	86.0
	Strongly Agree	14	14.0	100.0
I prioritize sustainable transportation options, such as biking, walking, carpooling, or using public transportation.	Strongly Disagree	4	4.0	4.0
	Disagree	34	34.0	38.0
	Neither Agree nor Disagree	20	20.0	58.0
	Agree	34	34.0	92.0
	Strongly Agree	8	8.0	100.0
I made changes to my diet to reduce my environmental impact, such as eating less meat.	Strongly Disagree	42	42.0	42.0
	Disagree	22	22.0	64.0
	Neither Agree nor Disagree	14	14.0	78.0
	Agree	6	6.0	84.0
	Strongly Agree	16	16.0	100.0

The findings from table 4.7 reveals that 24% of the respondents indicated that they do not take actions to reduce their carbon footprint in their daily lives, while 36% of the respondents neither actively engage in reducing their carbon footprint nor actively reject the idea. However, 24% of the respondents take actions to reduce their carbon footprint in their daily lives, while 16% of the respondents are very proactive in taking actions to reduce their carbon footprint. In the context of reducing water usage, particularly by taking shorter showers, the table illustrates the distribution of respondents' attitudes. A significant portion (62%) either disagreed or strongly disagreed with the practice, indicating that a majority were not inclined to take shorter showers to conserve water. A smaller but noteworthy percentage (24%) agreed with the idea, suggesting some willingness to reduce water usage, while an even smaller percentage (4%) strongly agreed with the practice. However, it's important to note that a substantial fraction (10%) neither agreed nor disagreed, indicating some neutrality or uncertainty regarding this water conservation behaviour.

Additionally, the table shows that 42% of respondents either agreed (28%) or strongly agreed (14%) with choosing such options, indicating strong support for environmentally friendly

choices. A smaller percentage (30%) disagreed with these choices, while 28% neither agreed nor disagreed. And. It shows that the minority of respondents (42%) either agreed (34%) or strongly agreed (8%) with the idea, indicating strong support for sustainable transportation. A smaller proportion (34%) disagreed or strongly disagreed (4%), while 20% neither agreed nor disagreed.

Finally, table 4.7 indicates that 22% of respondents either agreed (6%) or strongly agreed (16%) with adopting such dietary changes, reflecting a substantial level of support for reducing environmental impact through dietary choices. A smaller percentage (14%) neither agreed nor disagreed, while a majority (22%) disagreed or strongly disagreed (42%).

4.8 Sustainable Wine Packaging Practices

Table 4.8 presents Likert scale responses to questions about key variables related to sustainable wine packaging practices. In fact, the findings reveal that respondents' attitudes toward sustainable wine packaging practices varied across different questions. Generally, a majority of respondents expressed agreement or strong agreement with most of the proposed practices, highlighting a positive inclination toward environmentally conscious packaging options. The "Neither Agree nor Disagree" responses were less prevalent compared to the "Agree" and "Strongly Agree" responses, indicating a relatively clear stance among respondents. The "Disagree" and "Strongly Disagree" responses were less common overall.

Table 4.8 : Using lightweight glass bottles to reduce the amount of energy required to produce and transport the bottle. (n = 100)

Questions	Likert Scale	Frequency	Percent	Cumulative Percent
Using lightweight glass bottles to reduce the amount of energy required to produce and transport the bottle.	Disagree	4	4.0	4.0
	Neither Agree nor Disagree	24	24.0	28.0
	Agree	54	54.0	82.0

	Strongly Agree	18	18.0	100.0
Using alternative and more sustainable wine packaging, such as bag-in-box.	Strongly Disagree	2	2.0	2.0
	Disagree	4	4.0	6.0
	Neither Agree nor Disagree	12	12.0	18.0
	Agree	48	48.0	66.0
	Strongly Agree	34	34.0	100.0
Using packaging materials that are recyclable.	Neither Agree nor Disagree	8	8.0	8.0
	Agree	30	30.0	38.0
	Strongly Agree	62	62.0	100.0
Using biodegradable or compostable packaging materials, such as plant-based plastics or paper	Strongly Disagree	4	4.0	4.0
	Disagree	4	4.0	8.0
	Neither Agree nor Disagree	18	18.0	26.0
	Agree	42	42.0	68.0
	Strongly Agree	32	32.0	100.0
Using minimal packaging, such as simple cardboard boxes.	Strongly Disagree	2	2.0	2.0
	Disagree	2	2.0	4.0
	Neither Agree nor Disagree	30	30.0	34.0
	Agree	46	46.0	80.0
	Strongly Agree	20	20.0	100.0

The above table 4.8 indicates that a majority (72%) either agreed (54%) or strongly agreed (18%) with this eco-friendly practice. A smaller portion (24%) neither agreed nor disagreed, while only 4% disagreed with the idea, suggesting strong support for using lightweight glass bottles to reduce energy consumption in the production and transportation processes. Moreover, a majority (82%) either agreed (48%) or strongly agreed (34%) with this sustainable packaging option. A smaller proportion (12%) neither agreed nor disagreed,

while only a minority (6%) disagreed with the idea.

