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How does personality influence the willingness to pay for sustainable wood-based products in Italy?

A quantitative research that investigates the relationship between the big five personality traits and the willingness to pay, in Italy, for wood-based products that come from a sustainable supply chain.

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ABSTRACT

This study is a quantitative exploratory research that aims to measure the relationship between personality traits and the willingness to pay (WTP) for sustainable wood-based products by consumers living in Italy. It counted with a total of 180 respondents, out of which 101 responses were valid and analyzed through a partial least squares structural equation modeling (PLS-SEM), also called PLS path modeling.

The available literature used as a foundation to base this study on covers subjects such as sustainability and green consumerism, linking them to socio-demographic factors, attitudinal dimensions and personality; general regulations and policies available to foster sustainable development in the forestry industry; and willingness to pay for a green premium. There is also a big focus on how personality influences behavior in general and consumer behavior, and specifically green consumerism.

All of these topics are not necessarily covered altogether in each individual source or scientific article. Hence, in comparison to other similar studies, this research provides a comprehensive outlook gathering the findings of the existing studies on the topics just mentioned, and expanding the available literature by including the influences on the willingness to pay for a green premium for wood-based products in Italy, from a personality-trait perspective.

The personality traits model used in this research is based on the Big-Five Personality traits, also known as The Five-Factor Model, by McCrae and Costa (2003). The traits of this model are Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. This study also considers two other personality traits, which the literature points as being very relevant when studying the influence of personality on sustainable consumer behavior, which are Need For Uniqueness and Skepticism.

The study tested nine hypotheses, being:

(H1): There is a positive relationship between agreeableness and the willingness to pay for sustainable wood-based products.

(H2): There is a positive relationship between conscientiousness and the willingness to pay for sustainable wood-based products.

(H3): There is a positive relationship between extraversion and the willingness to pay for sustainable wood-based products.

(H4): There is a negative relationship between neuroticism and the willingness to pay for sustainable wood-based products.

(H5): There is a positive relationship between openness and the willingness to pay for sustainable wood-based products.

(H6): Skepticism negatively moderates the effect of the Big Five on WTP for sustainable wood-based products

(H7): Need for uniqueness negatively moderates the effect of the Big Five on WTP for sustainable wood-based products

(H6b): Skepticism has a negative relationship with the willingness to pay for wood-based products.

(H7b): Need for uniqueness has a negative relationship with the willingness to pay for wood-based products.

The main finding of this research is confirming the hypothesis H1, that there is a positive relationship between agreeableness and the willingness to pay for sustainable wood-based products. Hypothesis H2 didn't pass the reliability/validity assessment. Hypotheses H3 and H4 resulted in an $f^2 < 0,02$, therefore there is no effect of the constructs associated with these hypotheses on WTP. For hypotheses H5, H6b and H7b, the path coefficients didn't result to be statistically significant, therefore it is not possible to confirm those hypotheses.

As for the moderator effects hypothesized in H6 and H7, the first one was not possible to confirm because it resulted to be not statistically significant. All tests of the moderator effect of Skepticism on each independent variable resulted in a p -value greater than 0,05. The latter turned out to be statistically significant only regarding the moderator effect of Need for Uniqueness on Openness. However, the construct Openness resulted in being not statistically significant as an independent variable in its relationship with WTP. Therefore, H7 couldn't be confirmed either.

This study also includes Practical uses and implications of this research's findings, its limitations and future research suggestions.

INDEX

| | |
|---|-----------|
| ABSTRACT..... | 2 |
| INTRODUCTION..... | 6 |
| LITERATURE REVIEW..... | 8 |
| Sustainability and the Forestry Industry..... | 8 |
| Sustainable Development & Circular Economy..... | 8 |
| Industry..... | 9 |
| Waste management..... | 13 |
| Consumer..... | 14 |
| Regulations and Policies..... | 16 |
| ISO and GRI..... | 17 |
| Certification Bodies..... | 18 |
| Certifications in the Forestry Industry..... | 18 |
| Personality and Sustainable Consumer Behavior..... | 22 |
| Behavioral Economics..... | 22 |
| The Big-five Personality Traits..... | 24 |
| Other personality traits..... | 26 |
| Skepticism..... | 27 |
| Need for Uniqueness..... | 28 |
| Environmentalism..... | 30 |
| Sustainable Consumer Behavior..... | 31 |
| Green Gap - Green Rhetoric vs Actual Purchasing Behavior..... | 32 |
| Green Consumer and the Willingness to Pay for a “Green Premium”..... | 34 |
| Attitudinal and Socio-demographic Aspects..... | 34 |
| Labels & Certifications..... | 36 |
| Skepticism..... | 39 |
| WTP for Sustainability in the Forestry Industry..... | 40 |
| Research Gap and Research objective..... | 44 |
| KEY RESEARCH QUESTIONS..... | 65 |
| Formulation of the Hypotheses based on the Big Five Personality Traits..... | 70 |
| Agreeableness..... | 72 |
| Conscientiousness..... | 73 |
| Extraversion..... | 74 |
| Neuroticism..... | 75 |
| Openness..... | 76 |
| Moderator Variables..... | 77 |
| Skepticism..... | 77 |
| Need for Uniqueness..... | 78 |
| Moderators that also function as independent variables..... | 79 |
| RESEARCH METHODOLOGY AND DATA COLLECTION..... | 80 |
| Methodology..... | 80 |
| Data collection..... | 81 |
| Measures and Scales..... | 82 |

| | |
|--|------------|
| Reliability of responses..... | 86 |
| Sample..... | 87 |
| Data examination..... | 88 |
| Missing data..... | 88 |
| Research requirements..... | 89 |
| Data distribution..... | 90 |
| Socio-demographic characteristics..... | 91 |
| DATA ANALYSIS AND RESULTS..... | 93 |
| PLS-SEM and Path Model..... | 93 |
| Measurement model & Analysis..... | 94 |
| Step 1 - Reflective Measurement Model..... | 95 |
| Reliability..... | 95 |
| Convergent Validity..... | 97 |
| Discriminant Validity..... | 102 |
| Step 2 - Evaluation of the Structural Model..... | 107 |
| Collinearity Assessment..... | 107 |
| Coefficient Of Determination, The R2 Value..... | 107 |
| The Effect Size f^2 | 108 |
| Structural Model Path Coefficients..... | 109 |
| Moderation..... | 112 |
| Skepticism as a moderator variable..... | 112 |
| Need for Uniqueness as a moderator variable..... | 116 |
| Significance of the moderating effect..... | 119 |
| Hypotheses testing..... | 120 |
| CONCLUSION..... | 127 |
| Practical uses and implications..... | 129 |
| Limitations and future research directions..... | 132 |
| REFERENCES..... | 139 |

INTRODUCTION

The awareness of the imperative importance of sustainability has grown in the last decades. When we say sustainability, we are referring to three main pillars: financial, environmental and social. This is also called “The Triple Bottom Line”. This term first appeared in the Brundtland Commission in 1987 (Książka and Fischbach, 2017).

In this commission, the United Nations, released the “Report of the World Commission on Environment and Development: Our common Future”. This report aimed at opening a new window of possibilities to economic growth based on policies that sustain and expand the environmental source base, human progress and survival. It defended that this type of growth was essential to relieve great poverty, especially in the developing world. This commission marked an extremely important milestone in the Sustainable Development (SD) movement since it created the fundamental ideas behind SD as we know it today, marking the beginning of a global movement towards more sustainable ways of living and exploring resources.

In this research, we are giving more focus to Environmental Sustainability, and specifically how it comes up in the forestry industry in the production of wood-based products. Here, wood-based products refers to finished wood and paper products, such as furniture and printed matter (Bosch et al. 2023), construction material, such as timber and wood-panels (Araújo et al. 2022) , wooden decoration items, and final products resulting from processing residues and recovered material, e.g. products composed of recycled or reused wood or paper (Shevchenko et al. 2023).

Sustainable wood-based products refers to the final products that come from a Sustainable Supply Chain, that is when the exploration of the natural resources, the production process, the addressing and management of the industrial waste and externalities, and distribution of these final products have been done in a sustainable manner. All this will be linked to the perception of added value by the final consumer, the influence of their personality in this perception, and its impact on their willingness to pay for final products derived from such sustainable supply chains.

This research is organized in the following manner:

- 1) Literature review, where it will be presented the three main dimensions of the available literature this research is based on: Sustainability and the Forestry

Industry; Personality and Sustainable Consumer Behavior; and, Green Consumer and the Willingness to Pay for a “Green Premium”;

- 2) Research questions and hypotheses formulation;
- 3) Presentation of the research methodology;
- 4) The data analysis and results of the hypotheses testing;
- 5) And, finally, the conclusions with the results and findings, practical uses and implications, limitations, and future research directions.

LITERATURE REVIEW

Sustainability and the Forestry Industry

Sustainable Development & Circular Economy

When we talk about development, its main goal is the satisfaction of human needs and aspirations. Now, the concept of Sustainable Development, as presented at the Brundtland Commission of 1987, is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Our common future, 1987). This concept works with two main sub-concepts, the concept of “needs”, especially the essential needs of the world’s poor. And the concept of the “environmental limitation”, a notion that the environment's capacity to meet present and future needs is limited by the state of technology and social organization.

In this conference it was also alerted that, while technological advancements may solve some pressing issues, they can create bigger ones, and a society may endanger its ability to provide for the basic requirements of its citizens in the future in a variety of ways, such as through overusing resources. This event was a big milestone in history and it marked the beginning of a global movement towards a more sustainable exploration of resources. It also paved the way for a broader view of the goals of development, the impacts of production processes and its externalities in areas such as environmental, social and financial, and how they all interact with and depend on each other (directly or indirectly). As well as how it might compromise the world’s future capacity to continue attending to human’s needs for survival.

From the day of that commission to the present moment, there has been a considerate growth in everything regarding sustainability. One of the concepts that arose since then was “Circular Economy” (CE), as opposed to “Linear Economy” (LE). Circular economy is a model of production and consumption that aims at extending the use of a given material or product for as long as possible. This is done through sharing, renting, reusing, refurbishing and recycling old goods, and by doing so, it’s possible to extend the life cycle of products (European Parliament, 2023).

Circular economy depends on all the parts involved in the production, consumption and waste processing chains. That includes the industries, the businesses, the consumers and waste management institutions.

It is crucial to reduce several environmental issues including waste discharge, the increasing production, and excessive consumption, which cause what is known as "rebound effect", the unintended consequences of using circularity tactics (Castro et al., 2022), which restrain the sustainability potential of the circular economy (Metic and Pigosso, 2022). Therefore, it is important to outline that the Circular Economy has its limitations, given that even cyclical systems consume resources and create waste and emissions, so it doesn't necessarily guarantee a sustainable outcome. Therefore, all CE activities should be evaluated for their (global) net environmental sustainability contribution (Korhonen et al., 2018).

