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INSIGHTS ON ATTRIBUTES AND CONSUMER PREFERENCES FOR NON-ALCOHOLIC BEER IN THE PORTUGUESE MARKET

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Abstract

As the global beverage industry shifts toward alcohol moderation, non-alcoholic beer (NAB) has emerged as a high-growth segment, yet its adoption among younger demographics remains complex. This research investigates the specific attributes and consumer preferences driving NAB consumption among Generation Z in the Portuguese market. Utilizing a quantitative choice-based conjoint analysis of 124 Gen Z residents in Portugal to evaluate five leading brands: Super Bock, Heineken, Sagres, Guinness, and Estrella Damm.

The analysis identifies flavor and price as the primary determinants of choice, while health-conscious attributes like lower calorie content and glass bottle packaging are valued, they remain secondary to sensory and financial considerations. The findings further highlight a significant brand equity effect, where Super Bock's strong reputation can offset less-than-ideal attributes. Conversely, the results suggest that lesser-known brands can gain market share by strictly aligning their product price combination with consumer expectations.

Keywords

Alcohol Consumption, Consumer Behavior, Consumer Preferences, Generation Z, NoLo Beverages, Non-Alcoholic Beer, Portuguese Market.

Glossary

ABV – Alcohol by Volume
Gen Z – Generation Z
NA – Non-Alcoholic
NAB – Non-Alcoholic Beer
NoLo – No and Low Alcohol
PET – Polyethylene Terephthalate
RQ – Research Question
WTP – Willingness to Pay

Introduction

The beverage industry has experienced a significant shift towards alcohol moderation and health-conscious alternatives. The No and Low-alcohol (NoLo) segment, and particularly non-alcoholic beer (NAB) is expanding rapidly across global markets (Kokole et al. 2022). This segment has demonstrated strong momentum, managing to achieve double digit growth and significantly outperforming traditional alcohol segment (IWSR 2024). NAB now constitutes a growing percentage of total beer sales worldwide, which incentivizes industry leaders to expand their lower-alcohol portfolios (AB InBev 2024).

Simultaneously, alcohol consumption among young adults has declined, with NoLo alternatives progressively replacing full-strength alcoholic drinks (Kokole et al. 2021). This shift can be partially attributed to evolving consumer values, with recent studies indicating that Millennials and Generation Z consumers are increasingly prioritizing brand authenticity, sensory quality, and balanced lifestyles when selecting beverages (IWSR 2025).

The Portuguese market presents distinct characteristics when compared to its European peers; although it has demonstrated significant growth (Statista 2025), national consumption remains low with revenues totaling US$36.62 million in 2022 (Figure 4, Appendix 1). Comparatively, the Spanish market achieved values of US$0.87 billion in 2018 and is expected to reach US$1.39 billion by 2030 (Statista 2025).

This dissertation narrows the object of study to the NAB market in Portugal, with the intent of understanding the specific attributes valued by Portuguese Generation Z consumers. The overall goal is to comprehend the decision-making processes, and the tradeoffs consumers make when choosing between different NAB options. It adds to academic literature by employing a choice-based conjoint analysis to identify the relative importance of product attributes in shaping consumer preferences, while highlighting brand-specific characteristics.

To ensure alignment with the research scope, identical eligibility requirements were established for both the qualitative and quantitative components. The criteria focused on individuals whose generational and cultural context was central to examining preferences and engagement with NAB. Participants were required to be members of Gen Z (born between 1996 and 2010; McKinsey 2024), legally permitted to consume alcohol in Portugal (18 years of age or older; Statista 2025), and current residents of Portugal. Consequently, only individuals aged 18 to 29 years with current residency in Portugal were retained. Exceptions were made to incorporate additional perspectives, specifically in the complementary analysis section, where participants from other age groups contributed.

Given the limited and inconsistent availability of public data on brand shares, Sonae MC, Portugal's largest retailer (Statista 2024), was consulted to obtain an informed overview of the competitive landscape. Based on Sonae MC's sales records, the five best-selling NAB brands were identified as Super Bock (1st), Heineken (2nd), Sagres (3rd), Guinness (4th), and Estrella Damm (Free Damm) (5th). Therefore, these brands were selected for analysis in this thesis as they provide a credible and pragmatic basis for market dynamics of the Portuguese NAB market in the absence of comprehensive public data.

The dissertation aims to answer the following questions: *How do Gen Z NAB consumers in Portugal prioritize and trade-off specific sensory and non-sensory attributes when evaluating NAB?* and *What is the optimal combination of product attributes that defines the "perfect" NAB in the eyes of Gen Z Portuguese consumers?*.

To answer these questions, a Literature review framed the research, explaining the current context of NAB market; the Methodology introduced the main types of conjoint analysis and its advantages. Afterwards, data was collected, analyzed and discussed in the Results. Main findings were summarized in the Conclusion, with limitations for future studies.

Although price may seem the most dominant factor when choosing NAB, taste emerged as just as significant and, in some cases, more important than price itself. The research highlights the consumers preferred choice across the attributes tested and what would be the perfect combination of attributes for the NAB market in Portugal.

Literature Review

NAB refers to a “fermented alcoholic beverage based on malt, hops, and water, which has an alcohol content of a maximum of 0.5% ABV” (Statista 2025). From a technological perspective, NAB is produced either by removing alcohol from a fully fermented beer (a physical process) or by inhibiting alcohol formation during fermentation (a biological process). Many breweries employ a hybrid approach of both techniques to achieve the desired sensory properties (Schmelzle et al. 2013). The physical approach often involves thermal or membrane separation, such as vacuum distillation or reverse osmosis, where alcohol is selectively extracted while retaining flavor compounds. These processes generally require reformulation after dealcoholization to restore balance in the body and aroma. The biological approach, by contrast, relies on controlling yeast activity or fermentation temperature to prevent the development of ethanol (Schmelzke et al. 2013).

The evolution of NAB has reached a tipping point, driven by wider availability and growing acceptance of NoLo across the countries surveyed (Spence 2025). Germany (30.5%), Spain (16.8%), the Netherlands (14.4%), Poland (12%), and the Czech Republic (7.1%) are leading markets, collectively accounting for more than 80% of EU NAB production (Baiano A. 2025). According to Euromonitor (2024), NAB's global sales volume has shown a consistent upward trajectory over the past decade. Statista Market Insights (2025) reports that in 2018, NAB's global total revenue was estimated at US$22.36 billion, rising to US$22.98 billion in 2020, and US$29.75 billion in 2022. Revenues reached US$36.49 billion in 2024 and are projected to grow to US$38.77 billion in 2025 worldwide. Forecasts suggest further expansion, with revenue expected to reach US$49.32 billion by 2030 (Figure 3, Appendix 1). This trajectory mirrors global consumer shifts toward moderation, where beer now leads the NoLo category, representing over 3% of total global beer sales, and is expected to rise further as major brewers commit to having at least 20% of their production in lower-alcohol formats by 2025 (AB InBev

2024). However, while total consumption is expected to keep increasing, the pace of growth will gradually decelerate over the coming years (Euromonitor 2024) (Figure 2, Appendix 1).

In Portugal, the NAB market has also demonstrated steady growth, with revenue increasing from US$29.98 million in 2018 to US$26.39 million in 2020 and US$36.62 million in 2022. In 2024, revenues were estimated at US$45.25 million, with the positive trajectory expected to persist, reaching US$47.45 million in 2025 and US$57.07 million by 2030 (Figure 4, Appendix 1). However, the Spanish market demonstrates higher figures, starting at US$0.87 billion in 2018 and expected to reach US$1.39 billion in 2030 (Statista 2025).

Regarding taste, consumers often describe NAB as having a "neutral aroma, a thinner body, and reduced palate fullness" (Schmelzle et al. 2013). The perceived quality of these products depends on a complex combination of sensory expectations linked to color, foam, flavor, aroma, mouthfeel, and aftertaste (Ghasemi-Varnamkhasti et al. 2012). As De Francesco et al. (2021) note, flavor attributes are critical to acceptance, and the recent diversification of styles has improved overall consumer perception. Nevertheless, taste remains the main limiting factor discouraging many consumers from purchasing NAB (Chrysochou 2014; Silva et al. 2016). While health-conscious individuals are more likely to choose NAB, many still regard it not as a replacement for regular beer but rather as a situational alternative suitable for occasions such as business lunches, driving, or exercising (Silva et al. 2016; Vasiljevic et al. 2019).

Methodology

Conjoint analysis, introduced in 1971 (Green et al. 1971), is a statistical technique characterized by five main features: quantifying buyer trade-offs and values, predicting buyers' likely reactions to new products, identifying buyers with similar trade-offs, assessing new product ideas within a competitive environment, and optimizing product profiles to maximize market share and return (Green et al. 2004).

There are four essential types of conjoint analysis methods: traditional conjoint analysis, which uses stated preference ratings; choice-based conjoint analysis, which relies on stated choices; adaptive conjoint analysis, developed to address the challenge of numerous attributes; and the self-explicated conjoint analysis, which employs a bottom-up approach (Rao 2010).

The first three methods are known as decompositional methods since they decompose stated-preference to obtain part-worth utility values for the components tested. In contrast, the self-explicated conjoint analysis is a compositional method that builds a preference score by aggregating scores for attribute levels and their relative importance (Rao 2010). A key benefit of conjoint analysis is the capability to enable market simulation, where it is possible to analyze the impact of various hypothetical and real product choices on market outcomes (Rao 2010).

Research Design

Choice-Based Conjoint

For the reasons and advantages previously explained, the conjoint analysis method chosen was choice-based conjoint analysis. Choice-based conjoint analysis is used to assess how individual product attributes affect consumer behavior (Haaijer et al. 2000). Unlike traditional conjoint analysis, where consumers rate product preferences based on comprehensive profiles that include all possible attribute combinations (Rao 2010), this approach involves respondents selecting from a limited set of alternative products with varying characteristics across different

attribute levels, closely reflecting real shopping decisions (Natter et al. 2002). The resulting choice data allows the estimation of part-worth utilities for each attribute and level, supporting the development of market simulations and the forecasting of their outcomes (Rao 2010).

Survey

To perform the conjoint analysis, a survey was created using the Conjointly platform (Conjointly 2025). The survey is divided into four sections with a total of 7 questions, and a block of conjoint ones. The first section included two screening questions designed to restrict the study to our target demographic: individuals aged 18 to 29 who reside in Portugal (McKinsey 2024; Statista 2025). The second section is the block of conjoint questions, where respondents were asked to choose between different sets of complete profiles of NAB. Based on their relative market importance, the brands selected were Super Bock, Heineken, Sagres, Guinness, and Estrella Damm. The third section collected data on the sample's sociodemographic profile, specifically: gender, employment status, and monthly income. The last section was an open-ended question in which respondents could share any feedback on the products.

Choice of Attributes

The attribute selection was based on the insights gained from the preliminary survey, in which consumers ranked the most important decision factors when consuming NoLo beverages. According to this ranking, the characteristics most valued by the respondents were in this order: taste, price, health/nutritional value, brand image, and packaging (Figure 5, Appendix 2). The choice-based conjoint analysis included five attributes designed to evaluate these key decision factors: flavor, employed as an indicator of taste; calories per 330 ml and ABV, to assess health and nutritional value; packaging type; and price.

Given that bitterness is one of the primary desirable characteristics of beer (Habschied et al. 2021), the levels for the flavor attribute were based on this premise. Starting with light & mild, corresponding to low bitterness; followed by crisp, a middle ground in bitterness; and hop-forward, representing high bitterness. A fourth level for the flavor attribute was also added to satisfy customers who do not identify with a particular level of bitterness; this option was labeled as "sweet".

