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How the Big Five Personality Traits and Product Involvement influence consumers' Willingness to Pay for sustainable beer.

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How the Big Five Personality Traits and Product Involvement influence consumers' Willingness to Pay for sustainable beer.

Beer market is a fast growing one, with a rapidly expanding demographic and an increasing number of small-size craft brewers entering the market. Beer is a resource intensive production, with consumption of high volume of water and electricity. Emissions coming from transportation have a high incidence on the carbon emission, mainly for smaller-size companies, which do not possess the means to optimize their means of transportation.

Sustainably produced beer and sustainable business models can be helpful for brewers to attract new consumers who are environmentally conscious. The investments for changing to a sustainable production can come with high switching costs, which the entrepreneurs bear by raising the price of the beer.

For this reason my thesis aims to analyse the relationship between the Big Five Personality Traits – Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism - and Willingness to Pay for sustainable beer. The construct of Product Involvement will also be considered and treated as independent variable of the research model.

Moderating effects of Knowledge of the Product Class and Perceived Quality will be hypothesized.

The hypothesis have been tested through a quantitative research model: a survey was created which registered 139 valid answers allowing to analyse the hypothesised model through the SEM-PLS technique.

Results show that Openness to Experience and Product Involvement have a positive relationship with Willingness to Pay more for sustainable beer.

INTRODUCTION

In recent years, sustainability has emerged as the main concern across various industries, with growing recognition of the need to address environmental, social, and economic challenges. One sector that has been increasingly under the spotlight is the beer brewing industry, where conversations around sustainable practices and products have gained considerable attention.

The quest for sustainability within the beer brewing industry is not just about reducing environmental impact; it is an approach that integrates environmental stewardship, social responsibility, and economic viability. At its core, sustainable beer production seeks to minimize resource consumption, mitigate carbon emissions, promote ethical labour practices, and foster community engagement. It represents a shift from conventional brewing practices towards more ecologically and socially conscious methodologies.

As the global demand for beer continues to rise, fuelled by changing consumer preferences and the proliferation of craft breweries, there arises a pressing need to address the sustainability challenges inherent within the industry. From water scarcity and energy inefficiency to waste generation and supply chain management, breweries are confronted with sustainability issues that necessitate innovative solutions and proactive initiatives.

Moreover, the concept of "sustainable beer" extends beyond production processes to encompass packaging, distribution, and consumption habits. It needs a commitment to sourcing local ingredients, use of renewable energy sources, implementing circular economy principles, and fostering a culture of environmental stewardship among consumers.

My thesis will explore various dimensions of sustainability within the beer brewing industry, with a specific emphasis on sustainable beer production. The purpose of this study is to:

1. Provide a comprehensive understanding of the concept of sustainability within the context of beer production, including its environmental, social, and economic dimensions;
2. Examine the current state of sustainable practices and initiatives adopted by breweries worldwide, highlighting best practices and emerging trends;
3. Investigate consumer perceptions and preferences regarding sustainable beer, exploring factors influencing purchasing decisions and willingness to pay;
4. Propose strategies and recommendations for fostering greater sustainability within the beer brewing industry, addressing challenges and opportunities for improvement.

It is hoped that the insights obtained from this research will be helpful for breweries, policymakers, consumers, and other stakeholders to embrace more sustainable approaches towards beer production and consumption, thereby contributing to a more environmentally resilient and socially equitable future.

This study aims to understand the relationship between consumers' personality and their willingness to pay for sustainable beer.

Researching willingness to pay is useful to get insights into consumers' preferences and behaviours, so that firms are able to estimate the correct perceived value of their product and price the product accordingly.

My thesis will investigate the relationship between personality traits and willingness to pay for sustainable beer. In particular the traits from the Big Five model developed by McCrae and Costa Jr in 1999, which assumes that an individual's personality can be represented by five factors: Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism.

Openness to Experience is the trait associated with imagination, curiosity, innovative solutions seeking, and a higher order of self-transcendence (Schwartz, 1992). Markowitz et al. (2012) explain that Open individuals appreciate beauty and are more innovative. This trait is linked with higher flexibility, and it is positively associated with willingness to experience new products and sustainable alternatives. It refers to the ability of being receptive to new ideas and approaches. People with high degree of Openness to Experience are usually intelligent, imaginative, and broad-minded (McCrae and Costa, 1985). In my research I will hypothesize that this trait is positively connected to WTP for sustainable beer.

Conscientiousness is the second trait object of my study, it is an inclination of individuals who are organized, self-disciplined, hard-working, and goal-directed (McCrae and Costa, 1985, Roberts et al., 2009). Conscientious individuals are determined, purposeful and systematic, they tend to invest in long-term planning, wanting to maximise their benefits (Milfont and Sibley, 2012), this ability to make and execute long-term planning leads to greater environmental concern to obtain a better future outcome for the environment. Conscientious individuals are usually more mature and exhibit a higher degree of environmental concern (Borden and Francisc, 1978), also due a tendency to follow social guidelines and "doing the right thing". For the reasons mentioned above the second hypothesis of my thesis will be the existence of a positive relationship between Conscientiousness and WTP for sustainable beer.

Extraversion is the trait that characterises social, talkative, and assertive individuals, which can be perceived as authoritarian and dominant (Gustavsen and Hegnes, 2020). This trait is usually linked to an emphasis of self-expression values, high subjective well-being, and a disbelief in the role of fate (McCrae et al. 2005). Existing studies disagree on if Extraversion is positively linked to environmental concern or not, Gustavsen and Hegnes (2020) indicate that introverts are more interested in organic food than extroverts, but Borden and Francis (1978) and Pettus and Giles (1987) have found a positive effect of Extraversion on environmental concern' scores. My research will hypothesize that Extraversion has a positive influence on WTP for sustainable beer.

Agreeableness is the personality trait related to trusting, affectionate, altruistic, and social individuals (McCrae and Costa, 1987). Agreeable individuals display a strong concern for the welfare of their close ones. Greater degree of empathy and compassion as well as inclinations towards pro-social actions lead to greater pro-environmental attitudes (Hirsh, 2014). For these reasons I hypothesized that Agreeableness has a positive relationship with WTP for sustainable beer.

The fifth and last trait object of my analysis will be Neuroticism, the trait representing anger, anxiety, depression, and emotional instability (McCrae and Costa, 1999).
Neurotic individuals show sign of detachment, vulnerability, dejection, inner turmoil and despondency, with a less distinct locus of control they have a reduced willingness to assume responsibility for the outcomes of their actions. My thesis will hypothesize that individuals characterised by higher levels of neuroticism will exhibit lower levels of trust and could be more hesitant to believe in the benefits of sustainable products, thus presenting a negative relationship with WTP for sustainable beer.

I decided to add a sixth independent variable to achieve a greater understanding of consumers' behaviour: Product Involvement. This variable will represent individuals' perception of importance of the product category. Usually greater involvement entails higher motivation to evaluate the product and seeking information on it (Tsiotsou, 2006). Involved consumers are able to evaluate information about the product and will have a positive attitude towards sustainable and organic products (Tarkianinen and Sundqvist, 2009). Higher level of product involvement are related to higher WTP for sustainable products (Hsu et al., 2023).
Thus I hypothesize that there exists a positive relationship between Product Involvement and WTP for sustainable beer.

My model features two moderator variables that can affect the direction or the strength of the relationship between the dependent and the independent variables.

The first moderator I included in my model is Perceived Quality. Consumer's purchase behaviours are influenced by past experience, social ques, and pre-concepts of the product. It is interesting to test if the perceived quality of a sustainable product is

positive or negative, and how it moderates the relationship between the Big Five and WTP for sustainable beer. Negative perceived quality of a sustainable product can lead to a trade-off effect which is referred to as the "sustainability liability effect" (Luchs et al., 2010, Lin and Chang, 2012). Associating lower quality of the sustainable product may have a negative effect on the relationship between personality and WTP for sustainable beer.

The second moderator variable is Knowledge of the Product class, and I will observe its effect on the relationship between Product Involvement and WTP for sustainable beer. Involved consumers have a higher predisposition to look for information about the product and its characteristics, and the more informed they become the higher the involvement will be. Knowledgeable consumers are able to appreciate sustainable efforts and understand green labels, green claims, and green advertising.

The initial segment of my thesis offers an exhaustive examination of key elements within sustainability, with a particular emphasis on the beer brewing sector. It will delve into the concept of "sustainable beer," elucidate sustainable production methodologies, and explore how breweries can adopt sustainable business models to increase profitability. Subsequently, attention will shift towards presenting, through a comprehensive literature review, the rationale behind investigating the relationship between the Big Five Personality Traits and consumer willingness to pay for sustainable beer.

The second chapter highlights the presence of a research gap in the field of consumers' behaviour and beer consumption, and it presents the hypothesized research model and the research questions by explaining the developed hypotheses. This will involve the presentation of a proposed research framework, along with delineated research hypotheses.

Following this, the third chapter will delineate the development and administration of a survey for quantitative research purposes. Detailed insights into the data collection and

analysis methodologies will be provided, alongside an exposition on the key characteristics and descriptive statistics of the final sample.

The fourth chapter will present an analysis of the survey-derived data accompanied by a systematic evaluation of the formulated hypotheses. Finally, the concluding chapter will offer a comprehensive exposition and discussion of the research findings, elucidating their contributions to the existing body of literature, implications for practical applications, and acknowledgment of potential limitations inherent within the study.

Chapter I: Literature Review

1.1 Sustainability

The most accepted definition of sustainability was presented in 1987 by the United Nations Brundtland Commission and is as follows: "*meeting the needs of the present without compromising the ability of future generations to meet their own needs".*

With their daily processes businesses effect the environment and society, for this reason it is important to adopt a sustainable business strategy to have a positive impact on:

- Climate change;
- Income inequality;
- Depletion of natural resources;
- Human rights issues;
- Fair working conditions;
- Pollution;
- Racial injustice;
- Gender inequality.

In today's world, staying relevant and competitive means organizations cannot ignore sustainability. Just like the push for digital transformation, going sustainable mandates a comprehensive organizational transformation across every division of their business. Nowadays, it is a must for sustainability to be a core element when companies are planning their strategies.

Sustainable business strategy are a result as well as a cause of/for profits. In light of this many firms are adopting the "*triple bottom line",* a concept referring to three key dimension that can be employed to evaluate the overall performance of an organization. They are:

1 Profit (economic bottom line), it focuses on the economic value that the organization creates, and it measures the financial success;

2 People (social bottom line), this dimension considers the social impact and responsibility of the organization focusing on employee well-being, community engagement, social equity;
3 Planet (environmental bottom line). This final dimension addresses the environmental impact and sustainability practices of the organization, evaluating how the business activities effect the environment and it includes issue such as resource conservation, pollution, and carbon footprint

Companies often use environmental, social, and governance (ESG) metrics to gauge how ethical and sustainable they are. McKinsey & Company found that those with high ESG ratings tend to perform better in the market over the medium and long term. Even though investing in sustainability strategies is costly in the short run, they yield higher profits in the long term.
Nonetheless the World Economic Forum states that only 60% of organizations have implemented sustainability strategies.
Koller and Nuttal (2020) from McKinsey & Company highlighted that sustainability could reduce cost and affect operating profits by up to 60%
Investors demand is a powerful factor in shaping the shift towards sustainability as in 2020 85% of investors were considering ESG factors when analysing investments. Moreover 91% of banks are monitoring ESG performance of their investments.

A 2019 study of the company Nielsen found that 73% of global consumer are willing to switch their consumption habits towards more sustainable products in order to reduce their negative impact on the environment. Sustainable products' sales have grown by 20% since 2014. This proves that *consumer demand* for sustainable products is strong and increasing, so it is important for businesses to implement and embed sustainability into their strategy to remain relevant.

1.1.2 Main agreements

In the contemporary global landscape, a prevalent trend is the concerted effort among nations to forge environmental agreements at various levels, encompassing the global, regional, and intraregional domains. This collaborative approach signifies a shared necessity for cooperative frameworks to address these issues effectively. Nations across the world are actively engaging in agreements that transcend geographical boundaries, reflecting a commitment to environmental stewardship and the pursuit of sustainable practices Furthermore, intraregional agreements highlight the collaborative endeavours among neighbouring nations to tackle shared environmental concerns.

These efforts create *regulatory demands.* The most important agreement to date is the Paris Climate Agreement (2015) requiring all countries to set emissions-reduction pledges. Its aim is to reach global net-zero emissions in the second half of the 21st century.

Before the Paris Climate Agreement was the Kyoto Protocol of 2005, the first legally binding climate treaty. It required a reduction of emissions by developed countries and it established a system to monitor the progress.

Many countries (e.g. Sweden, Germany, UK, Canada, Japan) have legally binding net zero target for 2045/2050.

Sustainable regulations in the EU also affect global businesses wanting to do business in the EU.

At COP26 the USA and the EU agreed on a Global Methane Pledge aiming to decrease 30% of methane emissions by 2030.

One of the most important steps towards sustainability has been the 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015. Its seventeen sustainable development goals (SDGs) are tracked yearly.

In the field of study of this thesis the SDGs object of interest are those found in the following picture.

Figure 1: SDGs applicable in the beer industry

Many companies across the beer industry produce a yearly report of how their business activities impacted the SDGs. The reports share data and figures such as water reduction, yield improvement, CO2 emissions reduction, packaging recycling process, and investments. This tool is useful both for investors and for costumers, allowing for an evaluation of the company and of its efforts towards sustainability.

This premise on sustainability allows to understand why this thesis focuses on it: it is a feature that cannot be ignored by companies, but in the beer industry it is often overlooked, especially by smaller-sized breweries which do not possess the means to switch towards sustainable business models.
Understanding consumers' demand for sustainable beer can be useful for manager to price their products adequately and allows them to make the necessary investments which will yield higher profits in the long run.

1.2 Beer industry

This section will focus on what the existing literature is able to provide about beer industry and in particular sustainability in the sector. It is important to have a clear understanding of the factors characterising this field, how it works and what it is meant by sustainable brewing. Through knowledge of the industry comes and understanding

that sustainable characteristics of beer do not alter the composition of the product itself, but the means of production.

The beer industry is a very popular and important one, it is possible to find extensive literature on the topic, varying from its sustainability to its packaging, to its production process, to the carbonation and to customers preferences and behaviour.

Beer is considered to be the "fifth most consumed beverage" globally, after tea, carbonates, milk, and coffee (Olajire, 2020).

Europe is the second largest beer producer globally, with internal production of 390 million hectolitres of beer and consumption of 357 million hectolitres in 2012.
125,400 people are employed in this field, with 1000 of breweries being small, medium, and micro-breweries (Berkhout et al., 2014).
In 2012 the average beer consumption in Europe was estimated to be 108.1 Liters per capita.

The beer market is an interesting one as it is highly segmented, it is possible to divide it into four categories: brewpubs, microbreweries, regional craft breweries and large breweries.
The first three types are considered craft-breweries, distinguishing themselves from large breweries by the amount of beer produces annually and their brewing techniques and social culture.

Price increases of beer have a negative effect on the profitability of the entire chain, considering beer's demand elasticity and low switching costs to alternative products (wines and spirits) (European Commission, 2013; Global Insight and The Parthenon Group, 2005; Rojas and Shi, 2011). Consumers of beer are price-inelastic, they do not substitute commodities across the market segments, but they are segmented within market categories (Carley and Yahng, 2018).

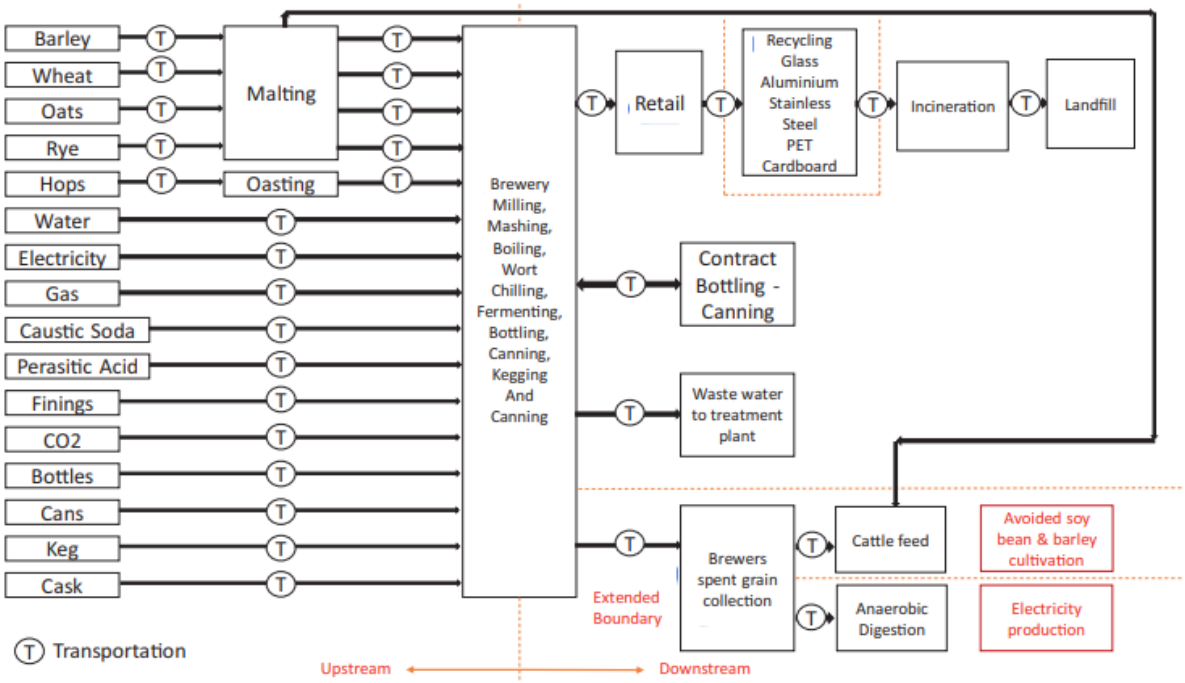
An important contribution in the beer market literature was made by Berkhout et al. (2014). His research has shown that the beer market in Italy has a major influence on

the economy as Italian brewing companies are focusing on innovation, sustainability, and responsible consumption.
It was also indicated that consumers made a shift from super premium to specialty beers and from cheaper beers and wine to specialty beers. The reason is that there are stricter BAC (Blood Alcohol Concentration) police controls for drivers. This results in consumers deciding to drink less while spending the same amount on more expensive higher quality products.

Consumers are interested in these new craft beers mainly for the different flavours and aroma, switching from the commercial brands. This phenomenon is also linked to the increasing attention paid to the nutritional components and health benefits associated with moderate beer consumption (Sohrabvandi et al., 2012).

Beer's production life cycle can be summarized as: raw material acquisition, production, distribution, consumer use, disposal, and recycling (Cimini et al., 2018). These stages can be then translated into cultivation, upstream processing, upstream transportation, brewery activity, downstream transportation, brewing and packaging waste (Morgan et al., 2021). Below is shown a graphical representation of the stages of beer production.

Figure 2: Life cycle stages of beer production with system boundaries to encompass all main processes



Morgan et. al., 2021

The entirety of the actions needed during the brewing process are energy-intensive, with a big amount of water used, creation of waste water and organic waste. It is thus interesting to understand how the brewing industry can be sustainable and which steps it can take to ensure a more environmentally friendly production.

A sustainable production is needed to endure freshwater shortages, climate changes, and degradation of natural ecosystems. These are issues by which the brewing industry is threatened but at the same time to which it contributes.

Brewing is an energy intensive process, and it generates potentially valuable wastes (Sturn et al., 2012).

Forssel and Lankoski (2015) explained that an important feature of food production is that it heavily employs scarce natural resources such as land, soil and water and therefore it is responsible to cause negative environmental impact.

Brewing sustainable beer can produce twofold benefits: cost savings from reduced inputs and attraction of new environmentally conscious consumers.

1.2.1 Business model for sustainability

Traditional brewing businesses are mainly profit-driven, while sustainable brewing businesses are based on profits, the planet, and people.

In existing literature the work of Schaltegger et al. (2012) is important as it highlighted an important distinction between business case *of* sustainability and business case *for* sustainability; the first type refers to a situation in which a business yields environmental benefits alongside economic success, and the benefits are just coincidental, not intentional.

On the other hand, the business case *for* sustainability is when economic success is achieved through purposeful and intentional activities for the environment. It means that there is a management activity which targets and plans for environmental and economic success at the same time. In the case of breweries a business case *for* sustainability can be expressed with a mission supporting the environment. This mission then has to be implemented through internal managerial practices, environmental assessments, and active environmental planning (e.g. ESG metrics tracking).

On the research carried out by Rosburg and Gretibus it was shown that a little less than half of the breweries in their sample conduct annual assessment (internal or external) to evaluate their brewing procedures, or to identify opportunities for sustainable improvement.

Benefits of an environmental focus of breweries can be summarised in the following table.

Table 1: Benefits of environmental focus

Input & external	Process	Output & impact
Purchase cost	Operations cost	Value from wastes
Resilience to scarcity	Defray upgrades	Disposal cost
Lower footprint	Lower footprint	Brand presence
Opens doors to collaboration		Brand leadership
		Market share growth

Source: Ball and MacBryde, 2020

Ball and MacBryde (2020) explain that breweries willing to employ sustainable practices have the potential to experience a wider range of opportunities.

The switch to a sustainable business model (SBM) must not be taken lightly. It comes with a number of challenges, which may be difficult to face especially for small-sized breweries (craft breweries). Larger companies are more equipped to pursue extensive environmental strategies, as they can also rely on larger production scales. The unit price of a beer, after switching to an SBM, would not see such an increase for large companies as it would in smaller breweries.

An important role is also played by networking. It allows smaller-sized breweries to discover/adopt new sustainable brewing techniques. Peer influence is an important aid in the sustainable development of breweries.