Industry

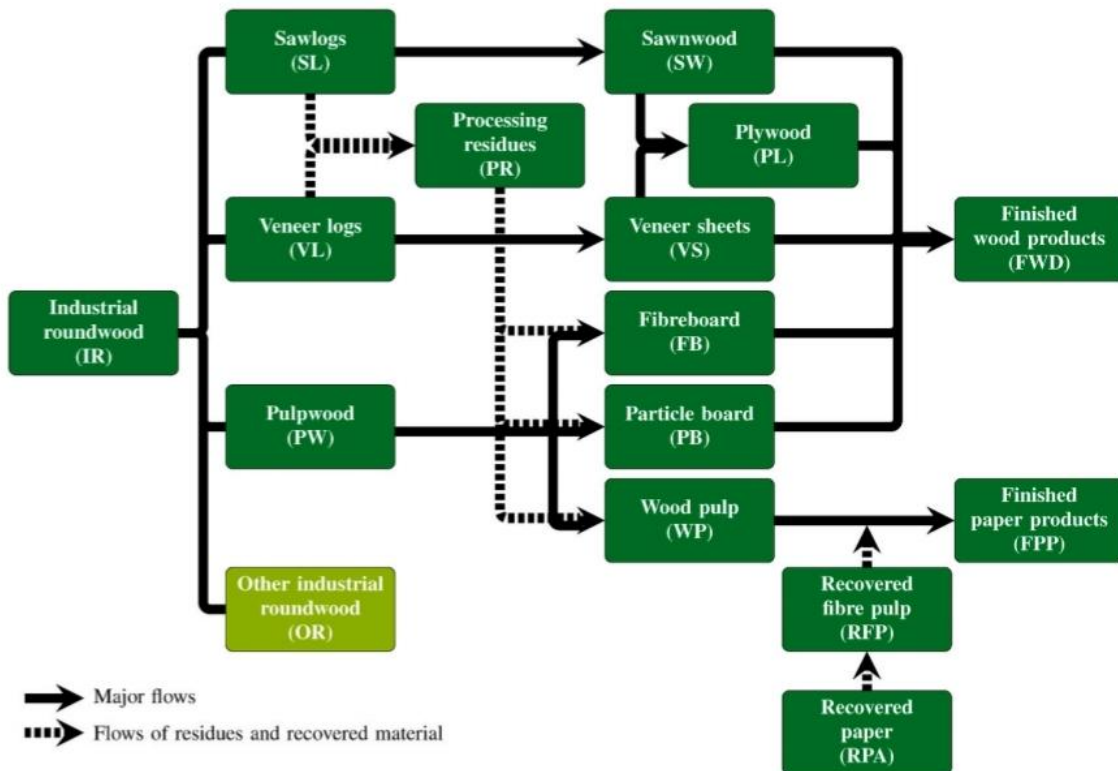
In terms of the industry's contribution to the circular economy, this involves the entire production process, from the extraction of raw materials, their processing and turning into the final product, to the industrial waste management of the production process and waste derived from the distribution of the final product, such as emitted gasses by the transportation vehicles (Araújo et al. 2022). In the forestry industry, all of these stages are crucial in diminishing the impact on the environment and supporting long-term environmental sustainability.

The environmental advantages of the CE are related to reduced waste and emissions, multiple uses of resources, and waste turning into nutrients for future use during the input phase. They are also related to reducing the need for virgin materials and energy inputs, as well as using renewable ecosystems during the output phase (Korhonen et al., 2018).

In terms of the forestry industry, in order to address the level of sustainability of its activities and circularity of its outputs, since it is very complex and there are several parts involved in it, we need to evaluate the entire supply chain. It is possible to see in Figure 1 below, the many stages of production of wood-based products, from the extraction of raw materials, the many sub-products that serve as raw material for other industries and its flow throughout the supply chain in order to produce the final

industrial roundwood and derived products, whether they are for the home or industrial use, or construction in the global forest-based sector.

Figure 1. Industrial roundwood and derived products in the global forest-based sector. Source: Where does the wood come from? A physical accounting model to trace the origin of wood-based products. Bosch et al, 2023.



Wood-based products are traded internationally over elaborate supply chains, crossing vast distances and countries (e.g. Dieter and Englert, 2007; Gan et al., 2016; Long et al., 2019), so frequently the final product is imported from nations different from those where the wood was actually grown (Bosch et al, 2023). Therefore, the potential environmental effects of logging and wood extraction (e.g. deforestation, soil erosion, forest degradation, biodiversity loss) have an inherent relationship with the origin of the roundwood (e.g. Kastner et al., 2011; Dias and Arroja, 2012).

Bosch and colleagues (2023) have made a matrix tracing the origin of the wood of finished wood and paper products, which is presented in Table 1 below. Flows of processing residues and recovered paper, as well as finished wood and paper

products, such as furniture and printed matter are also considered in their model. In this research, it is not the goal to evaluate the technicality of the supply chains, but to appreciate how their configuration impacts the level of complexity involved in the formation of interventions, policies and regulations to ensure that the exploitation of this industry is done in a sustainable manner and holding accountable all parties involved.

Table 1. Consumption of finished paper products in 2018 (in 1.000 m³ (f)). Source: Where does the wood come from? A physical accounting model to trace the origin of wood-based products. Bosch et al, 2023.

| | CHN | USA | RUS | CAN | BRA | DEU | JPN | SWE | FIN |
|--------------|-------------------|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| CHN | 22,898.47 | 402.73 | 12.95 | 3.92 | 5.12 | 92.41 | 80.38 | 5.57 | 1.85 |
| USA | 41,361.88 | 92,669.04 | 333.57 | 2056.96 | 271.77 | 3272.24 | 3690.96 | 188.61 | 33.94 |
| RUS | 6056.73 | 137.54 | 10,087.88 | 2.65 | 13.44 | 828.96 | 231.38 | 266.62 | 1615.00 |
| CAN | 16,649.15 | 12,007.03 | 20.35 | 9983.81 | 10.45 | 388.94 | 1974.98 | 12.24 | 10.64 |
| BRA | 17,318.80 | 4117.09 | 64.27 | 130.51 | 12,757.29 | 3312.88 | 424.63 | 173.89 | 525.46 |
| DEU | 1144.09 | 81.14 | 28.83 | 1.64 | 9.47 | 3840.54 | 16.59 | 84.97 | 20.23 |
| JPN | 3987.25 | 98.98 | 3.50 | 1.08 | 1.30 | 21.78 | 9396.54 | 1.56 | 0.28 |
| SWE | 2295.70 | 233.09 | 80.83 | 5.37 | 14.97 | 3307.48 | 60.92 | 9625.45 | 140.13 |
| FIN | 4159.93 | 156.36 | 75.99 | 8.01 | 16.49 | 2360.50 | 79.44 | 681.59 | 9857.48 |
| IDN | 6942.37 | 214.48 | 6.96 | 3.11 | 2.16 | 35.22 | 184.78 | 2.61 | 0.75 |
| IND | 69.87 | 35.20 | 0.53 | 0.72 | 0.81 | 9.78 | 0.50 | 0.77 | 0.35 |
| POL | 439.62 | 30.25 | 36.59 | 0.72 | 2.53 | 1541.49 | 3.32 | 149.95 | 99.43 |
| FRA | 1035.00 | 62.45 | 12.57 | 1.81 | 5.69 | 1006.74 | 10.82 | 26.90 | 5.13 |
| TUR | 0.77 | 0.10 | 0.02 | 0.00 | 0.00 | 0.75 | 0.01 | 0.02 | 0.01 |
| ITA | 156.94 | 7.91 | 1.43 | 0.16 | 0.45 | 126.86 | 1.45 | 3.73 | 0.60 |
| GBR | 472.13 | 24.87 | 2.51 | 0.47 | 0.96 | 144.64 | 2.70 | 61.48 | 5.50 |
| VNM | 1581.00 | 93.61 | 2.95 | 1.12 | 0.56 | 9.20 | 449.11 | 0.97 | 0.18 |
| KOR | 49.79 | 6.90 | 1.02 | 0.15 | 0.08 | 0.69 | 2.10 | 0.16 | 0.01 |
| CHL | 7294.33 | 453.93 | 20.49 | 19.45 | 16.14 | 539.96 | 279.64 | 8.86 | 2.50 |
| ROW | 16,345.26 | 749.07 | 125.98 | 15.46 | 211.06 | 8587.41 | 454.80 | 2315.71 | 626.52 |
| Total | 150,259.06 | 111,581.79 | 10,919.22 | 12,237.12 | 13,340.74 | 29,428.48 | 17,345.05 | 13,611.66 | 12,945.98 |

Due to the ever-increasing competitiveness in the global market, it is becoming more and more important to look for mechanisms that provide everything consumers demand while also being socially and environmentally responsible (Ferreira and Machado, 2010). With that in mind, in industries, such as the wood panel industry, various techniques have been developed to study and pinpoint the primary causes of environmental consequences of goods and processes (Klein et al., 2015, in Araújo et al, 2022).

One of the main techniques for environmental profiling that aims at minimizing such impacts and enabling a cleaner production is the Life Cycle Assessment (LCA). It allows identifying and measuring potential environmental effects, therefore visualizing the phases of a process or system that have the greatest potential for environmental impact (Cambria and Pierangeli, 2012).

Also, there have been efforts to discover and apply circular economy ideas to various wood panel product systems. Wood panels are products made with wood in

different forms, such as veneers, battens, particles, and others, and are used in the furniture industry and civil construction. For instance, using wood shavings as inputs to the production of new particleboards (Silva et al, 2021), or identifying potential circular economy measures in fiberboard and oriented strand board (Araújo et al, 2022). Araújo and her colleagues (2022) have mapped out the stages of the manufacturing of wood panels under the Brazilian context and their potential environmental impacts, showing the inputs and outputs of the industrial process, in a gate-to-gate perspective. The study includes all stages from the preparation of the soil to grow the trees, extraction of the raw material, manufacturing and transportation (of raw material and final products).

The most common impact categories presented in their study were: global warming (GW) or climate change (CC); ozone depletion (OD) and ozone layer depletion (OLD); photochemical oxidation (atmospheric pollution by ozone produced by reactions with gasses such as NO₂ and volatile organic compounds - VOC -, mainly linked to the transport sector); acidification (AC); eutrophication (EU/EP); human toxicity (HT) and ecotoxicity (EC/EU); abiotic depletion (AD); human toxicity soil (HTS).

The stage that presents the greatest environmental impacts is the actual manufacturing of the wood panels. The main contributors are the resin used binding the materials that make up the panel, emissions during manufacturing, natural gas used to generate thermal energy, fuel used for transport, wood wastes, electricity. The second stage with the most environmental impact potential is the extraction of the raw materials, due to use of industrial fertilizers; obtaining natural gas, electricity, resin and fuels; and wood waste.

As mentioned previously, the Circular Economy aims to eliminate the end of life (EOL) of products, diminish waste production through the application of the 3Rs (reduce, reuse, and recycle) and other similar strategies, develop new business with eco design models, and use raw materials from renewable sources. So, in order for the forestry industry to promote and contribute to Sustainable Development, it needs to take in consideration, not just the stage of the final product manufacturing, but its supply chain as a whole in every detail.

Waste management

A very important part of the Circular Economy is the correct addressing of waste. This applies to all industries, including the forestry one, and also applies to the final product discard. The increasing waste production is mainly due to inefficiencies at the EoL. Therefore, strategies that aim at extinguishing the EOL of a product, as mentioned before, are a good solution. These include reducing, reusing, recycling, and recovering materials and energy in a way to close cycles, by connecting the end of the use phase with another cycle in which the product is given a value-adding destination (Kirchherr et al, 2017). By applying these strategies, companies can also contribute to lowering the environmental impacts of their activities, and therefore reducing various risks related to climate change and/or waste generation (WBCSD, 2019).