To identify which levels to use for the calories per 330 ml attribute, the values of the products with the largest market share (Heineken 0.0, Super Bock 0.0, Sagres 0.0) were obtained. The most prominent brands by market share ranged from 69 to 86 kcal per 330 ml (Table 3, Appendix 3); accordingly, three levels were chosen: 70, 80, and 90 kcal per 330 ml. Also, within the health and nutritional value sphere, ABV was selected as a representative attribute. Two relevant levels were selected for this attribute: 0.0% ABV for consumers who want no alcohol at all, and ≤0.5% ABV, as this still fits the definition of NAB (Statista 2025).

For packaging type, the levels used were either a 330 ml can or a 330 ml glass bottle, since these are the most common packaging types for beverages in general (Lorencová et al. 2019). The identification of the price attribute levels was based on data from the restaurant and bar market environment. This choice aligns with the data from the preliminary survey, where 64.6% of consumers stated that their NAB purchases and consumption occurred at events, festivals, cafés, bars, or restaurants (Figure 6, Appendix 2).

To establish realistic price ranges, during the period between the 23rd and the 25th of September, 12 restaurants/bars in the Lisbon Metropolitan area known for serving alcoholic beverages were contacted to determine whether they sold NAB, and, if so, the price and size of the NAB (Table 4, Appendix 3). From the data, it is possible to conclude that the price of 330 ml of NAB (the most common size) ranged from €1.70 to €2.50. Given that price is a quantitative attribute and

that the gap between price levels should be identical, the appropriate price levels chosen were €1.70, €2.00, €2.20, and €2.50.

Data Collection

The survey data were collected from September 26th, 2025, to October 20th, 2025, yielding 124 valid responses. The survey was shared through the researchers' social and academic channels, including Instagram, LinkedIn, WhatsApp groups, and academic email. These channels were selected since they were the most effective means of reaching the target demographic of 18-29-year-olds, and due to easier survey completion on desktop computers. Participation was voluntary and anonymous to ensure compliance with data privacy requirements. The questionnaire took approximately five minutes to complete and was available in English.

In total, the dataset comprised 736 survey entries: 530 that were not completed, 39 that were screened out for not meeting the target requirements (age and residency), and 42 that were completed but deemed invalid responses by the platform, either due to their low time completion or an incomplete examination of all options by these survey respondents. The exclusion criteria improve the quality and relevance of the collected data, as evidenced by a strong McFadden's R-squared of 82.6%, which confirms the regression model's reliability (Figure 13, Appendix 6).

Results

Sample Description

The survey on Gen Z individuals currently living in Portugal yielded a valid sample of 85 male respondents (approximately 68.5%) and 37 female respondents (approximately 29.6%), with two respondents who opted not to disclose their gender (Figure 9, Appendix 5). Regarding the respondents' nationality, 115 respondents (approximately 92.7%) were Portuguese. The sample also included 5% from other European countries, 1% from South America, 1% from Africa, and 1% from Asia (Figure 10, Appendix 5). Although the respondents had varied nationalities, all were living in Portugal at the time of the survey, as this was one of the selection criteria.

In terms of employment status, 61% of respondents were currently studying, while 45 people were working; of those, 42% were working students, indicating the transitional phase Gen Z is currently experiencing from academia to the start of working careers (Figure 11, Appendix 5). Considering disposable income, 32.26% reported an income of less than €250, 9.68% between €250 and €499, 5.65% between €500 and €749, 3.23% between €750 and €999, 5.65% between €1000 and €1250, and lastly 16.94% earned more than €1,250 per month. On the other hand, 33 respondents elected not to disclose their income (Figure 12, Appendix 5).

Key Attributes Shaping User Preferences: The 'Perfect' NAB

To assess consumers' trade-offs, the Conjointly platform was used to estimate part-worth utilities for each attribute level using survey responses. These utility values, which are 0-centered within each attribute, directly quantify preferences, with positive values indicating strong consumer preference, while negative values indicate relative dispreference. These utilities formed the basis for answering RQ5: *How do Gen Z NAB consumers in Portugal prioritize and trade-off specific sensory and non-sensory attributes when evaluating NAB?* and

RQ6: *What is the optimal combination of product attributes that defines the "perfect" NAB in the eyes of Gen Z Portuguese consumers?*

Since these part-worth utility values are derived from regression estimation models, they are point estimates subject to statistical variance. Consequently, confidence intervals and margins of error will be considered during the analysis of the results.

Before assessing the impact of each individual attribute, a violin chart showing the average preference and the distribution of preferences across the sets of profiles for the brands tested was created to identify which brands were most preferred by respondents and which were negatively viewed.

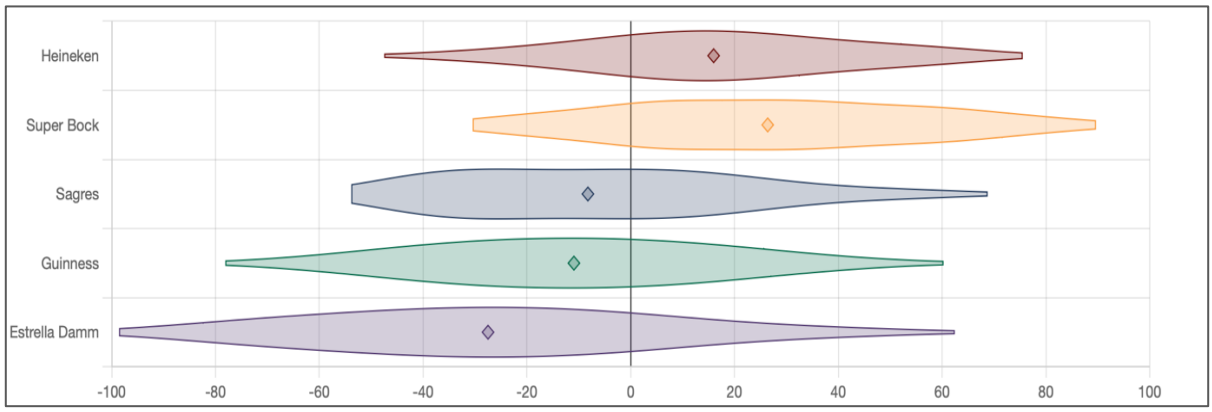

Figure 1: *NAB brand preference among respondents*

As illustrated by the violin chart in Figure 1, Super Bock was the favorite brand among respondents, with a median value of 26.4, while Heineken ranked 16; the remaining brands were all seen unfavorably by consumers. These values align with previous market share data and indicate strong brand reputations for these two brands. Sagres had a score of -8.3, followed by Guinness with -11, and, with a significant distance from the other two, Estrella Damm had the lowest value of -27.5. On the other hand, Estrella Damm's low score relative to its peers suggests a low market reputation and limited recognition among respondents. Notably, every brand tested exhibited at least one attribute combination that respondents preferred.

The attribute-level analysis started with insights common across all the brands tested, followed by specific insights for each brand. The preferred flavor for all brands was light & mild (low bitterness), while there was a strong dispreference for a hop-forward (high bitterness) flavor across all brands (Figures 15, 17, 19, 21, 23; Appendix 6). This might indicate that, within the NAB category, consumers have a strong preference for low-bitterness beers and are strongly opposed to NAB with high bitterness levels, confirming previous studies on bitterness preferences in beer.

In the health and nutritional value category, the preference characteristics among respondents were 70 kcal per 330 ml and ≤0.5% ABV. Although the values for the ≤0.5% ABV vary between 2.0% and 5.4%, all these values prove to be significant since the margins of error for every brand fall outside indifference levels (Figures 16, 18, 20, 22, 24; Appendix 6). These preferences demonstrate a shift in Gen Z into more health-conscious choices, while the preference for ≤0.5% ABV is supported by the fact that the process that removes alcohol from beer also removes some nutrients crucial for flavor, as described in the startup founder interview (Table 11, Appendix 7).

From the data gathered, it is possible to conclude that the price of NAB has an inverse relationship with preference. Specifically, consumers' preferred choice was the lowest price level of €1.70, with preference steadily decreasing across the higher tested price points of €2.00, €2.20, and €2.50. Among the highest values tested at €2.50, dispreference values ranged from -11.1% for Estrella Damm to -20.2% for Guinness (Figures 21, 23; Appendix 6). In contrast, the values for €1.70 varied between 25.6% for Sagres and Super Bock, and 20.9% for Estrella Damm (Figures 15, 19, 23; Appendix 6).

In terms of packaging, respondents favored glass bottle packaging, with brands like Super Bock, Heineken, and Estrella Damm, where this type of packaging consistently held a preference

value above 4.8% (Figures 15, 17, 23; Appendix 6). Conversely, respondents showed indifference towards the type of packaging for Sagres and Guinness, with the values of preference and dispreference for this type of packaging falling within the margin of error (Figures 20, 22; Appendix 6). These findings potentially indicate that consumers of Super Bock, Heineken, and Estrella Damm hold higher expectations regarding packaging standards than consumers of other brands. This sensitivity to packaging type stems from functional concerns, as consumers reported that glass bottles are more effective at preserving the beer's flavor throughout consumption.

Focusing on specific details about each brand, in the flavor category, the respondents showed a dispreference for the sweet flavor for Super Bock, Sagres, and Guinness brands, while for Estrella Damm and Heineken, this characteristic was positively preferred (Figures 15, 17, 19, 21, 23; Appendix 6). This might indicate that the sweet flavor does not fit the perceived taste of these three brands. Another insight within the flavor attribute is that, for Sagres, the only flavor level respondents preferred was light & mild.

Within the health and nutritional sphere, the 70 kcal per 330 ml attribute level showed consistent positive utility across the five brands tested, indicating a general preference for NAB with a lower caloric level. Conversely, the relative dispreference between the 80 kcal and 90 kcal levels varied by brand. For Super Bock and Estrella Damm, the 90-kcal level exhibited a slightly lower dispreference than the 80-kcal level, whereas the order was reversed for Heineken, Sagres, and Guinness. This inconsistent ordering and the relatively minor differences in average preferences between the two higher-calorie levels across all brands suggest a low marginal utility and potential consumer indifference between the 80 kcal and 90 kcal options, provided the preferred 70 kcal level is unavailable.

Based on this analysis, it is possible to extrapolate and answer RQ6. On average, consumers preferred a NAB that was made by Super Bock, with a light & mild flavor, 70 kcal per 330 ml, ≤0.5% ABV, packaged in a glass bottle, and priced at €1.70. On the other hand, the least preferred product tested was a NAB produced by Estrella Damm, with hop-forward flavor, 80 kcal per 330 ml, 0.0% ABV, packaged in a can, and available at a price point of €2.50.

Attributes Relative Importance: What Consumers Value the Most

The following analysis aims to answer, RQ5: "*How do Gen Z NAB consumers in Portugal prioritize and trade-off specific sensory and non-sensory attributes when evaluating NAB?"*, and to understand the relative importance of attributes across brands, as well as the insights that can be extrapolated and observed across all brands tested.

	Super Bock	Heineken	Sagres	Guinness	Estrella Damm
Flavor	29.2%	32.8%	30.9%	32.0%	37.6%
Price	35.9%	32.9%	31.9%	31.8%	30.5%
Calories per 330 ml	11.7%	16.7%	14.0%	17.4%	12.6%
Packaging Type	15.3%	12.7%	13.1%	10.0%	10.9%
ABV	7.8%	4.8%	10.0%	8.7%	8.3%

Table 1: *Attributes' importance across brands*

Table 1 indicates the average preference level for each of the attributes tested across the five brands tested. The analysis of relative attribute importance reveals distinct consumer prioritization patterns across the five beer brands, with communalities and distinct differences between them. Starting with communalities, across all five brands, the first and second most important attributes were consistently flavor and price.