1.2.2 How sustainability is achieved in the beer industry

Existing literature relies heavily on practices of leading firms and focus less on understanding what conditions allow for the adoption of sustainable production practices.
These practices usually include: design, materials, packaging, distribution, reuse, recycle, waste reduction, and regulatory compliance (Yacob et al., 2018) and can be either value adding or support for value adding (Pande and Adil, 2019).
What is especially important, and challenging is understanding how companies can become more sustainable.

There are three broad categories in which it is possible to divide environmental issues in the brewing industry:

- Upstream : the production and transportation of raw materials which can become either beer or packaging;
- Operations: consumption of resources directly employed in the process of beer making;
- Downstream: all the resources used to transport and refrigerate the beer after it leaves the brewery.

There is extensive research on food and drink supply chains in diverse areas of life cycle analysis (Hagelaar and van der Vost, 2002), but it is especially scarce when it comes to breweries and the brewing industries.

Using a Life Cycle Assessment (LCA) calculation tool (Morgan et al., 2021) can help identify environmental hotspots in the brewing process, so that brewers know where to act and which mitigation measures to take.

Rosburg and Grebitus (2021) indicate that brewers can use internal benchmarking of key performance indicators (KPIs) to manage energy and water use and waste generation.

Examples of such KPIs are the water-to-beer ratio or the total diversion rate.

The use of KPIs allows brewers to analyse past and current performances, comparing their production to the one of their peers thus being able to develop plans to enhance energy and waste management decision making processes.

In fact, in the absence of a systematic review of operation and benchmarking of KPIs it is difficult to establish how a brewery is performing in the sustainability aspect (Patterson et al., 2016).

Ball and MacBryed (2020) propose a summarized process view of improvements to production operations that UK brewers have put into place, which can be used to extract KPIs and have a wholesome picture of how breweries can be sustainable

Table 2: Improvements to beer production to be more sustainable

Type	Input	Process	Output
Materials and consumables	Regional sourcing Develop suppliers (farms) Reuse (others' waste bread)	Standard Operating Procedures (SOPs) Measure Stop loss (scrap, waste) Reduce use (double brew) Reuse (yeast, cleaners)	Segregate to maintain value Reuse (farms, foodstuffs, Anaerobic digestion (AD))
Water	Reduce by using available resource (rainwater) Smooth utility demand	Measure Stop leaks Reduce use Reuse	Prevent (Filter/settle before discharge)
Energy	Renewable energy Reuse others' wastes (AD) Reduce by using available resource (e.g. outside air)	Prevent use (insulate) Stop use (switch off) Reduce use (set points, minimise brew cycle, efficiency equipment)	Reuse (Heat exchange)
Packaging, storage and transport	Reduce Use recycled Use biodegradable	Reduce (energy efficiency)	Reduce (light weighting, consolidation, vehicle efficiency)
People		Sharing knowledge Training / develop skills Foster behaviour change Process improvement culture Promote circular thinking	Certification for market advantage Customer awareness Promote landfill diversion

Rosburg and Gretibus (2021) found that breweries producing less than one-thousand barrels of beer annually are less likely to have a SBM and environmental mission. In fact they have a lower tracking index.

It is important to note that there are barriers to sustainable brewing processes, mainly: financial barriers, organizational barriers, lack of costumer pull, lower cash flow, lack of perceived benefits. (Ball and MacBryde, 2020).

Among different pieces of literature on the theme it is possible to identify five main challenges that need to be faced in order for breweries to be more sustainable.

Challenge 1: Decrease amount of freshwater usage

Most of the water used during the brewing process is waste water used for cleaning, cooling, and packaging.

Breweries can diminish their water usage by implementing policies that refrains from spillage, eliminating the need to clean the facility floors. There is also the possibility to re-use municipal wastewater as a result of new and advanced purification systems.

Challenge 2: Reduce the transportation distance

According to the report "Food System Impacts on Biodiversity Loss" of United Nations Environment Programme (UNEP) in collaboration with Chatham House and Compassion in World Farming (2021), the global food system contributes around 30% of all anthropogenic emissions. This also accounts for the transportation of food.

Brewers should diminish the length of their supply chain; i.e. buying local hops and malts.

They should also work on improving their means of transportation by making them more efficient (less travels, more volume transported at once).

This is especially difficult for smaller-sized breweries as they mainly ship smaller batches and cannot afford big lorries. On the other hand smaller-sized breweries can be more sustainable than bigger-sized companies as they rely more on local and short-chain products and raw materials, relying more on organic farming. (Graefe et al., 2018)

Challenge 3: Modify agricultural practices

Barley and Hops are water-intensive plant species. Denby et al., (2018) were able to develop a genetically modified strain of yeast that can produce terpene. Terpene is the compound responsible for the hop-effect of beers. This discovery removes the need for hops, reducing water usage.

Additionally it is important to work with local farmers who employ sustainable agricultural practices.

Challenge 4: Lower the carbon footprint

According to the Brewer's Association (2007) a beer barrel (117L) requires 50-60Kwh to be produced.

This challenge may be addressed through the transition to renewable energy sources, as evidenced by the commitment of the renowned beer brand, Budweiser, which aims to exclusively rely on renewable energy by the year 2025.

Challenge 5: Introduce a closed-loop system to reduce waste

A sustainable business model must take into consideration the principles of circular economy to keep products and materials in use as long as possible.

This can be achieved by utilizing spent grains as animal feed, a practice advocated for shelf-life preservation (Mussatto et al., 2006). Additionally, CO2 reclamation systems can be implemented to utilize the carbon dioxide generated during the brewing process for carbonating the beer.

1.2.3 Important data about sustainability in the beer industry

This paragraph will illustrate data that elucidates the current industry standards in the brewing sector.

These figures are useful to understand to which measure the brewing industry is an energy intensive industry and how much SBM can decrease beer's carbon footprint.

A single pint (0.5L) of beer can have a carbon footprint of 900g CO2. To explain what this means it is useful to propose a comparison: 900g of CO2 is the 14% of the daily average carbon footprint derived from meals of a USA citizen.

Rye crops are found to be responsible for the highest greenhouse gas emissions (GHG), with figures reaching 870g of CO_2 eq. per kg. This is a particularly high result especially if compared to the GHG emissions of wheat, barley, and oats: 570-590g of CO_2 eq. per kg. (Rajaniemi et al., 2011).

The grains can be employed again after beer production, "spent grains" are considered a valuable co-product.

Insoluble raw ingredients (spent grains) account for an approximate 85% of solid input.

Brewing stage: it relies on a large amount of thermal energy, consuming between 4-7L of water per 1L of beer (Funk, 2008; Olajire, 2020) although this number may vary across different studies, such as the one of University of Vermont (2015) where the beer to water ratio is found to be 1:10L.

Malt: to process one tonne of malt $3.5m^3$ of water are required. The input of malts per litre of beer varies from 0.15 to 0.023 for smaller breweries (Morgan et al., 2021), while for a multinational brewery (i.e. Birra Peroni Srl) the figures are significantly lower (0,11 kg of malt per L of beer). This is explained by a higher brewery efficiency obtained by a larger scale of production.

An important factor contributing to low environmental efficiency of beer production is the use of products necessary for maintaining and cleaning the facilities (Cordella et al., 2008).

The stages which are found to be a significant environmental hotspot are cultivation and packaging (Koroneos et al., 2005). Reusable stainless-steel kegs generate lower emissions than glass bottles. Packaging has a significant impact (Amienyo and Azapagic, 2016), steel can have lower impact than glass bottles, in fact the heaviest carbon footprint belongs to beer sold in 330ml glass bottles.

After cultivation and packaging the most energy intensive process is hop processing.

It is noteworthy to highlight that lager beer has a high carbon footprint due to the fact that it requires higher electricity usage for its cooling during the fermentation and maturation process. (De Marco et al., 2016).

For the micro-breweries object of Morgan et al., 2020 study, the global warming potential of 1 L of beer varied from 760g of CO_2 eq. per L to 1900g of CO_2 eq. per L of beer. Multinational brewery Peroni has reported that, for the beer distributed in 0.66L and 0.33L glass bottles the footprint is 567g and 665g of CO_2 eq. per L of beer, while when using a 0.33L aluminium can or 30L reusable stainless-steel kegs the footprints are 692g and 248g of CO_2 eq. per L of beer.

1.2.4 What are the existing certifications for sustainable beer

The Brewers Association in the USA provides a Sustainability Benchmarking Tool, developed to help brewers to benchmark and track KPIs.

A third-party certification program is helpful especially for small scale breweries as it provides customers with the proof that the performance and/or the environmental claims of the brewer are validated by an external organization. This can lead to new customers and additional revenue.

As mentioned in the previous paragraphs it is quite important to analyse and benchmark KPIs in order to build a SBM. An impediment for benchmarking and tracking of production is the time required to collect, input, and analyse data.
External entities can play an important role by providing benchmarking tools, entering the data in the tools or even in giving assistance in identifying the right data.

National business associations (e.g. BA) are useful in providing the adequate benchmarks for the industry.
There are also local programs (e.g. IGBC) which support SMEs in regional clusters.

Many bigger sized brewing companies (e.g. Carlsberg Group, Molson Coors, and The Heineken Company) are publishing their own sustainability reports and declarations of long-term green goals.

1.2.5 Common misconception about sustainable beer

It is crucial to emphasize that the term "craft beer" does not inherently imply “sustainable beer”.
Environmental concerns play a significant role when choosing to consume craft beer (Yang et al., 2002). But although the craft beer sector has the reputation of being a “green” and sustainable sector, there are evidence demonstrating its strong impact on the environment (Morgan et al., 2021). As craft beer are more flavourful than industrial beer, they require more resource inputs to extract the flavours of the ingredients (Brewers Association, 2016; Olajire, 2012).

Water and energy consumption per unit is smaller for macro-brewers (Olajire,2012) as these types of producers have the monetary resources to invest in clean-in-place

systems, solar panels, carbon dioxide recovery systems, an overall more efficient production with less wastes.

As described above, differently from organic food, which has the potential to protect the health of the consumers, sustainable beer is achieved through the production process which does not change the composition of the drink.
A sustainable beer and a normal beer should be identical. If consumers would be willing to pay a premium for the sustainable option it is merely for the environmental aspects of the product, not its functional quality or its effect on health.

1.2.6 Beer consumption habits of consumers

When analysing factors affecting beer choice and consumption from a consumer preference point of view it is possible to divide them in two categories: beer attributes and factors related to the purchase process.

Beer attributes

As explained by Sester et al. in 2013: "*past sensorial consumer experiences affect present choice motivations, which in turn depend on brand influence, received stimuli, mental representations together with consumer propensity to refuse a beer basing this attitude on taste and packaging, even if taste was found to be more important in determining such behaviour*"
Sester et al., 2013 expect consumers to reject a beer if flavours expected, such as bitterness, texture characteristics such as sparkles, or physiological qualities such as being thirst-quenching are not confirmed in the act of drinking.
Alternative beers are chosen to express a preference for taste and individuality (Choi and Stack, 2005).

The importance of aroma is higher for consumers of commercial and craft beer consumers than for drinkers of purely commercial beer (Aquilani et al., 2015).

Purchase Process

The consumer's process of purchasing beer encompasses considerations such as price, brand, distribution, differentiation, packaging, and information.

There is existing literature explaining how the above-mentioned factors influence consumer's decision-making process of consumption of beer.

- Price: consumers are willing to pay a premium when a beer comes from a preferred country-of-origin (Speece et al., 1993), in fact consumers believe that higher prices indicate better quality or status of the product, on the other hand lower prices are a sign of more affordable and mass-produced drinks (Ascher, 2012);

- Brand: as stated in AssoBirra (2012) Italian consumers, when buying beer, especially in supermarkets, have clear ideas. They mostly (53%) buy according to their knowledge of both products and brands, they spend less than 1 min (59.5%) choosing and are loyal to brand and format (47.6%).

  Observed willingness to pay for most of the consumers reflects the influence of their past experiences. Brand capital in fact, evolves endogenously as a function of consumers' life histories and it decays slowly as it is formed. Brand preferences have a key role in beers with high levels of advertising and social visibility (Bronneberg et al., 2012). According to Galizzi and Garavaglia (2012): "*Consumers are affected by brands in their evaluations more than by the intrinsic characteristics of the product"*. Brand preference is a result of brand loyalty, consumers choose a particular brand when there are other competing brands present but are also willing to accept substitutes product if the preferred brand is not available (Amadi and Sunday, 2014);

- Distribution: consumers are shown to have preferences shifting towards off-trade, as beers are distributed through different channels, allowing them to drink the preferred brand also at home (Ascher, 2012; AssoBirra, 2012; Brink et al., 2011);

- Differentiation: when it is achieved by different manufacturing processes it is not recognised by consumers, while differentiation through innovative emotional appeal is appreciated and recognised (Choi and Stack, 2005);

- Packaging: it is a very variable factor, it reflects consumers' preference, culture, climate, and geographical area. But a trend is shown for preference for more sustainable packaging. (Donoughe et al., 2012). According to Sester et al., 2013, packaging trigger semantic association, but consumers are more willing to reject a beer due to its taste than from its packaging;

- Information: consumers need to be provided information about the beer they are about to purchase. González-Benito (2006) asserted that if environmental initiatives are not appropriately communicated to consumers, breweries can miss the opportunity to help the customers form an educated opinion on their product and on the performance of their brewery. Lee et al. (2006) explained that beer nutritional components and information, when provided to consumers can affect their purchase choice. Wright et al. (2008), stated that the availability of nutritional information increases beer consumers' perceptions of the healthfulness of the beverage.

When focusing on "organic beer" its acceptance depends on the consumers awareness on naturalness and positive effects of organic technology on health and the environment (Caporale and Monteleone, 2004).

Brewers typically do not know if consumers are willing to pay a premium for sustainably brewed beer. For this reason it is important to understand consumer's willingness to pay for sustainable beer.
If brewers were to be surer of the fact that consumers would be willing to pay higher prices for sustainable beer, it would be easier for them to begin adopting sustainable production practices. Brewers would have higher trust in the fact that the switching costs for sustainability can be sustained by higher prices and no difference in sales.

For this reason my thesis focuses on this topic.

1.3 Willingness to pay for sustainability

Consumers have a significant role in the product development process, although often firms consider them to have a passive and reactive role (Hoffmann, 2007). When developing sustainable products companies often fail to integrate the consumers' view and needs into the product development process as they are focused on costs, improving efficiency, and complying with sustainability legislations (Martensson and Westerberg, 2016). For products with highly involved consumers it is necessary to have an active consumer integration in the product development process as consumers have high interest level and knowledge.

If manufacturers produce better targeted products, it could help address the existing attitude-behaviour gap affecting sustainable consumption (Liu et al., 2012; Hughner et al., 2007).

For a successful Food Supply Chain (FSC), and in this case for brewing supply chain, it is fundamental that the way beer is produced aligns with the characteristics of how it is delivered to the market, which must align with consumer preferences and demand. For this reason it is important to understand consumers' WTP, as it allows for a better alignment of the whole supply chain.

As this thesis' purpose is to analyse and understand consumers' willingness to pay (WTP) for sustainable beer this paragraph will describe what it is meant by WTP and specifically WTP for sustainability.

WTP is the highest price a consumer is willing to pay for a specific good or service. It is usually represented by a price in euro or a price range.
Consumers may be happy to pay less than this price, but they will not be willing to pay more.

Variance in WTP among costumers depends on differences in the customer population, which can be either intrinsic or extrinsic.

Extrinsic differences

This typology of differences are characterized by their observability. They are factors which can be determined without asking about them directly to the consumers. For example the age, gender, education, income, country of origin.

Intrinsic differences

These factors are also referred to as "unobserved differences", some examples are: risk tolerance, desire to fit with others, and as in this thesis' object their personality traits.

A consumer's WTP is not a static value. It may vary as the degree of the good's need varies, if there is a shrinkage in its supply or if there are innovative marketing strategies that make the good more appealing.

Understanding consumers' WTP is helpful for companies to determine its prices in a way that allows them to maximize profits. WTP is especially useful when companies adopt pricing strategies based on value, not on cost or on competition.

Usually there are four ways in which it is possible to elicit consumers' WTP:

- Surveys and Focus Groups: directly ask a large sample of consumers by developing appropriate questions in order to obtain reliable data;
- Conjoint Analysis: a survey in which respondents are required to rank different bundled features;
- Auctions: they tie the revelation of consumers' preference to the probability of obtaining it;
- Experiments and Revealed Preference: using data about past choices of consumers. It is based on what consumers do instead of what they say. The downside is that there might be missing data which lead to misinterpretation of the results.

In this research the modality used to elicit consumers WTP is through a survey administered to beer consumers.

In recent years the literature on WTP for sustainability has been increasing at a rapid rate. Consumers' increasing concerns for the environment are pushing them to switch to

a more conscious consumption of goods and services, for this reason a vast number of studies has been carried out to help companies understand their consumers' needs and expectations.

Among different pieces of literature there are a few factors that are recurrent in their influence on consumers' WTP: environmental concern, with its positive influence, green skepticism, with a negative one and knowledge about the product.

Environmental Concern

Environmental Concern can be described as "a general attitude that relates to consumers' cognitive and affective evaluations of the attitude object *environmental protection* (Bamberg 2003, Momberg et al., 2012). It is a measure of how much consumers are aware of environmental issues, their concerns about the risks, the consequence of their action or lack thereof (Dunlap and Jones, 2002; Shen, 2012).

Consumers showing high level of environmental concern are seeking products with lower impact on the environment and thus are willing to pay more (Cerri et al., 2018; Testa et al., 2020; Sadiq et al., 2021; Canio et al., 2021).

Environmental Awareness

Prior literature shows that Environmental Awareness can positively influence consumers' WTP for sustainability. It is related to their knowledge about the product itself and it is considered to be a significant predictor of an individual green purchasing behaviour (Testa et al., 2015). Lee et al. (2020) explained that high knowledge corresponds to a higher WTP.

Green Scepticism

According to Goh and Balaji (2016) lower knowledge of the product and lower environmental knowledge may lead to green scepticism. The authors described green skepticism as: *"the tendency to doubt the environmental claims or environmental performance of green products".*

Sceptical consumers are likely to believe that green claims of packaging/advertising are due to profit making reasons or to improve the firm's image.

Green scepticism is not an enduring and stable disbelief, but it may vary depending on situation and context (Pomering and Johnson, 2009; do Paço and Reis, 2012).

Nonetheless green scepticism has an indirect negative effect on WTP for sustainable products through the reduction of environmental concern and the disregard to increase one's environmental knowledge. In fact sceptical consumers are usually not motivated to seek additional information about a sustainable product.

There is not a vast existing literature about willingness to pay for sustainable beer. Below will be reported the existing reliable literature on the topic.

Staples et al. (2020) conducted a study on a sample of US beer consumers to estimate their WTP for environmental attributes in beer. The authors focused on the effect of eco-labels carrying information about: amount of energy and water consumed in the production, solid waste generated, primary packaging and localness attributes. This allowed for an estimation of the total WTP and of the marginal WTP for each of the attributes. Their efforts showed that there is significant demand for sustainable beer as 75% of the consumers object of their study are willing to pay a premium for sustainably brewed beer.

Also in Carley and Yahng's (2018) research consumers were found to have high WTP for sustainable beer which depends on their awareness of the purchase behaviour, on their consumption patterns and on their lifestyle.

Rosburg and Gretibus (2021) analysed the perceived consumers' WTP by Iowa brewers: the majority believes that some of their customer would be willing to pay a small (1-5%) premium for sustainable beer, but half of the respondents stated that more than 40% of their customers are not willing to pay a premium for sustainably certified beer.

1.3.1 Sustainability as a liability: a trade-off between sustainability and WTP

Prior literature shows that a third of the consumers claim to prefer sustainable brands (Unilever, 2017), but there is a gap between these communicated attitudes and the actual purchase behaviour (Auger and Devinney 2007; Luchs et al. 2010). This difference can be explained by the perceived trade-off between sustainability and functional product quality (Luchs and Kumar, 2017; Luchs et al., 2012).

To sum up the "sustainability liability effect" is when consumers might prefer non-sustainable products as they are perceived to be more effective than the sustainable alternatives (Lin and Chang, 2012; Luchs et al., 2010; Pancer et al., 2017).

Skard et al. (2020) and Chang (2012) believe that consumers may infer lower quality of products even when the green attribute is non-product related (e.g. packaging). Sustaining these theories is also the work of Pancer et al. (2017) documenting that a single environmental packaging cue (e.g. eco-label or the colour green) reduces the perceived product efficacy. This phenomenon is especially expected to happen in the evaluation of fast-moving consumer goods (FMGC) when decisions are made fast and with low efforts. Consumers do not reflect on the lack of a true negative relationship between the peripheral attribute and the quality/function of the product. The product object of this thesis falls under the category of FMCG, so it is reasonable to believe that this phenomenon is applicable to beer.

Luchs et al. (2010) research proved that the effect of sustainability on preference is not uniformly positive or negative as it is affected by consumers' judgments about other attributes.
Lin and Chang (2012) and Newman et al. (2014) propose theories suggesting that the trade-off evaluations are not based on the actual consumers' knowledge about the products' sacrifice of quality for the sake of sustainability.
Heuristics and simple inferences play an important role in the mind of consumers, who may believe that there is a zero-sum heuristic, meaning that a firm's effort towards sustainability imply resource reallocation away from product quality. This is also confirmed by Chernev and Carpenter (2001): *"consumers may infer that products that are superior on one attribute will be relatively inferior on other attributes".*

Discrepancies between consumers' stated preference versus their purchase decisions may come from a social desirability point of view (Luchs et al. 2010), in observed contexts individuals may declare to prefer the more sustainable options, but in the setting of unsupervised decisions they will tend to buy the non-sustainable product.
The sustainability liability effect is moderated by consumers' attitude towards sustainability. (Luchs et al. 2012; Steenhaut and Kenhove, 2006).