In the forestry industry, two critical moments in which waste management is crucial are the extraction of raw material and manufacturing. As an example, let's use the production process of reconstituted wood panels in the Brazilian context. Araújo and her colleagues (2022) conducted a study where they mapped out the wood panel production system. They identified "potential measures to increase circularity in the wood panel production system, increasing the efficiency of processes and reducing waste, while also reducing potential environmental impacts of the life cycle, through effective circular economy actions" (Araujo et al, 2022)

Regarding waste management, they identified elements that can be directly disposed of into nature, and other elements that require special attention and treatment. The former involve elements that don't contaminate nature, and can actually be reused instead by nature itself to enrich the biosphere. They are water, energy, wood and "green" fertilizer that returns to the biosphere and contribute to the soil, and therefore also decreasing the use of industrial fertilizers which are harmful to the environment.

On the other hand, the latter involve other types of waste and sub-products that negatively affect nature when not an incorrect discard process is used. In the stage of obtaining raw material, waste can be related to:

- Wood residues left in the forest after thinning, pruning and cutting of wood, taken to rivers by the rain;

- Fertilizers used during the soil preparation stage that also reach the waters in rainy periods;
- The incorrect disposal of chemical waste (resin preparation, wastewater from the sizing equipment) that ends up in the soil and reaching rivers, contaminating the water;
- Gas emissions and substances from fuel used in the transportation of raw materials.

In the manufacturing stage, waste is mainly associated to the following:

- Waste water from the production process and equipment cleansing, when done in inappropriate places, such as rivers present in the company surroundings;
- Gas emissions during the panel pressing due to the use of toxic resins, burning of wood waste to generate thermal energy, emissions from equipment and transportation, and during the production of chemicals;
- Emission of greenhouse gases from materials when put under high temperatures and disposal of solid waste in inappropriate locations (Silva et al, 2013; Ferro et al, 2018).

Consumer

The consumer plays a key part in the Circular Economy cycle. The consumption stage begins with the consumer (i.e., someone who uses a product) as a customer (i.e., someone who buys a product). According to Shevchenko et al (2023), the choice of a product or service created and manufactured based on CE perspectives, as opposed to a traditional product in the linear economy, determines the customer's contribution to the CE at this early stage. The customer's contribution to the CE will be zero if they choose a LE-oriented product. And his/her contribution to the CE will be greater, the more circularity potential a product has. This of course is also subjected to the availability in the market of options that possess circularity.

Therefore the consumer's contribution can be negative or positive, depending on the circularity of the product purchased, and the system changes from linear to circular assuming various levels of circularity (Shevchenko et al. 2023). All possible consumer (as customer) contributions to the CE, are presented below according to the work of Shevchenko and her colleagues (2023) linked to the circular product

categorization in Figure 2, also proposed by them. This categorization was based on the terminology proposed by Bocken et al. (2016) of “slowing and closing loops”, where circular strategies can be separated into two types depending on their contribution to closing or slowing the material loop.

Hence, the ways consumers can contribute to CE can be by: avoiding wastage today; waste prevention in a short-term period in the future; waste prevention in a short-term period in the future and avoiding waste today; waste prevention in a long-term period in the future; and, waste prevention in a long-term period in the future and avoiding waste today.

The first one refers to the acquisition of products with long life cycles, meaning they won't contribute to the wastage production in the short-term, but not in the long-term. It is associated with products that slow and/or close the loop according to the circular product category. This is the one that contributes the least to CE.

The second one considers products whose useful lifetime can be prolonged in the future. It is associated with products that slow the loop based on the circular product category. This level still doesn't contribute in a considerable way to the circular economy, but it still contributes more than the previous one mentioned.

Going one level up, the third way of contributing refers to the consumption of products whose useful lifetime can be prolonged today to avoid waste and consequently, avoid their waste and of materials in the future. The product categories linked to this third level of contribution are future slowing, past closing, and/or slowing loop-based products.

The fourth level of contribution is stronger to the circularity of the economy, where products are considered either future closing loop products, or future closing and slowing loop-based products, by prolonging the useful lifetime of products and materials in the future. And last, but not least, the fifth and higher level of contribution to circularity is regarding products from six categories: future closing/closing and slowing and past closing and/or slowing loop-based products, as seen in Figure 2. So consumers in this level contribute to prolonging their useful lifetime and/or that of materials today to avoid waste, thereby prolonging their useful lifetime and/or that of materials in the future (Shevchenko et al. 2023).

In the case of wood-based products, they can be found in all categories of products, from slowing to closing loops, depending on their production method, usage purpose

and adequate discard. And the role the consumer plays in their circularity, consequently can also fit in any of the five levels of contributions mentioned above.

Figure 2. The pyramid of CE-related products. Source: Consumer behavior in the circular economy: Developing a product-centric framework. Shevchenko et al. (2023)



Regulations and Policies

One way to promote a sustainable supply chain in any industry, including the forestry one, is through Policies and Regulations. As stated in the report Our Common Future (1987), regulations to control the impacts of industrial activity across national boundaries and on the international commons are necessary. These policies and regulations guide and govern all the production process, from the extraction of raw material to the distribution of the final products. Many times, it also regulates, or at

least partially contributes to the consumer participation in the circular economy by communicating how to correctly discard such final products.

In order for industries to become more sustainable, the companies in them need to be ISO, GRI, and other standards registered. These external sustainability certifications can positively affect organizational performance (Ali and Yusuf, 2019). This is done through certification bodies, which are responsible for auditing and certifying that each company is operating in a manner that is aligned with the Sustainable Development Goals (SDG) of the UN 2030 agenda. With registration by highly reputable certification bodies, sustainability certification can provide more recognition and competitive advantage to companies (Chkanikova and Sroufe, 2020).

ISO and GRI

ISO is one of the biggest standard developers. It has more than 22,000 sustainability management standards and is used in 170 countries to fulfill the SDGs requirements (ISO, 2018a). ISO introduced the SDGs action plan regarding the UN 2030 Agenda, helping enable more sustainable practices. They cover social, economic, and environmental concerns, and also foster international trade partnerships. ISO has developed significant standards that contribute to sustainability and provide essential tools to assist governments, industrial sectors, and consumers in achieving each of the SDGs (Ikram et al, 2021).

GRI is the second-largest sustainability reporting non-profit and multi-stakeholder international organization. It was founded in 1997 and introduced in 2000 in collaboration with the United Nations Environmental Program - UNEP (Sethi et al., 2017). It provides services for multinational companies, government agencies, Small Medium Enterprises (SMEs), NGOs, industrial groups, and United Nations Global Compact (Gómez Martín et al., 2020; Tsalis et al., 2020). GRI's sustainability guidelines and standards provide assistance to foster economic, social, and environmental sustainability. Since 2016, GRI has been included in the UN SDGs and developed standards and disclosure, contributing to these goals.

Certification Bodies

When implementing sustainability standards such as international guidelines, certified and assured tools, non-certified tools, management programs, and disclosures, it is important that companies choose an external certification body that is aligned with the SDGs. The benefits of implementing these standards are countless and are not limited to just the sustainability dimension, but also cost reduction, competitive advantage, customer complaints reduction, productivity, and customer satisfaction (Ikram et al, 2021).

There are various certification bodies (CB) such as DNVGL, Bureau Veritas (BV), SGS, Lloyd's Register (LR), BSI, TUV, Intertek, and others. The selection of an appropriate CB can be a difficult decision for companies, but according to a model built by Ikram and colleagues (2021), the main factors companies bear in mind when choosing a certification body are: reputation, payment method & cost, and quality of auditors.

Certifications in the Forestry Industry

Within the global forestry industry, the main existing certifications regarding sustainability are the following:

- Forest Stewardship Council (FSC): It was founded in 1993 with the mission to “promote environmentally sound, socially beneficial and economically prosperous management of the world's forests” (FSC), and has the vision of fostering the meeting of today’s needs for forest products, without compromising world's forests for future generations. FSC creates the standard of responsible forest management and has auditors who guide the certification process. It is the leader in sustainable forest management, operating the world’s most rigorous and trusted forest certification system. Therefore, the FSC-certified label guarantees that management, harvesting, processing, and manufacturing of the wood product meets their certification standards.

In a study done by Lehtonen et al (2021) to evaluate the contributions of the FSC forest certification to the conservation of biodiversity in four northern

European countries (Finland, Sweden, Estonia, Latvia), they identified that 80% of the FSC certification requirements related to specific biodiversity targets were more prescriptive than the national legislation. One-third of these requirements were considered to have a positive contribution to biodiversity conservation, whereas four requirements (up to 2 per country) were considered to have a low positive contribution.

- The Sustainable Forestry Initiative (SFI): This is an independent, non-profit organization that collaborates with a diverse network “to help address local and global sustainability challenges. SFI works with the forest sector, brand owners, conservation groups, resource professionals, landowners, educators, local communities, Indigenous Peoples, governments, and universities” (SFI). SFI’s measures and core indicators are more production-oriented than the FSC, which is more ecologically-oriented. It acts mainly in the US and Canada, and has already certified over 150 million hectares of land.
- Programme for the Endorsement of Forest Certification (PEFC): Founded in 1999 and active in more than 30 countries, PEFC certification “provides a mechanism to promote the sustainable management of our forests and ensures that forest-based products reaching the marketplace have been sourced from sustainably managed forests” (PEFC). Very similar to the certifications presented previously, it also promotes sustainable forest management through certification, in order to explore forest-based natural resources in a way that doesn’t compromise its availability for future generations.

Figure 3. Logos of certifications in the forestry industry. Sources: SFI, FSC, PEFC.



Due to the complexity of the systems involved, each country has its challenges regarding the transition to a more sustainable exploration of natural resources. A study conducted by Falcone and colleagues (2020) developed a SWOT analysis (Table 2) of the forest sector in Italy to identify some effective policy strategies that could be applied in order for Italy to transition towards a sustainable bioeconomy. These strategies are: improving environmental and forest planning tools by defining viable methods of circular management; promoting investment in forest infrastructure; supporting entrepreneurship programs for forest professionals; and enhancing innovative forest-based value chains (Falcone et al, 2020).

Table 2. SWOT strategies for the Italian forestry sector. Source: Towards a sustainable forest-based bioeconomy in Italy: Findings from a SWOT analysis. Falcone et al, 2020.