The primary focus for consumers with a positive preference for Super Bock and Heineken was price, with relative importance values of 35.9% and 32.9% respectively, followed closely by flavor at 29.2% and 32.8%, respectively. This trend of price prioritization was maintained with

Sagres, where the price attribute was also the most relevant at 31.9%, ahead of flavor at 30.9%. These findings suggest that Gen Z is highly price-sensitive, a trend that may be partially explained by low disposable income, with 42% of the sample reporting a monthly income of less than €500.

However, the valuation shifted when considering Guinness and Estrella Damm. For these brands, flavor emerged as the most critical attribute, with relative importance of 32.0% and 37.6%, respectively, while price followed with relative importance of 31.8% and 30.5%, respectively. Notably, the importance assigned to the flavor attribute appears to correlate inversely with brand preference. While Super Bock, which had the highest brand preference, had a flavor attribute importance of 29.2%, Estrella Damm, the lowest preferred brand among respondents, had a significantly higher value for the flavor attribute of 37.6%.

The third most important attribute for all brands except Super Bock was calories per 330 ml. This finding aligns with consumer feedback from the preliminary interviews survey, which identified health and nutritional value as the third-most-important overall attribute (Figure 25, Appendix 3). At the same time, calories per 330 ml was the fourth most important attribute for Super Bock, in which respondents prioritized packaging type as its third most important attribute. The importance of packaging type varied significantly, ranging from a low of 10.0% for Guinness to a high of 15.3% for Super Bock. Consumers of Super Bock and Heineken placed greater value on packaging than those of Guinness and Estrella Damm.

Finally, ABV consistently ranked as the least important attribute across all brands examined. Its importance ranged from a minimal 4.8% for Heineken to a maximum of 10.0% for Sagres. Crucially, the maximum importance assigned to ABV remained lower than the minimum importance recorded for any other attribute across all brands. These findings suggest that although Gen Z demonstrates greater health consciousness when choosing products, these

concerns are not enough to outweigh NAB's packaging characteristics. Furthermore, it is also possible to conclude that due to the low significance of this attribute, consumers will not discard a NAB if it has an undesired ABV level.

Overall, price and flavor were consistently the most important drivers of consumers' purchasing decisions, with the two values combined accounting for more than 60% of the decision-making weight across all brands tested. Regarding specific brand insights, Estrella Damm was the most dependent on flavor, while Super Bock was the most price sensitive. Guinness and Heineken were brands for which consumers had greater sensitivity to calories.

Willingness to Pay

To determine willingness to pay (WTP), the monetary value per unit of utility had to be calculated. The computation started with the difference between the highest (€2.50) and lowest (€1.70) price presented to consumers and then calculating the range of utility within the price attribute. The next step involved dividing the "price range" by the "utility range". The resulting coefficients corresponded to the monetary value for each percentage of utility.

After concluding these calculations for all brands, the monetary value of each percentage of utility obtained was 4 cents for Heineken, 3 cents for Super Bock, 5 cents for Guinness and Sagres, and 8 cents for Estrella Damm. All these values were rounded to the nearest unitary cent; however, in intermediate calculations to determine willingness to pay for each level, the exact values were used, and the resulting values were also rounded. With these values, it is possible to extrapolate WTP for each attribute level for each brand by multiplying the 0-centered values for each attribute level by the monetary value of each percentage of utility for each brand.

Willingness to pay for:	Light & Mild Flavor	Glass Bottle Packaging	70 kcal per 330 ml
Super Bock	€0.15	€0.30	€0.16
Heineken	€0.35	€0.21	€0.22
Sagres	€0.56	-	€0.22
Guinness	€0.21	-	€0.32
Estrella Damm	€0.55	€0.36	€0.24

Table 2: *Willingness to pay for attributes across brands*

These unitary values translated into a willingness to pay 36 cents for a NAB packaged in a glass bottle by Estrella Damm. Comparatively, Heineken had the lowest willingness to pay for glass bottle packaging at 21 cents. It also demonstrated a consistent willingness to pay 20 cents for this type of packaging for all brands, except for Sagres and Guinness, where consumers were indifferent between can and glass bottle packaging.

When focusing on the flavor attribute, there were significant differences in WTP across brands. Within Sagres and Estrella Damm, the WTP for light & mild flavor was 56 and 55 cents, respectively, which were significantly higher than the values for Super Bock and Guinness, at 15 and 21 cents, respectively. This significant difference might be due to Super Bock's established brand association, which led consumers to prefer it over the others, even though it offered different flavors. Conversely, the limited brand recognition and awareness of Estrella Damm dictated a higher WTP for the consumers' most desired flavor.

Lastly, for the calories per 330 ml attribute, it was possible to conclude that only the 70-kcal level demanded a premium over the other two levels. The WTP for this attribute level ranged from 16 cents for Super Bock to 32 cents for Guinness, the highest among the brands tested, with a median of 22 cents overall.

In conclusion, the analysis of WTP reveals that consumer valuation is not uniform across all brands tested. While the 70-kcal level enables a consistent but moderate opportunity for a price premium across brands, factors like light & mild flavor have a more significant impact on price across most brands. Notably, the data suggest an inverse relationship between brand equity and attribute dependency: the preferred brand of consumers, Super Bock, commands a lower price premium for each attribute, while Estrella Damm, with the lowest brand preference, has the highest price premiums. Lastly, even though glass packaging is generally preferred, it does not command a price premium across all brands tested.

Market Simulations

To simulate the impact of attribute choices and their importance on market outcomes, market simulations were run to identify each brand's strengths and weaknesses and the relevant characteristics. Therefore, to understand the impact of flavor and price on consumers' preferred brands, a simulation was run with the two most preferred companies (Super Bock and Heineken) and their second-preferred flavor (crisp) at a price of €2.00. In contrast, the flavor selected for Sagres was sweet, while for Guinness and Estrella Damm was light & mild, the preferred flavor across all brands. For the price, these last options were all available at €1.70. All the remaining attributes were the same across all brands: glass bottle packaging, 70 kcal per 330 ml, and ≤0.5% ABV. In this market, Super Bock achieved a 28.6% preference share, demonstrating that its brand equity and preference are sufficient to overcome a less-preferred taste attribute, enabling Super Bock to demand a higher price than competitors with worse characteristics. Even though consumers' brand preferences dictated the winning brand of this scenario, Estrella Damm managed to achieve the second-highest preference share with a value of 18.4%, demonstrating that having the most preferred product, at the lowest price, allows for gains of market share, despite the consumers' dispreference for the brand (Figure 25, 26; Appendix 6).

The second simulation focused on the two brands respondents viewed positively: Super Bock and Heineken. To better understand the impact of the third-most-important attributes for these two brands, a simulation was created that included only these two brands. Both had two products, one with the third most important attribute at their preferred level but at a higher price point, and one with a lower preferred level but a lower price point. In the case of Super Bock, it was a product with a can as packaging type and €2.00 price point (Super Bock 1), with another packaged as a glass bottle at a €2.20 price level (Super Bock 2); while in the case of Heineken, on product had a calory level of 90 kcal per 330 ml at a €2.00 price point (Heineken 1), while another had a calory level of 70 kcal per 330 ml at a €2.20 price point (Heineken 2). All remaining attributes remained the same across all products, meaning light & mild flavor and an ABV of ≤0.5%. The calories attribute for Super Bock was set at 80 kcal per 330 ml for both products.

With these product settings, Super Bock 1 achieved 37.4% preference share, while Super Bock 2 achieved only 10.6% (Figure 25, 26; Appendix 6). In contrast, Heineken 1 only achieved a 9.4% preference share, while Heineken 2 achieved 21.5%, proving that, in this simulated environment, a lower calorie level is enough to command a 20-cent price premium and demonstrate a higher relative importance of the third-most-important attribute in Heineken compared to Super Bock.

In conclusion, these simulations highlight the impact of and interactions among brand equity, product attributes, and pricing on consumers' purchasing decisions. While strong brand equity, such as Super Bock's, can offset less desirable product attributes, a lower-priced product with the most sought-after attributes can yield significant gains in market share. Furthermore, while some brands are not significantly affected by their less relevant attributes, such as Super Bock, others, like Heineken, must consider most attributes.

Conclusion and Limitations

This research allowed to find meaningful results that contribute to the knowledge about the NAB industry, Conjoint analysis in Marketing and the Portuguese Market. The Portuguese Market is characterized by high levels of beer consumption and strong alcohol integration in social settings, while having a growing exposure to NoLo alternatives (Statista 2025). Taste and Price emerge as the most important decision factors in NAB, accounting for more than 60% of decision-making weight. Within the health and nutritional values sphere, ABV was considered the least important attribute tested by respondents, which follows in line with consumers' weak associations of NAB as healthy. While calories emerged as a relevant attribute, their importance remained secondary to sensory and price considerations, reinforcing the limited role of health as a primary driver of choice.

The results of the conjoint analysis demonstrate that the average consumer's preferred NAB profile corresponds to a Super Bock product characterized by a light and mild flavor, 70 kcal per 330ml, 0.5% ABV, glass bottle packaging, and a price point of €1.70.

Within the simulated market scenario, Super Bock achieved a 27.8% preference share, indicating that brand equity and familiarity can compensate for less-than-optimal product attributes (e.g., flavor attribute, which is not the most preferred), consistent with prior research highlighting the influence of brand familiarity in NAB evaluation (IWSR 2025). This suggests that the brand's perceived credibility and familiarity exert a substantial influence on consumer choice, enabling it to charge a higher price than competitors.

At the same time, Estrella Damm secured a 22.6% preference share, demonstrating that offering the most preferred product configuration at the lowest price can yield substantial gains in preference share, even when the brand itself is not highly favored. This outcome reinforces the idea that, within the NAB segment, consumers' evaluation of product attributes and price

sensitivity can partially offset weaker brand associations, enabling less-preferred brands to capture meaningful market share when their product–price combination aligns strongly with consumer expectations.

Although this research provides valuable insights into Gen Z's preferences regarding NAB in Portugal, several limitations must be acknowledged. These limitations arise from both the early stage of the market and methodological constraints related to data collection and analysis.

In the conjoint analysis, the brand selection was restricted to five NAB brands, all of which also produce alcoholic versions. This overlap likely introduced brand association bias, as respondents' prior experiences with the alcoholic parent brand may have influenced their evaluations of NA variants. Moreover, some respondents demonstrated limited familiarity with certain brands, particularly Estrella Damm, which may have resulted in evaluations based on assumptions rather than direct experience. Consequently, when customers lack information about a product, their evaluations are more likely to be based on assumptions. Future studies should include a brand familiarity screening question to ensure respondents assess only brands they recognize.

Insufficient data and platform limitations reduced statistical robustness and the breadth of the design. Of 736 survey entries, only 124 were valid responses. The platform recommended a minimum of 450 valid responses for target precision, which was not achieved due to time constraints, even after reducing the number of attributes from the initial plan and thereby narrowing the scope of inference. Participants' feedback also indicated that the platform's mobile usability was suboptimal. Given that Gen Z frequently uses smartphones to access the Internet (Ahmed 2019), this likely contributed to lower completion rates and reduced attention quality. Future research should use mobile-optimized conjoint platforms, shorter, more

interactive choice tasks, and improved recruitment strategies to achieve the recommended sample size.