Researchers have also found that an improved corporate social responsibility does not always translate into benefit for the company (Luo and Bhattacharya, 2006; Sen and Bhattacharya, 2001).

1.4 Product involvement, product knowledge and perceived quality

1.4.1 Perceived Quality

Expectations play an important role in the food behaviour of consumers, Cardello (1994); Carello and Sawyer (1992) explained that expectations influence food behaviour through assimilation or contrast processes. They can improve or degrade the product evaluation, perception, and consumption.

Expectations directly affect preferences: Lee et al., 2006, proved this through an experiment. In their research they experimented by creating a beer adding a few drops of balsamic vinegar to it, they then asked participants to taste the new beer in two settings: firstly a blind taste, with no information given about the product and secondly, they informed the consumers about the composition of the new beer. Then they asked participants to rate the beers. Results showed that the balsamic vinegar beer was significantly preferred in blind tasting than in a tasting condition where information about the composition of the beer were previously presented to the sample.

Information about the manufacturing process influence beer acceptance: there is a lower acceptance for “genetically modified” beer, and a higher one for “organic” beer.

In their study Sester et al. (2013) confirmed that beer representation elicited from packaging or tasting evaluations can be distinguished in three sets of mental representations: affective, sensory/analytical, and semantic/experience based.
It is though important to be aware that consumers create associations with different moments of consumption as this can be used to create appropriate marketing campaigns, enhancing consumers’ experience (Sester et al., 2012).

Confirmed by Peattie (2001), Griskevicius et al. (2010) and Newman et al. (2014) sustainable products are often considered inferior to their conventional counterparts. Also Li, McCluskey and Messer (2018), Waldrop and McCluskey (2018) present that sustainably produced products may face negative connotations from consumers believing that sustainable attributes translates to lower product quality, showing that some products may be affected by the sustainability-liability effect.

1.4.2 Product Involvement and product knowledge

Product involvement and product knowledge are two factors to be analysed and explained together as they are deeply connected, in fact high involved consumers actively and frequently look for information about the product (Hanzaee and Taghipourian, 2012).

It is possible to provide various definitions of Product Involvement, that, when examined collectively, converge to form a comprehensive understanding. This plurality of definitions enriches the overall comprehension of the subject. The diverse definitions, instead of conflicting, serve as complementary facets, each shedding light on specific dimensions and aspects.
Sherif and Cantril (1947) defined it as "*the degree to which an individual relates to himself or herself through activity stimuli or situational feelings";* Wulf et al., 2001; Mittal, 1995, Zaichkowsky, 1985; Kong and Zhang, 2013 argue that product involvement is the "*consumers' enduring perceptions of the importance of the product category derived from his innate desires, values and interests".* Mittal and Lee (1989) described it to be the individual's interest in and attention to the target topic based on its own value. Consumers are considered to be involved with a product when it signifies something of substantial value or importance in their lives (Vermeir and Verbeke, 2006).
Laurent and Kapferer (1985) argue that differences in the decision-making process of consumers depends on the degree of involvement with the product.

Scholars indicate three types of product involvement:

- *Personal involvement* is defined as the intrinsic interests, values, or needs that serve as motivational factors driving an individual toward a particular object, as articulated by Houston and Rothschild (1978). To illustrate, an individual with a strong commitment to maintaining a health-conscious lifestyle may exhibit high levels of personal involvement in organic food and beverages.

- Conversely, *physical involvement* pertains to the attributes of an object that contribute to differentiation and stimulate interest, as elucidated by Bloch and Richins (1983) and Zaichkowsky (1985). For instance, an individual possessing a profound fascination with aspects such as engine efficiency, technology, or cabin comfort may experience heightened levels of involvement with automobiles.

- Furthermore, *situational involvement* refers to circumstances that momentarily elevate the significance or interest in a particular object, as expounded by Bloch and Richins (1983) and Zaichkowsky (1985).

Products that are hedonic or self-concept expressive such as beer evoke an enduring involvement, while functional or utilitarian products can be important to costumers without developing an enduring involvement.

The knowledge of a product category influences the consumer's decision to buy it, as it is possible to make objective evaluations (Tsiotsou, 2006). Higher involvement pushes the motivation to evaluate it and look for information pondering the pros and cons of the product.
In the case of low involvement, the product's attributes are less likely to heavily impact the purchase decisions, and consumers are more likely to make a decision based on a superficial examination of salient cues and stimuli (Coulter, 2005).

According to Dodd et al. (2005), consumers characterized by high involvement in the context of wine selection exhibit a greater reliance on the intrinsic attributes of the wine compared to their low-involvement counterparts. This inclination among high-involvement consumers stems from their endeavour to optimize the anticipated satisfaction derived from their product selection, employing a comprehensive decision-

making process. This process involves extensive brand comparisons, increased time investment, and reliance on multiple attributes, as documented by Chaiken (1980), Assael (1981), and Laurent and Kapferer (1985).
Notably, consumers characterized by a heightened involvement typically possess a substantial level of knowledge and exhibit a propensity to pay higher prices for the product, as highlighted by Lockshin et al. (2006) and Yuan et al. (2005).
High-involved consumers are more inclined to purchase sustainable products characterised by having a higher price also when having to sacrifice quality.

As discussed above past experiences and expectations can have a negative effect on consumers' perception of sustainable beer. This effect can be mitigated by the degree of knowledge of the product and product involvement. My thesis will focus on understanding if higher knowledge and product involvement will lead to more informed choices translating in higher willingness to pay for sustainable beer. It will be assumed that more involved and informed consumers will automatically nullify the effect of perceived quality on their decision-making processes to pay for sustainable beer.

In this research there will also be a focus on if and how perceived quality of the product will affect the influence of the Big Five Personality Traits on willingness to pay for sustainable beer.

1.5 Big Five Personality Traits

An important element of this thesis are the Big Five Personality Traits and their influence on consumers' WTP for sustainable beer.

The personality of individuals is important as it describes the intensity of their thoughts, feelings, behavioural patterns, and relationship with other people. It is a developing part of each individual, from birth to around the age of thirty, when it is believed to be stable (McCrae and Costa, 2003).
The sum of an individual's personality traits reflects how he/she will react in different situations, what choices he/she will make. How impulsively will the decisions be taken, the degree of emotion or rationality involved in the process. Personality is considered to

be a core part of what motivates and individual's beliefs, attitudes, values, for this reason it is logic to expect that differences in personality influence environmental engagement.

The Big Five Personality is a model and a psychological theory assuming that an individual's personality can be represented by five factors that will be described below. It is often referred to as the OCEAN model.

Openness To Experience

This trait is linked to being curious, creative, individuals with high Openness to Experience score have a preference for variety and novelty. Openness to experience is usually thought to have a positive influence on attitude towards sustainable products and WTP for sustainability as it is associated with aesthetic interests and the curiosity to try new things. This is usually the personality traits with the highest influence on WTP as showed in Gustavsen and Hegnes research (2020).

Conscientiousness

Conscientious individuals are organized, self-disciplined, hard-working and goal oriented.
Higher levels of self-discipline, perfectionism and competence are related to planning for better outcomes for the future and thus higher level of environmental concerns.

Extraversion

Associated with assertiveness, sociability, talkativeness, seeking stimulation in the company of others. Extravert individuals are often attention seeking ones and authoritarian/dominant. These individuals maximise their gains from social relations resulting in an increased engagement with others (Ashton and Lee, 2007; Nettle, 2006). Individuals who are reserved and reflective score low on Extraversion and are considered Introverts.
Usually extraversion is negatively or neutrally associated with WTP for sustainability.

Agreeableness

It can be described as the tendency to be trusting of others and be compassionate. Low score on Agreeableness means presenting traits of suspiciousness and being

antagonistic towards others. This trait is usually linked with environmental concern, as it entails an altruistic behaviour and concerns about the environment.

Neuroticism

It is a trait of individuals who react badly to psychological stress. It is related to higher levels of irritability, anger, anxiety, and vulnerability thus negatively affecting related to environmental engagement (Milfont and Sibley, 2012).

The Big Five Personality traits model is generally recognized and widely used as a useful tool to outline and understand personality patterns, but scholars believe that it is not possible to summarize in five traits all the different aspects of human's personality as it is made of complex feelings patterns, thoughts, and behaviours.

In this piece of research I will try to find the relationship between consumers' willingness to pay for sustainable beer and their big five personality traits.

The following table lists some of the most important studies that have been used to develop the quantitative research on which this thesis is based.

Table 3: The most relevant scientific articles related to sustainable beer, Big Five Personality Trais, consumers' Willingness to Pay for sustainability.

Title, Author(s), Publication year	**Journal of Publication**	**Main Topic and Context**	**Content and purpose**	**Type of analysis**	**Results and conclusions**
When is Sustainability a Liability, and When Is It an Asset? Quality Inferences for Core and Peripheral	Journal of Business Ethics	When is sustainability a liability. Context: three categories of products: shampoo,	The authors investigate how different types of sustainable features (green core attributes vs. green	Four experimental studies to test six hypotheses. Study 1, 2, 3 test the type of green attribute as a	The studies shows three consistent patterns: 1. consumers infer lower functional quality in the presence of

Attributes Siv Skard, Sveinung Jørgensen, Lars Jacob Tynes Pedersen. 2019		body lotion, drain opener. Linked to the perceived gentleness/strength.	peripheral attributes) are valued by the consumers in respect to the product being considered gentleness-dependent or strength-dependent. A study to investigate the consumers' inference about the product's functionality.	within-subjects factor, through online surveys (N=436), framed field experiments (N=181) and (N=164). Study 4 (N=407) replicates the findings in a between subjects design.	peripheral green attributes of strength dependent products (sustainability liability effect). 2. Consumers infer higher functional quality in the presence of a green core attribute of gentleness dependent products. (sustainability asset effect) 3. There is either a negative or no effect of the green peripheral attribute on functional quality inferences in the gentleness dependent category.
Consumer	Agribusiness	Consumers'	The purpose	Stated	The result of

willingness to pay for sustainability attributes in beer: A choice experiment using eco-labels Aaron J. Staples, Carson J. Reeling, Nicole J. Olynk Widmar, Jayson L. Lusk. 2020		WTP for sustainability in beer: experiment on eco-labels Context: sustainable beer and ecolabels.	of this study is to understand if sustainable beer breweries can attract new customers by differently labelling their products.	preference choice experiment on beer consumers to estimate MWTP for five attributes using a latent class model: a) amount of water consumed in production b) amount of energy consumed in production c) amount of solid waste generated in production d) primary packaging e) localness. This is to test which attribute consumers prefer the most. The model estimates different utility functions for	the survey highlights that there is an important demand for sustainable beer: 75% of beer consumers are willing to pay a premium for sustainably produced beers.

				different consumer classes. The authors use a discrete choice experiment in a five-part survey (N=825).	
Consumers' Motivations Driving Organic Demand: Between Self-interest and Sustainability Sylvette Monier-Dilhan, Fabian Bergès 2016	Agricultural and resource Economic Review, vol. 45/3, pp. 522-538. Published by Cambridge University Press.	Analyses consumers' motivation when buying organic food: sustainable development or self-interest? Context: consumers' shopping habits and shopping basket analysis.	The article investigates the shopping basket of consumers in order to make assumptions on customers' reasons for buying organic food. It looks at their behaviour instead at analysing their declarations of intent through a questionnaire . In fact the main purpose is to answer the question of "do	The analysis relies on the 2008 and 2009 Kantar Worldpanel data of 22,539 French households shopping habits. The authors developed a basked choice model based on Utility taking into consideration four types of food: Eggs, Coffee, Margarine, and Cooked Ham.	A marginal change in the price of the organic produces does not have an impact in the consumer's decision of buying organic vs. conventional products. But the main result of this study shows that environmenta l motivation can predict the purchase better than health motivations.

			consumers buy organic food to promote sustainability or to meet their desire for healthfulness and-or quality? "		
Willingness to pay for organic products: Differences between virtue and vice foods Jenny van Doorn, Peter C. Verhoef 2010	Elsevier	Understanding of (un)willingness to pay for organic food and if it differs between virtue and vice food categories. Context: variety of households virtue and vice foods (orange juice, jam, rice, coffee, beer …) .	In this paper the authors investigates different hypothesis about WTP for organic food, such as: if the organic claim negatively(positively) effects the quality perceptions of vice (virtue) products, if the positive effect of a perceived organic claim is stronger for vice products than for	Lab experiment with a student sample, with manipulation of vice/virtue nature of the products using priming techniques (N=172). The authors employed a 2x2 between-subjects experimental design. Open ended questions with direct WTP questioning. Then large-scale study on	The three studies show association between organic products and higher prosocial benefits, an association which is greater for vice products. The authors explains this as a guilt-reducing mechanism. Organic vice food has negative quality inference, this is due to the decreased

			virtue ones. Lower quality perceptions are compensated (partially) by higher prosocial benefits but nonetheless translate in lower WTP.	an online panel (N=737) and direct WTP questioning with same measure of study 1. Final study applying the BDM method to elicit WTP (N=233) with monetary compensation depending on the answer, this is in contrast with the theoretical WTPs of the first two studies.	amount of enjoyment or to negative taste inference. Quality is positively related to WTP, the effect being stronger for virtue products.
"Yes, but this Other One Looks Better/Works Better": How do Consumers Respond to Trade-offs Between Sustainability and Other Valued	Journal of Business Ethics vol. 140, pp. 567-584.	How customers' response changes when moral attributes of a product are traded-off for sustainability. Relation to the nature of the product:	Understandin g if the willingness to switch to a sustainable product is higher (lower) when the products shows hedonic (utilitarian)	Studies 1A and 1B: product choice task measuring the participants anticipatory emotions (N=149) (N=247).	Consumers' response when there is a trade-off with or in favour of sustainability depends on what is being traded off. The likeliness of consumers'

Attributes? Michael G. Luchs, Minu Kumar 2017		hedonic or utilitarian. Context: utilitarian vs hedonic products (kitchen blenders, calculators vs digital audio players, watches vs sunglasses vs coffee makers).	characteristics. Attention on the perceived importance of these characteristics.	Study 2 employs relative purchase likelihood in an online study (N=149).	choosing a product that trades off hedonic values in favour of sustainability is higher than the one of consumers trading off utilitarian value products.
The Sustainability Liability: Potential Negative Effects of Ethicality on Product Preference Michael G. Luchs, Rebecca Walker Naylor, Julie R, Irwin, & Rajagopal Raghunathan	Journal of Marketing, Vol. 74, pp. 18-31	Understanding the sustainability liability effect: how the type of products influences the degree by which sustainability enhances/lowers preferences. Context: Negative effect of	The authors suggest that sustainability may not always be an asset, even though most consumers care about social and environmental issues. The extent to which sustainability strengthens preference depends on the type of	Four theoretical studies based on Implicit Association Test (IAT) 1 observational field study with the purpose of eliciting consumers' decision-making process in a real consumption	Sustainability can be either an asset or a liability. It's not possible to say that there is one uniform effect of the attribute, because it depends on the nature of the product (strength dependent or gentleness dependent).

2010		ethicality on product preference, using Baby and Car shampoos as research products.	benefit that consumers value most for the product category in question. The result of these associations is that the positive impact of product sustainability on consumer preferences is diminished when strength-related attributes are valued, sometimes leading to a preference for less sustainable alternatives.	context.	Sustainability influences consumer's judgements about the other product attributes (quality/functionality/…). In the case in which sustainability is seen as a liability the study showed that by providing explicit cues about the product strength the negative effect is mitigated.
The building blocks of drinking experience across men and women: A case study with craft and	Appetite, vol. 116, pp. 345-356	Understand the building blocks of the drinking experience in consumers that search for an	Assessing possible differences in drinking beer between genders and consumer habits.	Two conglomerate analyses to evaluate similarities between themes and between	The building blocks of the drinking experience are similar across beers (industrial vs craft).

industrial beers Carlos Gomez-Corona, Hector B. Escalona-Buendía, Sylvie Chollet, Dominique Valentin 2017		experiential consumption. Context: beer consumption determinants.	Beer is chosen as it represents two attitudes: experiential and functional. The purpose is to see how the different building blocks are involved in the experience of drinking and how the involvement differs between men and women. The building blocks are: 1. Attitudes toward beer 2. Sensory experience 3. Consumption habits 4. Affective experience 5. Cognitive experience 6. Shopping experience	focus groups. Computation with the Jaccard coefficients across themes and sessions to measure similarities among a set of samples.	Habits, attitudes, shopping experience and beer benefits shape the pre-purchase experience, cognitive dimension, sensory dimension, and affective dimension shape the core consumption experience together with social vs. individual consumption. New habits formation and new attitudes generation are responsible for the remembered consumption experience.

			7. Individual vs. social experience 8. Beer benefits.		
Thirsty work: Assessing the environmental footprint of craft beer Dyfed Rhys Morgan, David Styles, Eifiona Thomas Lane 2021	Sustainable Production and Consumption. , vol. 27, pp.242-253.	Assessment of the environmental footprint of craft micro-breweries in Wales. Context: environmental footprint of craft beer, industrial setting.	The study uses attributional life cycle assessment (LCA) with an expanded boundary to account for the use of co-products in beer crafting process. It creates a calculation tool for small independent breweries. This is to identify environmental hotspots and taking the appropriate measures.	Analysis of the value chain of beer. Division in seven stages. Cradle to grave approach: the study considers the entire life cycle of beer. Face to face interviews with managers of breweries (N=7).	Downstream distribution is particularly critical for micro-breweries as it is the main increaser of their ecological footprint.
Linking green skepticism to green purchase behaviour	Journal of Cleaner Production, vol. 131, pp. 629-638	How skepticism affects purchase of green	This study examines how environmental knowledge	Survey intercepting consumers in a mall (N=303).	As customers have a high level of green skepticism it results in

See Kwong Goh, M.S. Balaji 2016		products. Context: household shopping habits to assess the grade of skepticism.	and concern mediate the link between green purchasing intentions and green skepticism. Based on the attitude-behaviour context theory. Two main questions: 1 what is the role of green skepticism influencing green purchase intentions? 2. what is the role of environmental knowledge and concern in the connection between green skepticism and purchase intentions.	SEM using AMOS 21.0. Maximum likelihood estimation method was used to test the model – with a two-step approach by Anderson and Gerbing.	lower concern and lower knowledge of environmental issues. This inhibits consumers from green purchasing. Consequently if consumers have higher knowledge about the environmental issues, they will more likely consider purchasing green products.
Beer choice and	Food Quality and	Study the emerging	Compare the consumer	Exploratory study	Some commercial

consumption determinants when craft beers are tasted: An exploratory study of consumers preferences Barbara Aquilani, Tiziana Laureati, Stefano Poponi, Luca Secondi 2015	Preference Journal, vol. 41, pp. 214-224.	craft beer industry from a consumer preference perspective. Context: preferences of beer consumers.	profile of "purely" commercial beer with that of commercial beer customers who have had a taste of craft beer. Inclination of "purely" commercial beer consumers to sample craft beer may be explained by criteria such as scent and perceived quality, preference for draft beer, and frequent or solo beer consumption.	(N=444), samples is made of visitors of a special event dedicated to food and beverage. Sample was asked to rate the importance of a set of beer attributes and factors related to the beer purchasing process on a 6-point scale. Results are obtained through STATA 11.2, referring to Marginal Effects (MEs).	beer attributes are drivers to consume craft beer: aroma, quality, bottled beer, age, choice to drink alone.
Investigating consumers' representations of beers through a free association task: A	Journal of Food Quality and Preference,vol. 28, pp. 475-483.	Investigation of how beer is present in the consumers' mind to understand their food	This study sought to determine whether drinking beer causes one to form distinct	Free association task in two evaluation condition. Firstly	The terms that were elicited were of three types: 1. Affective: positive

comparison between packaging and blind conditions Carole Sester, Catherine Dacremont, Ophelia Deroy, Dominique Valentin 2012		behaviour. Context: behaviour of beer consumers.	mental images. Contrasting the phrases evoked from the packaging (extrinsic qualities) and from blind tasting (intrinsic attributes) in order to account for both intrinsic and extrinsic features associated with beers.	participants were asked to say what came to their mind when evaluating fourteen types of beer bottles, provided with full packaging info. Then the sample tasted the same beers. (N=67). Data were organized in a contingency matrix analysed by Correspondence Analysis (CA). Followed a Hierarchical Cluster Analysis (HCA) with the Ward criteria.	hedonic asymmetry: consumers would be more prone to rejecting a beer from its taste than from its aspect. 2. Sensory/analytical: linked to sensory characteristics or basic description of beers. 3. Semantic/experience based: consumers rely on personal memories and elicit experiences-based mental representations.
Sustainable development	Journal of Business	Evaluation of current	What current brewing	Web-based survey	Many breweries

in the craft brewing industry: A case study of Iowa brewers Alicia Rosburg, Carola Grebitus 2021	Strategy and the Environment, vol. 30, pp. 2966-2979.	sustainability practices within breweries. Context: beer in the industrial setting.	factors, conditions, practices influence the brewers' decision to adopt sustainable practices. Understanding of producers' perceptions about consumer preferences and WTP for sustainable beer. Insight on environmental practices and potential resources provided to brewers.	(N=23), respondents were breweries from Iowa. Combination of descriptive statistics and in-means test for variables of interest.	lack environmental plans, they need to reassess their practices and create business case *for* sustainability. 40% of the samples believes that the consumers would not be willing to pay a premium for sustainability certified beers.
Willingness to pay for sustainable beer Sanya Carle, Lilian Yahnh 2018	Plos One, vol. 13(10)	Evaluation of consumers' Willingness To Pay mor for sustainable beer. Context: sustainable	Sustainability means investment in new brewing processes for producers. This raises the price per unit of beer in the short run,	Survey conducted through Amazon's Mechanical Turk (MTurk), an online crowdsourcing workplace.	59% of the samples would pay more for sustainable beer (1.8 cents/oz). A factor found to be

		beer.	causing sustainable breweries not to be cost-competitive. This is true unless costumers are willing to pay more since they value beer as an eco-commodity.	(N= 1095). Two WTP framing: WTP1 – context of an actual beer the respondent enjoys. WTP2 – context of a hypothetical beer designed by the respondent. OLS regression with robust standard errors.	present in those with a higher WTP is the degree to which respondents believe they can have an impact on the environment through their behaviour. Consumers who already show sustainable purchase behaviour and greener lifestyle. Lastly: sustainable practices should not compromise the quality or consistency of the products.
Individuals' personality and consumption of organic food	Journal of Cleaner Production, vol. 245, 118772	Understanding the relation between individuals' personality and choice of	Testing how Extraversion, Agreeableness, Conscientiousness,	Estimation of WTP through the interval regression model.	Personality does have an impact on the consumption of organic food.