SWOT strategies for the Italian forestry sector.

| Factors | Strengths (S) | Ranking score |
|-------------------|---|---------------|
| Opportunities (O) | S-O Strategies: | |
| | ● (O6/8-S/7) Improve environmental and forest planning tools (e.g. SFPPF) | 4.9 |
| | ● (O2/3-S/5/6) Increase investment in forest infrastructure (e.g. <i>trans</i> -Shipment points, biomass trade centers) to improve the availability of forest resources | 4.27 |
| | ● (O1/2/4-S1/2/4) Promote innovative forest-based value chains | 4.3 |
| | ● (O6-S3) Support vocational training programs for rural populations | 3.81 |
| Threats (T) | T-S Strategies: | |
| | ● (T5/6-S5/7) Design innovative policy strategies to improve the policy performance of local governments (e.g. tax relief, subsidies, feed in tariffs, research projects) | 4.45 |
| | ● (T3-S6) Establish wood processing industry networks to improve domestic supply chain integration | 4.09 |
| | ● (T2-S4) Share technological development among companies to promote competition with international markets | 3.90 |
| | ● (T1-S1/7) Improve certification schemes based on socio-environmental indicators (e.g. resource efficiency, biodiversity, health) | 3.8 |
| | ● (T4-S3) Promote new business models (e.g. craft- based models) to employ local professionals | 3.54 |

| Weaknesses (W) | Ranking score |
|--|---------------|
| W-O Strategies: | |
| ● (O4/6–W9/12) Promote entrepreneurship programs for forest professionals | 4.90 |
| ● (O1/4–W7/10) Support training programs on silvicultural practices to better exploit resource availability and reduce the volume of imported biomass | 4.6 |
| ● (O5–W3/4/5/8/11) Support dialogue and collaboration between academics, high-level forest officials, practitioners, and representatives of civil society | 4.54 |
| ● (O1/2–W1/2/3/5/8) Design new business models to improve economic performance and strengthen inter-sectoral network relations, especially within small- scale forests | 4.36 |
| ● (O7/8–W10/11) Promote business models that support the achievement of the SDGs and further support the domestic production of biomass | 4.09 |
| T-W Strategies: | |
| ● (T4–W 6/9) Simplify administrative procedures and support highly skilled professionals in forest management | 4.63 |
| ● (T5/6–W1/4/5/6) Promote the organization of consortia that can achieve national political influence and be representative at the European level | 4.36 |
| ● (T3–W8/11) Develop horizontal networking and common projects to promote “made in Italy” | 4.09 |
| ● (T4–W2/9/12) Implement training courses and incentives tailored to forest management and related industries | 4.09 |
| ● (T2–W3) Support a domestic wholesale market to monitor prices | 3.44 |

In Italy, forests correspond to around 37% of the national territory, and the potentially great availability of wood resources could underpin sector development (Maetzke and Cullotta, 2016; Paletto et al., 2017). In summary, the Italian forest sector is divided into three closely related strands: forest production (harvesting); the first transformation, which includes the production of semi-finished materials, such as wood-based panels and packaging; and third, the second processing, which consists of paper and furniture production, as well as other wood production (Falcone et al, 2020).

The study also highlights that it is necessary for policy makers to go beyond a simple “best option” approach, given the complexity of the system in the forestry sector and some internal barriers and landscape pressures that might interfere or slow down the process. But when properly addressed, and sustaining an accurate strategy to promote its strengths and mitigate its weaknesses, it can give place to potential new strategies to support the Italian forest sector transition towards a circular bioeconomy (Falcone et al, 2020).

Personality and Sustainable Consumer Behavior

In this block, the available literature on the influence of personality in behavioral aspects, such as consumer behavior, environmentalism, job performance, decision-making, and others, will be covered.

Personality has been the object of study of many researchers, scientists, psychologists and even economists. It has been used to explain a series of human phenomena, such as motivation and behavior. At the beginning, the study of personality was restricted to the field of psychology, but in the last decades its relevance expanded to other fields, including the field of economics. This growing interest in the mixture of psychology and economics has come to be known as "behavioral economics", and is widely used to explain consumer behavior. Important names in this field are Richard H. Thaler, considered one of the founding fathers of behavioral economics, along with Daniel Kahneman and Amos Tversky.

Regarding personality, many models have been developed through the years to describe it. This study focuses mainly on "The Big Five Personality Traits", also known as "The Five-Factor Model" (McCrae and Costa, 2003), and other personality traits, such as Skepticism (Obermiller et al, 1998) and Need for Uniqueness (Snyder and Fromkin, 1977; Lynn and Harris, 1997). Nonetheless, in this block of the literature review, other models are also mentioned when exploring the influence of personality in consumer behavior and environmentalism.

Behavioral Economics

In order to explore the relevance of personality and sustainable consumerism, it is necessary to begin by elaborating about behavioral economics. Behavioral economics is a subfield of economics that combines insights and methods from psychology, sociology, and neuroscience to better understand and predict human decision-making behavior. In the 1870's the "marginalist revolution" in economics introduced the assumptions that business firms maximize profits while workers and consumers maximize utility, and therefore "behavioral economics is a reaction against the restrictive assumptions of the marginalist revolution" (Hattwick, 1989).

Hence, in order to change or complement the array of profit-and-utility maximizing models used up until then by mainstream economics, behavioral economics utilizes concepts and insights from the other social sciences. According to Richard H. Thaler, who is considered one of the fathers of this field, the rise of behavioral economics is sometimes characterized as a paradigm-shifting revolution within economics, whereas to him, the methodology of behavioral economics returns economic thinking to its origins, with Adam Smith, Irving Fisher and John Maynard Keynes in the 1930s (Thaler, 2016).

This field of economics recognizes that humans are not always rational or objective in their decision-making processes, but are influenced by a wide range of factors such as cognitive biases, social norms, emotions, and other psychological factors. According to Thaler (2016), the basic problem on the economic theory side is that it relies on one theory to accomplish two very different goals. These are, to characterize optimal behavior and to predict actual behavior. The first one is essential to develop any kind of economic analysis, yet the latter needs further exploration with the inclusion of descriptive theories that are derived from data rather than axioms (Thaler, 2016). Therefore, behavioral economics aims to understand how these other factors influence economic decisions and behaviors, and how they can be leveraged to design more effective policies and interventions. "The behavioral approach offers the opportunity to develop better models of economic behavior by incorporating insights from other social science disciplines" (Thaler, 2016).

Regarding psychological factors, Thaler (2016) says behavioral economics has highlighted the importance of cognitive biases and heuristics in shaping economic decision-making. He also says there are three main concepts of behavioral economics: overconfidence, loss aversion, and self-control. On overconfidence Smith (1776, p. 1) says "the over-weening conceit which the greater part of men have of their own abilities", that leads them to overestimate their chance of success. Regarding loss aversion, Smith (1759, p. 176-177) noted that "Pain ... is, in almost all cases, a more pungent sensation than the opposite and correspondent pleasure." As for self-control, Smith (1759, p. 273) says: "The pleasure which we are to enjoy ten years hence, interests us so little in comparison with that which we may enjoy today."

Two other important names in this field are Daniel Kahneman and Amos Tversky, and their work "Prospect theory: An analysis of decision under risk" (1979). This

theory provides a framework for understanding how people make decisions under uncertainty and has important implications for fields such as economics, finance, and psychology. It proposes that people's decision-making is not based solely on rational analysis, but also on psychological factors such as biases, emotions, and perceptions of risk and value. It also suggests that people often make decisions based on how they perceive potential losses or gains, rather than on the objective probabilities of those outcomes.

They attributed this to the “certainty effect”, where people tend to place less relevance to outcomes that are merely probable when compared to outcomes that have certainty attached to them (Kahneman and Tversky, 1979). They also claim that people choosing under conditions of risk don't appear to behave according to economist's assumptions that consumers maximize expected utility (Kahneman and Tversky, 1979). Hence, prospect theory also proposes that people tend to be risk-averse when faced with gains, but risk-seeking when faced with losses.

Overall, behavioral economics offers many insights involving loss aversion, time discounting (people tend to discount the value of future rewards, preferring immediate gratification), prospect theory, question framing effects, meaning that the way a question is presented can influence how people respond (Kahneman and Tversky, 1979) and has important implications for fields such as economics, finance, psychology and policy-making (Thaler, 2016).

Regarding the personality influences on economic decision-making, a very accepted model to analyze this is The Big Five Personality Traits, also known as Five-Factor Model (McCrae and Costa, 2003), which is why this study focuses on said model. The Big Five Personality Traits will be presented in the next section.

The Big-five Personality Traits

This model is a widely accepted theory of personality that identifies five core dimensions that can describe and predict individual differences in personality. The Big Five traits are broad dimensions of personality which show to be stable across the adult lifespan in general (McCrae and Costa, 2003). Each of these traits exists on a spectrum, and individuals fall somewhere along each trait, not solely in one of them.

The Big-five traits, in English, spell the acronym OCEAN. They are:

- Openness to experience: this trait reflects a person's level of imagination, creativity, and appreciation of new experiences;
- Conscientiousness: this trait reflects a person's level of organization, responsibility and self-discipline;
- Extraversion: this trait reflects a person's level of sociability, assertiveness, and positive emotionality;
- Agreeableness: this trait reflects a person's level of kindness, empathy, and cooperativeness;
- Neuroticism: this trait reflects a person's level of emotional instability, anxiety, and negative emotionality.

The beginning of the development of this model can be traced back to the 1960s and 70s, with Jerry S. Wiggins (1968) and “The Big Two”, and Warren Norman (1963) who presented one of the first five-factor models. This model has been researched and developed by many psychologists over the last decades, but it was in the 1980s and 90s that it gained more acceptance and popularity. Some of the key researchers who have contributed to the development and validation of the Five-Factor Model include Lewis Goldberg (1990), Paul Costa and Robert McCrae, who developed the NEO Personality Inventory in 1983 and first presented the five-factor model used in this study in 1992.

For this research, The Five-Factor Model has been chosen because it has been extensively researched and has shown to have strong predictive power for a wide range of behaviors and outcomes, including academic performance, job performance, mental health, environmentalism and consumer behavior, which is the focus of this research.

Regarding behavioral economics, various personality traits have shown to have significant effects on economic decision-making. For example, in a study by Donnelly et al (2012) found that Conscientiousness was positively correlated with money management, whereas Neuroticism was negatively correlated with it. Moreover, a study by Ratnawa and Borgave (2019) found that individuals high in Agreeableness and Neuroticism were found to be significantly correlated with impulsive buying behavior.

In terms of time preferences and willingness to delay future rewards, studies show that these are influenced by personality traits such as impulsivity and self-control, associated with Neuroticism. For example, in a study by Hirsh et al (2008), the trait Extraversion predicted greater discounting at lower levels of cognitive ability meaning these individuals have a tendency to prefer instant reward over delayed gratification. Whereas emotional stability was related to lower discounting at higher levels of cognitive ability, being more able to manage delayed rewards. Nyhus and Webley (2001) conducted a study to analyze personality traits as predictors of saving and borrowing behavior. The research found that individuals high in Extroversion and Agreeableness were more prone to have less savings and to borrow money.

Personality also influences other areas of behavior, such as job performance. The meta-analysis done by Barrick and Mount (1991) found that the five-factor model was related to job performance in different occupations and job types. In the study, they analyzed the relationship of the big five to 3 job performance criteria (job proficiency, training proficiency, and personnel data) for 5 occupational groups (professionals, police, managers, sales, and skilled/semi-skilled). Among the findings, Conscientiousness showed consistent relations with all job performance criteria, so to predict overall job performance; Extraversion and Openness to experience also appeared to be predictors of different occupations.

Another study by Nadkarni and Herrmann (2010) suggested that CEO personality can be an important factor in determining a firm's strategic flexibility and financial performance. Specifically, openness to experience and extraversion have been found to be positively related to a firm's strategic flexibility, which in turn is positively related to maximizing the firm's performance.

Other personality traits

Besides the Big Five Factor model, there are many other personality traits that have been proposed and studied in the field of psychology. Some personality traits that are found in existing research, and mentioned in this study, linking personality, behavioral economics, sustainability and willingness, are altruism, skepticism and need for uniqueness.