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Appendix

Appendix 1 – Literature Review Market Data

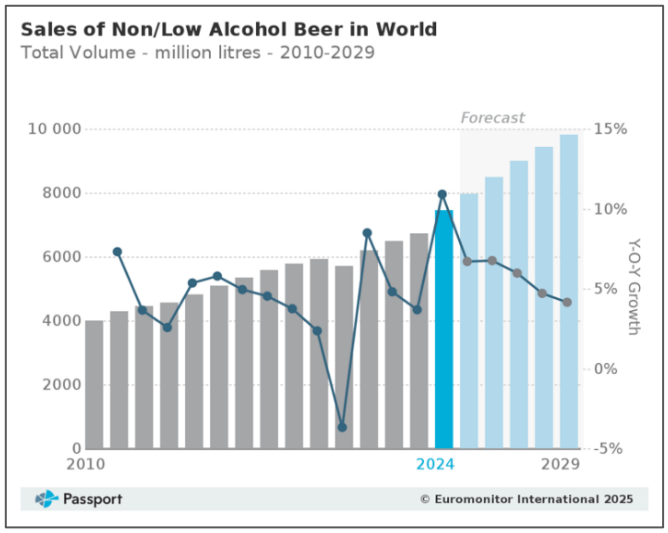

Figure 2: *Sales of Non/Low Alcohol Beer in World*

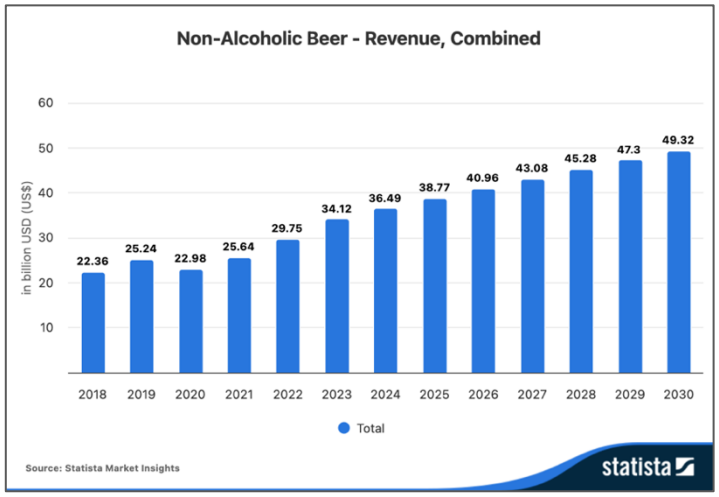

Figure 3*: NAB revenue in World*

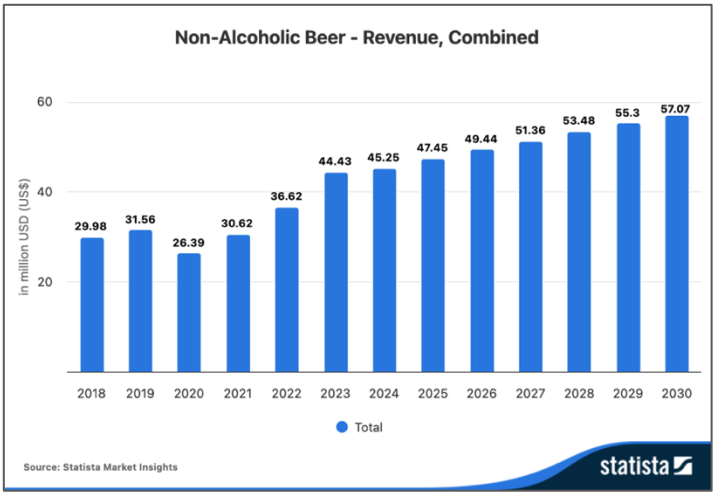

Figure 4: *NAB revenue in Portugal*

Appendix 2 – Survey 1 Results

Figure 5: *Ranked importance of choice factors for NoLo beverages among Gen Z NA users (N=147). Answers to the question "When choosing a NoLo beverage, what factors matter most to you?"*

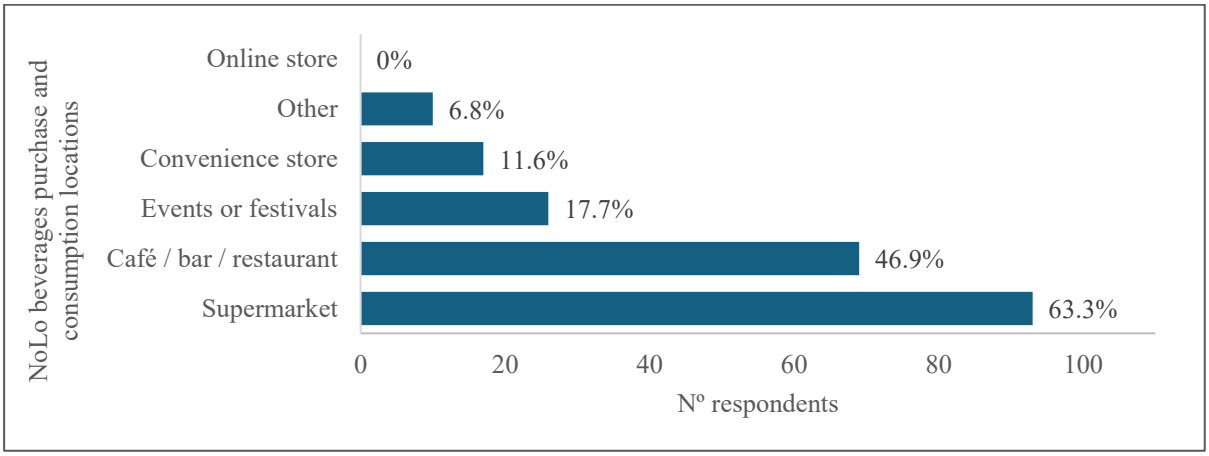

Figure 6: *Purchase and consumption locations of NoLo beverages among Gen Z NA users (N=147). Answers to the question "Where did you buy or get NoLo beverages?"*

Appendix 3 – Attribute Choice Data

Brand	Product	Calories per 330ml
Heineken	Heineken 0.0	69 kcal
Super Bock	Super Bock 0.0	86 kcal
Sagres	Sagres 0.0	82 kcal

Table 3: *Calories per 330ml for most popular NAB's*

Type/place	Availability	Price	Quantity in cl
Restaurant & Bar 1	Yes	€2	33
Restaurant & Bar 2	Yes	€2	33
Restaurant 1	No		
Bar 1	No		
Restaurant & Bar 3	Yes	€2.50	33
Bar 2	Yes	€2.20	33
Bar 3	Yes	€1.50	25
Bar 4	Yes	€2.15	33
Bar 5	Yes	€2	33
Bar 6	No		
Bar 7	Yes	€1.50	25
Bar 8	Yes	€1.70	33

Table 4: *NAB Availability and Prices across Lisbon Metropolitan Area*

Appendix 4 – Conjoint Analysis Survey

Sections	Questions
Screening	1. How old are you? o <18 (move to the end of the survey) o 18-29 o >29 (move to the end of the survey) 2. Do you currently live in Portugal? o Yes o No (move to the end of the survey)
Block of conjoint	3. Brands Tested: o Super Bock o Heineken o Sagres o Guinness o Estrella Damm 4. Attributes tested: o Flavor o Price (out of home) o Packaging Type o Calories per 330 ml o Alcohol by volume 5. Flavor Attribute levels: o Light & Mild (low bitterness)

	o Crisp (moderate bitterness) o Hop-forward (high bitterness) o Sweet 6. Price attribute levels: o €1.70 o €2.00 o €2.20 o €2.50 7. Packaging type attribute levels: o Can (330 ml) o Glass bottle (330 ml) 8. Calories per 330 ml attribute levels: o 70 kcal o 80 kcal o 90 kcal 9. Alcohol by volume attribute levels: o 0.0% o ≤0.5%
Demographics	10. Gender o Female o Male o Other o Prefer not to say 11. Nationality o Portuguese o Other (open question) 12. Current status o Student o Working Student o Early worker (< 2 years) o Working > 2 years o Unemployed o Other (open answer) 13. Approximate monthly personal income o Less than €250 o €250 - €499 o €500 - €749 o €750 - €999 o €1000 - €1249 o €1250 or more o Prefer not to say
Additional Comments	14. If you have any additional comments or thoughts about NoLo beverages, you can write them below (optional)

***Table 5**: Survey 3 Questions*

Appendix 5 – Survey 3 Results

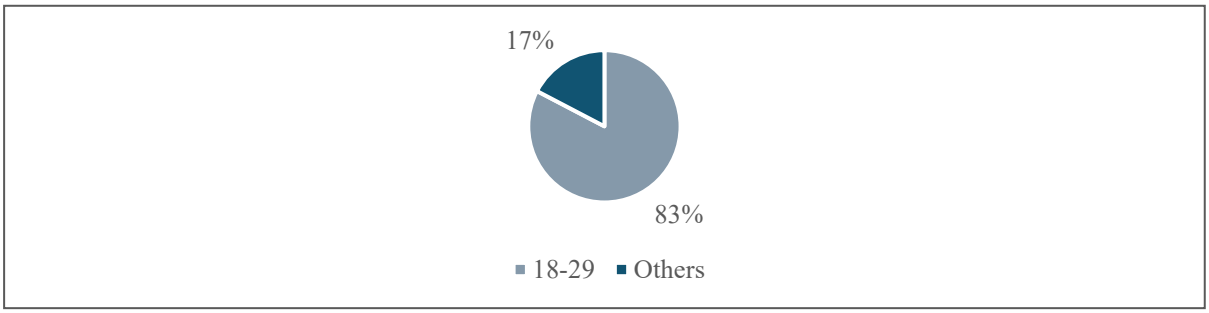

***Figure 7**: Age distribution of survey 3 respondents (N=150). Answer to the question "How old are you?"*

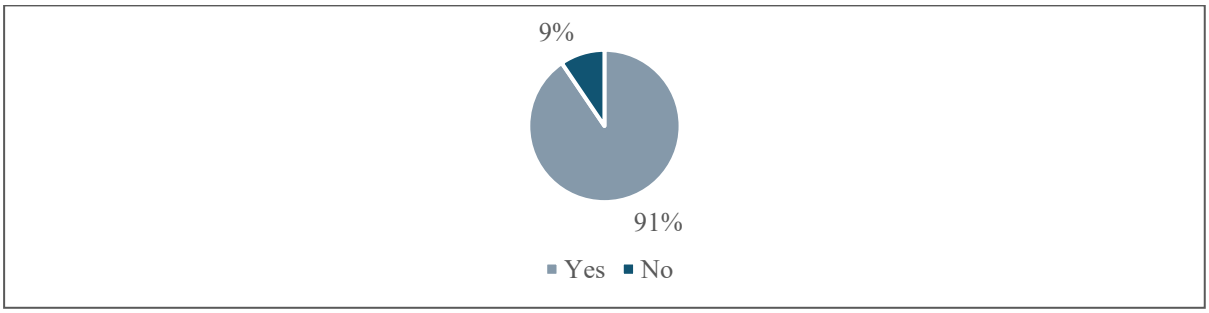

***Figure 8**: Current residency in Portugal distribution among Gen Z respondents of survey 3 (N=137). Answer to the question "Do you currently live in Portugal?"*