Geir Waehler Gustavsen, Atle When Hegnes 2020		organic foods using the Big Five personality model. Context: psychological evaluation of consumers' sustainable behaviour.	Emotional stability, and Openness to experience influence willingness to pay for organic food.		Mainly: Openness to experience is an important predictor for the choice/preference of organic food. Also: Extraversion is negatively associated with the behaviour towards organic food, in fact introverts thinks organic food tastes beet.
The big five personality traits and environmental engagement: Associations at the individual and societal level Taciano L. Milfont, Chris	Journal of Environmental Psychology, vol. 32, pp. 187-195	Correlations of big five personality traits and environmental engagements. Analyses at individual level, retrospective self-reports	Compare person and country-level personality correlates of environmental engagement. Focus on traits of people and aggregate	Three studies: 1. Mini-IPIP, four items measure of each of the five traits 2. Ten Item personality inventory (TIPI)	Agreeableness, Conscientiousness and Openness to experience are the main personality traits associated with environmenta

G. Sibley 2012		and across nations and personas. Context: personality evaluation of consumers and their sustainability behaviour.	personality traits.	3. Use of cross-cultural personality database and environmental engagement attributes	l engagement.
The Interplay of Product Involvement and Sustainable Consumption: An Empirical Analysis of Behavioral Intentions Related to Green Hotels, Organic Wines and Green Cars Imran Rahman 2018	Sustainable Development, vol. 26, pp. 399-414	How consumers' product involvement influences purchase intentions, willingness to pay more and willingness to sacrifice. Context: green hotels, organic wines, green cars.		Quantitative research (N=375). Data analysis using SPSS. Involvement was measured with a shortened version of Zaichkowskys' semantic differential product involvement scale. WTPmore was measured using items from Lee et al., 2010.	High-involvement consumers understand the dynamics of the organic wine process and are more willing to purchase those types of beverages, are willing to pay more for them and to make more sacrifices.

Willingness-to-pay for ready-to-eat clean label food products at convenient Stores Jane Lu Hsu, Chin-Chang Sung, Jo-Ting Tseng 2023	Future Foods, vol.7 - 100237	WTP for clean label food products. Context: red bean bread, rosemary chicken lunch, lemon tea, sliced mango preserves.	Measuring WTP for ready-to-eat clean label food products at convenient stores and how much product involvement influences the results.	Five-parts survey including: purchasing experiences, product knowledge, involvement, WTP of ready-to-eat clean label food products. Cluster analysis using K-means approach dividing respondent into clusters of high-WTP and low-WTP. Application of multivariate analysis of variance (MANOVA)	The results indicate that product involvement is the core factor for those who have a higher WTP Also: knowledge has a positive effect on WTP.
Developing a frameworkfor adopting environmental manufacturing practices: learning from	Journal of Production Planning and Control, vol. 33:8, pp. 758-773	Understand how breweries can be more sustainable. Context: sustainable	Developing a framework that answer to the question of how breweries can achieve	Empiric research based on UK beer producers, using the production site as unit of	Drivers for change were found to be: values, impact, resource efficiency, resilience,

breweries Peter Ball, Jill MacBryde 2020		breweries in the UK	sustainability by looking at motivators for change, implemented practices, barriers to change, how to measure change, and communities as a way to support change.	analysis. Use of a grounded approach based on process thinking capturing companies at all levels of sustainability maturity. The research was carried out through one-to-one interviews and three half days workshops to collect data on practices and barriers.	and brand. Three main barriers to change were highlighted: financial barriers, lack of priority, and the absence of external pressure from a regulatory point of view. Most of the practices employed are: low-cost changes to prevent, reuse and recycle, an alignment to lean practices but without the language of lean production pointing to a low knowledge of what lean principles are. Brewers mainly want

					to reduce inputs and extract further value from the output.
Transforming food supply chains for sustainability Miguel I. Gomez, Deishin Lee 2023	Journal of Supply Chain Management, vol. 59:79, pp. 79-92	A research agenda explaining findings from life sciences and integrating them with a sustainable supply chain management approach. Context:	Integrating approaches from Supply Chain Management (SCM) and Food and Agricultural Economics (FAE) as a way to improve long-term sustainability of food supply chain. Alignment of the three interdependent pillars of a food supply chain: farmers, distributors and retailers, and consumers.	Findings are drawn from existing research and case studies on agricultural and life sciences in order to identify sustainable/unsustainable farming practices.	One of the main findings of this research is that to obtain a successful Food Supply Chain (FSC) how food is produced must match the characteristics of how it is delivered to the market. Both should also match consumers' preferences and the demand for food.

Chapter II: Key research questions

Studying the literature dealing with sustainability, sustainability in the beer industry, willingness to pay, personality traits and product involvement made possible to formulate the research question, addressing the identified gap in the literature and contributing to the knowledge base in the field.

The following table summarizes the existing pieces of literature on WTP for sustainable products, especially for sustainable beer.

Table 4: The most relevant scientific articles for my study and how they differ from the key research question of this study

Title **Author(s)** **Journal of publication** **Year of publication**	**Personality analysis** **(Big Five personality traits or other personality traits)**	**Analysis of willingness to pay**	**Sustainability analysis** **(If yes, for which product)**
Consumer willingness to pay for sustainability attributes in beer: A choice experiment using eco-labels Aaron J. Staples, Carson J. Reeling, Nicole J. Olynk Widmar, Jayson L. Lusk. Agribusiness, published by Wiley Periodicals LLC. 2020	No	Yes	Yes Beer
Consumers' Motivations Driving Organic Demand: Between Self-interest and Sustainability	No	No	Yes

Sylvette Monier-Dilhan, Fabian Bergès Agricultural and resource Economic Review 45/3, pp. 522-538. Published by Cambridge University Press. 2016			
Willingness to pay for organic products: Differences between virtue and vice foods Jenny van Doorn, Peter C. Verhoef Elsevier 2010	No	Yes	-
Beer choice and consumption determinants when craft beers are tasted: An exploratory study of consumers preferences Barbara Aquilani, Tiziana Laureati, Stefano Poponi, Luca Secondi Food Quality and Preference Journal, 41, pp. 214-224. 2015	No	No	Yes Beer
Willingness to pay for sustainable beer Sanya Carle, Lilian Yahnh	No	Yes	Yes Beer

Plos One, 13(10) 2018			
Individuals' personality and consumption of organic food Geir Waehler Gustavsen, Atle When Hegnes Journal of Cleaner Production, 245, 118772 2020	Yes	Yes	Yes
Sustainable development in the craft brewing industry: A case study of Iowa brewers Alicia Rosburg, Carola Grebitus Journal of Business Strategy and the Environment, 30, pp. 2966-2979. 2021	No	No	Yes Beer

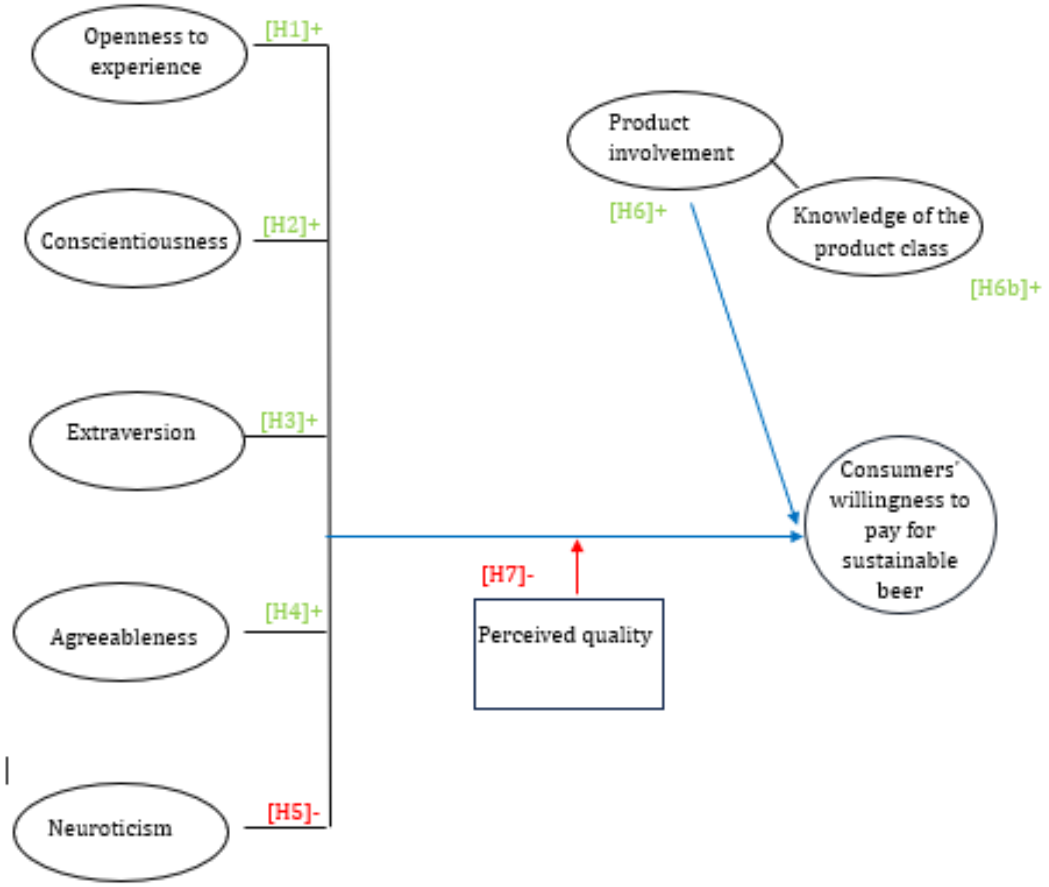
From what is displayed on Table 2 it is clear that there is no existing literature analysing of personality traits influence consumers' willingness to pay for sustainable beer as well as their involvement with the product.

For this reason I was able to develop a hypothesised research model. Exhibit 1 graphically represents the assumptions made. Independent variables Personality Traits are moderated by perceived quality. The choice of the moderator is an effort to also

detect a possible sustainability as a liability effect. A separate independent variable is Product Involvement with moderating variable product knowledge.

The object of this thesis is to understand how much the above-mentioned variables influence Consumers' WTP for sustainable beer.

Exhibit 1: Graphical representation of my research model



2.1 Independent variables

The following independent variables are those that will be used to manipulate and control to hypothesize their effect on the dependent variable "Willingness to Pay for Sustainable Beer". They are the potential cause while the dependent variable is the potential effect. The purpose of this piece of research is to understand the cause – effect relationship between these variables and how changes in independent variables lead to changes in the dependent one.

Big Five Personality Traits

As mentioned in the first chapters the Big Five Personality traits is the most widely used, recognized, and accepted model to analyse an individual's personality, often referred to as the "Big Five". Developed by McCrae and Costa Jr in 1999 today it is still of outstanding relevance. Its importance is also linked to the fact that the Big Five models holds cross-culturally (McCrae and Allik, 2002; McCrae et al. 2005). It finds its main use in organizational situations (Kluemper et al. 2015; Hurtz and Donovan, 2000).

The model is so widely accepted because the five features are characterized by being consistent along time and being able to wholly represent personality of individuals in fact *"the five traits are real, pervasive, universal and biologically based"* (Costa and McCrae, 1992).

The decision to use the "Big Five" as independent variables for my quantitative research stems from the desire to understand what influences consumers demand for sustainable beer. Personality shapes the individual and for this reason it is appropriate to use it as a starting point to study consumers' behaviour.

2.1.1 Openness to experience

This is the trait associated with high intelligence, imagination. People scoring high on Openness to Experience often embrace universalistic attitudes with tolerance for the others. They invest in new solution seeking, new gains and may be affected by hidden costs in dangerous environments. It is positively associated with consumerism (Hirsh and Dolderman (2007), while Hirsh (2010) asserted that this trait is significantly associated with greater environmental concerns. Schwartz (1992) argues that the higher-order personal value of self-transcendence (i.e. universalism and benevolence) is highly related to Openness due to higher levels of cognitive ability and thought flexibility, confirming this are also Milfont and Gouveia (2006), Milfont et al. (2010), Schultz and Zelesny (1999), Schultz et al. (2005). Higher cognitive ability is related to greater awareness of the consequences of one's environmental behaviour (Hirsh, 2014).

Prior studies explain that openness to experience has a positive relation to sensation seeking while being negatively associated with conforming to values of others (Aluja et al. 2003; Parks-Leduc et al. 2015; Giluk and Postlethwaite 2015).

Individuals with low score in openness to experience are characterised by their preference for practical, familiar, and concrete aspects of life, this does not mean they are defensive nor narrow-minded.

Markowitz et al. (2012) demonstrated that those who frequently take part in pro-environmental activities tend to appreciate aesthetic beauty, are more innovative and have a wider range of interests.

Gustavsen and Hegnes' (2020) study proves that Openness to experience is positively associated with higher willingness to pay for organic food than for ordinary food. Also DeYong et al. (2005) psychological research links Openness to experience with environmentally conscious behaviours.

Individuals with high score of openness to experience are more open to change and to develop new habits, such as switching to a more sustainable consumption. These individuals value nature's aesthetic, so they may develop a strong sentiment for its preservation. Considering Roccas et al. (2002) and Olver and Mooradian (2003) studies it is clear that there is a strong link between Openness and environmental engagement due to more intellectually curious individuals that are more likely to hold unconventional beliefs such as those related to the environmental cause.

For all the reasons mentioned above it is possible to hypothesize that:

(H1) Openness to Experience has a positive effect on consumers' WTP for sustainable beer.

2.1.2 Conscientiousness

Conscientious individuals are organized, self-disciplined, hard working. This trait is associated with being careful, responsible and organized. People who score high in conscientiousness present tendencies to invest in long-term planning aiming to

maximise benefits in those situations where long-term planning leads to better outcomes (Milfont and Sibley, 2012).

In Gustavsen and Hegnes (2020) conscientiousness was shown to have negative impact on the willingness to pay for organic food.

In other pieces of literature conscientiousness was proved to have a positive influence on environmental behaviour of consumers and on WTP for sustainable products.

Borden and Francisc (1978) stated that conscientious people, which are more mature, exhibited a high degree of environmental concern in respect to other individuals. Hirsh (2010) confirms this stating that higher environmental concern is linked with higher conscientiousness levels.

Higher degrees of self-discipline, competence and perfectionism allow conscientious individuals to make plans for the future and have a defined perspective of it (Kairys, 2010; Zimbardo & Boyd, 1999). This is connected to greater environmental engagement, which requires long-term planning and responsibility (Milfont and Sibley, 2020). Conscientiousness is positively related to future time perspective, and it is negatively related to present time perspective (Kairys, 2010; Zimbardo and Boyd, 1999).

Together with Milfont and Sibley (2020) also Hirsh (2010), Hirsh and Dolderman (2007) and Nisbet et al. agree that conscientiousness is positively associated with environmental values in individuals.

Despite strong the strong evidence presented it is important to keep in mind that there is existing literature pointing to a negative impact of conscientiousness on WTP for organic food. This evidences a disagreement that is worth focusing on.

For the purpose of my thesis I will hypothesize as follows:

(H2) Conscientiousness has a positive effect on willingness to pay for sustainable beer.

2.1.3 Extraversion

This is the trait associated with assertiveness, sociability, talkativeness, and the tendency to seek stimulation in the company of others. These individuals are perceived to be authoritarian and dominant (Gustavsen and Hegnes, 2020). Extraverts thrive in social settings as they are more outgoing, energetic and assertive. Those scoring low on extraversion are classified as introverts and are reserved and reflective.

Extraversion has been linked to an emphasis on the self-expression values, high subjective well-being, and disbelief in the role of fate (McCrae et al. 2005) which are variables linked to environmental sustainability and environmental protection (Inglehart and Baker, 2000; Leung and Bond, 2004; Milfont and Sibley, 2012).

In their work Gustavsen and Hegnes (2020) indicate that more introverts are interest in organic food that extraverts, highlighting a negative effect, although small of extraversion on WTP for organic food.

On the contrary Borden and Francis (1978) reported that extraverted individuals have higher scores of environmental concerns, accordingly Pettus and Giles (1987) believe that self-confidence and sincerity to be related to pro-environmental attitudes.

Hirsh (2010) and Hirsh and Dolderman's (2007) findings suggest that Extraversion does not have an influence on environmental engagement at an individual level of analysis, but it has the strongest relation to environmental engagement at a country-level. This means that there are different associations at various levels of analysis.

It is thus reasonable to hypothesized that:

(H3) Extraversion has a positive effect on consumers' willingness to pay for sustainable beer.

2.1.4 Agreeableness

Individuals with elevated scores in agreeableness exhibit inclinations towards compassion and a trusting demeanour towards others. They are generally compliant,

pleasant, and cooperative, displaying a strong concern for the welfare of their family and friends.

On the other hand, individuals with low agreeableness scores tend to harbour suspicions and adopt an antagonistic stance towards others. Agreeableness is associated with a heightened commitment to reciprocal social arrangements, albeit accompanied by an augmented vulnerability to exploitation by others.

In Gustavsen and Hegnes (2020) was highlighted a positive effect of Agreeableness on consumers' WTP for organic food although this effect is not highly significant. Hirsh (2014) explains that agreeable individuals display pro-environmental attitudes coming from their greater empathy and compassion. Psychological studies have established a correlation between environmental consciousness and the personality attribute of Agreeableness (Hirsh, 2010; Milfont and Sibley, 2012; Nisbeth et al., 2009).

Hirsh and Dolderman (2007) agree that there exists a positive relationship between Agreeableness and Environmentalism, while in Milfont and Sibley (2012) Agreeableness, together with Conscientiousness, was the trait which featured the highest positive association with environmental value.

Similarities exist between Agreeableness and Openness to Experience in terms of their association with a higher-order personal value known as transcendence, which is correlated with involvement in environmental concerns. (Schwartz, 1992; Milfont and Gouveia, 2006; Milfont et al., 2010; Schultz and Zelesny, 1999; Schultz et al., 2005).
The significance of self-transcendence lies in its foundation on the value types of benevolence and universalism, reflecting a commitment to the well-being of others and the transcendence of selfish interests. Individuals who exhibit concern for and engage in actions addressing environmental issues typically possess a selfless orientation, demonstrating cooperation with others and a willingness to compromise their personal interests. Kaiser and Byrka (2010) asserted that those with a greater inclination towards environmentally related behaviours are more prone to engage in pro-social actions.

Based on the explanations and demonstrations provided in this paragraph, it is evident that a hypothesis can be formulated as follows:

(H4) Agreeableness has a positive effect on consumers' willingness to pay for sustainable beer.

2.1.5 Neuroticism

Neuroticism is the final personality traits object of my research, it pertains to the inclination to suffer from adverse emotional experiences such as anger, anxiety, depression, which are sign of emotional instability (McCrae and Costa, 1999). Neurotic individuals have a tendency for fearlessness, detachment, and toughness, exhibiting vulnerability, impulsivity, dejection, and a persistent involvement in inner turmoil and despondency.

Individuals exhibiting elevated levels of neuroticism tend to display a less distinct locus of control, indicating a reduced inclination to assume responsibility for the outcomes of their actions, as they lack confidence in their own capabilities (DeVille et al., 2021).

Literature regarding the relationship between Neuroticism and environmental concern is contradictory.

Although Neuroticism was initially found to have a positive correlation with environmental preservation when assessed by Eysenck using the "Eysenck Personality Questionnaire" in 1975 (Wiseman & Bogner, 2003), subsequent studies on the association between this personality trait and environmentalism have produced mixed outcomes.

Fraj and Martinez (2006) and Hirsh and Dolderman (2007) observed no significant relationship between Neuroticism and ecological concerns, while Sibley and Milfont (2012) reported inconsistent associations, indicating both positive and negative links between Neuroticism and environmental engagement. Additionally, Hirsh (2010) identified a very slight positive relationship between environmental concern and Neuroticism. Gustavsen and Hegnes (2020) found no significant effects on the interest in organic food for individuals with Neurotic tendencies, implying that there were no noteworthy distinctions in the attitude toward organic food between those high and low in Neuroticism.

It is thus possible to suggest that individuals with higher Neuroticism scores, who generally exhibit lower levels of trust, might be more hesitant to believe in the benefits

coming from the adoption of sustainable products and, consequently, have a lower willingness to pay for sustainable products.

Their distrust and detachment towards others may be linked to a form of green scepticism. Even more than that, Neurotic individuals may deject the environmental problem, by believing that their efforts to purchase sustainable products does not eventually lead to a significant effect on the environmental cause.