Regarding altruism, its study is an important area of research in social psychology, and has implications for understanding a wide range of behaviors and phenomena, including prosocial behavior, social influence, and intergroup relations. For example, in “Altruism in humans” by C. Daniel Batson (2011), an analysis of the possibility of human beings’ capacity to care for others for the other’s sake, and not uniquely for their own is presented. However, the choice of complementary personality traits to be explored further for the purpose of this research have been Skepticism and Need for Uniqueness. This is due to their controversial influence on a person’s tendency to support environmentalism and consume products that are associated with this cause and/or moderate their willingness to pay for a green premium. Also, altruism is already a facet of “Agreeableness” (McCrae & Costa, 2003).

Skepticism

The concept of skepticism can be traced back to ancient Greek philosophy, especially to the school of skeptics founded by the philosopher Pyrrho. A belief that Pyrrho and his followers had was that knowledge is uncertain and that it is not possible to know anything for sure. Philosophers from this school were the first to develop a systematic approach to skepticism (The Wilson Quarterly, 1976-). The concept of Skepticism was also explored by other philosophers throughout history, including René Descartes (1641). He developed his famous method of doubt, in order to challenge his own assumptions and beliefs. His method involves systematically questioning the truth of all beliefs in order to arrive at a foundation of knowledge (Descartes, 1641).

In this study, we are interested in looking at skepticism toward advertising in general, which is the tendency toward disbelief of advertising claims (Obermiller and Spangenberg, 1998). This can happen by an intrinsic skepticism or by a deception with previous advertising claims, which evokes a general negative posture towards further advertising and generalized mistrust (Darke and Ritchie, 2007). In the book “Personality in Adulthood: A Five-Factor Theory Perspective” (2003), Costa and McCrae attribute Skepticism to individuals who score low on Agreeableness.

In terms of consumer behavior, skepticism is found to influence the trust consumers have regarding marketing claims, whether they are regarding quality, origin, healthiness, or even sustainability. Hardesty and colleagues (2002) conducted a

study called "Brand Familiarity and Invoice Price Effects on Consumer Evaluations: The Moderating Role of Skepticism toward Advertising", where they found that skepticism toward advertising can decrease the impact of brand familiarity and invoice price information on consumer evaluations. Where "brand familiarity" refers to the extent to which a consumer is familiar or not with a particular brand or product; and, invoice price information refers to the actual cost of a product or service.

When confronted with pro-sustainability consumer behavior, this relationship mainly affects the willingness to pay for sustainable products in a negative way. In this case, two types of skepticism can be seen, green skepticism and skepticism toward labels and advertising. The first one refers to not believing in the environmental cause, whereas the other refers to mistrust towards company's claims and advertising.

A study conducted by Goh and Balaji (2016) in Malaysia found that green skepticism has an indirect negative effect on green purchase intentions through environmental concern and environmental knowledge. Hence, when customers present high levels of skepticism towards green products, they are likely to have lower concern and lower knowledge about environmental issues (Goh and Balaji, 2016). Delmas and Burbano (2011) refer to this as "greenwashing". It is when a company engages in poor environmental performance, yet communicates to the market they have positive environmental performance, meaning the contrary (Delmas and Burbano, 2011).

Regarding mistrust towards the claims of the product's labels, skepticism also appears to inhibit the purchase of sustainable products. This will be further explored in the section "Labels & Certifications - Skepticism".

Need for Uniqueness

The concept of "need for uniqueness" was initially proposed by Snyder and Fromkin in 1977, in their paper "Abnormality as a positive characteristic: The development and validation of a scale measuring need for uniqueness". They developed the "theory of uniqueness", where the need to see oneself as being different from others is awakened when individuals see themselves way too similar to others in their social environment. They also developed a scale to measure an individual's need for uniqueness and found that this trait was associated with creativity, nonconformity, and consumerism as an extension of self (Tian et al, 2001). Later, Lynn and Harris (1997) built on Snyder and Fromkin's work and extended the concept to the realm of consumer behavior, examining how individuals with a high need for uniqueness may

pursue self-uniqueness through their consumption choices, especially when that involves scarce, innovative, and customized products (Lynn and Harris, 1997). Since then, the concept of "need for uniqueness" has been studied by many researchers in different fields, including personality psychology, social psychology, and consumer behavior.

Regarding the relationship between Need for Uniqueness and Environmentalism and Green Consumerism, research shows that consumers are willing to pay for products that have sustainability claims, as long as that represents some form of uniqueness to themselves. For example, in a study conducted by Sestino et al (2022) analyzed the effect of a communication message towards a luxury product, focusing on sustainability rather than performance. The results were that this communication led to higher positive attitudes toward the product in hand, and also that this effect was mediated by consumers' perceived product uniqueness. The findings also include the role of conspicuous consumption in magnifying such effects.

On the other hand, in a study done by Polyportis et al (2022) we see a different consumer behavior regarding need for uniqueness, where consumers with strong individualism were less prone to engage in green consuming (products made from recycled material). This is due to the fact that consumers with strong individualism tend to prioritize their own interests, purposes, experiences and values, rather than social situations (Polyportis et al, 2022). Since environmentalism is a collective issue, individualists tend to be less sensitive to this.

This can be explained by the Inverted-U-shaped effect, which is when a positive phenomena reaches an inflection point at which its effect turns negative (Grant and Schwartz, 2011). Therefore, the moment that a specific sustainable cause or attitude stops being nonconformist and is considered mainstream, the tendency is that the consumers will prioritize their individualism over the sustainability cause.

Griskevicius et al (2010) presents another interesting insight about NFU not influencing the purchase of sustainable products. In his study "Going Green to Be Seen: Status, Reputation, and Conspicuous Conservation", he argues that green consumerism, that at a first glance might look like it's driven by a desire to be unique, different, and fashionable, because eco-friendly products are perceived as unique and fashionable. However, he also argues that at the moment of the study, green products were already rather common. Hence, this altruistic attitude towards the environment could be motivated by one's own self-interest, since it earns that person

a good reputation and increases his/her status in a group, and not to a sense of uniqueness or individualism.

Another interesting finding in the literature regarding NFU is a study that found an association between the self-attributed need for uniqueness and a general conspiracy mentality and endorsement of conspiracy beliefs (Imhoff and Lamberty, 2017). In this study, participants high in conspiracy mentality showed more support for a fictitious conspiracy theory when this theory was said to be supported by only a minority (vs. majority). These findings support the notion that conspiracy beliefs can provide individuals a sense of uniqueness.

This is interesting for our study, because it is possible to link it with green skepticism, as mentioned in the previous section. Meaning that individuals high in NFU might actually be less prone to buying sustainable wood-based products if they are skeptical towards the sustainability claims of the industry or in general, and if their skepticism is funded in conspiracy beliefs.

Moreover, the forestry industry is highly regulated, as we have seen in the previous sections regarding the industry and its regulations. Therefore, sustainability claims and labels might not represent an innovative approach, but more of a mainstream one. This also leads me to think that in the case of wood-based products, NFU might actually have a negative effect on willingness to pay. This subject will be further explored in the hypotheses section.

Environmentalism

When analyzing the relationship between personality and environmentalism, the literature points out that it is important to take in consideration factors such as core values, cultural and social influences along with it. Although studies differ on how exactly one influences the other, research has found some personality traits to be more strongly associated with environmental attitudes and behaviors than others. An example is a study conducted by Hirsh (2010), where his findings show that greater levels of Openness and Agreeableness were associated with higher environmental concern. Neuroticism and Conscientiousness also showed this relationship but on a lower degree. On the other hand, a study that was conducted by Brick and Lewis (2016) showed that regarding greenhouse gas emission, both Openness,

Conscientiousness and Extraversion have a positive relationship to pro-environmental behaviors.

Another example I found is the article "Personality traits and environmental choices: On the search for understanding" by Farizo et al (2016), where it examines the relationship between the big five personality traits and their choice among alternative choices for improvements in power generation from wind farms. The article also takes in consideration the role of other factors in this relationship, such as socio-demographic variables and contextual factors, as influencers of the relationship between personality and environmental behavior. The main finding of the article is that the personality traits Agreeableness, Openness and Conscientiousness, have a significant positive relationship with environmentally responsible behavior.

Marcus and Roy (2019), in their article called "In Search of Sustainable Behaviour: The Role of Core Values and Personality Traits", argue that understanding the role of both core values and personality traits is important for predicting sustainable behavior. After reviewing the existing research, they suggest that values such as environmental concern and social justice are important predictors of sustainable behavior, as well as personality traits such as openness to experience, extraversion, and agreeableness.

Sustainable Consumer Behavior

Expanding the concept of Environmentalism to Sustainable Consumer Behavior, research shows that certain traits from the Big Five personality model are related to sustainable consumerism. However, just like environmentalism, it is a phenomenon that is influenced by several different factors, therefore it requires a holistic analysis. In the literature, there is not a consensus either as to how personality traits influence the consumer's choices.

For example, the article "Some Relationships between Personality and Consumer Decision Making" by Horton (1979) explores the relationships between two personality traits, namely Anxiety and Self-confidence, along with six other factors (impulsiveness, social and general anxiety, family structure, task orientation and age) and consumer decision-making in general, such as brand loyalty, information

processing, and decision-making styles. The study found that both traits anxiety and self-confidence influence consumer behavior, as well as the factors general anxiety and task orientation. The study also found that there is a relationship between self-confidence and brand choice, but the direction of this relationship varies according to the product class. Although this study wasn't specifically about sustainable consumerism, it highlights how personality traits can provide valuable insights into consumer behavior and decision-making processes.

Another example in the literature is the study conducted by Hirsh and Dolderman (2007), where they examine the relationship between the big five personality traits as predictors of consumerism and environmentalism. The study found that Agreeableness and Openness were positively related to environmentalism, while Agreeableness negatively predicted consumerism. Whereas, neuroticism had a significant zero-order correlation with environmentalism ($r = -0,20$; $p < 0,05$).

Green Gap - Green Rhetoric vs Actual Purchasing Behavior

As presented so far, various studies show that consumers express concern for the environment and, as will be presented in the following section, they express a willingness to pay more for environmentally friendly products. However, they often don't follow through with their intentions when making purchasing decisions. This phenomenon is explored in a study conducted by Johnstone and Tan (2015), where they refer to the term as "attitude-behavior gap" or the "green gap". In this study, the authors explore the gap between consumers' environmentally friendly attitudes and their actual green purchasing behavior.

It showed that environmental concern is not the only determinant of green purchasing behavior and that consumers are influenced by various other factors. One of the themes that most appeared in the research was the perception that "It is too hard to be green". This was attributed to inner factors and external ones. Among the inner factors were lack of time, money, knowledge and perceived sacrifice. While the external factors included their residence, the people they live with, confusing packaging information and the lack of easy-to-understand regulatory or green accreditation schemes (Johnstone and Tan, 2015).

Therefore, the authors suggest that marketers place more attention and effort into reducing consumer's cynicism, and policymakers and government to implement regulations regarding sustainable products that reassures consumers that the green claims are true.

Green Consumer and the Willingness to Pay for a “Green Premium”

The awareness of matters related to sustainability and the longevity of the planet influences consumers' purchase decisions. Consumers are much more conscious of the environmental damage that materials used in items for daily use create (Singh et al., 2018; Kumar et al., 2020). The use of pesticides, packaging materials, and waste management are all issues that many companies are now more concerned with (Prakash and Pathak, 2017). Therefore, consumers with a higher awareness of environmental issues tend to have a preference for products that respect the environment, both in its production and discard. In this block, the consuming behavior of people who value sustainability will be presented, as well as the factors that influence their purchase decision, value perception and willingness to pay for a “green premium”. In this study they are referred to as "green consumers".