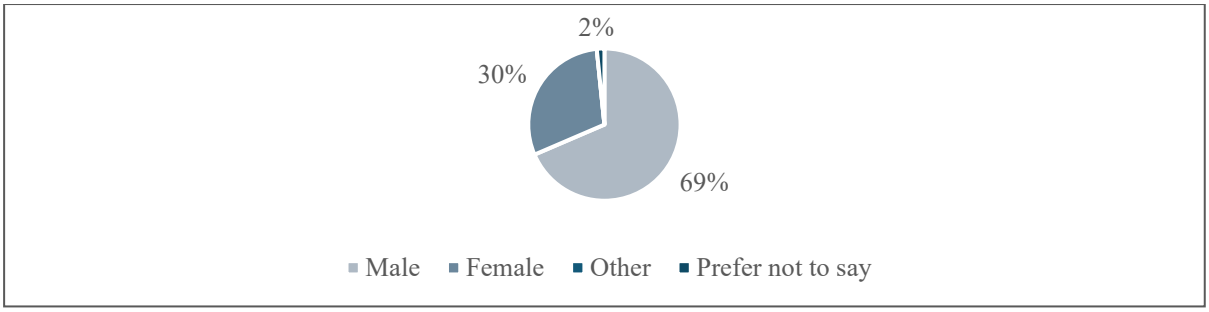

***Figure 9**: Gender distribution of survey 3 sample (N=124)*

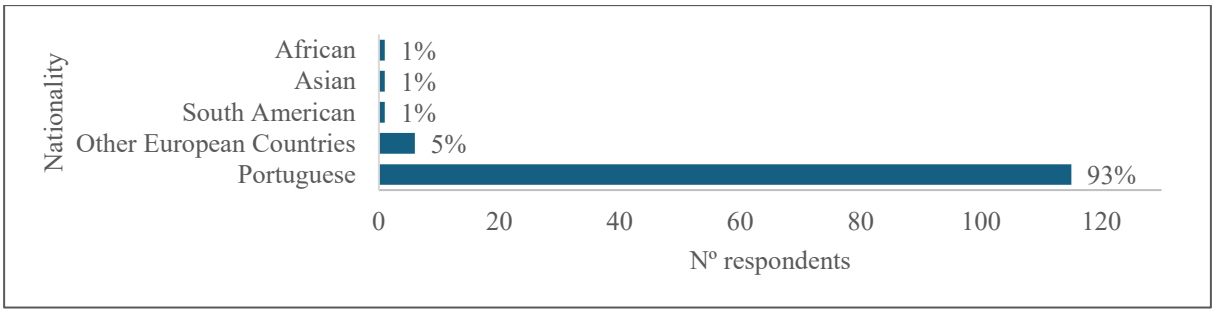

Figure 10: *Nationality distribution of survey 3 sample (N=124)*

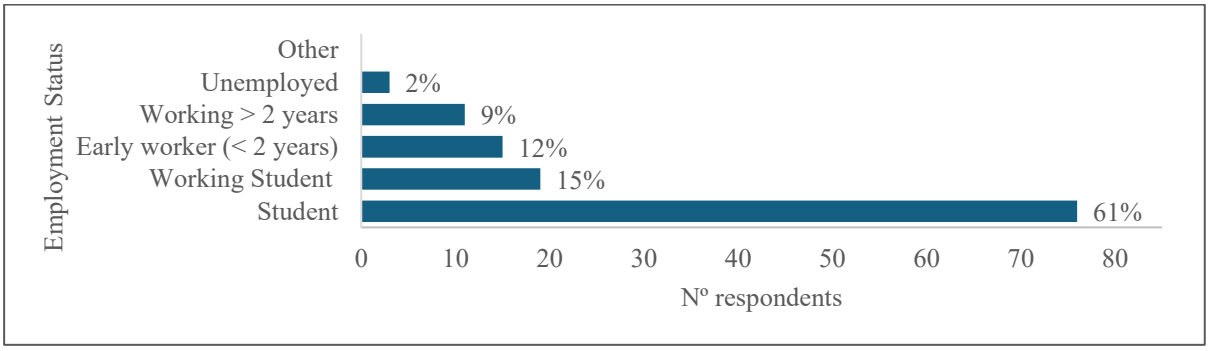

Figure 11: *Current employment and study status of survey 3 sample (N=124)*

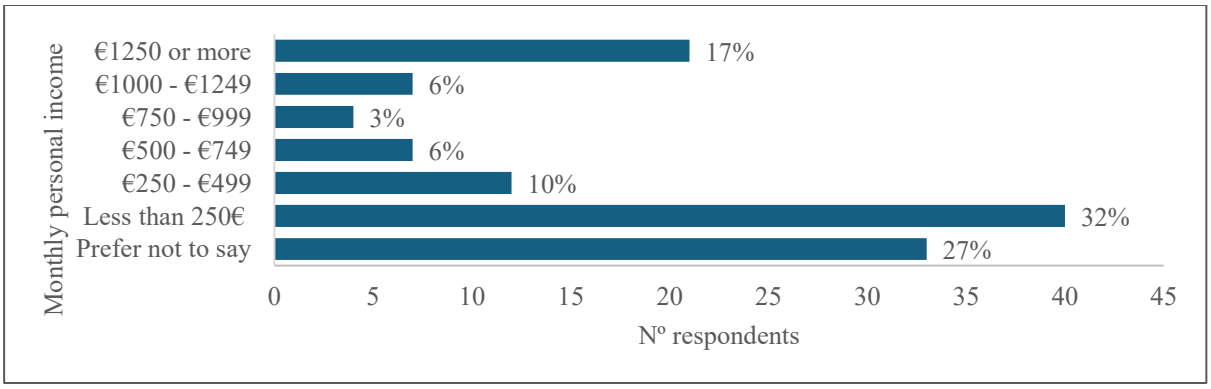

Figure 12: *Monthly personal income distribution of survey 3 sample (N=124)*

Appendix 6 – Conjointly Results

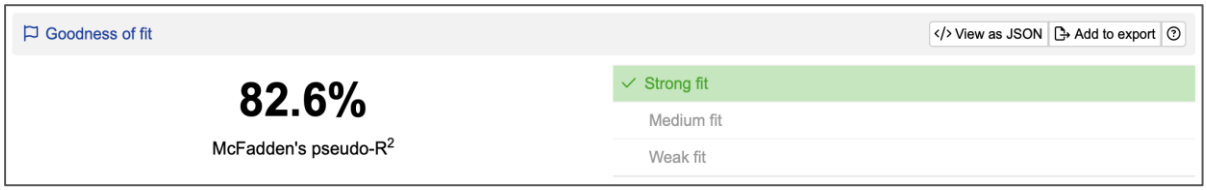

Figure 13: *Goodness of fit for the brand-specific conjoint analysis experiment*

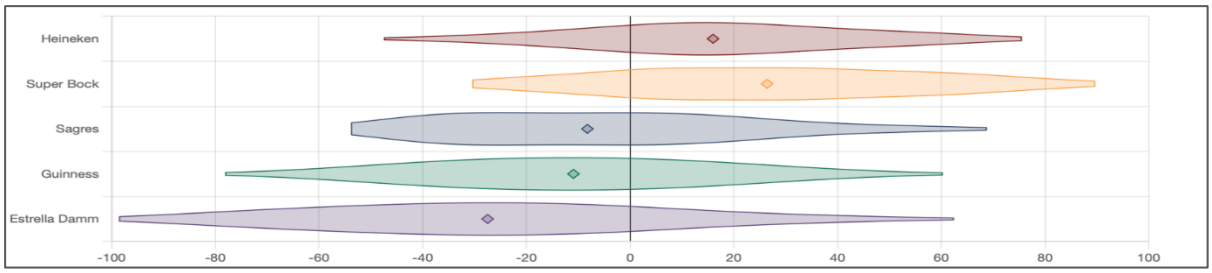

Figure 14: *NAB brand preference*

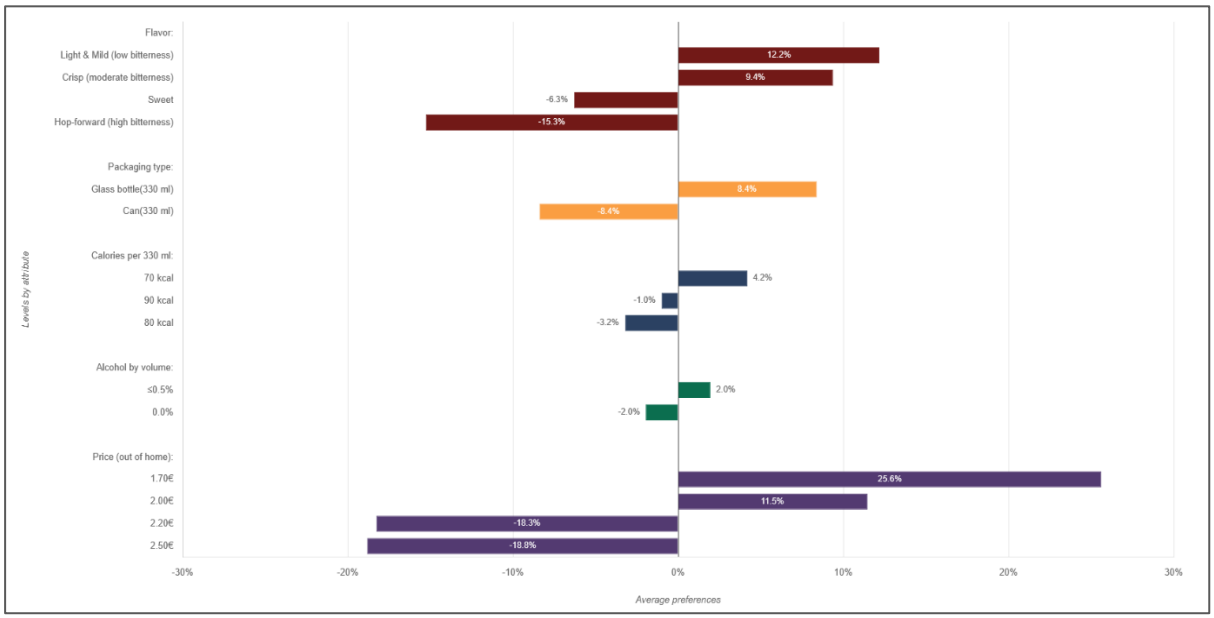

Figure 15: *Super Bock's average preferences for each level*

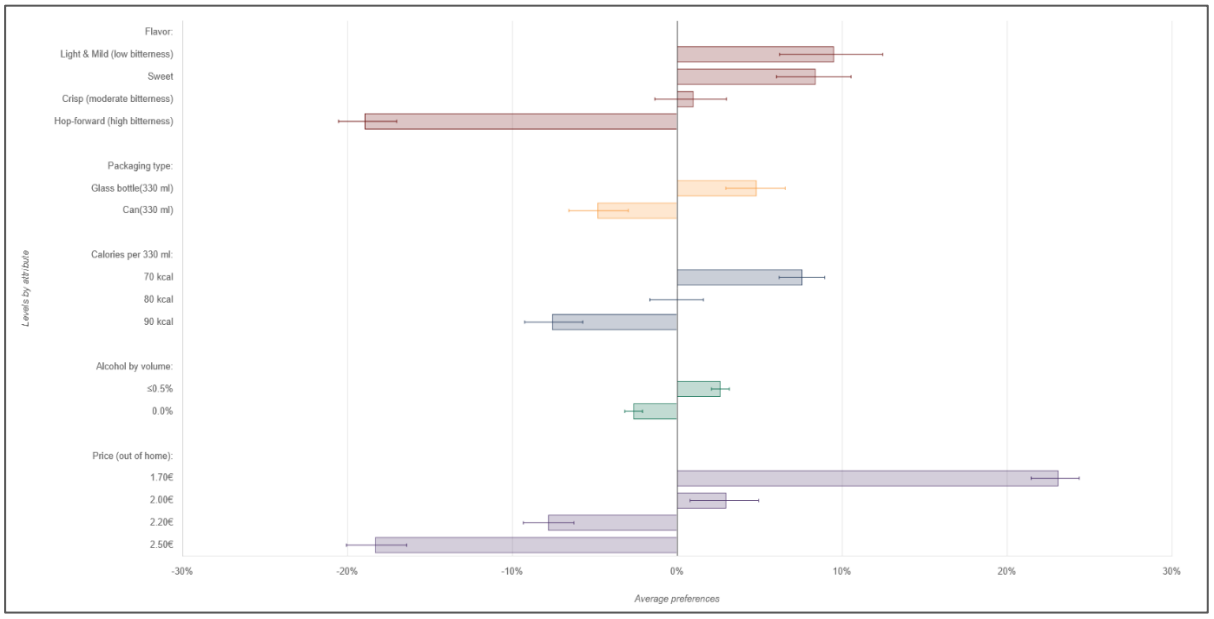

Figure 16: *Super Bock's average preferences for each level with margins of error*