For the sake of exploration, and since there existing literature does not agree on one effect, this research will hypothesize as follows:

(H5) Neuroticism has a negative effect on consumers' willingness to pay for sustainable beer.

2.1.6 Product Involvement

As presented in Chapter I product involvement is an important construct to understand consumers' behaviour and it represents their perception of importance of the product category, signifying that the product category in question has substantial value and fundamental importance in their lives. Behaviours of individuals and their decision process differs in respect to their degree of involvement. As explained by Zaichkowsky (1985) the involvement is the degree of relevancy that individuals sense based on their own needs, values, and interests.

Involved consumers have the ability and the motivation to evaluate the product, pondering the pros and cons and making objective evaluations (Tsiotsou, 2006).

Highly involved individuals are able to process the decision through their central pathway, thus eliminating positive and negative cues such as advertisement, labels, marketing strategies, warranties etc. Product's attributes have a high importance for these types of consumers, who are able to perform a non-superficial evaluation of easily accessible salient cues and stimuli (Coulter, 2005).

Additionally highly involved consumers encompass more risk that are associated with the purchase (Auger et al. 2010).

Consumers require sustainable products to meet the quality standards of their conventional counterparts. Those who are more involved with the products are more qualified to carefully evaluate if the sustainable products is worth their purchase. They spend more time comparing brands and options (Chaiken, 1980; Assael, 1981; Laurent and Kapferer, 1985).

Rahman (2018) proposes that high-involvement consumers have a higher willingness to pay for sustainable products and have a higher disposition to sacrifice quality.

Tarkianinen and Sundqvist (2009) hypothesize that higher involvement leads to a more positive attitude to buy sustainable and organic food and a more frequent purchase. Hanzaee and Taghipourian (2012) propose that high-involvement individuals actively search for product-related information, this leads to a higher willingness to purchase for the product.

Results from Hsu et al. (2023) indicate that involvement takes a critical and significant role in WTP measurements. In fact consumers who feel more relevant to the benefit of eating clean label food are willing to pay more for them.

High involvement is related to a strong consumer's preference for a specific brand of the product category, which stems from the perceived differences among products of different brands.

High involved individuals have the capacity and the willingness to consider and analyse the differences between the green products and their non-sustainable counterparts. They are willing to find information about a new product or production technique in that product category, meaning that they will likely appreciate innovative efforts from firms.

All the evidence presented above allows to hypothesize that:

(H6) Product Involvement has a positive effect on consumers' willingness to pay for sustainable beer.

2.2 Moderator variables

A moderator variable, in the context of statistical analysis and research, is a variable that affects the strength or direction of the relationship between an independent variable and

a dependent variable. This type of variable influences the strength or direction of the relationship between the independent and dependent variables.

2.2.1 Perceived quality

As outlined in the initial chapter of this thesis, a key objective is to investigate whether sustainable beer is susceptible to the "sustainability liability effect." This phenomenon suggests that consumers might prefer non-sustainable products, perceiving them as more effective than their sustainable counterparts (Lin and Chang, 2012; Luchs et al., 2010; Pancer et al., 2017).

Skard et al. (2020) and Chang (2012) elaborate on the idea that consumers may associate a lower product quality, even if the green attribute is non-product related, such as packaging. Additionally, Pancer et al. (2017) document that a single environmental packaging cue can diminish the perceived product efficacy.

Consumers who highly value the quality or distinct attributes of a beer and are already willing to pay a premium for them are also inclined to pay an additional premium for sustainability. Hence, it becomes imperative that sustainable brewing processes do not compromise or alter the quality and consistency of the products and as discussed in first chapter, sustainable attributes in beer do not affect the drink's composition but rather its production process throughout the entire supply and production chain. However, consumer awareness of this fact may be limited due to a lack of knowledge and involvement in the product, as well as other factors influencing their decision-making process.

When delving into the factors shaping consumers' decision-making process for beer purchases, it becomes evident that heuristics and simple inferences play a pivotal role. Past consumer experiences with brands, mental representations, taste, packaging, and various stimuli collectively contribute to a distinct product image in the consumer's mind, often leading to prejudices against new or sustainable beers that haven't been tasted yet. Furthermore, green skepticism emerges as a significant factor in evaluating the purchase of sustainable beer. Consumers may harbour beliefs that green claims in packaging or advertising are motivated by profit-making or image improvement.

For the reasons explained above it is reasonable to hypothesize as follows:

(H7) Lower levels of perceived quality have a negative moderating effect on the Big Five Personality traits effect on consumers' willingness to pay for sustainable beer

It is important to underline that the effect of this variable will be studied on H1, H2, H3, H4, and H5 and not on H6. Due to the definition provided above, high-involved consumers are able to overcome biases and carry out independent analysis and attentive evaluation of the product. They should not perceive different quality for sustainable beer.

2.2.2 Knowledge of the product class

In this research this variable serves as moderator for the independent variable "Product Involvement".

(H6b) Knowledge of the product class has a positive moderating effect on consumers' degree of Product Involvement.

This means that as higher Product Involvement is hypothesized to have a positive effect on consumers' WTP for sustainable beer, consumers' degree of knowledge for the product will contribute to a stronger positive effect of product involvement on WTP.

With high product involvement comes a higher willingness to look for information on the product class, meaning that consumers will develop a deeper knowledge. Informed and knowledgeable consumers will have an understanding of beer's sustainable production processes, meaning that they will understand that sustainable attributes in beer will not alter the quality of the product.

The more knowledgeable the consumers, the more he/she is expected to appreciate sustainable efforts in the brewing industry. Knowledgeable consumers have the capacity to understand eco-labels, green claims, green advertising and to overcome the bias.

When analysing the hypothesis in the next chapters it will be expected that consumers with a higher degree of product knowledge and product involvement will have lower scores of perceived quality and vice-versa.

This comprehensive framework seeks to unravel the intricate relationships between personality traits, product involvement, and the willingness to pay for sustainable beer. The following chapters will delve deeper into the empirical analysis, examining these hypotheses in the context of consumer behaviour in the beer market.

Chapter III: Research methodology and data collection

3.1 Methodology

A SmartPLS model was employed in order to test the hypothesis presented in Ch. II, meaning verifying the effect on personality traits and produc involvement on WTP for sustainable beer.

My thesis is an exploratory factor analysis, aiming to find patterns in data in where there is little to no prior knowledge available. The objective is to find out if and which independent variables are predictors of the dependent variable.

Structural equation modelling (SEM) is the technique used to confirm or develop theories of exploratory research and it has two main characteristics:

1. The causality processes investigated are represented by a series of structural equations;
2. The structural relations can be modelled graphically as a way to improve the understanding and conceptualization of the theory object of the study.

In particular I relied to partial least squares SEM (PLS-SEM or PLS path modelling), which is mainly used to explain the variance in the dependent variables after examining the model. This method aims at estimating coefficients in order to maximise the $R2$ values of the target, or endogenous, constructs.

3.2 Population and Data Collection

In order for me to verify my hypothesis I have prepared a survey which was distributed through the Qualtrics software. It is an online tool used to create and distribute questionnaires.

The questionnaire was prepared both in Italian and English language as a way to facilitate its distribution to different countries and respondents. The anonymous participation was declared at the beginning of the survey. Five different blocks compose the questionnaire.

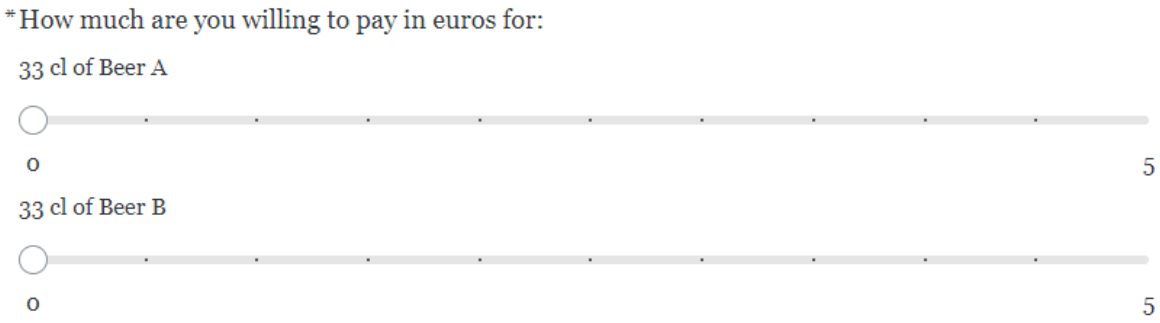
The first block was referred to as "Preliminary Questions" and it served the purpose to firstly give a quick presentation of the research as a way to let participants know the purpose of the questions. The first two questions were used as a filter: *Are you a beer consumer?* And *Are you over the age of 18?* If the answer to one of the two question was "*No"* then the respondents were redirected to the end of the survey. This allowed to only register answers of respondents to whom questions apply to. Individuals who do not consume beer or who are not over the age of eighteen and cannot legally consume or purchase beer are not of interest for my sample, as their answers would not be based on their beer drinking or purchasing experiences and thus not reliable.

After these questions I provided two images of beer, one representing a non-sustainable beer (Beer A) and the other representing a sustainable beer (Beer B). To create the two images I relied on AI tools. This allowed to present images of beer that do not exist in reality and that consumers could not have seen before as to not influence them on taste, quality etc.

Beer A

Beer B

I then provided a brief explanation of what is meant by "*Sustainable beer"* in order to provide a base knowledge on the topic, highlighting the fact that the two beers have the same brand, are made by the same company, are of the same type (lager beer) and measure the same (33cl). This introduction allowed less informed individuals to be able to answer to the following question that is "*Would you be willing to pay more for beer B"* to which answers could be "*Yes"* or *"No".* I then asked my sample how much they were willing to pay in euros for Beer A and for Beer B. To help them make the decision I provided the information that the average price for the type of beer presented is €1.20.



I then asked a question about the dependent variable "WTP for sustainable beer" where I investigated the WTP more for sustainable beer. The variable was measured according to a 5-point Likert-type scale.

The second block, "Personality Traits", is the block where I asked questions about the first five independent variables, namely the Big Five Personality Traits. The variables were measured according to a 5-point Likert-type scale.

The third block finds the question linked to the last independent variable "Product Involvement" which is measured through a 7-points Likert-type scale.

The fourth block "Moderator Variables" presents questions about perceived quality and knowledge of the product class, the first measured by a 5-point Likert-type scale and the second by a 7-point one.

The final block, "Demographic factors", includes questions such as individuals' age, sex, country of origin, level of education, job position and annual income. Sensible questions namely the ones about sex and annual income allowed "prefer not to say" as an answer. This is to respect individuals' privacy and preferences.

3.3 Measures and Scales

The constructs and items used to measure the variables were chosen from existing literature.

This paragraph will show the sources of the different constructs and the scale used for measurement.

Dependent variable

Willingness to pay more, 3 items scale, source: Habel J et al., (2016); Legere A. and Kang J., (2020).

Independent variables

Openness to experience, 4 items scale, source: Goldberg L., (1999) and Mahlamäki T., (2010).

Conscientiousness, 4 items scale, source: Goldberg L., (1999) and Mahlamäki T., (2010).

Extraversion, 4 items scale, source: Goldberg L., (1999) and Mahlamäki T., (2010).

Agreeableness, 4 items scale, source: Goldberg L., (1999) and Mahlamäki T., (2010).

Neuroticism, 4 items scale, source: Goldberg L., (1999) and Mahlamäki T., (2010).

Product Involvement, 5 items scale, source: Zaichkowsky J.L., (1985).

Moderator Variables

Perceived quality of the product, 6 items scale, sources: Grewal, Monroe and Krishnan (1998); Grewal et al., (1998).

Knowledge of the Product Class, 8 items scale, sources: Flynn and Goldsmith, (1999).

It is possible to read the complete tables of constructs, items, and sources in Appendix A, which can be found at the end of this research.

The wording of the items of the original scales have been slightly modified and adapted to the topic – sustainable beer.

It has yet to be discovered a scale that is capable of measuring WTP, for this reason I decided to measure it in two ways: firstly by providing an open-ended question asking respondents to expressly state how much they are willing to pay for the sustainable beer (Beer B), then I used the Habel et al. (2016) scale, which measures the Willingness to Pay More. Pairing the open-ended question and the WTP more scale should provide specific and good-enough indication of the WTP for sustainable beer of my sample.

Most of the questions of the survey are formulated through positive sentences, but some items have a *"Reverse Coded Item"* indication; this is used to rephrase a positive item in a negative way or vice versa, it is useful to check whether respondents are giving consistent answers aiming to reduce the response bias, preventing straight line answering. Reverse coded items serve the purpose to force the respondent to slow their answering technique and force a more thoughtful reflection on the question and answers.

For the measurement of Big Five Personality Traits constructs the source of the items finds its origin in the 50-item International Personality Item Pool-Five-Factor Model (IPIP-Big5) of Goldberg (1999). For sake of straightforwardness and simplicity in this research I decided to adopt the short-form scale, of four items each. This scale was developed by Mahlamäki T. in 2010.

Product Involvement has been measured through the Zaichkowsky's scale. The author is one of the most influential personalities in the field of product involvement studies.

The first moderator variable *Perceived Quality* find measure in the scale firstly proposed by Grewal et al (1998) and then changed and further validated by Flynn and Goldsmith (1999). , with an emphasis on product's performance.

Knowledge of the Product Class's scale was developed by Flynn et al. (1996) to measure the individuals' self-reported familiarity and expertise with the product. It is a subjective measure, and it is related but distinct from objective knowledge and expertise.

The scale used to measure the variables is a Likert-type scale, either a 5-point or a 7-point one. The 5-point scale ranges from "1" meaning "Strongly disagree" to "5" or "7" meaning "Strongly agree". Likert-type scales are especially useful as the respondents usually find them easy to understand, this is also due to them being symmetrical, with "Neither agree nor disagree" as the central point of the scale.

To verify the reliability of the recorded responses, I incorporated two attention check questions. This enabled the differentiation between participants who actively engage in the survey by providing high-quality answers and those who submit low-quality and/or unreliable data. The attention checks were placed in the second and fifth block and asked participant to select a specific answer among different options:

*Please select “strongly disagree” from the following answers

- ○ Strongly agree
- ○ Somewhat agree
- ○ Neither agree nor disagree
- ○ Somewhat disagree
- ○ Strongly disagree

*Please select number 8 from the following list:

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
- ○ 9

For the same reason as to why I included attention check questions I also asked redundant questions, meaning I asked the same question three times across the survey, once at the beginning, once in the middle, and once at the end. The purpose of this type of question is to, once again, verify that respondents answer with attention and carefully and not answering randomly. Specifically the redundant question I used is one about the age of the respondents.

When individuals in the sample do not respond correctly to at least one of the attention checks or redundant questions their answers will not be registered and will be excluded from the analysis.

After the process of choice and definition of the constructs, items, scale, filter questions and attention check questions, the survey was published on Qualtrics on the 20th of

December 2023. Through the anonymous link provided by the software, the survey was shared across different social media platforms and forwarded to friends, relatives, and colleagues. In particular the survey's link was posted on: Facebook, Instagram, LinkedIn, and WhatsApp and I asked participants to kindly share the survey with other people they know; this method of collecting data is referred to as "snowball sampling", which is explained as a non-probability sampling process where existing participants recruit new participants to become part of the sample in a research study, like a rolling snowball grows larger as it rolls, the sample size increases as more participants are added through referrals.

Its advantages are:

- It is cost-effective as it does not require extensive resources for identification and recruitment of participants;
- It allows for a rapid data collection;
- It works through established trust as participants recruited through referrals may feel more comfortable participating in the study due to the level of trust established from the initial contact

Its disadvantages are:

- There is the potential for bias as the sample may not be representative of the broader population, participants are likely to recruit individuals similar to themselves;
- Lack of generalizability due to the non-randomness, it is difficult to generalize the findings to a wider population;
- Difficulties in calculating and determining the sample error.

For this research the advantages outweighed the disadvantages, and I used the snowball sampling method by trying to reduce to the minimum the possible risks.

The questionnaire was officially closed on Monday, 22nd January 2024 after collecting a total of 444 responses.

3.4 Sample

The first analysis of the 444 answers recorded excluded participants who answered "*No"* to the questions of "*Are you over the age 18?"* and *"Are you a beer consumer"*; answering no means that their characteristics did not match the ones I was looking for in the respondents, for this reason 4 individuals were excluded due to their age and 102 were not beer consumers, this reduces the sample size to 338 answers.

Among the 338 answers unfortunately 152 were left unfinished, meaning that respondents did not reach the end of the survey; these answers were considered irrelevant for the purpose of this research, leading to 186 valid interactions.

At this point I tested the validity of the 186 answers by checking the reliability of the samples through the attention checks and redundant questions:

- 2 individuals failed to respond to the redundant questions each of the three times;
- 10 respondents chose the wrong number at the question "*Please select number 8 from the following list"*;
- 28 people failed to choose the correct answer when asked to "*Please select strongly disagree from the following answers";*

Finally I excluded 13 answers where there was no coherence between the answer to the question "*Would you be willing to spend more for Beer B"* and the price respondents indicated they were willing to pay for Beer A and Beer B. For example, 8 individuals stated that they were not willing to pay more for the sustainable beer than for the non-sustainable one, but then they chose a higher price point for Beer B than for Beer A. These answers have been eliminated as they show lack of attention or coherence, thus making the entire set of answer unreliable.

In total 47 answers were excluded from the final sample, a percentage of 10.59% of the initial sample, which reaches 139 valid entries.

After reaching the number of valid entries I analysed the demographic of the sample: 59.71% of respondents were women, 38.85% men and 1.44% of people (two entries) preferred not to express their gender.

Almost the entirety of the respondents are from Italy (97.84%).

Ages are varied across the sample; the most selected choice is the range between 25 and 34 years old (34.53%) and the least selected is the over 65 years old field (2.88%).

Most of the respondents are high school graduates (48.92%) and selected "*employed full time*" as their job position (62.59%).

Regarding income the same number of people (16.55% each and 46 people in total) selected that they earn less than €10,000 or that they prefer not to say; but the most selected answer is income from €20,000 to €29,000 (21.58%).

In the following table it is possible to see the detailed demographic characteristics of the sample of this research.

Table 5: Descriptive statistics

	N	%
Are you over the age of 18?		
Yes	440	99.1%
No	4	0.9%
Are you a beer consumer?		
Yes	338	76.8%
No	102	23.18%
Age		
18-24	24	17.27%
25-34	48	34.53%
35-44	17	12.23%
45-54	29	20.86%
55-65	17	12.23%
>65	4	2.88%

Sex		
Female	83	59.71%
Male	54	38.85%
Prefer not to say	2	1.44%
Country of Origin		
Italy	136	97.84%
Others	3	2.16%
Education		
Less than high school	11	7.19%
High school graduate	68	48.92%
Bachelor's degree	29	20.86%
Master's degree	29	20.86%
Doctorate	2	1.44%
Other	1	0.72%
Job Position		
Employed full time	89	62.59%
Employed part time	20	14.39%
Unemployed looking for work	3	2.16%
Unemployed not looking for work	2	1.44%
Retired	4	2.88%
Student	14	10.07%
Other	9	6.47%

Annual Income		
> €10,000	23	16.55%
€10,000 - €19,000	31	22.3%
€20,000- €29,000	30	21.58%
€30,000 - €39,000	21	15.11%
€40,000 - €49,000	4	2.88%
€50,000 – €99,000	4	2.88%
€100,000 - €149,999	1	0.72%
< €150,000	2	1.44%
Prefer not to say	23	16.55%

Chapter IV: Data analysis and results

The previous chapter focused on analysing the answer of the survey recorded through the Qualtrics software. The current chapter will elaborate on the testing and validation of the hypothesized model through the use of the Smart-PLS modelling tool.

This modelling tool adopts the Structural Equation Modelling (SEM), a second-generation technique, as the way to allow researchers to introduce unobservable variables measured indirectly by indicator variables, facilitating the accounting for measurement error in observed variables (Chin, 1998).

For the purpose of this research I relied on partial least squares SEM (PLS-SEM or PLS path modelling) , which is used to develop theories in exploratory research by explaining the variance in the dependent variables examined in the model. The other type of SEM is the Covariance-Based SEM (CB-SEM), which was not applicable for my path modelling as its main use is to confirm or reject theories, which is a different objective than the one of my thesis.
PLS-SEM generally makes no assumption about the distribution of the data, while when working with CB-SEM a normal distribution is desirable. PLS-SEM is also particularly convenient in case of a causal-predictive analysis with low availability of information. As it accounts for measurement and theoretical condition, distributional and practical consideration, it is possible to assert that its use is highly beneficial.

PLS-SEM poses many advantages in the case of my research:

- PLS-SEM is often preferred when dealing with complex models that have many variables and potential interconnections;
- It is often used in situations where the emphasis is on forecasting or understanding the predictive power of variables;
- PLS-SEM is well-suited for exploratory research when there is no certainty about the underlying structure of the model or when theory development is in the early stages. It is more flexible and forgiving;
- PLS-SEM is robust in handling non-normal data distributions;

- When dealing with a small sample size, PLS-SEM is often considered more suitable compared to other SEM methods like covariance-based SEM (CB-SEM) as it tends to perform well with limited data;
- PLS-SEM is appropriate for models where constructs are formative (i.e., the indicators collectively define the construct) rather than reflective (i.e., the indicators measure the latent construct);
- PLS-SEM is versatile and can be applied across various disciplines, making it suitable for studies that involve diverse variables and research questions.

The PLS path model is a diagram that allows to visually display the hypothesis of a study and to demonstrate the relationship among constructs and their indicators. (Hair et al., 2011; Hair et al., 2016). Constructs are variables not directly measured, while their indicators are the manifest variables which contain the raw data. Exhibit 2. shows the PLS path model for this study.