Since green consumer behavior is more related to each person's attitudes, socio-demographic aspects, values and beliefs, rather than the industry or the product being purchased itself, the focus of this segment is presenting precisely these factors that guide their consumerism preferences, not only in the forestry industry but in other ones as well. Also, in a world where people are continuously increasing their perception of the importance of sustainability, communicating to the consumer that the business complies with such practices is crucial. This can be done through many strategies, including the promotion of certifications and labels.

This block will also cover this aspect, where commercializing a certified product that guarantees sustainable practices were used in the making of it, can in turn have a positive impact in the increase of demand and the clients' willingness to pay. This benefits the business in return, and acts as an economic incentive for it to work according to the SDGs standards and guidelines. This part of the literature review is done in order to have a better understanding of how sustainability awareness appears in the consumer's purchase decisions, which will set the foundation to formulate the hypotheses for this research.

Attitudinal and Socio-demographic Aspects

In order to understand the purchase intention for wood-based products of the environmentally-conscious consumer, it is necessary to evaluate a set of attributes, among them, the influence of attitudinal and socio-demographic aspects. Baldi et al (2021) conducted a study to further understand how the attitude toward environmental protection and toward nature shaped the consumer's behavior in the food industry. The study was made specifically based on the purchasing behavior of sustainably-produced tomatoes, with improved resource efficiency in its production. Since individual characteristics and personality traits affect food consumption in general (Roberts, 2009, Peschel et al., 2016, Lin et al., 2019, Ardebili and Rickertsen, 2020, Wu et al., 2020) and also sustainable food consumption (Bazzani et al., 2017, Peschel et al., 2019), Baldi and colleagues explore in their research, how individual attitudes toward the environment can potentially determine green behavior. In their research, attitude toward environmental protection and attitude toward nature appreciation are treated as two separate concepts, as proposed by environmental psychologists who distinguish environmental preservation from nature appreciation (Baldi et al, 2021). And, taking into account the customer's psycho-attitudinal propensity towards both of these attitudes, the results showed that they play a significant role in shaping the purchasing behavior and willingness to pay (WTP) for the "resilient tomato", as they call it in their study.

In a different study, conducted by Kumar et al (2021) in the Indian clothing market, showed that Indian consumers are aware of green apparels, have a positive attitude to them and show a responsible purchase intention to protect the environment. The study also found a willingness to pay a price premium for eco-friendly apparel. In this study, Indian consumers are compared to consumers from the UK, USA, Brazil, Russia and many other countries, where Indian people show a higher environmental concern than other countries in regards to green apparel.

However, a crucial factor that determines green consuming behavior, presented in the study by Calderon-Monge et al (2020), is the perception that including more sustainability-related factors in their purchasing decision has an actual impact towards environment preservation, therefore it is productive into this outcome. Their study also presented that there are two important barriers to this, especially regarding the social dimension of sustainability, which are communication and skepticism.

Some information asymmetries prevent consumers from being informed of the company's efforts towards this. Also, consumers' beliefs about companies' Corporate Social Responsibility (CSR) undermines the credibility of communications by these companies regarding this aspect, thereby creating mistrust within consumers. Therefore, the study also presents this as a business opportunity, where in order to reach potential clients who are socially and environmentally conscious, manufacturers that are already investing in sustainability-related actions could increase their communication regarding these aspects. This can be achieved through the enhancement of their transparency regarding the product manufacturing and distribution processes, inclusion of traceability information on the label, and others. Which takes us to the next section in this block, the influence of labels and certifications.

Labels & Certifications

As presented before, consumers who have a pro-environmental attitude tend to be willing to pay a price premium for eco-friendly products. Now, how can businesses communicate to consumers about the sustainable bias in the product being offered? This raises a lot of questions and doubts, and there is much research done on this topic. On one hand, certifications and labels can be very helpful and are very important to ensure a sustainable supply chain, as it has been presented previously in the section of "Regulations and Policies". On the other hand, it also influences the consumer's willingness to pay and can be used as a business opportunity to reach new potential clients, as mentioned in the previous section referencing the study by Calderon-Monge et al (2020).

This is where labels and certifications come in place in terms of communicating and guaranteeing consumers that the product is actually sustainable. But this raises the question, to which degree these certifications and labels have an impact in the WTP for a price premium when compared to a similar product without such claims, for the same or a cheaper price? Another issue that might come in the way is the credibility of said certifications and labels in the consumer's perception. This is another reason why businesses must choose with care the certification body and audit for their products, in addition to what has already been mentioned in the section of policies and regulations, to give the product more credibility.

Majer et al (2022) performed a systematic review of the empirical literature regarding the effects of visual sustainability labels on consumer perception and behavior. Labeling schemes stand out as an easy-to-implement, low-cost, and non-intrusive policy tool to increase transparency and trust in sustainability-related product attributes and to foster sustainable consumption behavior (Demarque et al., 2015; Sunstein, 2017). The aggregated findings of the study suggest that labels do have positive effects on psychological and behavioral outcome variables. They provide utility for them, increase willingness to pay and can change consumer's behavior (Majer et al, 2022).

The two most prominent label types are organic and ethical labeling. Two of the studies analyzed in Majer et al (2022) research found that a fictional traceability label is associated with a higher WTP than a national organic label or the ASC label (Banovic et al., 2019; Bradu et al., 2014). Similarly, another study showed that participants were willing to pay 25% more for locally produced almonds (as indicated by a fictional distance label) and only 5% more for certified organic almonds (de-Magistris and Gracia, 2016).

Also, two of the studies investigated the moderating effect of income on the labeling effect. One of them revealed that income positively affected WTP, so that participants with higher income were willing to pay more for the reprocessed labeled product (Drichoutis et al., 2017). However, another study results show no significant effect on utility by income (Risius et al, 2017). Moreover, other socio-demographic aspects that appear to moderate the labeling effect are societal class and education level, a higher level of both are associated with greater use of sustainability information (Grunert et al, 2014).

However, the influence labels play on the consumer is not homogeneous among them, as it depends on a set of individual, contextual, and label characteristic factors. This complex interaction within each person is what ultimately determines the final consumer choice. In Table 3 below, this set of factors is presented from the study done by Majer and colleagues (2022).

Table 3. Overview of the moderating factors of the labelling effects. Source: The effects of visual sustainability labels on consumer perception and behavior: A systematic review of the empirical literature. Majer et al, 2022.

| Individual Factors | Label Characteristics | Context Factors |
|---|---|---|
| <ul style="list-style-type: none"> - Trust in environmental information (larger effect of labelling for higher trust, 16) - Environmental awareness (larger effect of labelling for higher awareness, 16; no effect, 22) - Concern about sustainability issues (larger effect of labelling for higher concern, 14) - Understanding of sustainability labels (larger effect of labelling for better understanding, 14) - Time preference (larger effect of labelling when focus on future consequences, 11) - Attitude towards companies' CSR activities (7) - Information exposure (19) - Sociodemographic factors: <ul style="list-style-type: none"> - Age (larger effects among older people, 14) - Gender (larger effect among females, 14; no effect of gender, 8, 22 a & b) - Income (larger effects in participants with higher income, 15; no effect of income, 24) - Class (larger effect among higher classes, 14) - Education (larger effect among highly educated, 1) - Nationality (Germany > UK > Spain > France > Italy, 3; UK > Sweden > Germany > Spain > France > Poland, 14) - Distinct Consumer Segments (3, 10, 13, 17) | <ul style="list-style-type: none"> - Labelling scheme (Traceability > Organic Label, 3, 7; Distance Label > Organic Label, 10; Organic > Carbon Trust, 11; Ethical > Environmental, 14; ; Organic > Ethical > No label > Environmental, 20; Organic > Ethical > No label, 21) - Labelling Organization (larger effect of governmental label, 2, 11, 20, 21; larger effect of fictional label, 7, 10; effect label specific, 2, 14, 25) - Valence (positive information/no information better than negative information about the product; 8, 10) - Mass balance certification (larger effect of 100% certified than certified mix; 13, 17) - Additional information surrounding the label (effect depends on the type of information, 16, 22, 23; larger effect after information provision on labelling scheme, 5) | <ul style="list-style-type: none"> - Product Type (Fresh fish > smoked fish > canned fish, 3; Chocolate > Coffee > Ice Cream > Breakfast Cereal > Ready meals > Soft drinks, 14; Meat > Dairy & Vegetable, 18) - Product Origin (domestic labelled product preferred; 5, 15, 21) - Season (Winter < Summer, 2) - Price (1, 19) |

A study was conducted in Italy by Mazzocchi et al (2022) to identify the consumer's awareness of sustainable supply chains, where they analyzed the attributes that influenced customers when acquiring Parma ham PDO (protected designation of origin). The WTP was increased depending on the production method used. The study confirms the existence of consumer's preference for antibiotic-free products. The results also seem to suggest that the pork industry could explore the reduction of pollutant emissions and consumers' environmental concerns in agriculture, but in particular in the livestock sector. Using appropriate communication tools can be an appropriate marketing strategy for the agri-food sector (Burnier et al., 2021, in Mazzocchi et al, 2022).

Morone et al (2021) performed an artefactual field experiment to evaluate the effects in the WTP of certified bio-based products, compared to products with no sustainability bias. They used three product categories: hand soap, food bags and colored pens. In this experiment, consumers demonstrate an interest in "green products", and WTP for a "green premium" is seen in all of them. However, WTP for "certified green premium" was not seen in colored pens. Also, in terms of elasticity, conventional products present more elasticity than the demand for bio-based products. This could be explained by the awareness participants showed that the adoption of environmentally friendly practices involved higher production costs, therefore higher selling prices. And finally, their study showed that the higher the demand elasticity of conventional products, the more prone consumers were to preferring the bio-based version when faced with a price-increase in the non-sustainable one.

Skepticism

One important factor that has already been presented and influences the purchase decision of green consumers, and has the ability to "neutralize" or decrease their WTP for a green premium is skepticism towards labels and certifications. As shown in the research by Rossi and Rivetti (2023) in the context of food products, consumer's skepticism inhibits the purchase behavior of sustainability-labeled

products. This is due to the existence of too many sustainability labeling schemes in this industry, which decreases the trust of consumers on said labels.

Also, in this study by Rossi and Rivetti (2023), it is presented that third-party labels tend to gain higher consumer trust (e.g., Atkinson and Rosenthal, 2014, Gordon et al., 2011, Thøgersen and Nielsen, 2016, Majer et al., 2022) than corporate-based (self-declared) information, which may be perceived as greenwashing (Delmas & Burbano, 2011).

This could be counterbalanced by providing more concrete evidence of all sustainability claims. Certifying labels can serve warranty and help to overcome informational asymmetries existing between producers and consumers (Nikolaou and Kazantzidis, 2016; Noblet and Teisl, 2017). This is where certification and labels by official certification bodies can also serve a purpose in terms of marketing opportunities.

Studies show that improved and clear standards and certification schemes and labels for bio-based products may be key in boosting their market penetration (Ladu and Blind, 2017; Morone and D'Amato, 2019). A certified product offers a more reliable claim that can dribble customer's mistrust. Using third-party labels and self-declared claims together result in higher perceptions of credibility and product quality than those alone (Ertz et al., 2017; Rossi and Rivetti, 2020).