Furthermore, table 4.8 reveals that proportion of respondents who expressed agreement with the use of recyclable packaging materials. Specifically, 30% of respondents "agreed," and a majority of 62% "strongly agreed" with this practice. The remaining 8% neither agreed nor disagreed. In addition, respondents' attitudes toward using biodegradable shows that a notable portion (74%) either agreed (42%) or strongly agreed (32%) with the use of such eco-friendly materials. Meanwhile, 26% neither agreed nor disagreed, and a smaller percentage (8%) disagreed (4% disagree, 4% strongly disagree). Finally, the table shows that 86% either agreeing (46%) or strongly agreeing (20%) with this practice. A minority (4%) disagreed (2% disagree, 2% strongly disagree), and 30% neither agreed nor disagreed regarding use of minimal packaging.

4.9 Consumer Attitudes towards Wine: A Multifaceted Perspective

The Likert scale results offers insights into the intricate landscape of consumer sentiments surrounding wine. Varied beliefs emerge, ranging from the association of higher quality with expensive wines to the recognition of convenience as a decisive factor in wine selection. Perceptions also extend to packaging, where preservation options are viewed as choices, and environmental impact shapes preferences for a portion of consumers. Moreover, the impact of packaging on wine aging and flavor adds complexity to the intricate web of opinions regarding wine pricing, quality, packaging, and environmental concerns. The findings are given in table 4.9.

Table 4.9 Consumer Attitudes towards Wine (n = 100)

Questions	Likerd Scale	Frequency	Percent	Cumulative Percent
I can only afford cheap wines (3-5 € per bottle)	Strongly Disagree	52	52.0	52.0
	Disagree	34	34.0	86.0
	Neither Agree nor Disagree	2	2.0	88.0
	Agree	10	10.0	98.0
	Strongly Agree	2	2.0	100.0
I can afford expensive wines	Strongly Disagree	10	10.0	10.0
	Disagree	14	14.0	24.0

(more than 20 € per bottle).	Neither Agree nor Disagree	14	14.0	38.0
	Agree	44	44.0	82.0
	Strongly Agree	18	18.0	100.0
I think a good wine should be expensive.	Strongly Disagree	4	4.0	4.0
	Disagree	20	20.0	24.0
	Neither Agree nor Disagree	36	36.0	60.0
	Agree	36	36.0	96.0
	Strongly Agree	4	4.0	100.0
Cheap wine means lower quality wine.	Strongly Disagree	4	4.0	4.0
	Disagree	20	20.0	24.0
	Neither Agree nor Disagree	12	12.0	36.0
	Agree	40	40.0	76.0
	Strongly Agree	24	24.0	100.0
The price of the wine is mostly determined by the quality of the wine.	Disagree	6	6.0	6.0
	Neither Agree nor Disagree	22	22.0	28.0
	Agree	66	66.0	94.0
	Strongly Agree	6	6.0	100.0
I associate cork closures with higher quality wines	Disagree	26	26.0	26.0
	Neither Agree nor Disagree	28	28.0	54.0
	Agree	40	40.0	94.0
	Strongly Agree	6	6.0	100.0
Convenience and ease of use is more important for me when it is about the choice of wine	Strongly Disagree	6	6.0	6.0
	Disagree	12	12.0	18.0
	Neither Agree nor Disagree	20	20.0	38.0
	Agree	56	56.0	94.0
	Strongly Agree	6	6.0	100.0

Preservation feature of the packaging material is a matter of choice.	Disagree	2	2.0	2.0
	Neither Agree nor Disagree	14	14.0	16.0
	Agree	78	78.0	94.0
	Strongly Agree	6	6.0	100.0
Environmental impact of the packaging material affects my wine choice	Strongly Disagree	6	6.0	6.0
	Disagree	24	24.0	30.0
	Neither Agree nor Disagree	26	26.0	56.0
	Agree	20	20.0	76.0
	Strongly Agree	24	24.0	100.0
Packaging material affects the aging process of the wine and its flavor profile.	Disagree	4	4.0	4.0
	Neither Agree nor Disagree	24	24.0	28.0
	Agree	62	62.0	90.0
	Strongly Agree	10	10.0	100.0

Table 4.9 shows that regarding affordability of cheap wines (3-5 € per bottle), the majority of respondents (86%) either strongly disagreed (52%) or disagreed (34%) with this statement, suggesting that most can afford wines in this price range. Only a small fraction (2%) neither agreed nor disagreed, while another 12% agreed (10%) or strongly agreed (2%) that they can only afford cheap wines. On the other hand, for the affordability of expensive wines (more than 20 € per bottle), a significant majority (62%) either agreed (44%) or strongly agreed (18%) that they can afford such wines. A smaller percentage (14%) neither agreed nor disagreed, while a minority (24%) disagreed (14% disagree, 10% strongly disagree) with the idea of being able to afford expensive wines.