There are two elements that concur to form a PLS model:

1. A structural model or inner model representing the constructs and potential causal dependencies between exogenous and endogenous variables;
2. A measurement model or outer model, displaying the relationships between constructs and indicator variables, meaning between the latent variables and their indicators.

Path models are developed based on theory (which is presented on chapter two of this research), a set of systematically related hypotheses which have been developed through a scientific method that can be used to explain and/or predict outcomes. There are two ways of measuring unobservable variables, depending on the relation they have with the items:

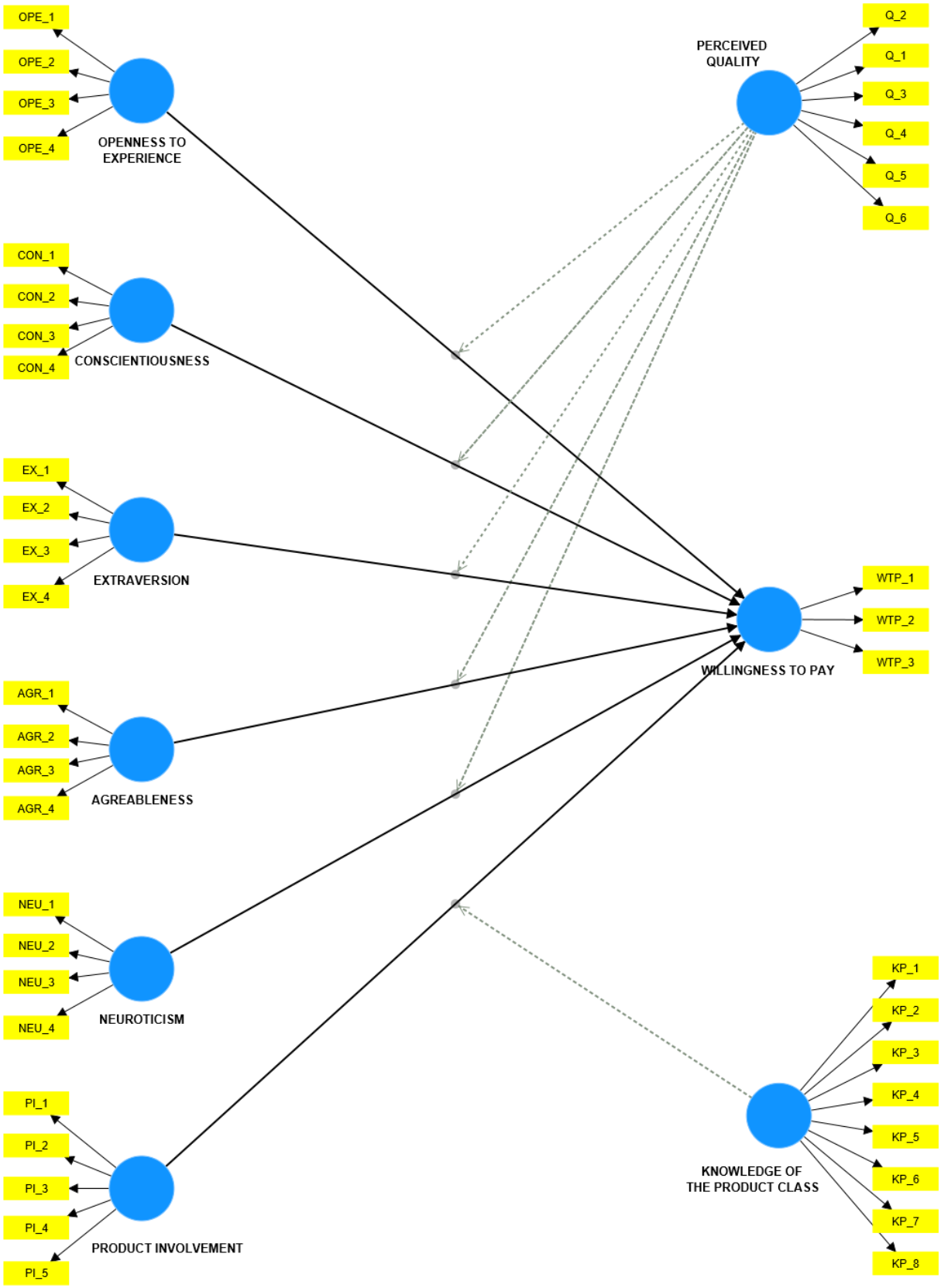
- A Formative Measurement Theory, based on the concept that measured variables have a causal (predictive) relationship with the construct; its error is the inability to wholly explain the construct and for this reason a comprehensive indicator list is needed. The indicator list is also useful to assess the validity and the reliability of constructs. Indicators are directly measured, in fact they are the observed variables, and this model allows to show the relationship between them and the

constructs. In this model the directional arrows point from the item to the construct, meaning that the construct is caused by the observed variable.

- The Reflective Measurement Theory stands on the concept that the latent constructs cause the measured variables and the error results in an inability to adequately explain these measures; it represents the constructs while examining the relationship among them. The direction of the arrow is from the construct to the indicator variables. A latent or unobservable concept can cause a variation in a group of observable indicators, which can be then used to indirectly measure the construct.

In this study I will use a reflective measurement model, in fact the structural theory explains the existing relationship among different constructs.
The construct on the right of the Exhibit 2 is the dependent variable (Willingness to Pay for Sustainable Beer), which is expected to be predicted by constructs on the left – the independent variables. In my model there are also two moderator variables: Perceived quality and knowledge of the product class.

Exhibit 2. – Path model presentation of the relationship among variables using Smart-PLS



Source: Smart-PLS

4.1 Measurement model analysis

4.1.1. Constructs' reliability

The first part of the analysis focuses on testing and assessing the reliability and validity of the constructs by making an evaluation of the measurement model.
Firstly I targeted missing values by asking Smart-PLS to replace them with the mean value. This is possible because missing values were just two across the whole recorded answers.

Since the model for my study is a reflective one, I evaluate it based on its internal consistency, reliability and validity using Cronbach's Alpha and Composite Reliability values. Reliability is related to consistency, and validity is linked to accuracy.

Reliability in the model is the degree to which results are generated under consistent conditions. We test reliability to assess how much of the variance in the model's outcome can be attributed to variance in the original data or is a result of specific measurement errors, such as respondents' misunderstandings about the meaning of the questions.
Reliable measurements are expected to be consistent if the analysis is repeated.

Internal consistency reliability has to be evaluated first; the most common method to do it is to calculate its Cronbach's alpha, which is able to provide a reliability estimation based on intercorrelations of the observed indicator variables.
This analysis allows to demonstrate how well the items measure the constructs and it is sensitive to the number of items employed in the scale. It is important to highlight that this instrument has a tendency to underestimate internal consistency reliability, meaning it can be considered a more conservative instrument for the internal consistency reliability.
Cronbach's alpha should be greater than 0.70 for variables to be considered reliable.

Since Cronbach's alpha has the above-mentioned limitations, it is useful to recur to and additional measure of internal consistency reliability – the Composite Reliability. It is a more modern methos that tends to overestimate the internal consistency reliability providing higher reliability estimates. While the Cronbach's alpha weights all the items

equally, without taking into account their load factors, the Composite Reliability takes the different outer loadings of the indicator variables into consideration.

Values for Composite Reliability range between 0 and 1, figures closer to the unit indicate a higher level of reliability. Its interpretation is similar to the Cronbach's alpha one, in fact values of 0.60 to 0.70 are considered to be acceptable in exploratory research. Values above 0.70 are excellent, but it is important to be careful in case of values greater than 0.90 and especially 0.95, as it would mean that all the indicator variables are measuring the same phenomenon. Values below 0.60 are sign of a lack of internal consistency reliability.

Both Composite Reliability and Cronbach's Alpha should be considered in this first assessment of the model, in fact, usually, true reliability is a value between the two, the first representing the upper bound and the latter the lower bound.

My study presents three variables with a value for the Cronbach's alpha lover than 0.70 – Extraversion, Neuroticism and Openness to Experience. Seven out of nine variables have a Composite Reliability value between 0.70 and 0.90, with three variables which present either a too low value (Neuroticism with 0.042) or a value above 0.90 (Perceived Quality with 0.906).
Neuroticism has unacceptable values both for Cronbach's alpha and for Composite reliability, this means that we have to be more careful about the values of this variable.
Results are presented in Table 6.

Table 6: Descriptive coefficients of the measurement model developed in SmartPLS

	Cronbach's alpha	Composite reliability (rho_c)
AGREABLENESS	0.765	0.777
CONSCIENTIOUSNESS	0.761	0.790
EXTRAVERSION	**0.669**	0.803
KNOWLEDGE OF THE PRODUCT CLASS	0.868	0.881
NEUROTICISM	**0.458**	**0.042**
OPENNESS TO EXPERIENCE	**0.690**	0.676
PERCEIVED QUALITY	0.878	**0.906**
PRODUCT INVOLVEMENT	0.757	0.830
WILLINGNESS TO PAY	0.915	**0.946**

4.1.2 Constructs' convergent validity

The second step in assessing the validity of the model is to test the Convergent Validity: it is the extent to which a measure correlates positively with alternative measures of the same construct. Indicators of the same reflective construct should converge or share a high proportion of variance. This value is evaluated by considering the outer loadings of the indicators.

Higher outer loadings of the constructs suggest that the associated indicators have a lot in common, which is captured by the construct, meaning that factor loading indicates how well an items is representing a latent construct. The size of the outer loadings is referred to as Indicator Reliability.

Outer loadings of all indicators should be statistically significant, an acceptable threshold for validity is that standardized outer loadings should be 0.78 or higher, the greater the loading value, the better the representation.

Researchers in the social science studies often get weak outer loadings (below 0.70), especially when they employ new scales (Hulland, 1999). In these cases researchers should carefully consider the removal of the indicators by analysing the effects it could have on the composite reliability and on the validity of the construct. A rule of thumb is

to remove outer loadings between 0.40 and 0.70 only if their exclusion leads to a growth in the composite reliability or in the AVE above the initial values.

Indicators with particularly low outer loadings – below 0.40, should always be removed.

The convergence validity on the construct level is the Average Variance Extracted (AVE), measuring the amount of variance captured by the construct, in relation to the variance caused by the measurement error. This method is also referred to as "*the grand mean value of the squared loadings of the indicators associated with the construct*" – the sum of the squared loadings divided by the number of indicators. (Hair, Hult, Ringle and Sarstedt, 2017).

AVE equal or greater than 0.50 indicates that, on average, the construct explains more than half of the variance of its indicators. When the value is below 0.50, more variance can be found in the error of the items.

Table 7: Descriptive coefficients of the measurement model developed in SmartPLS with Average Variance Extracted (AVE).

	Cronbach's alpha	Composite reliability (rho_c)	Average variance extracted (AVE)
AGREABLENESS	0.765	0.777	0.482
CONSCIENTIOUSNESS	0.761	0.790	0.508
EXTRAVERSION	**0.669**	0.803	0.513
KNOWLEDGE OF THE PRODUCT CLASS	0.868	0.881	0.508
NEUROTICISM	**0.458**	**0.042**	**0.337**
OPENNESS TO EXPERIENCE	**0.690**	0.676	**0.380**
PERCEIVED QUALITY	0.878	**0.906**	0.617
PRODUCT INVOLVEMENT	0.757	0.830	0.506
WILLINGNESS TO PAY	0.915	**0.946**	0.854

After this evaluation it is possible to eliminate the indicators which are characterised by extremely low outer loadings (below 0.40). My model has four indicators which do not satisfy the requirement and that will be deleted.

CON_3 = 0.351

KP_6 = 0.148

NEU_4 = -0.051

OPE_3 = 0.342

I also removed the variables with outer loadings between 0.40 and 0.70: AGR_1, AGR_2, AGR_4, CON_4, EX_2, EX_3, KP_3, KP_8, NEU_2, NEU_3, PI_4, PI_5, Q_2. After their removal I verified the values of Composite reliability and AVE, which have seen an increase as shown in Table 8.

Table 8: Descriptive coefficients of the measurement model after the removal of indicators with outer loading values lower than 0.70

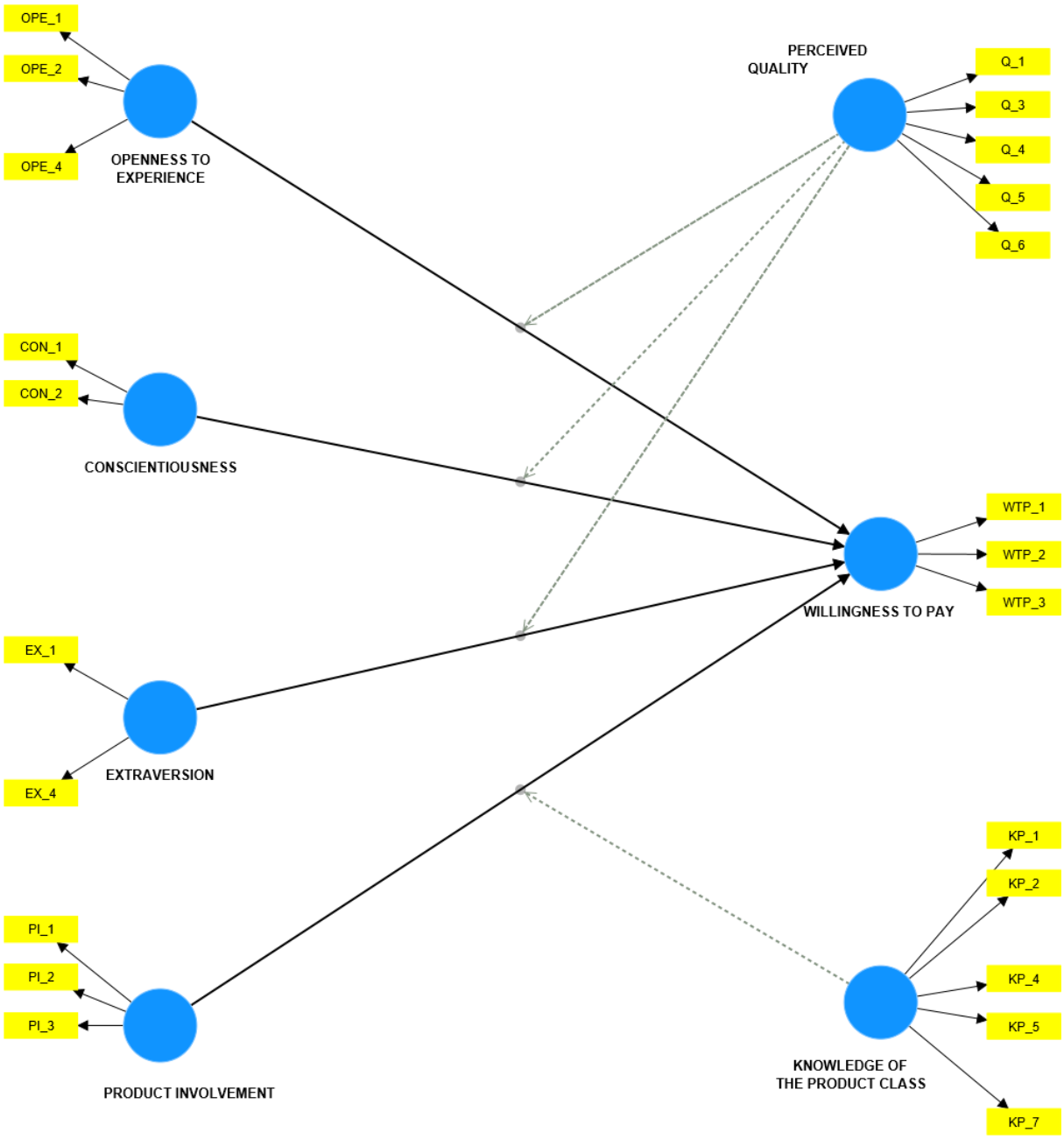
	Composite reliability (rho_c)	Average variance extracted (AVE)
CONSCIENTIOUSNESS	0.877 ↑	0.781 ↑
EXTRAVERSION	0.871 ↑	0.771 ↑
KNOWLEDGE OF THE PRODUCT CLASS	0.929	0.725 ↑
OPENNESS TO EXPERIENCE	0.707 ↑	0.474 ↑
PERCEIVED QUALITY	0.908 ↑	0.665 ↑
PRODUCT INVOLVEMENT	0.868 ↑	0.690 ↑
WILLINGNESS TO PAY	0.946	0.854

Since removing variables with outer loadings lower than 0.70 two variables have become single-item scale: Agreeableness and Neuroticism. These two variables have been removed from the model as the adoption of a single-item scale can be dangerous by posing a problem of credibility as it is not able to represent or measure a complex construct.

As a consequence the hypotheses linked to Agreeableness (H4) and Neuroticism (H5) and their relationship with Willingness to Pay for sustainable beer cannot be demonstrated.

Exhibit 3 shows the new path model.

Exhibit 3: Path model after the deletion of non-reliable indicators, and the Agreeableness and Neuroticism variables.



Source: SmartPLS

4.1.3 Constructs' discriminant validity

The extent to which a construct differs from other constructs by empirical standard is defined as "discriminant validity". When it is proved the construct is considered to be unique and thus able to capture phenomena not covered by any other construct in the model.

The first measure that can be used to assess the discriminant validity is to check the Cross-Loadings: the indicator's outer loading on the associated construct should be greater than any of its cross-loadings (i.e. its correlation) on other constructs. The best way evaluate and check cross loading is with a table with indicators as rows and columns as latent variables.

Table 9 shows the Cross-Loadings of the constructs and indicators of my model.

Each indicator represents most efficiently the construct it is supposed and expected to describe. The outer loading related to the corresponding variable is greater than the values associated with other constructs.

Table 9: Cross Loadings of the items of the variables in the proposed model

	CON_	EXT_	KP_	OPE_	Q_	PI_	WTP_
CON_1	0.849	0.284	-0.156	0.267	0.032	0.084	0.104
CON_2	0.917	0.337	-0.008	0.013	0.027	0.159	0.137
EX_1	0.431	0.862	0.198	0.237	0.113	0.174	0.109
EX_4	0.205	0.894	0.110	0.090	0.114	-0.018	0.123
KP_1	-0.039	0.250	0.879	0.062	0.299	0.387	0.167
KP_2	-0.090	0.113	0.812	-0.027	0.241	0.305	0.091
KP_4	-0.044	0.194	0.893	0.053	0.341	0.332	0.109
KP_5	-0.104	0.056	0.848	-0.020	0.162	0.174	0.092
KP_7	-0.088	0.061	0.821	0.001	0.172	0.180	0.127
OPE_1	0.132	0.283	0.047	0.516	0.033	0.043	0.069
OPE_2	0.189	0.311	0.020	0.467	-0.009	0.034	0.042
OPE_4	0.103	0.102	0.014	0.969	0.205	0.131	0.309
PI_1	0.074	0.097	0.234	0.105	0.428	0.917	0.471
PI_2	0.232	0.059	0.381	0.065	0.307	0.842	0.310

PI_3	0.074	0.033	0.256	0.158	0.238	0.721	0.271
Q_1	-0.022	0.018	0.329	0.119	0.862	0.385	0.412
Q_3	-0.031	0.113	0.197	0.104	0.815	0.268	0.277
Q_4	0.022	0.088	0.236	0.001	0.773	0.257	0.335
Q_5	0.090	0.179	0.237	0.148	0.768	0.389	0.348
Q_6	0.057	0.133	0.195	0.296	0.855	0.339	0.531
WTP_1	0.020	0.049	0.077	0.231	0.450	0.371	0.912
WTP_2	0.223	0.218	0.210	0.290	0.442	0.446	0.907
WTP_3	0.118	0.080	0.100	0.269	0.460	0.397	0.953

Observing Table 9 it is clear that the cross-loading approach is confirmed, as all the higher outer loading of the indicators are the highest in correspondence to the measured variable. For this reason it is possible to assert that the model reports a correct discriminant validity.

The second approach to assess discriminant validity is the Fornell-Larcker criterion. It compares the square root of the AVE values with the latent variable correlations. We want the square root of each construct's AVE to be greater than its highest correlation with any other construct.

Fornell-Larcker methos is based on the reasoning that a construct shares more variance with its associated indicators than with any other construct.

Table 10 figures a visual representation of the Fornell-Larcker approach. The principal diagonal showcases values of the square root of the AVE for each variable. Values below the diagonal are representing the correlation among latent variables and each of these values should be smaller than the square root of the AVE. For example, the correlation between Conscientiousness and Openness to Experience (0.138) is lower than the Conscientiousness's AVE square root (0.884).

Table 10: Fornell-Larcker coefficients

	CON_	EXT_	KP_	OPE_	Q_	PI_	WTP_
CON_	0.884						
EXT_	0.354	0.878					
KP_	-0.081	0.172	0.851				
OPE_	0.138	0.181	0.024	0.689			
Q_	0.033	0.129	0.292	0.184	0.816		
PI_	0.143	0.082	0.335	0.127	0.407	0.830	
WTP_	0.138	0.132	0.145	0.287	0.488	0.441	0.924

A third and final method to assess the constructs' discriminant validity is to investigate the Heterotrait-Monotrait ratio (HTMT) of the correlations. This method proposed by Hensler et al. (2015) calculates the ratio of the between-trait correlation to the within-trait correlations. It is the mean of all correlation of indicators across constructs measuring different constructs relative to the mean of the average correlations of indicators measuring the same construct. The HTMT is an estimate of what the true correlation between two constructs would be if they were measured perfectly – perfectly reliable.

We can refer to this as a disattenuated correlation, and if it is close to one it shows the absence of discriminant validity. Discriminant validity can be evaluated it all the values are lower than 0.850.

The HTMT coefficients for my model are shown in Table 11.