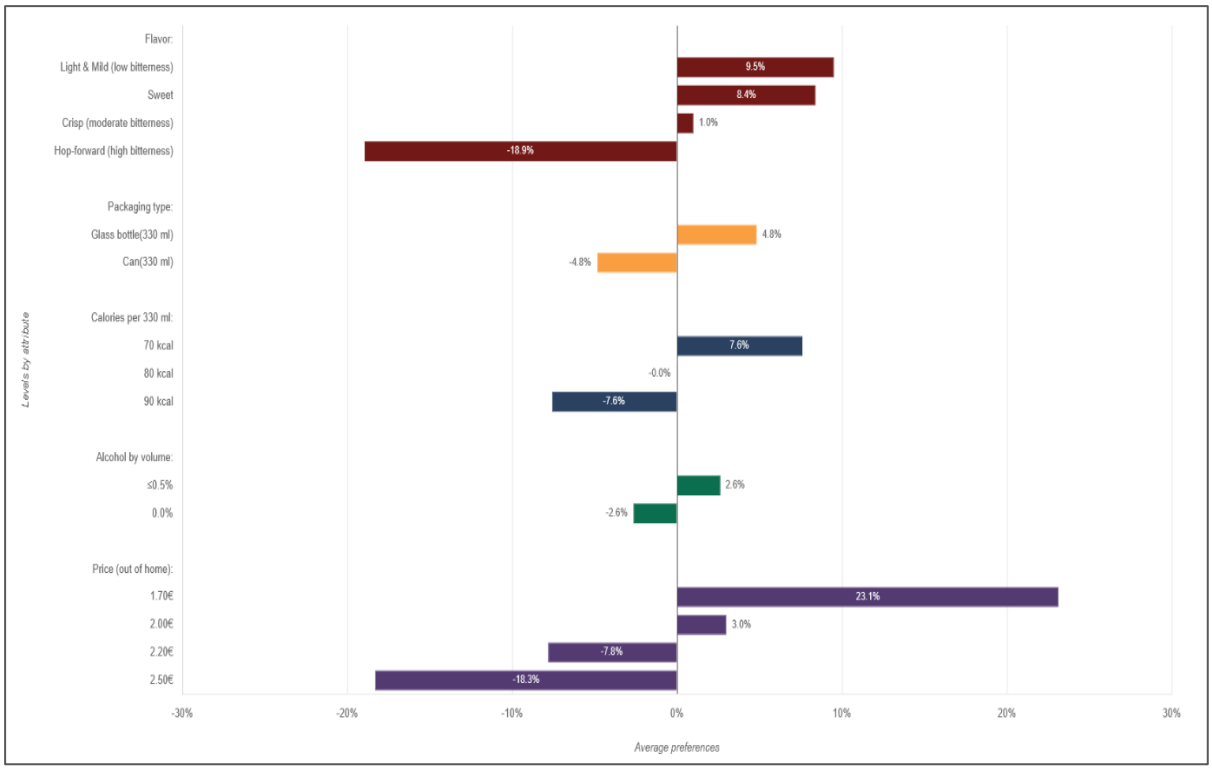

Figure 17: *Heineken's average preferences for each level*

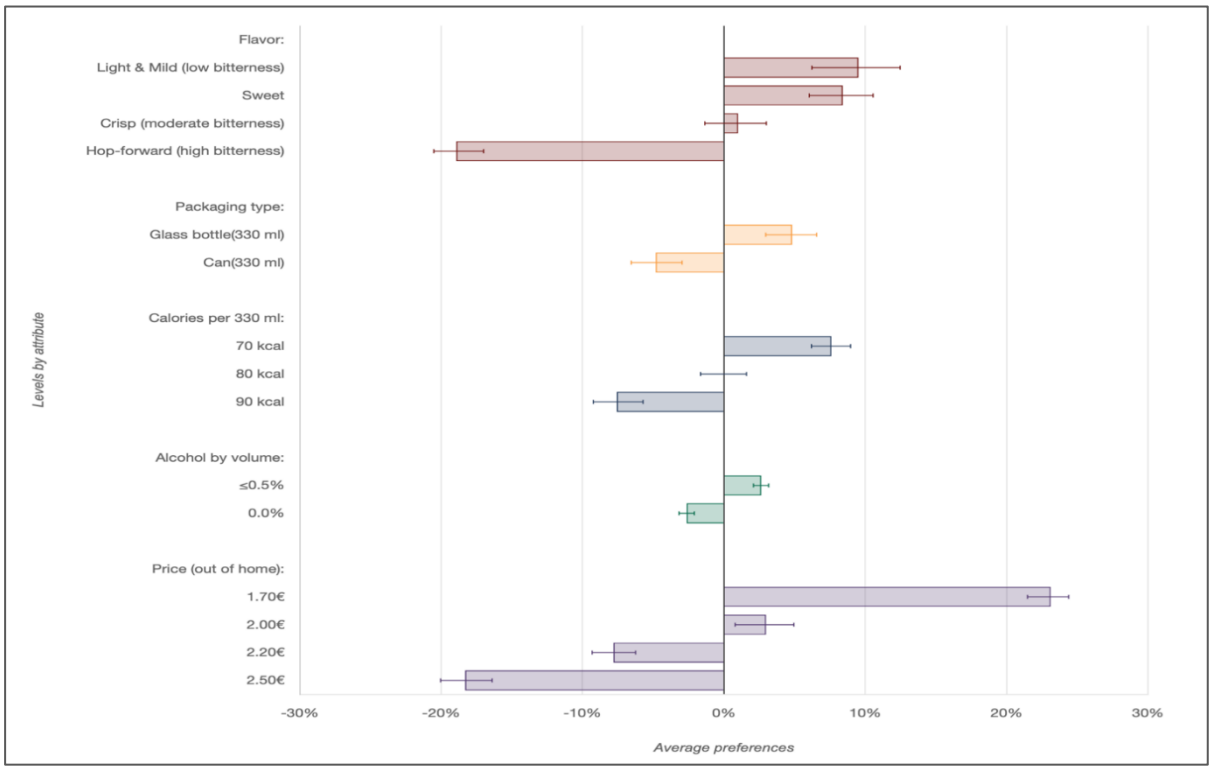

Figure 18: *Heineken's average preferences for each level with margins of error*

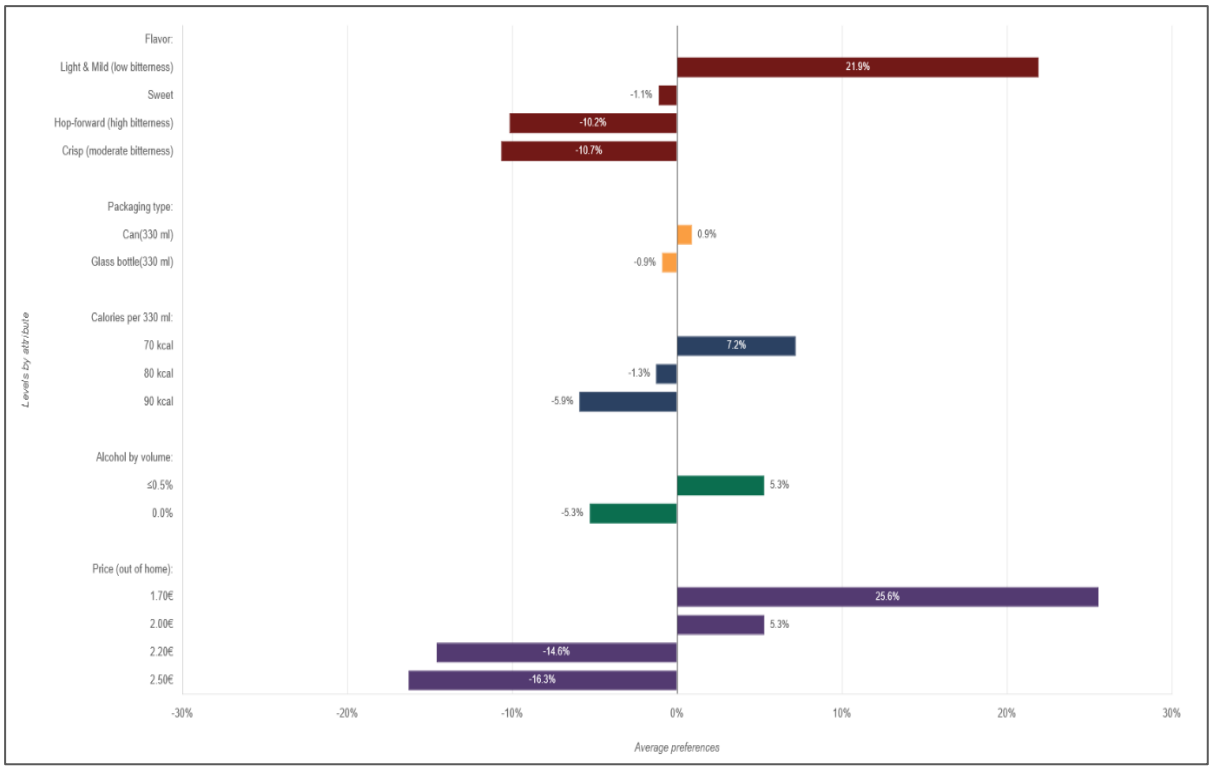

Figure 19: *Sagres' average preferences for each level*

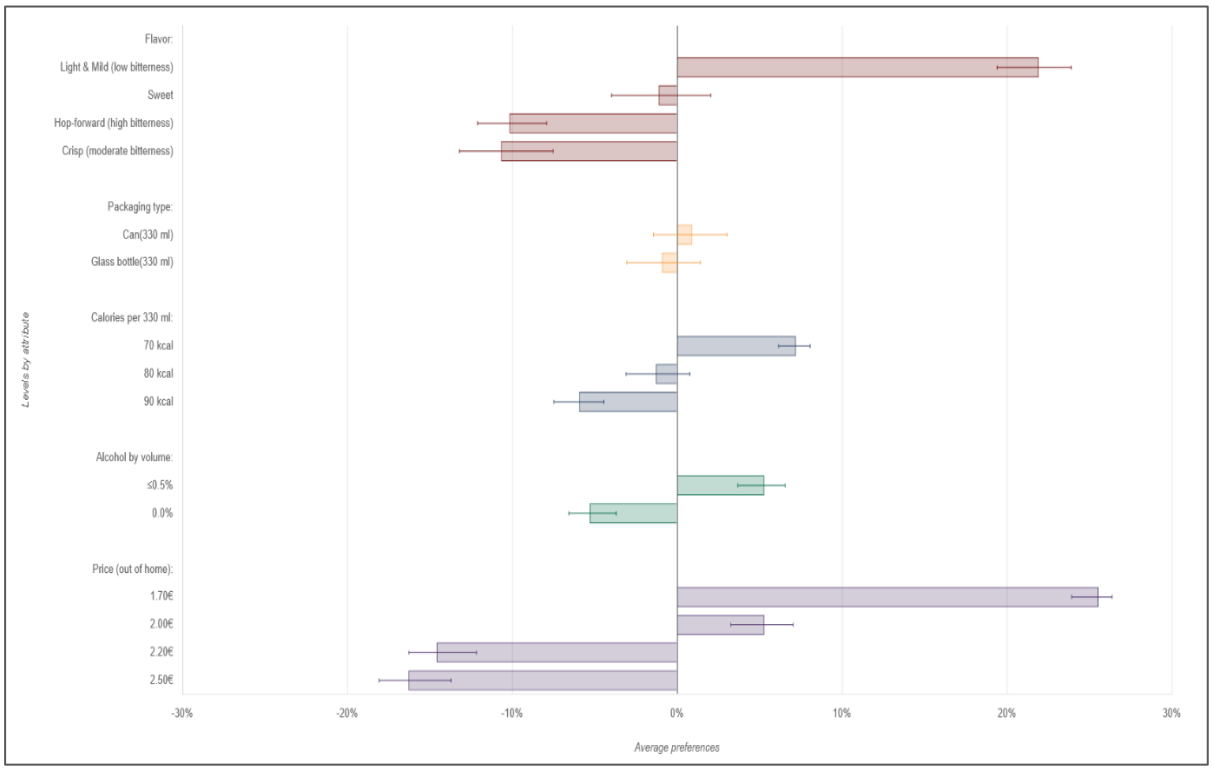

Figure 20: *Sagres' average preferences for each level with margins of error*