So far, it is possible to see that certifications and labels tend to influence purchase decisions. However, it is not an unconditional truth that certified products will necessarily increase the WTP of all green consumers, since this is moderated by some attitudinal and socio-demographic aspects.

WTP for Sustainability in the Forestry Industry

In the forest industry, the literature shows that green consumerism behaves similarly to the other industries presented in the previous sections. Factors such as income, attitudinal dimensions, certification reliability, appear to influence the WTP in this industry as well. It was also noticed that green premiums are not always associated with certifications, also in line with what was observed in other industries.

In Italy, a research was done by Zanchini et al (2022) to evaluate the consumer's interest in forest sustainability and quality certifications and how they influence their

value perception and WTP in the acquisition of pellets. They found that the consumerism of wood in Italy responds to some attributes in a hierarchical way. First of all, price was the most important attribute influencing the purchase decision. Second, sustainability certifications, and lastly, quality certifications. The study was conducted based on the certifications ENplus, FSC and PEFC. The first one is related to quality warranty, and the following ones, as it was presented previously in the section of certifications in the forestry industry, are regarding the origin of the products by forests managed according to the principles of sustainability.

In the study by Zanchini and colleagues (2022), the general public seems to attach the same function and meaning to all of those certifications. This could reinforce the importance of choosing internationally known certification bodies as a marketing strategy to increase the value perception in the final product. The study also found that the socio-demographic aspects that had a relevant correlation with the WTP were age and education level. Where younger age and low education level was associated with higher sensibility to price changes.

Regarding socio-demographic aspects, a study done by Aguilar and Vlosky (2007) in the United States, showed a strong relationship between income and willingness to pay for certified wood products. Their study found that consumers tend to be more willing to pay a price premium for sustainability when the product is certified and thus, associated to lessen environmental impacts, such as tropical deforestation. Although this tendency was seen, the WTP for a green premium was not always true for all consumers seeking certified products. Among the ones willing to pay more, the average green premium was 10%, whereas the maximum observed was 25%.

In terms of income, these consumers' household (who were willing to pay for a green premium) annual income was observed to be higher than \$39,999. This reinforces other studies where income appears to be a moderator of the sustainable consumer behavior, weakening the influence attitudinal aspects have on increasing the WTP. Yet, the study also showed females expressed a higher likelihood of paying more for sustainability when compared to males.

A research was conducted in 2022 by Panico et al. to assess the consumer purchasing behavior for certified wood products in Italy based on the Theory of Reasoned Action (TRA) model, by Ajzen and Fishbein (1980). This theory, along with the Theory of Planned Behaviour (TPB), by Ajzen (1991), state that individual behavior is determined by intentions and, in thus, by attitudes toward a specific

behavior and subjective norms. Intention expresses the probability of performing a specific behavior (Ajzen and Fishbein, 1980). However, consumers don't always act along the lines of their principles, so a gap may appear between attitudes and purchasing behaviors.

Their study focuses on that, by analyzing, in the light of the TRA integrated model, the relationships between knowledge of FSC and PEFC ecolabels, general attitudes toward the environment, specific attitudes toward forest certification, trust in forestry certifying organizations and the purchasing behavior of a sample of Italian consumers toward FSC or PEFC labeled products (Panico et al, 2022). The results of the study showed that all the attitudinal constructs of the model play a significant role in affecting the willingness to pay a premium price for certified wood products, where 70% of the respondents answered a price premium between 5%-10%.

A similar study was performed long before by Hansmann et al (2006) in Switzerland. Their study aimed at assessing people's sustainability orientation concerning the forestry industry in the ecological, social, and economical dimension, and also their knowledge of labels for sustainable forestry (SF). This was done with the aim to orientate marketing strategies to promote the SF certification to enhance the demand for correspondingly certified wood products. The certifications taken in consideration were the Forest Stewardship Council (FSC) and the Swiss Quality label (Q-label).

This study focused on measuring people's individual tendencies regarding the relative importance they attach to the three sustainability dimensions - ecological, social, economic - and linking it to preferences for certified wood. The results showed that, on average, social and ecological aspects of forests are of higher importance to the participants than economic aspects.

Certifications alone didn't play a major influence on WTP. But when it was communicated that the certificates FSC and Q were related to ecological and social values, then the attention to these labels increased significantly and the stated willingness to pay was 5% higher price for labeled wood products. Another interesting finding was that the information on the wood labels reduced the WTP differences between consumers more socio-ecologically concerned and those with a higher economic orientation. With that, it indicates that communication efforts regarding SF certificates could also influence economically oriented consumers, not only the typical green consumer.

So, in general, the literature points that just like in other industries, when it comes to wood-based products and the forestry industry, the value perception attributed to sustainability is the result of a combination of factors, that go from culture, knowledge and awareness of the cause, awareness of how they can contribute to improving the situation, attitudinal aspects towards environmental causes and trust in institutions and certifications that aim at lowering the environmental impacts of economic activities. Also, certifications and labels in general are associated with WTP for a green premium, which reinforces what studies for other industries have shown, that the green attitude could be seen as a business opportunity, using certifications and labels also as a marketing strategy, not just a policy and regulations compliance.

Research Gap and Research objective

As presented so far, in the literature available there are many studies regarding sustainability and green consumerism, linking them to socio-demographic factors, attitudinal dimensions, personality and general regulations and policies available to foster sustainable development. There are also studies available covering how all of them impact the consumer's willingness to pay for a green premium. Each individual study doesn't necessarily link all of the mentioned factors together at once, and when so, there aren't enough studies to cover all of the existing industries in the market. Also, an analysis focusing on the influence that personality traits have on all these factors seem to have room in the scientific field to be explored in further studies.

This research aims to fill the gap for a study focusing is on the willingness to pay for a green premium for wood-based products, taking in consideration the existing studies and expanding the available literature by including a perspective from a personality-trait point of view, based on the Big-Five Personality Traits (McCrae and Costa, 2003).

Down below, in Table n. 4, it is possible to see the most significant scientific articles used in this literature review.

Table 4. The most significant scientific articles related to sustainable consumerism, willingness to pay and personality traits. Source: Author, 2023.

| Title, author, year, scientific journal | Main Topic | Type of Analysis | Content and Purpose | Results and Conclusions | ΔP WTP in % | ΔP WTP in € |
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| Enhancing wood products through ENplus, FSC and PEFC certifications: Which attributes do consumers value the most? - Raffaele Zanchini et al - 2022 - Forest Policy and Economics | -The valorisation of wood products goes through certifications, in particular the ENplus certification guarantees quality and the FSC and PEFC certifications guarantee the origin of the products by forests managed according to the principles of sustainability. -Price is the attribute with the | Quantitative research - 252 respondents from different Italian regions - conjoint method, cluster analysis and Ward's method | Fill the gap in sources assessing consumer interest towards forest sustainability certifications and quality certifications, verifying the existence of a hierarchical scale among them, in particular on products used for energy purposes. | Consumers perceive such certifications in a similar way, attaching the same function and meaning to both as a general trend. In terms of the attributes of wood products: price was the most important attribute in terms of mean relative importance, followed by sustainability certifications and, finally, by quality certification. | Mentions certifications to increase the WTP, but it doesn't present any % or number. | |

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| | highest importance; sustainability certification is the second most relevant attribute. The quality attribute linked to the ENplus label is the lowest relative importance score in the model. -Relationship with socio-demographic characteristics. | | | | | |
| Analysing the consumer purchasing behaviour for certified wood products in Italy - Teresa Panico et al - 2022 - Forest Policy and Economics | -Test of the role of several attitudinal characteristics of Italian consumers on their purchasing intention with a structural equation model. -It considers both direct and indirect impact of ecolabel knowledge, general environmental attitude, attitude toward environmental certification, trust in certification. | Quantitative research - structural equation modeling (SEM) - 478 respondents | To analyze how knowledge, environmental attitudes and trust in forestry certifications are related to each other in the purchase decision-making process. | -Results: all the attitudinal constructs of our model play a significant role in affecting the willingness to pay a premium price for certified wood products. | 70% of the respondents answered between 5%-10% of price premium. | |
| Consumer willingness to pay price premiums for environmentally certified wood products in the U.S. -Francisco X. Aguilar, Richard P. Vlosky - 2007 - Forest Policy and Economics | Model suggests that higher probabilities of paying a premium are associated with consumers who seek out certified products and who believe certification can lessen environmental impacts such as tropical | Quantitative research - Tailored Design Method - 165 respondents, who are residential consumers (homeowners) , are over 18 years old with incomes over \$30,000/year | To advance the understanding of consumers' WTP premiums for environmentally certified products, in particular with respect to wood products in the U.S. | In general, consumers that seek certified products may not necessarily be willing to pay a premium. Yet, females expressed a higher likelihood of paying a price premium than males | Females presented a higher likelihood of WTP price premium, but value is not specified. | |

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| | deforestation. There is also a strong relationship between income and willingness-to-pay. | | | | |
| Influence of consumers' socioecological and economic orientations on preferences for wood products with sustainability labels - Ralf Hansmann et al - 2006 - Forest Policy and Economics | Assessment on people's sustainability orientation concerning the forestry industry (ecological, social, and economical dimension) and their knowledge of labels for sustainable forestry (SF). The results indicate that it is possible to successfully promote SF and to enhance the demand for correspondingly certified products through marketing and other strategies. | Quantitative research, 175 respondents | To measure people's individual tendencies concerning the relative importance they attach to the three sustainability dimensions and to subsequently relate this measurement to preferences for labeled wood. | On the average, social and ecological aspects of forests are of higher importance to the participants than economic aspects. | Mentions WTP, but it doesn't present any % or number. |
| Personality traits and environmental choices: On the search for understanding - Farizo et al - 2016 - Science of The Total Environment | The study involves an extensive survey based on the Big Five Traits model to find a pattern of choice that will help to better understand environmental decisions. | Statistical analysis - 701 valid respondents | To yield good estimates for willingness to pay (WTP), as an expression of preference, giving a figure for the value of the environmental good or service. | There is a relationship between the choices individuals make and their personal characteristics, such as social-demographic (income, age) and by their personality traits (using the big five traits model) | Mentions green consuming, but any %WTP or number. |

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| <p>Going Green to Be Seen: Status, Reputation, and Conspicuous Conservation. Griskevicius, V., Tybur, J. M., & Van den Bergh, B. (2010). Journal of personality and social psychology, 98(3), 392-404.</p> | <p>The relationship between conspicuous consumption and conservation behavior</p> | <p>Empirical study using survey and experimental methods</p> | <p>The authors propose a theory that people engage in "conspicuous conservation" to signal their status and enhance their social image, and then present a series of studies to test their theory. Investigation on how people's environmental conservation behavior is influenced by the desire to signal status and reputation.</p> | <p>Evidence supporting their theory that people engage in conspicuous conservation to signal their status and reputation. People are more likely to engage in pro-environmental behavior when they believe it will be noticed and respected by others, and purchase "green" products when they are prominently displayed or visible to others. Social image concerns are an important factor in driving pro-environmental behavior, and these concerns can be leveraged to encourage more widespread adoption of green practices.</p> | <p>Mentions green consuming, but any %WTP or number.</p> |
| <p>Attitude toward environmental protection and toward nature: How do they shape consumer behaviour for a sustainable tomato? - Lucia Baldi et al - 2021 - Food Quality and Preference</p> | <p>-Attitude toward environmental protection and toward nature appreciation as two separate concepts. -Psycho-attitudinal propensity towards environmental issues affect consumer WTP differently. -The way attitudes impact WTP for a sustainable tomato is also country-specific.</p> | <p>Literature review, with an original methodological framework, that combines the contribution of the Campbell Paradigm with the advancements proposed by Kaiser's scale to explain food consumption choices,</p> | <p>To explore how individual attitude toward the environment could be a potential determinant of green behavior. And second, to explain consumer purchasing intentions, represented by Willingness to Pay, toward a hypothetical tomato with improved resource use efficiency taking into account consumer psycho-attitudinal propensity towards environmental</p> | <p>Both attitudes toward environmental protection and toward nature, have a big influence in the purchasing behaviour for the resilient tomato. But Italians and British consumers show different WTP regarding the origin of the tomato and its water footprint.</p> | <p>It states that WTP is higher for tomatoes grown in areas with a reduced water footprint, but it doesn't bring a % or a number.</p> |