Table 11: HTMT Coefficients

	CON_	EXT_	PK_	OPE_	Q_	PI_	WTP_
CON_	1						
EXT_	0.502	1					
PK_	0.127	0.201	1				
OPE_	0.318	0.477	0.072	1			
Q_	0.074	0.166	0.320	0.200	1		
PI_	0.196	0.140	0.402	0.149	0.467	1	
WTP_	0.164	0.155	0.145	0.247	0.520	0.496	1

4.2 Structural model analysis

The previous analysis of the measurement model allowed to establish the reliability and validity of it. It is now possible to identify how the variables are related to each other – the structural model.

Firstly I will analyse the structural model's collinearity, followed by an assessment of how well the model is able to predict the endogenous variables through the consideration of the significance of the path coefficient, the R^2 values, and the f^2effect size.

4.2.1 Collinearity assessment

Tolerance (TOL) must be computed in order to assess the level of collinearity. TOL represents the amount of variance of one formative indicator not explained by other indicators in the same block.

A different, but correlated, instrument to assess collinearity is the Variance Inflation Factor (VIF), it is calculated as the reciprocal of the tolerance: VIF=1/TOL.

TOL value equal or smaller than 0.20 (VIF estimates equal or higher than 5) indicate collinearity issues, if this happens the construct is removed. Results displayed in Table 12 show the combinations of the dependent variable and the corresponding predictor variables. All values are below the level of 5, therefore we can say that the model has no critical collinearity issues.

Table 12: Inner VIF values to assess the presence of collinearity issues

	CON_	EXT_	PK_	OPE_	Q_	PI_	WTP_
CON_							1.242
EXT_							1.251
PK_							1.269
OPE_							1.109
Q_							1.382
PI_							1.397
WTP_							

4.2.2 Coefficient of determination, R^2 value

The R^2 value is the most common measure to evaluate the structural model. It measures the model's predictive power by calculating the squared correlation between a specific endogenous construct's actual and predicted values. R^2 coefficient represents the exogenous latent variables' combined effect on the endogenous latent variable, meaning that the coefficient represents the amount of variances in the endogenous constructs explained by all the exogenous constructs linked to it.

R^2 value is a measure of *in-sample predictive power* (Rigdon, 2012; Sarstedt, Ringle, Hanseler and Hair, 2014) and it can range from 0 to 1, the closer it is to the unit the higher its level of predictive accuracy. In research analysing consumers' behaviour a R^2 value of 0.20 is considered acceptable and high enough. When focusing on marketing issues R^2 values ranging of 0.75 are considered substantial, values of 0.50 are moderate and values of 0.25 are weak (Hair et al., 2011; Henseler et al., 2009).

Table 13 showcases the R^2 value obtained from the computation on SmartPLS of the dependent variable of my model "Willingness to Pay". As my thesis focuses on investigating consumers' behaviour a value of 0.36,much higher than 0.20, means that my model has an efficient predictive power.

Table 13: R^2 value for Willingness to Pay

	R-square	R-square adjusted
WTP_	0.360	0.310

4.2.3 Effect size f^2

The f^2 effect size is the variation in the R^2 value when an exogenous construct is eliminated from the model, this allows to evaluate whether the omitted construct has a substantive impact on the endogenous construct.

Generally f^2 values of 0.02, 0.15, and 0.35 represent respectively small, medium, and large effects on the exogenous latent variable (Cohen, 1998). If the f^2 value is below 0.02 there is no effect.

Table 14 displays the f^2 for my model, how constructs impact the endogenous latent variable. Results shows that Conscientiousness, Extraversion and Product Knowledge have no effect on consumer's Willingness to Pay.

Table 14: f^2 effect size

	CON_	EXT_	PK_	OPE	Q_	PI_	WTP_
CON_							0.003
EXT_							0.001
PK_							0.005
OPE_							0.05 1
Q_							0.130
PI_							0.095
WTP_							

4.2.4 Structural model path coefficients

After running the PLS-SEM algorithm we obtain the estimates for the structural model relationships (i.e. the path coefficients): they indicate the hypothesised relationships that exist among the various constructs. The standardized values of the coefficients range between -1 and +1 (values can also be bigger or smaller in some cases). When the values are closer to +1 they have a strong positive relationships and they are statistically significant (different from zero in the population). If the coefficients are close to zero the relationship is weak.

Table 15 displays the calculated path coefficients with the rows indicating the antecedents and the columns indicating the target constructs. Most of the independent variables have a positive relationship with the independent variable (WTP_) except Product Knowledge. Perceived Quality and Product Involvement have the highest positive effect on WTP.

Table 15: Path Coefficients

	CON_	EXT_	PK_	OPE_	Q_	PI_	WTP_
CON_							0.046
EXT_							0.021
PK_							-0.064
OPE_							0.191
Q_							0.338
PI_							0.292

WTP_							

The significance of a coefficient is ultimately determined by its standard error, obtained through the bootstrapping routine; this technique helps determine whether a formative indicator contributes significantly to its associated construct.

The bootstrap standard error allows to calculate the empirical t-values and p-values for each structural path coefficient. The coefficient is statistically significant at a certain error probability (i.e. significance level) if the empirical t-value is higher than the critical value.

Tests can be one-tailed or two-tailed, with levels of significance of 1%, 5% or 10%.

Common critical values for two-tailed tests: 2.57 (significance level = 1%), 1.96 (significance level=5%), and 1.65 (significance level = 10%).

Common critical values for one-tailed tests are 2.33 (significance level = 1%), 1.65 (significance level = 5%), and 1.28 (significance level = 10%).

Researchers in the marketing field usually choose a 5% significance level, but research on consumers usually prefer a 1% significance level, especially when there is an experiment involved. When the nature of the study is exploratory researchers assume a significance level of 10%. This study employs a 5% significance level.

To assess significance levels we employ the p-value, which represents the probability of obtaining a t-value at least as extreme as the one actually observed, assuming the null hypothesis is supported. The p-value is, in fact, the probability of rejecting erroneously a true null hypothesis and assuming a significant path coefficient when it is not.

To verify if a path coefficient is significantly different from zero, we use the bootstrap confidence interval. This allows to obtain information about the estimated coefficients' stability by giving a number of population values for the parameter depending on the variation of data and the sample size. The confidence interval is based on standard errors determined by bootstrapping, and it describes the range into which the population parameter will fall, assuming a certain level of confidence (e.g. 95%). If the confidence interval does not contain zero, then the hypothesis according to which the path equals zero is rejected and we can assume a significant effect.

For this research I employed two-tailed confidence intervals on a 5% level of confidence.

After examining and analysing the relationships' significance I assessed the relevance of significant relationships.

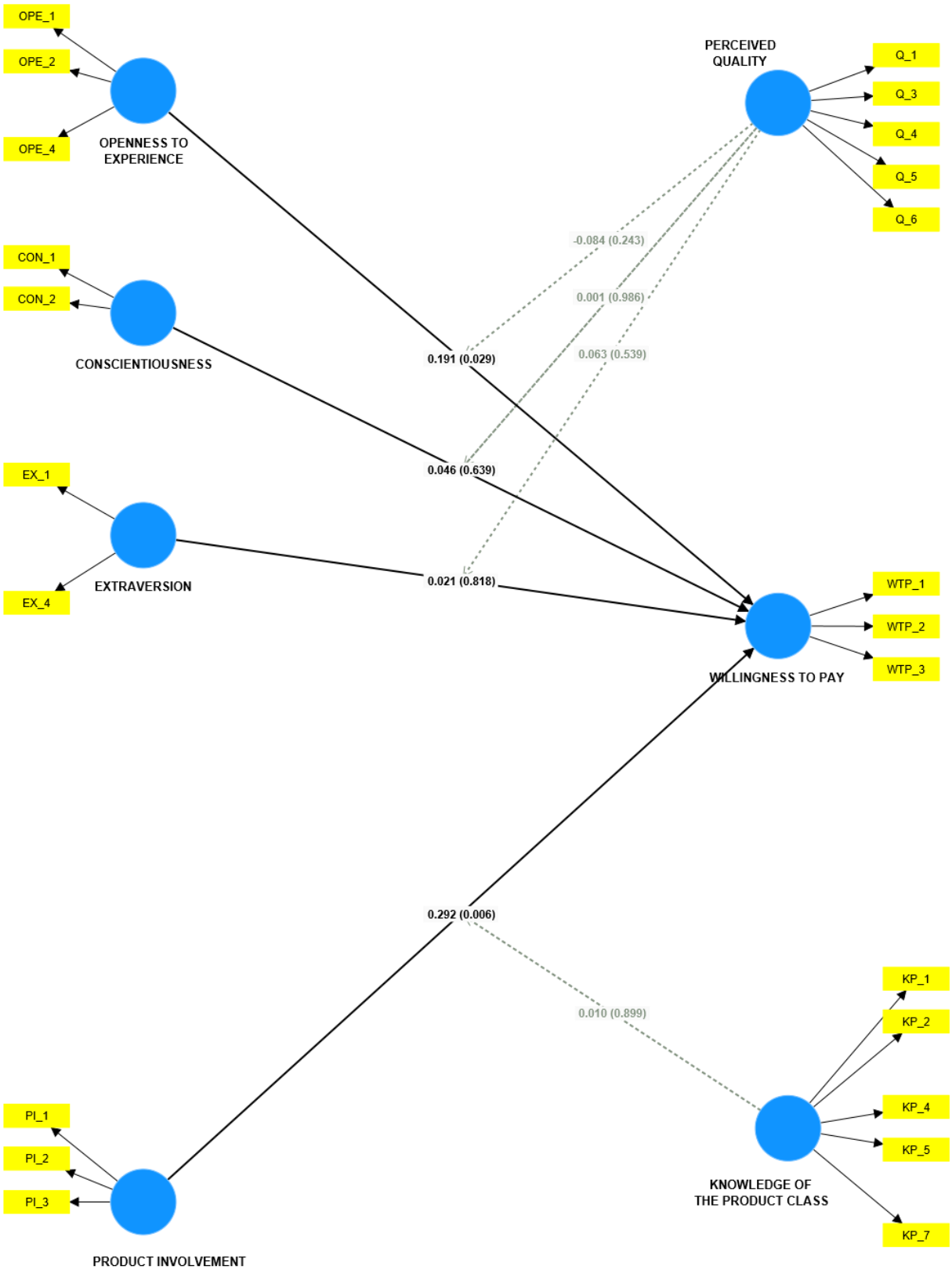
Table 16 displays the bootstrapping results for the total effects of the exogenous latent variables on the endogenous construct, p-values, t-values, the Original Sample or Beta value (the weight that the independent variables have on a dependent variable) which should be higher than 0.20 when indicating significant relationship between two variables.

Table 16: Results of the hypothesis testing

	Direction	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Significance (p-value <0.05)
CON_ -> WTP_	+	0.046	0.070	0.098	0.469	0.639	**NO**
EXT_ -> WTP_	+	0.021	0.024	0.093	0.230	0.818	**NO**
PK_ -> WTP_	-	-0.064	-0.039	0.092	0.697	0.486	**NO**
OPE_ -> WTP_	+	0.191	0.207	0.087	2.186	0.029	**YES**
Q_ -> WTP_	+	0.338	0.336	0.072	4.690	0.000	**YES**
PI_ -> WTP_	+	0.292	0.269	0.106	2.740	0.006	**YES**

After the hypothesis testing, I am able to state that, for a 5% significance level, my structural model has three significant relationships: Openness to Experience → WTP (p-value 0.029), Perceived Quality → WTP (p-value 0,000), and Product Involvement → WTP (p-value 0,006).

Exhibit 4: Graphical representation of path coefficient and p-values for the structural model relationship as resulting from the bootstrapping procedure.



Source: SmartPLS

4.3 Moderation

Moderation is used to describe a situation in which the relationship between two constructs is not constant but depends on a third variable – the moderator variable, which can change the strength, and in some cases, the direction of the relationship between the two constructs.

Moderation can be intended as a mean to account for heterogeneity in the data.

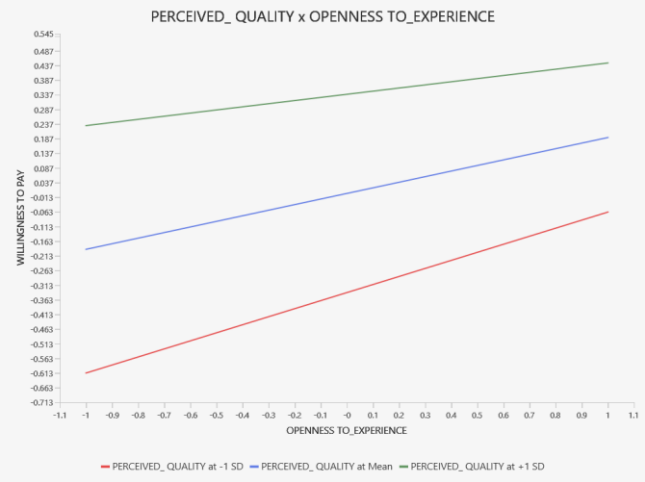
There are multiple types of moderator variables which can represent observable or unobservable traits and can be measured by a single item or multiple items. My study presents two *continuous moderator variables:* they can affect the strength of the relationship between two constructs

In particular my research wants to evaluate the moderator effect of Perceived Quality on the Big Five Personality Traits and the effect of Product Knowledge on Product Involvement.

As my model only has two remaining significant independent variables: Openness to Experience and Product Involvement; I will focus on the impact of their associated moderators (i.e. Perceived Quality and Product Knowledge).

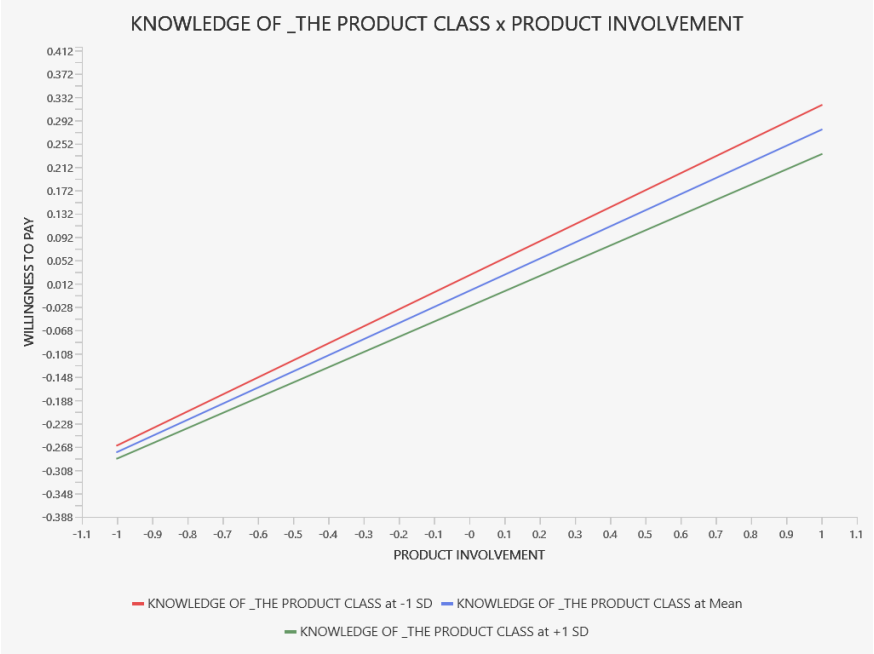
The middle line represents the relationship for an average level of the moderator variable Perceived Quality. The green and red line represent the relationship for higher and lower levels of the moderator variable.

For Openness to Experience the green line, representing higher levels of perceived quality has a flatter slope, while the red line, representing lower levels of moderator construct has a steeper slope, meaning that there is a negative interaction effect that dampens the positive relationship between Openness to Experience and WTP. When there is lower Openness to experience has a lower, but still positive effect on WTP.



Effect of Knowledge of the product class on Product Involvement are shown in the following graph.

There is a positive relationship between Product Involvement and WTP since the mean is sloping upwards. The red line has a steeper positive effect, while the green line is flatter, characterized by higher levels of Knowledge of the Product Class.



In order to assess if the moderating variables are significant or not we should look at their t-statistics and p-values.

Table 17: Results of hypothesis testing with the moderation effect.

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Significance (p-value <0.05)
PERCEIVED QUALITY x OPE_ → WTP_	-0.090	-0.109	0.071	1.269	0.204	**NO**
KNOWLEDGE_PRODUCT x PRODUCT INVOLVEMENT → WTP_	-0.015	-0.017	0.090	0.172	0.864	**NO**

Both moderating variables have been found to have a negative effect on the relationship between the independent variable and the dependent construct. But they both have tested to be non-significant in my analysis.

Whether a consumer's perceived quality of the product is positive or negative it will not influence his WTP if the consumer is open to experience, and Knowledge of such product does not have an influence on a highly involved consumer.

4.4 Hypothesis testing

Results of PLS-SEM method and the interpretation of path coefficients shown in Table 15 can be used to confirm the hypothesised correlation.

Significance level has been appointed at 5%, with the acceptance region of a two-tail test is in the interval [-1.96; +1.96]. If the t-value falls within the interval the relationship between the two variables is not significant, otherwise, if the value is found outside the interval than the relationship will be considered significant.

P-values will be checked to determine if they are higher or lower than 0.05, t-value should be higher than 1.96 and Beta value should be higher than 0.20.

Openness To Experience

(H1) is accepted, as there is a significant p-value (0.029), t-value (2.186) and Beta value (0.191). Openness to Experience is a significant predictor of consumer's WTP for sustainable beer.

	Direction	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Significance (p-value <0.05)
OPE_ -> WTP_	+	0.191	0.207	0.087	2.186	0.029	YES

Conscientiousness

(H2) is not accepted, as p-value = 0.639 > 0.05, t-value = 0.469 < 1.96 and Beta value is 0.046 < 0.20. The original hypothesis is not confirmed.

	Direction	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Significance (p-value <0.05)
CON_ -> WTP_	+	0.046	0.070	0.098	0.469	0.639	NO

Extraversion

(H3) is rejected, the variable is non-significant with p-value higher than 0.05, confirmed by a t-value lower than 1.96.

	Direction	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Significance (p-value <0.05)
EXT_ -> WTP_	+	0.021	0.024	0.093	0.230	0.818	**NO**

Agreeableness and Neuroticism

(H4) and (H5) cannot be demonstrated as the constructs have been removed from the model due to their scarce reliability levels.

Product Involvement

(H6) has been confirmed by the hypothesis testing, with p-value = 0.006 signifying its significance.

	Direction	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Significance (p-value <0.05)
PI_ -> WTP_	+	0.292	0.269	0.106	2.740	0.006	**YES**

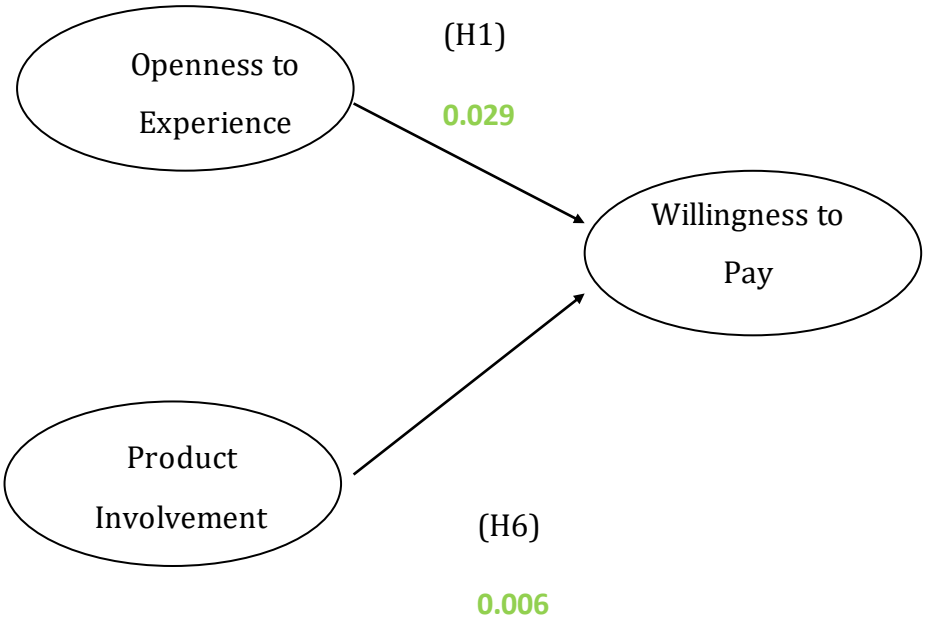
Perceived Quality and Knowledge of the Product Class

None of the moderating effects have been found to be statistically significant. So both hypotheses related to moderating effects (H7) and (H6b) have been rejected.

	Direction	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Significance (p-value <0.05)
PERCEIVED_ QUALITY x OPENNESS TO_EXPERIENCE -> WILLINGNESS TO PAY	-	-0.090	-0.109	0.071	1.269	0.204	**NO**
PERCEIVED_ QUALITY DIFFERENCES x CONSCIENTIOUSNESS -> WILLINGNESS TO PAY	+	0.014	0.032	0.085	0.164	0.870	**NO**
KNOWLEDGE OF _THE PRODUCT CLASS x PRODUCT INVOLVEMENT -> WILLINGNESS TO PAY	-	-0.015	-0.017	0.090	0.172	0.864	**NO**
PERCEIVED_ QUALITY DIFFERENCES x EXTRAVERSION -> WILLINGNESS TO PAY	+	0.055	0.026	0.100	0.552	0.581	**NO**

In the end, I have been able to confirm two of my initial hypotheses (H1) and (H6), as shown in Exhibit 5.

Exhibit 5 – Graphical representation of the confirmed hypothesis with the relative p-value



Chapter V: Conclusions

My research aimed at understanding the relationship between consumers' personality traits and their willingness to pay for sustainable beer.