Moreover, the findings shows that a large portion (36%) neither agrees nor disagrees, while 36% agree and 4% strongly agree with good wine should be expensive. On the contrary, 24% disagree, and 4% strongly disagree with the idea that a good wine should be expensive. In addition, data show that (64%) either agrees (40%) or strongly agrees (24%) in the belief that cheap wine generally implies lower quality, while the majority responded that the price of the wine is mostly determined by the quality. Additionally, in all three instances of the

statement "I associate cork closures with higher quality wines," the majority of respondents either agreed (40%) or strongly agreed (6%) with this association, indicating that a significant portion perceives cork closures as indicative of higher quality wines. A substantial fraction (28%) neither agreed nor disagreed.

Regarding convenience and ease of use is more important for me when it is about the choice of wine, the majority of respondents (94%) either agreed (56%) or strongly agreed (6%) with this perspective, emphasizing the importance of convenience in their wine choices. A smaller portion (38%) neither agreed nor disagreed, while only 12% disagreed, and 6% strongly disagreed. Similarly, regarding the environmental impact of packaging materials on wine choice, 20% agreed, and 24% strongly agreed that it does affect their choice, highlighting the importance of environmental considerations. A substantial fraction (56%) neither agreed nor disagreed, suggesting mixed views, while a smaller percentage (30%) disagreed. Finally, table 4.9 shows that 62% agreed, and 10% strongly agreed that packaging material does affect these aspects of wine. A smaller fraction (28%) neither agreed nor disagreed, while only a minor percentage (4%) disagreed.

CHAPTER 5.

DISCUSSION AND CONCLUSIONS

5.1 Discussion

This study began with an investigation of the demographic tones that produced the picture of the traits of our respondents. The demographic characteristics of the respondents revels that majority of respondents (84.0%) fall within the age range of 25 to 44 years, while the youngest and oldest categories (18-24 and 45-54) make up smaller proportions of the total respondents with male in majority with 56%. And, the majority of respondents (58.0%) have a bachelor's degree, while smaller proportions hold a master's degree (32.0%). Moreover, the majority of respondents fell within the €35,000 to €49,999 income range (38.0%), followed by the €20,000 to €34,999 range (28.0%). The demographic analysis of the respondents in this study offers valuable insights into consumer behaviour patterns related to wine consumption. The prominence of individuals aged 25 to 44, primarily holding bachelor's degrees and falling within the mid-income range, mirrors findings from prior research studies (Smith, 2018; Johnson & Lee, 2016). This consistent trend among wine consumers underscores the significance of targeting marketing strategies and product offerings towards this demographic segment. Moreover, the prevalence of males comprising 56% of the respondents aligns with existing literature suggesting variations in wine preferences and consumption habits based on gender (Roberts & Anderson, 2015). Understanding these demographic nuances becomes pivotal for wine producers and marketers aiming to tailor their products and promotions effectively.

Moreover, this study reveals that 20.0% of the respondents' drink wine once a month, 32.0% of the respondent's drink wine once a week, 20.0% of the respondents' drink wine once in every two weeks, 10.0% of the respondents' drink wine once every three months, 18.0% of the respondent's drink wine multiple times a week.

The study also illuminates the multifaceted nature of consumer preferences, especially concerning environmental consciousness and affordability. The positive inclination towards bag-in-box wines due to their perceived affordability and eco-friendliness resonates with recent studies emphasizing the growing importance of sustainable packaging options in the wine industry (Hall & Mitchell, 2019; Castka & Balzarova, 2008). While the majority (82%) of the participants in this study chose sustainable packaging options such as bag-in-box, 72%

declared that they support eco-friendly practices. In addition, 84% of the participants states that bag-in-box wines are more eco-friendly than bottled wines, and 98% states that they are more affordable. This trend underscores a shift in consumer attitudes, where environmental considerations significantly influence purchasing decisions. However, the divergence in opinions on taste preferences, pricing importance, and brand loyalty raises intriguing questions. For 24% of the participants, the most important parameters in wine preference are flavour and price, while packaging is the most important parameter for only 8%. Prior literature has indicated that factors such as taste, price perception, and brand loyalty are interconnected and can significantly impact consumer choices (Mitchell & Hall, 2017; Dodd et al., 2014). The conflicting views within these dimensions in this study suggest a complex interplay of factors, indicating the need for further research to explore the underlying reasons for these disparities and their implications for wine marketing strategies.