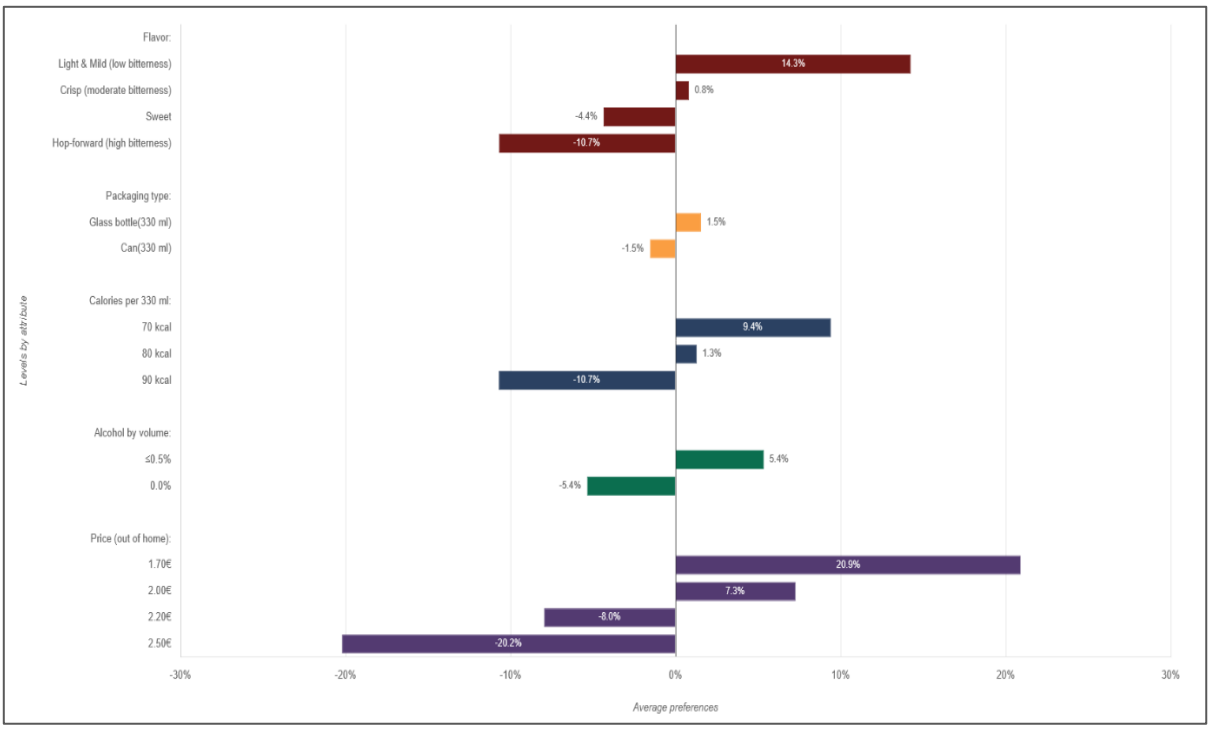

Figure 21: *Guinness average preferences for each level*

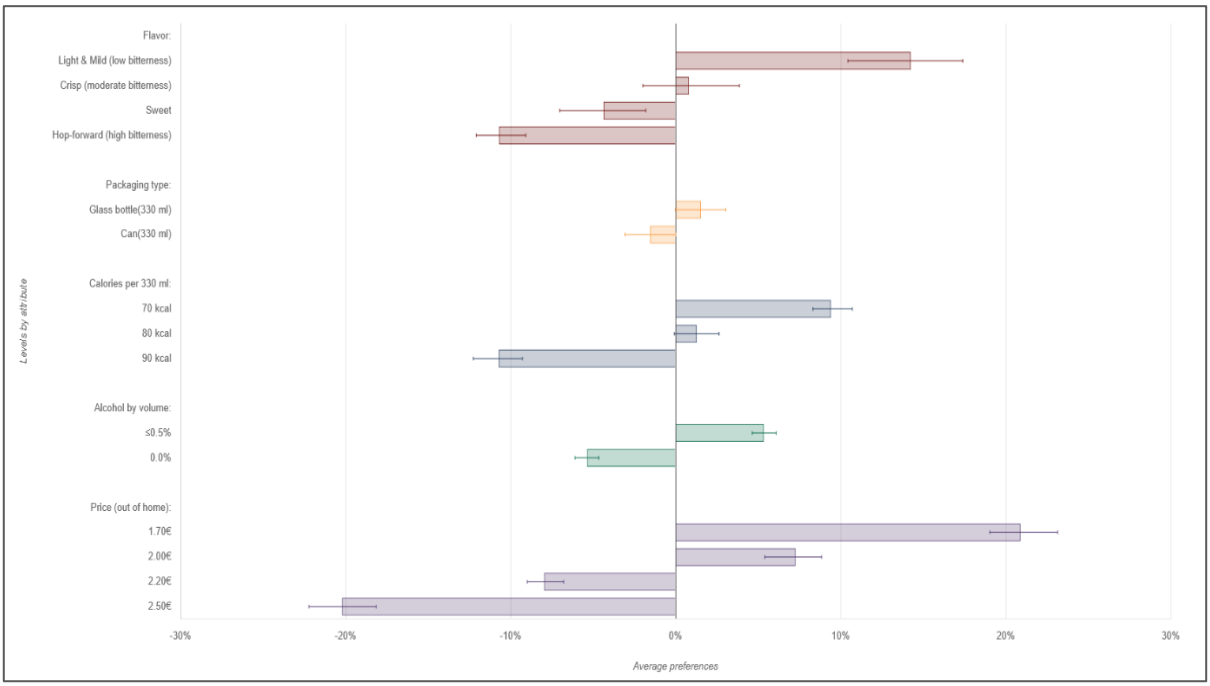

Figure 22: *Guinness average preferences for each level with margins of error*

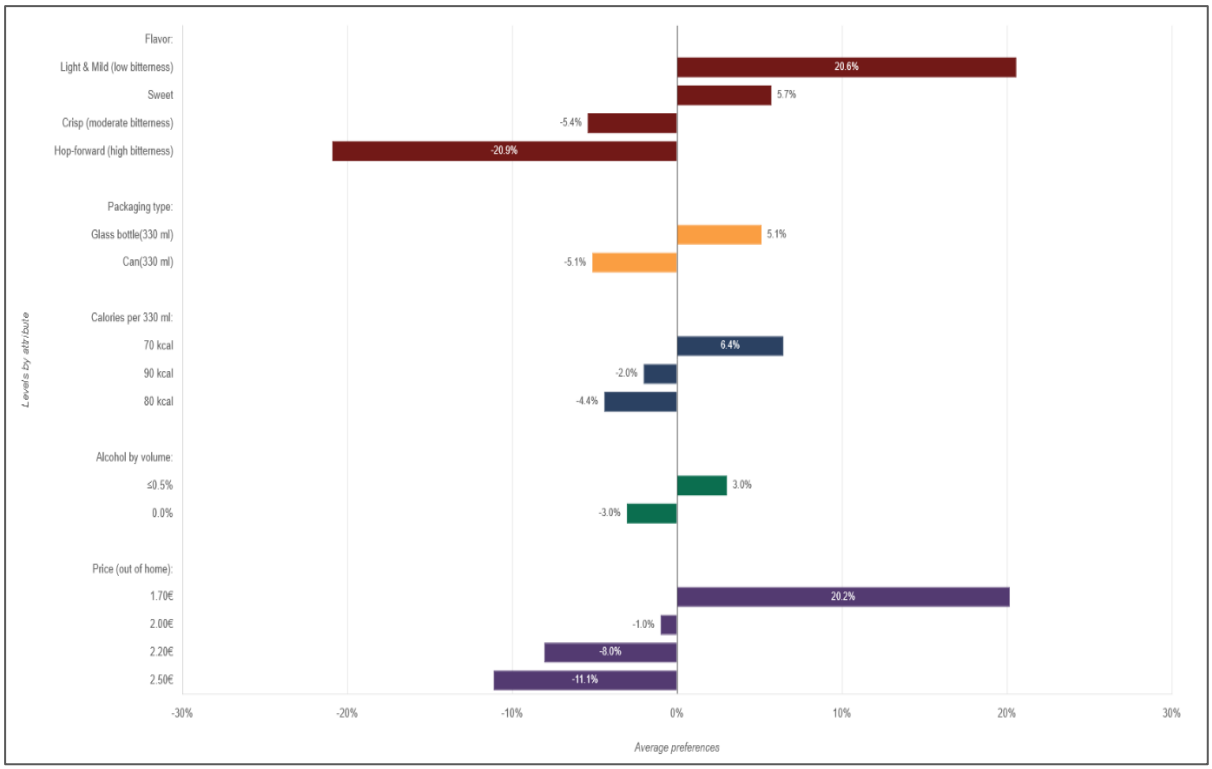

Figure 23: *Estrella Damm average preferences for each level*

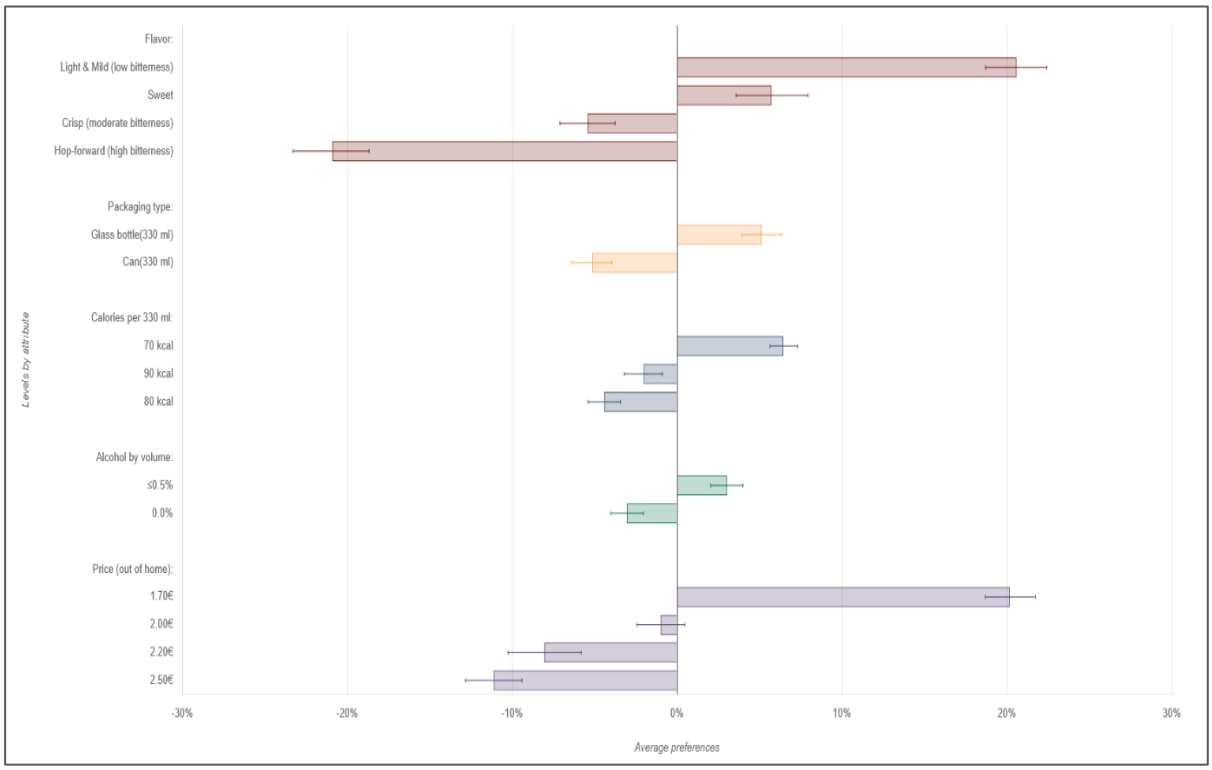

Figure 24: *Estrella Damm average preferences for each level with margins of error*