The reason for the choice of this topic is that sustainability is to be a central theme in all aspects of consumers' life and sustainable strategies are to be enforced in all fields of production.

Beer production is an especially resource-intensive one, with beer consumption steadily increasing over the years (Olajire,2020). This means that the brewing industry is consuming and employing too many resources (water, energy, raw material, crops…) and more brewing companies, especially small craft brewers should adopt a sustainable business model to be able to gain more advantages in the long run (Ball and MacBryde, 2020).

In the short run beer producers can face high switching costs to sustainable production practices, which they can face by raising the unit price of their product. To understand if this is possible this research has tried to understand what is the WTP of consumers for sustainable beer with a quantitative research model.

Willingness to Pay is a useful method to understand consumers demand and insight on a product, companies can use it to understand how they can price their products correctly to sustain cost and still gain profits (Liu et al., 2012; Hughner et al., 2007).

Consumers' purchase decisions and behaviour is affected by a variety of factors such as emotions, past experiences, knowledge, involvement, and personality. For this reason, my thesis focused on investigating the relations of Big Five Personality traits (independent variables) and WTP for sustainable beer (dependent variable).
The Big Five model is generally recognized and used as a tool to outline and understand personality patterns through five attributes: Openness to Experience, Agreeableness, Conscientiousness, Extraversion, and Neuroticism.
Product Involvement was used as a sixth independent variable.

Two moderating variables have been introduced: perceived quality as moderator for the Big Five and Knowledge of the Product Class for Product Involvement,

Data have been collected through the distribution of a survey which reached 444 interactions over the course of one month (from December 20th to January 26th). The survey has reached wide distribution as the snowball sampling method was employed. After checking the filter questions, and the attention check question I successfully obtained 139 valid answers of people who are over the age of eighteen and are beer consumers.

The descriptive statistics of my sample showed a good enough distribution among genders, ages, job positions, annual income and education levels.

Most of the consumers (96) on my sample have a positive WTP meaning that they would pay a higher price for sustainably brewed beer than for the non-sustainable one. This is an interesting result and through the SEM modelling I investigated which are the personality traits that characterised these types of consumers.

5.1 Discussion

To verify the hypothesis of my research I analysed the data through a partial least squares Structural Equation Modeling method on the SmartPLS software. This tool allows for estimation and modelling of complex, multiple and interrelated dependence among several variables, and is used to develop theories in exploratory research allowing to forecast and understand the predictive power of variables. PLS-SEM assumes that the relevant concepts can be determined as composites (Jöreskog and Wold, 1982) and it aims at coefficient estimation to maximise the R^2 values of the constructs.

There is no prior literature investigating the relation between the Big Five and WTP for sustainable beer. Although many researchers have analysed the influence of personality on sustainable behaviours and attitudes their relations with WTP for sustainable products is scarce. For this reason, it is possible to assert that my study contributes to the literature by filling an existing gap. Taking a step forward I also included additional variables such as Product Involvement, Perceived quality and Knowledge of the Product Class to test their influence on the dependent variable.

The first step of my analysis was to assess the convergent validity of my model on SmartPLS, this led to the exclusion of two constructs: Agreeableness and Neuroticism. The deletion of indicators with outer loadings lower than 0.70 lead to the two variables becoming single-item scales. H4 and H5 cannot be demonstrated as the variables have become non-significant.

It is possible to generally assert that the confirmed hypotheses of my model confirm what prior literature generally states regarding the relationship between the Big Five and WTP.

The first hypothesis confirmed through my analysis is *(H1) Openness to Experience has a positive effect on consumers' WTP for sustainable beer.* My findings are in line with existing literature about the relations between Big Five and sustainable behaviour. Openness to Experience is found the be the most significant predictor for the purchase and consumption of sustainable food or products.

People high in Openness are curious, wanting to try new experiences, tastes, and foods. They are more likely and willing to experiment with new products, and thus sustainable products. Sustainable behaviours are motivated by creativity, curiousness, hedonistic values (Markowitz et al. 2012).

The second confirmed hypothesis is *(H6) Product Involvement has a positive effect on consumers' willingness to pay for sustainable beer*. As expected, Product Involvement has a positive relationship with WTP for sustainable beer. Since involved consumers are able to evaluate the product and ponder on its advantages, they can make objective evaluations (Tsiotsou, 2006). Highly involved individuals have a higher WTP for sustainable products (Rahman, 2018) and have a more positive attitude towards sustainable food (Tarkianinen and Sundvist, 2009).

Involved consumers consider, analyse and are willing to seek information on the product, they are likely to appreciate and recognize sustainable and innovative efforts of firms.

This hypothesis is in line with existing literature on the topic.

(H2) Conscientiousness has a positive effect on willingness to pay for sustainable beer has not been confirmed from my analysis. Conscientious individuals are careful, responsible, and organized. They have a tendency for long-term planning in those situations where long-term planning could lead to better outcomes such as sustainable purchase decisions. Prior studies mostly agree that conscientious people have a positive attitude and behaviour toward environment issues and a higher WTP for sustainable products. Fraj and Martinez (2006) and Milfont and Sibley (2012) have found positive and significant relations between Conscientiousness and pro-environmental behaviours. Hirsh (2010) pointed that conscientious individuals are likely to follow societal guidelines, wanting to do the "right thing", this trait can lead to higher environmental concern. Although a positive relation between Conscientiousness and WTP for sustainable beer have been found in my model the effect was considered statistically non-significant, and the hypothesis was rejected.

The second rejected hypothesis is: *(H3) Extraversion has a positive effect on consumers' willingness to pay for sustainable beer.* A positive but non-significant relationship has been found in my model between Extraversion and WTP. Literature on the topic is not uni-directional with some studies pointing to a small but negative effect of Extraversion on WTP for organic food (Gustavsen and Hegnes, 2020) and others that highlight a positive or neutral relationship (Hirsh, 2010; Vu Q.M. et al., 2024). For this reason, it is logical to have discovered non-significant effect of Extraversion on WTP for sustainable beer.

Both the moderators of my model (Perceived Quality and Knowledge of the Product Class) have been found to be non-significant. The negative effect of H7 and the positive one of H6b are not supported by the data collected through my survey.

(H6b) Knowledge of the product class has a positive moderating effect on consumers' degree of Product Involvement was based on the strong relationship, explained by literature, between Knowledge of a Product and the degree of Involvement of such product. High knowledge leads to higher involvement, which in turn pushes individuals to seek new information about the product and increasing its knowledge.

(H7) Lower levels of perceived quality have a negative moderating effect on the Big Five Personality traits effect on consumers' willingness to pay for sustainable beer was based on prior literature stating that consumers may associate a lower product quality from the presence of a green attribute (Skard et al., 2020; Chang et al., 2012). This is connected to the sustainability as a liability effect; H7 was, in fact, introduced to test if perceived quality has an influence on the relation between personality traits and WTP. From the data it appeared that the highest the perceived quality of the beer, the highest the WTP. Lower quality associated to the sustainable product has a negative effect on the positive relationship between the Big Five and WTP. H7 was not confirmed by the tests: the effect of the moderating variable is positive but not significant.

Table 18 displays a comparison between my findings and what can be found on the topic of Big Five, WTP, sustainable behaviour in existing literature. I included the most recent findings up to February 2024.

Table 18: Literature's main findings on Big Five Personality Traits, WTP and pro-environmental behaviour

Title, author(s), journal of publication, year of publication	**Main topic**	**Main findings**	**My study's findings**
Individuals' personality and consumption of organic food Gustavsen G.W., Hegnes A.W. Journal of Cleaner production 2020	This paper focuses on finding a possible correlation between the Big Five personality traits and consumption of organic food.	The two traits found to have the strongest relationship with consumption of organic food are Openness to Experience and Extraversion. While the first trait is positively related to attitudes towards organic food, the second is negatively related.	My research found a strong relationship between Openness to Experience and WTP for a sustainable product.

		Some tests showed a positive relationship between Agreeableness and attitudes towards organic foods.	
The influence of cultural differences on consumers' willingness to pay more for sustainable fashion Khan O, Varaksina N., Hinterhuber A. Journal of Cleaner Production 2024	Which cultural aspects influence more consumers' WTP more for sustainable fashion in a cross-cultural analysis between Italy and Russia.	Italian and Russian consumers have different cultural forces driving their sustainable purchases decisions. Collectivism and long-term orientation have the most significant influence in Italy and Russia respectively.	My thesis did not take culture into consideration as a factor influencing consumers' purchase behaviours. Collectivism, masculinity, and uncertainty avoidance could be interesting topics to study jointly with personality traits to better understand consumers' behaviour.
Sustainability information, taste perception and willingness to pay: The case of bird-friendly coffee Grunert K.G, Seo H-S, Fang D., Hogan V.J., Nayga R.M. Jr.	Investigation of how sustainability information affects WTP for bird-friendly coffee through the analysis of taste perception, moral satisfaction and affective valence.	There is a positive effect of sustainable information towards taste perception, but cognitive effect of sustainability information lasts longer than the affective effect. This means the positive effects of sustainable	My study analysed perceived quality moderating effect on the Big Five relationship with WTP for sustainable products. Although not finding significant statistical evidence of the moderating effect, the effect found is positive,

Journal of Food Quality and Preference, 115:105124 2024		information are short-lived. The study suggests that there is a negative effect on sustainability clues on perceived quality of the product.	meaning that lower perceived quality had a negative effect on personality traits' relationship with WTP for sustainable beer.
The Influence of Personality Traits on Intention to Purchase Green Products Vu Q.M., Liao Y.K., Thi Y., Truong G.N.T. International Journal of Service Science, Management, Engineering, and Technology	Identification of how environmental concern, perceived value and green purchase attitudes mediate the influence of personality traits on sustainable purchase decisions. The Influence of Personality Traits on Intention to Purchase Green Products Vu Q.M., Liao Y.K., Thi Y., Truong G.N.T. International Journal of Service Science, Management, Engineering, and Technology	Extraversion is positively associated with concern about environmental issues, while Neuroticism has a negative influence. Conscientious, Agreeable and Open individuals showed a higher concern towards environmental issues.	In my study Neuroticism and Agreeableness were eliminated from the model after assessing reliability. Conscientiousness and Extraversion were found to have a positive but non statistically significant influence on WTP for sustainable beer. Openness to Experience is the only trait with a positive and significant relationship on WTP for the sustainable product.
Personality change and sustainability attitudes behaviors Hopwood C.J.,	Understanding how changes in personality (IPIP 6) are related to increases in sustainable attitudes and behaviours (SABs)	The study found that changes in personality (especially Agreeableness) are related to increases in SAB.	My study's findings differ from Hopwood et al. ones since Agreeableness was not considered a reliable variable, thus its effect on

Schwaba T., Milfont T.L., Sibley C.G., Bleidorn W. European Journal of Personality, vol. 36(5), pp. 750-770 2021		Honesty/Humility, Neuroticism, Conscientiousness, Extraversion and Openness are positively related to both attitudes and behaviours (the effect size is from largest to smallest).	WTP for sustainability were not researched. Openness is positively related with sustainable behaviours in both papers.
Influence of personality on ecological consumer behaviour Fraj E., Martinez E. Journal of Consumer Behaviour, vol. 5, pp. 167-181 2006	How the Big Five Personality traits shape the ecological consumer's profile.	This study proves that personality, which is defined as a multifaceted concept, is positively related to sustainable behaviour. The strongest positive relationship is found in Extraverted, Agreeable and Conscientious individuals.	My analysis has come to different results: Extraversion, Agreeableness and Conscientiousness influence on WTP for sustainability have not been confirmed.
Profiling the "Pro-Environmental Individual": A Personality Perspective Markowitz E.M., Goldberg L.R., Ashton M.C., Lee K.	Exploration of relations between Big Five Personality traits and pro-environmental actions.	The study found a positive relation between Openness to Experience and pro-environmental behaviours. This effect is also mediated by the environmental attitudes of individuals and their degree of	My findings confirm that Openness to Experience is positively linked with pro-environmental behaviours - Open individuals have a higher WTP for sustainable beer.

Journal of Personality, vol 80:1 2012		connection to nature. What motivates sustainable behaviours is creativity, curiousness, hedonistic values, not altruism.	
The effect of environmental cues on the purchase intention of sustainable products Lee E.J., Bae J., Kim K.H. Journal of Business Research, vol. 120, pp. 425-433 2020	How sustainable labels, traceability and consumers' knowledge of certification effect purchase intention for green products.	Results of this study demonstrate that purchase intentions of consumers are more elevated when sustainable label and traceability information are provided simultaneously. When consumers have a high knowledge of the product the purchase intention increases only when there is a sustainable label. Purchase intention can be increased by providing transparent and diverse environmental cues based on information to increase consumers' certification knowledge.	My research found evidence of a positive relationship between Product Involvement and WTP for sustainable beer. Meaning that more informed and involved consumers have an increased purchase intention for sustainable products.

Willingness to pay more for green products: A critical challenge for Gen Z Gomes S., Lopes J.M., Nogueira S. Journal of Cleaner Production, vol 390:136092 2023	Which determinants influence Gen Z's WTP for sustainable products.	Environmental concern, green future estimation and green perceived quality positively influence Gen Z's WTP more for sustainable products.	My research did not focus on a target age, it would be interesting to analyse the differences in the determinants that shape the WTP for green products in different age classes. Perceived quality of the green product was a moderating variable of my model, although no significant effects were found.
Meta analysis of consumers' willingness to pay for sustainable food products Li S., Kallas Z. Appetite, vol. 163:105239 2021	WTP for sustainable food products through two approaches: a hypothetical and a non-hypothetical one.	WTP estimates found through a hypothetical approach (choice experiment and contingent valuation method) are higher than non-hypothetical ones due to the hypothetical bias. Fruit and Vegetables have the highest WTP estimate. Asian consumers have the highest WTP estimates. There is a great marketing potential for sustainable products.	As my thesis found WTP estimates through a hypothetical approach it is reasonable to believe that the results can be positively skewed. It could be useful to repeat my research with the addition of a non-hypothetical approach in order to correctly define the hypothetical bias.

Personality and environmental concern Hirsh J.B. Journal of Environmental Psychology, vol. 30, pp. 245-248 2010	The study wants to investigate the relationship between personality traits and environmental concern.	Through SEM modeling the study shows that higher levels of Agreeableness and Openness are related to greater environmental concerns. There is a smaller positive relationship between environmental concern and Neuroticism or Conscientiousness.	Findings in my study suggest that Openness to Experience has the strongest positive relationship with WTP for sustainable beer. So there is a positive link between Openness to Experience and environmental topics.
Big Five and HEXACO Personality Traits, Proenvironmental Attitudes, and Behaviors: A Meta-Analysis Soutter A., Bates T., Mottus R. Perspective on Psychological Science, vol. 15(4), pp. 913-941 2020	Meta-analysis of the association of the Big Five and HEXACO personality domains with pro environmental attitudes and behaviours.	The strongest correlation of pro environmental attitudes and behaviours is with Openness to Experience and Honesty-Humility Agreeableness, Conscientiousness and Extraversion have a weaker but still positive association with pro environmental attitudes.	The results of my study are similar, with a stronger positive relationship between WTP for sustainable beer and Openness to Experience and weaker (non-significant) but positive relationship between Extraversion and WTP for sustainable beer. It could be interesting to further develop my thesis by investigating the

			HEXACO personality-trait model by adding honesty-humility to the Big Five Model.
The Role of Personality in the Adoption of Pro-Environmental Behaviors through the Lens of the Value-Belief-Norm Theory Hidalgo-Crespo J, Velastegui-Montoya A., Amaya-Rivas J.L., Soto M., Riel A. Sustainability, vol. 15:12803 2023	Big Five personality traits' relationship with Value-Belief Norm theory. Investigating differences in the relationships between the different constructs of VBN theory for the Big Five.	Personality traits influence pro-environmental behaviours. For example: there is a positive relationship between Neuroticism and pro-environmental behaviours. Agreeableness has the lowest correlation with the sustainable clusters.	My study has found as well that personality traits influence pro-environmental behaviours, with people higher in Openness to Experience having a positive and statistically significant relationship with WTP for sustainable beer.

5.2. Implications for Practice

Studies on consumers' WTP are useful to develop marketing strategies based on consumers' behaviour and preferences. Communicating features, values and messages in the correct way is fundamental to attract new clients. To do so it is important to understand which individuals to target. Understanding which types of personality trait is positively and strongly associated with willingness to pay for the product can help develop the correct strategies that appeals to individuals high in that trait.

Individuals high in Openness to Experience are attracted by graphic and visual representation, the distinction between sustainable and standard products has to be

strong and visible. When not advertising and marketing the products' sustainability features in the correct way, the risk is to lose appeal from Open individuals.

Managers and marketing departments should understand how to appropriately communicate with consumers, by highlighting what makes their product different than other, pushing individuals who are curious and likely to try novelties to be interested in purchasing the product.

For what concerns product involvement breweries could adopt marketing strategies to better marketize and advertise sustainable beer, this could develop a feeling of familiarity and it is an incentive for consumers to be more involved. Product involvement is about feelings of interest, motivation, excitement and enthusiasm. By forming more involved consumers that have a higher WTP for sustainable beer, more breweries could adopt sustainable practices and be able to sustain the costs.

5.3 Limitations and future research directions

This quantitative research has limitations that can be tackled through further studies and investigations.

The sample of answer analysed can be considered small. Only 139 answers out of 444 were analysed. This is due to respondents not respecting some minimum requirement standards. Had they paid more attention or finished the whole survey the sample would have been much bigger.

In further research it could be interesting to use different scales or use pecuniary incentives to encourage a more attentive compilation of the survey.

It could also be interesting to reach individuals from different areas of the world to have a more varied sample, if the survey were conducted on a wider population, it could be possible to obtain more significant variables and reliable results.

A criticism of the Big Five model is that it is too generalized as individuals' personality is difficult to group into just five traits. HEXACO or IPIP models take more traits into consideration, thus providing a more in depth understanding of human features and personality.

Data that have been extracted from the survey show that there is a considerable amount of people (43) who displays a negative WTP for sustainable beer. This phenomenon deserves to be further studied and understood in future research.

Sustainability in the beer industry is still a relatively unknown topic, especially for consumers. It could be interesting to see how results change if breweries pushed a stronger narrative for sustainable beer by explaining its features to consumers.

Appendix

Appendix A

Tables of constructs, items, and sources

Dependent Variable

Willingness To Pay More	[1] I am willing to pay a higher price for sustainable product than non-sustainable product.	3 items 5-points Likert-type scale Habel J. et al., 2016 Legere A., Kang J. 2020
	[2] I would like to keep buying sustainable product even if non-sustainable product were cheaper.	
	[3] For the advantages obtained from sustainable product, I would be willing to pay a higher price.	

Independent variables

Openness to Experience	[OE1] I have a vivid imagination	4 items 5-points Likert-type scale Goldberg, 1999; Mahlamäki, 2010
	[OE2] I greatly appreciate poetry	
	[OE3] I enjoy wild flights of fantasy	
	[OE4] I see beauty in things that other might not notice	

Conscientiousness	[C1] I am conscientious about the things I do	4 items 5-points Likert-
	[C2] I finish my work on time	

	[C3] I am deliberate in my decisions	type scale Goldberg, 1999; Mahlamäki, 2010
	[C4] I obey the rules the best I can	

Extraversion	[E1] In unclear situations, I usually take control of things	4 items 5-points Likert-type scale Goldberg, 1999; Mahlamäki, 2010
	[E2] It is easy for me to get to know other people	
	[E3] I usually let others make the decision (reverse coded)	
	[E4] Can talk others into doing things	

Agreeableness	[A1] I trust other people	4 items 5-points Likert-type scale Goldberg, 1999; Mahlamäki, 2010
	[A2] I trust what people say	
	[A3] I like to help others	
	[A4] I believe people usually have good intentions	

Neuroticism	[N1] I feel that I can handle any situation (reverse coded)	4 items 5-points Likert-type scale Goldberg, 1999; Mahlamäki, 2010
	[N2] It is hard for me to take criticism	
	[N3] It is easy to hurt me emotionally	
	[N4] I get very nervous before important meetings	

Product Involvement	[PI1] I would be interested in reading information about how the product is	5 items

	made	7-points Likert-type scale Zaichkowsky J. L., 1985
	[PI2] I would be interested in reading the Consumer Reports article about this product	
	[PI3] I have compared product characteristics among brands	
	[PI4] I think there are a great deal of differences among brands	
	[PI5] I have a most preferred brand of this product	

Moderator Variables

Quality of the product	[Q1] The sustainable beer appears to be of good quality	6 items 5-points Likert-type scale Grewal, Monroe and Krishnan, 1998 Grewal et al., 1998
	[Q2] The sustainable beer appears to be durable	
	[Q3] The sustainable beer appears to be reliable	
	[Q4] The sustainable beer appears to be dependable	
	[Q5] How certain are you that this sustainable beer will perform satisfactorily?	
	[Q6] My image of the sustainable beer is positive	

Knowledge of the Product Class	[PK1] I feel quite knowledgeable about sustainable beer	8 items 7-point Likert-type Flynn and Goldsmith, 1999
	[PK2] Among my circle of friends, I'm one of the "experts" on sustainable beer	
	[PK3] I rarely come across a sustainable beer I haven't heard of	

	[PK4] I know pretty much about sustainable beer	
	[PK5] I do not feel very knowledgeable about sustainable beer (reverse coded)	
	[PK6] Compared to most other people, I know less about sustainable beer (reverse coded)	
	[PK7] When it comes to sustainable beer, I really don't know a lot (reverse coded)	
	[PK8]I have heard of most of the new sustainable beer that are around	

Tables

Exhibits

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