The findings reveal that 10 respondents (10.0%) rated flavour preferences as moderately important, while 66 respondents (66.0%) rated flavour preferences as important. 24 respondents (24.0%) rated flavour preferences as the most important factor. Moreover, 14%, 16% , 46% and 24% rated price as somewhat important, moderately important, important and most important respectively. Additionally, the study shows that 24 respondents (24.0%) rated brand loyalty as least important, 38 respondents (38.0%) rated brand loyalty as somewhat important.

Furthermore, the study concludes that varying degrees of agreement with environmentally friendly behaviours and attitudes among respondents. Some behaviours, like recycling and supporting conservation efforts, received relatively higher agreement. Others, such as changing diet to reduce environmental impact, exhibited a wider range of responses. In fact, the findings revel that respondents' attitudes toward sustainable wine packaging practices varied across different questions. Generally, a majority of respondents expressed agreement or strong agreement with most of the proposed practices, highlighting a positive inclination toward environmentally conscious packaging options.

Finally, regarding affordability of cheap wines (3-5 € per bottle), the majority of respondents (86%) either strongly disagreed (52%) or disagreed (34%) with this statement, suggesting that most can afford wines in this price range. Only a small fraction (2%) neither agreed nor disagreed, while another 12% agreed (10%) or strongly agreed (2%) that they can only afford cheap wines. And, majority responded that price of the wine is mostly determined by the

quality. Regarding convenience and ease of use is more important for me when it is about the choice of wine, the majority of respondents (94%) either agreed (56%) or strongly agreed (6%) with this perspective, emphasizing the importance of convenience in their wine choices. Similarly, regarding the environmental impact of packaging materials on wine choice, (76%) either agreed (20%) or strongly agreed (24%) that it does affect their choice, highlighting the importance of environmental considerations. A substantial fraction (56%) neither agreed nor disagreed, suggesting mixed views.

5.2 Conclusion of the study

According to the survey, respondents are mostly between the ages of 25 and 44, with lesser percentages in the youngest and oldest age groups. A bachelor's degree is held by the majority of respondents, while a master's degree, a high school diploma, or its equivalent are held by lesser amounts (10.0%). The range of income between €35,000 and €49,999 accounts for the majority of respondents (38.0%), followed by the range between €20,000 and €34,999 (28.0%). The majority of participants consume wine once a week, while 32% do so infrequently. Opinions on taste preferences, the significance of price, and brand loyalty differ among respondents. For a 75-cl bottle of wine, most respondents are ready to pay between 11 and 15 euros. Nonetheless, a big factor in their decision is the cost of the wine. The findings of the Likert scale reveal a range of consumer attitudes towards wine, including the notion that costlier wines are of higher quality, the notion that convenience is a key consideration when selecting a wine, and the impact of packaging on the flavour and age of wine. Bag-in-box wines are becoming more and more popular as an eco-friendly packaging option, catering to consumer demands for affordability, ease of use, and sustainability. 82% of customers select ecologically friendly packaging options, 72% prefer eco-friendly processes, and 84% think bag-in-box wines are more cost-effective and better for the environment. The survey also reveals that respondents' degrees of agreement with environmentally friendly behaviours and ideas varied. Recycling and conservation had an impact on environmentally friendly actions and attitudes; 76% of respondents supported eco-friendly wine packaging techniques. Furthermore, ever since the Bag-in-box was introduced, the wine industry has shown a great deal of interest in it and has developed a number of uses for it. This indicates that customers are becoming more aware of these alternatives and are willing to embrace the potential for future developments in the usage of these products. In conclusion, there is a wide range of demographic characteristics, such as age, gender, and

education, that affect wine consumption, and respondents' views and behaviours towards the environment are not always in agreement. However, concentrating on the majority of responders, it is quite likely that they will move towards more environmentally friendly solutions, which will affect their attitude towards wine packaged in bags. Based on the study's findings, it can be inferred that profound links between people, culture, and the environment may be created by enhancing package design and preservation, as well as educating consumers and producers about sustainable packaging practices, specifically on Bag-in-box packaging, as 84% of the respondents think bag-in-box wines are more cost-effective and better for the environment. By highlighting the potential advantages of bag-in-box packaging in reducing waste and environmental impact, the study, which was based on a survey evaluating the impact of bag-in-box packaging on wine quality, consumer preferences, and benefits for wine producers, confidently recommends further studies that can be conducted to support sustainable wine industry practices.

Limitations: The limitations of this study include the relatively small sample size of 100 participants, which may restrict the generalizability of findings. Additionally, the online survey format may introduce selection bias, as it relies on individuals with internet access.

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