Attribute	Level	Count analysis of preferences for levels	0-centered values	WTP
Flavor	Light & Mild (low bitterness)	28.88%	4.480%	€0.15
Flavor	Crisp (moderate bitterness)	25.68%	1.279%	€0.04
Flavor	Hop-forward (high bitterness)	24.40%	0.000%	€ -
Flavor	Sweet	27.69%	3.291%	€0.11
Packaging type	Can (330 ml)	22.28%	0.000%	€ -
Packaging type	Glass bottle (330 ml)	31.05%	8.767%	€0.30
Calories per 330 ml	70 kcal	29.06%	4.614%	€0.16
Calories per 330 ml	80 kcal	26.46%	2.020%	€0.07
Calories per 330 ml	90 kcal	24.44%	0.000%	€ -
Alcohol by volume	0.0%	24.73%	0.000%	€ -
Alcohol by volume	≤ 0.5%	28.59%	3.859%	€0.13
Price (out of home)	€1.70	38.93%	23.342%	
Price (out of home)	€2.00	29.54%	13.948%	
Price (out of home)	€2.20	22.52%	6.929%	
Price (out of home)	€2.50	15.59%	0.000%	

Table 6: *Consumers' willingness to pay for each attribute level for Super Bock*

Attribute	Level	Count analysis of preferences for levels	0-centered values	WTP
Flavor	Light & Mild (low bitterness)	22.727%	9.214%	€0.35
Flavor	Crisp (moderate bitterness)	18.649%	5.135%	€0.20
Flavor	Hop-forward (high bitterness)	13.514%	0.000%	€ -
Flavor	Sweet	21.467%	7.954%	€0.31
Packaging type	Can (330 ml)	16.329%	0.000%	€ -
Packaging type	Glass bottle (330 ml)	21.862%	5.533%	€0.21

Calories per 330 ml	70 kcal	21.774%	5.750%	€0.22
Calories per 330 ml	80 kcal	19.473%	3.448%	€0.13
Calories per 330 ml	90 kcal	16.024%	0.000%	€ -
Alcohol by volume	0.0%	18.354%	0.000%	€ -
Alcohol by volume	≤0.5%	19.838%	1.484%	€0.06
Price (out of home)	€1.70	30.027%	20.838%	
Price (out of home)	€2.00	21.951%	12.762%	
Price (out of home)	€2.20	15.135%	5.946%	
Price (out of home)	€2.50	9.189%	0.000%	

Table 7: *Consumers' willingness to pay for each attribute level for Heineken*

Attribute	**Level**	**Count analysis of preferences for levels**	**0-centered values**	**WTP**
Flavor	Light & Mild (low bitterness)	20.321%	11.254%	€0.56
Flavor	Crisp (moderate bitterness)	9.409%	0.342%	€0.02
Flavor	Hop-forward (high bitterness)	9.067%	0.000%	€ -
Flavor	Sweet	14.130%	5.064%	€0.25
Packaging type	Can (330 ml)	9.639%	0.000%	€ -
Packaging type	Glass bottle (330 ml)	16.846%	7.208%	€0.36
Calories per 330 ml	70 kcal	15.524%	4.324%	€0.22
Calories per 330 ml	80 kcal	12.982%	1.782%	€0.09
Calories per 330 ml	90 kcal	11.200%	0.000%	€ -
Alcohol by volume	0.0%	11.876%	0.000%	€ -
Alcohol by volume	≤0.5%	14.572%	2.696%	€0.13
Price (out of home)	€1.70	22.460%	16.008%	
Price (out of home)	€2.00	15.013%	8.562%	

Price (out of home)	€2.20	8.919%	2.467%	
Price (out of home)	€2.50	6.452%	0.000%	

Table 8: *Consumers' willingness to pay for each attribute level for Sagres*

Attribute	**Level**	**Count analysis of preferences for levels**	**0-centered values**	**WTP**
Flavor	Light & Mild (low bitterness)	11.653%	4.226%	€0.21
Flavor	Crisp (moderate bitterness)	13.369%	5.942%	€0.30
Flavor	Hop-forward (high bitterness)	7.427%	0.000%	€ -
Flavor	Sweet	10.512%	3.085%	€0.1
Packaging type	Can (330 ml)	8.847%	0.000%	€ -
Packaging type	Glass bottle (330 ml)	12.617%	3.770%	€0.19
Calories per 330 ml	70 kcal	13.306%	6.479%	€0.32
Calories per 330 ml	80 kcal	12.072%	5.245%	€0.26
Calories per 330 ml	90 kcal	6.827%	0.000%	€ -
Alcohol by volume	0.0%	10.618%	0.000%	€ -
Alcohol by volume	≤ 0.5%	10.843%	0.225%	€0.01
Price (out of home)	€1.70	20.375%	16.086%	
Price (out of home)	€2.00	12.097%	7.807%	
Price (out of home)	€2.20	6.166%	1.877%	
Price (out of home)	€2.50	4.290%	0.000%	

Table 9: *Consumers' willingness to pay for each attribute level for Guinness*

Attribute	**Level**	**Count analysis of preferences for levels**	**0-centered values**	**WTP**
Flavor	Light & Mild (low bitterness)	11.828%	6.976%	€0.55
Flavor	Crisp (moderate bitterness)	6.915%	2.063%	€0.16

Flavor	Hop-forward (high bitterness)	4.852%	0.000%	€ -
Flavor	Sweet	7.027%	2.175%	€0.17
Packaging type	Can (330 ml)	5.384%	0.000%	€ -
Packaging type	Glass bottle (330 ml)	9.920%	4.536%	€0.36
Calories per 330 ml	70 kcal	9.658%	3.005%	€0.24
Calories per 330 ml	80 kcal	6.653%	0.000%	€ -
Calories per 330 ml	90 kcal	6.653%	0.000%	€ -
Alcohol by volume	0.0%	5.922%	0.000%	€ -
Alcohol by volume	≤ 0.5%	9.383%	3.461%	€0.27
Price (out of home)	€1.70	13.904%	10.130%	
Price (out of home)	€2.00	7.547%	3.774%	
Price (out of home)	€2.20	5.362%	1.588%	
Price (out of home)	€2.50	3.774%	0.000%	

Table 10: *Consumers' willingness to pay for each attribute level for Estrella Damm*

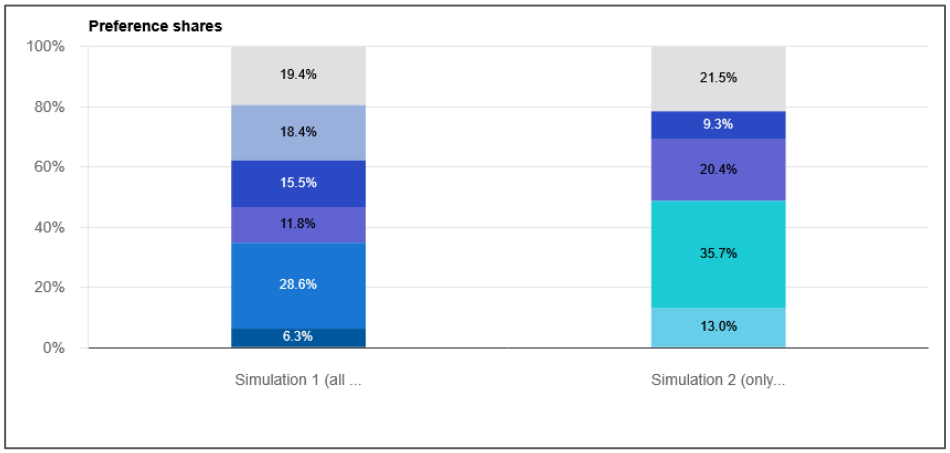

Figure 25: *Market Preferences shares for Market Simulations 1 and 2*

Figure 26: *Revenue Projections for Market Simulations 1 and 2*

Appendix 7 – Expert's Interview Results

Sections	Excerpts from Interview
Market Context and Evolution	**Evolution:** "…we realized that NAB was the only beer segment growing in production and consumption across Europe and globally…" **International Markets Comparison:** "Yes, we are very behind compared to other countries." **Channels:** "In craft beer bars, there is a need for a product like ours because there is always someone in the group who does not drink, and bars want to have at least one option."
Consumer Behavior and Perceptions	**Perceptions:** "…the peer pressure around NAB is still strong in Portugal." "Culturally, alcohol is part of the Portuguese identity, both socially and economically." **Gen Z vs Older Generations:** "Gen Z is interesting. Compared to previous generations, they have a much more controlled and conscious relationship with alcohol." "Gen Z is the most conscious generation." **Consumer Behavior:** "…people drink our beer simply because they want something refreshing and with good flavor." "We thought it would take more time to educate people, but they understood right away." "So, there is interest and understanding from people."
Product Attributes and Development	**Attributes:** "The key is to have products that are visually appealing, tasty, and offer benefits." "It is important that they taste good, are tropical or citrusy, and offer a sensory experience." "Price, visual identity, and sustainability." "They care about a brand that takes a stand, which defends values." **Development:** "There are two ways to make NAB."

	"The first is the industrial way, used by large companies like Sagres and Super Bock, which use dealcoholizing machines that heat the beer to remove the alcohol and reduce it to 0.0%. That is a good process for large-scale, but it removes a lot of aromas and flavors." "We use another technique, with specific yeasts that limit fermentation naturally, so the beer stays at around 0.2% or 0.3%, which is legally NA (anything below 0.5% is considered NA). This method also maintains aromas, nutritional properties, and vitamins because the beer is not reboiled after fermentation, so it is "alive." It has vitamin B, for example, and a fresher, more authentic taste."
Marketing and Brand Strategies	**Messaging:** "Instead of saying 'Don't drink and drive,' it should say, 'If you drive, drink this.' That would make a substantial difference." **Brand Strategies:** "Big brands have chosen to make all their NAB blue – Sagres, Super Bock, Heineken – and that automatically differentiates them. It is almost like a label that says, 'I'm drinking NAB'" "When we started signing with gyms and fitness clubs, they understood the concept right away." **Target**: "…we shifted toward running clubs and fitness communities, where there is more alignment with our concept: running for fun, socializing, and celebrating with a healthy beer. We are also present in gyms and CrossFit boxes." **Recommendations:** "…they should think about differentiation – to create something cool and with good packaging. Not 'the blue one' "
Opportunities and Challenges	**Opportunities:** "There is also potential in Middle Eastern countries, where alcohol is not allowed, but Western culture is growing. " **Challenges:** "Distribution. Portugal does not have a well-developed distribution system for small-scale products. Distributors prefer large brands because they have better margins." "Production is still expensive. And as a small company, we do not have a big marketing budget

Table 11: *Startup Founder's Interview Answers (Full interview available upon request)*