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| <p>Consumer willingness to pay for bio-based products: Do certifications matter?</p> <p>- Morone et al - 2021 - International Journal of Production Economics</p> | <p>-Consumers demonstrate a growing interest in green products.</p> <p>-A “green premium” (in terms of WTP) is always verified, but a “certified green premium” (in terms of WTP) is not always satisfied.</p> <p>-Demand for conventional products is more elastic than demand for bio-based products.</p> <p>-The higher demand elasticity of conventional products, the more prone to preferin sustainable products when faced with a price increase in the non-sustainable one.</p> <p>-An instrument mix can favor the development of bio-based products.</p> | <p>Quantitative research, artefactual field experiment in Italy. It measures consumer preference through an incentive compatible procedure using 1080 observations. Consumer preference was measured through an incentive-com patible procedure, within three product categories: hand soap, food bags and colored pens</p> | <p>It assesses consumer WTP for different categories of bio-based products and differences in WTP when products are certified as environmentally, economically and socially sustainable (i.e. eco-labeled).</p> | <p>Certification may play a key role in purchase decision making, especially for products in the food and nutrition and personal care categories. The diffusion of certified bio-based products may be a good strategy for overcoming economic challenges related to the implementation of the circular bioeconomy.</p> | <p>It states that WTP increases for sustainable products when non-sustainable products with high elasticity suffer a price increase, but it doesn't bring a % or a number.</p> |
| <p>Young consumers' purchase behaviour of sustainably-labell ed food products. What is the role of scepticism?</p> <p>- Carla Rossi, Francesca Rivetti - 2023 - Food Quality and Preference</p> | <p>-Skepticism influenced buying behavior and its relationships with other antecedents.</p> <p>-Too many sustainability labeling schemes on food products get consumers confused. Rather than reassuring,</p> | <p>Quantitative research, developing a covariance-ba sed structural equation model (CB-SEM), with a sample of 311 Italian high-educated young consumers, a group of sustainability-c onscious</p> | <p>This paper aimed to investigate consumer skepticism towards third-party sustainability labels in the context of food products, evaluating its role in the formation of the customer's buying behavior.</p> | <p>Consumer skepticism inhibits sustainably-labeled product purchase behavior, and also acts as a partial mediator within the relationships, linking the purchase behavior with socio-ethical and environmental concern, and reported use of on-pack sustainability</p> | <p>Skepticism reduces the WTP, but it doesn't present any % or number.</p> |

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| | <p>sustainable labels may themselves lead to consumer distrust.</p> <p>-In this study, skepticism played multiple roles in the food purchasing process.</p> <p>-Marketers should provide more robust evidence for all sustainability claims.</p> | <p>individuals</p> | | <p>information, thus reducing the effects of both variables on the sustainably-labeled product purchase behavior.</p> | |
| <p>The effects of visual sustainability labels on consumer perception and behavior: A systematic review of the empirical literature</p> <p>- Johann M. Majer et al - 2022 - Sustainable Production and Consumption</p> | <p>The effects of visual sustainability labels on consumer perception and behavior.</p> | <p>Systematic literature review</p> | <p>To provide a richer understanding of the effects of visual sustainability labels on psychological and behavioral outcomes and their boundary conditions.</p> | <p>Labels affect attitudes, provide utility for consumers, increase WTP, and can change consumer's behavior. Further consumer research may help to boost even more the effectiveness of sustainability labels</p> | <p>Labels related to sustainability increase the WTP, but it doesn't present any % or number.</p> |
| <p>Exploring the Gap Between Consumers' Green Rhetoric and Purchasing Behaviour.</p> <p>Micael-Lee Johnstone and Lay Peng Tan (2015). Journal of Business Ethics.</p> | <p>The study examines the inconsistency between consumers' stated environmental concerns and their actual purchasing behavior in the context of green products.</p> | <p>The study employs a mixed-methods approach, including a survey and follow-up interviews with participants.</p> | <p>The article aims to understand the factors that contribute to the gap between consumers' environmentally conscious rhetoric and their actual purchasing behavior.</p> | <p>The study finds that while consumers are generally positive about environmental issues and green products, they face a range of obstacles when it comes to making sustainable purchasing decisions, and other factors also interfere in their choices. Some of them are internal (lack of money, time, etc), while others are external (confusing packaging, people they live with, etc)</p> | <p>Green consumerism in general is mentioned as to explain the green gap, not WTP in values or %</p> |

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| <p>Does environmentally responsible purchase intention matter for consumers? A predictive sustainable model developed through an empirical study - Anil Kumar et al - 2021 - Journal of Retailing and Consumer Services</p> | <p>-Relationships among different factors such as attitude, social norms, perceived behavior control, environmental consciousness, willingness to pay (WTP) premium and consumer purchase intention for environmentally friendly apparels in India.</p> | <p>Qualitative research: 232 respondents were analyzed by structural equation modeling (SEM)</p> | <p>It aims to build a predictive sustainable model through an empirical study to examine the relationships among different factors such as attitude, social norms, perceived behavior control, environmental consciousness, willingness to pay (WTP)</p> | <p>Indian consumers are aware of green apparels, have a positive attitude to them and show a responsible purchase intention to protect the environment. Indian consumers show more environmental concern than UK, USA, Brazil, Russia and many others. And, willingness to pay premium price has a significant positive influence on purchase intention towards eco-friendly apparels.</p> | <p>It states that WTP premium price has a significant positive influence on purchase intention towards eco-friendly apparels, but it doesn't bring a % or a number.</p> |
| <p>Analysis of sustainable consumer behavior as a business opportunity - Esther Calderon-Monge et al - 2020 - Journal of Business Research</p> | <p>The findings of this study suggest that when customers perceive their purchasing behavior to be productive, they include sustainability-related factors and behave in a more socially responsible manner. The identified segments can help businesses in creating sustainability strategies that match their sustainable strategic objectives with consumer demands and behavior, more successfully attracting potential socially conscious clients.</p> | <p>Quantitative research: 223 consumers surveyed, residents in Spain and over 17 years old.</p> | <p>To analyze how consumers incorporate sustainability issues into their buying behavior.</p> | <p>manufacturers should increase transparency regarding the product manufacturing and distribution processes and include the product traceability information on the label or through some other medium.</p> | <p>States using labels communications to leverage sales, therefore WTP, but not a specific value</p> |

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| <p>Some Relationships between Personality and Consumer Decision Making. Raymond L. Horton (1979). Journal of Marketing Research.</p> | <p>The relationship between personality traits and consumer decision making.</p> | <p>Literature review on personality and consumer behavior.</p> | <p>The role of some personality traits in consumer decision making, including the impact of personality on information processing, risk-taking, and brand choice. The author reviews and synthesizes existing literature on the topic to develop a framework for understanding these relationships.</p> | <p>Personality traits have a significant influence on consumer decision making, with certain traits such as anxiety, self-confidence and task orientation having stronger effects than others. The author suggests that marketers should consider personality traits when developing marketing strategies and targeting specific consumer segments.</p> | <p>*Willingness to buy was analyzed instead</p> |
| <p>Linking green skepticism to green purchase behavior. Goh, S. K., & Balaji, M. S. (2016). Journal of Cleaner Production, 131, 629–638.</p> | <p>The role of green skepticism in influencing green purchase behavior was investigated in an emerging economy. (Malaysia)</p> | <p>Structural Modeling Equation. Sample: 303 respondents in Malaysia</p> | <p>The role of green skepticism in influencing green purchase behavior was investigated in an emerging economy. (Malaysia)</p> | <p>Green skepticism lowers customers' environmental knowledge and environmental concern, in turn adversely impacting their purchase intentions for green products.</p> | <p>Not specified</p> |
| <p>The Drivers of Greenwashing. Delmas, M., & Burbano, V. (2011). California Management Review, 54.</p> | <p>To examine the external (both institutional and market), organizational and individual drivers of greenwashing and offers recommendations for managers, policymakers, and NGOs to decrease its prevalence.</p> | <p>Literature review</p> | <p>To examine the external (both institutional and market), organizational and individual drivers of greenwashing and offers recommendations for managers, policymakers, and NGOs to decrease its prevalence.</p> | <p>Greenwashing can have profound negative effects on consumer and investor confidence in green products and environmentally responsible firms, making these stakeholders reluctant to reward companies for environmentally friendly performance</p> | <p>Not specified</p> |

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| Consumers' Attitudes Toward Sustainable Luxury Products: The Role of Perceived Uniqueness and Conspicuous Consumption Orientation. Sestino, A., Amatulli, C., & Deangelis, M. (2022). Handloom Sustainability and Culture (pp. 267–279). | This chapter investigates the effectiveness of luxury brands' messages focused on product sustainability rather than on traditional luxury product features. | Quantitative. Sample: 144 participants | To investigate the effectiveness of luxury brands' messages focused on product sustainability rather than on traditional luxury product features. | Results show that a communication message related to a luxury product and focused on sustainability (vs. performance) leads to higher positive attitudes toward such product and this effect is mediated by consumers' perceived product uniqueness. Additionally, findings underline the role of conspicuous consumption in magnifying said effect. | not specified | |
| Consumer acceptance of products made from recycled materials: A scoping review. Polyportis, A., Mugge, R., & Magnier, L. (2022). Resources, Conservation and Recycling, 186, 106533. | Consumer acceptance of products made from recycled materials. | Literature review, 46 articles | Various factors facilitate or hinder consumer preferences and adoption of products made from recycled materials. | Factors such as environmental benefits, perceived quality, safety, risks, emotions, and individual differences influence consumer acceptance of products made from recycled materials. Strong individualism is related to lower acceptance. | not specified | |
| Where does the wood come from? A physical accounting model to trace the origin of wood-based products -Matthias Bösch, et al - 2023 - Journal of Cleaner Production | International supply chains of wood-based products, relating its consumption, country by country, to the origin of roundwood. | Quantitative research: Data on production quantities collected in 2018 from the FAOSTAT database (FAO, 2022). Data on physical trade data collected from The UN Comtrade database (UN Statistics, 2022) regarding 268 countries and territories. | The paper suggests a novel accounting framework that allows tracing the flows of wood-based products along global supply chains, making it possible to consistently link consumption patterns to the origin of the roundwood. Includes finished wood and paper products, such as furniture and | Country-by-country matrices indicating the locations of origin of the products consumed in a given nation, tracing flows of wood-based products along international supply chains. Main conclusions are that the locations of roundwood production are often disconnected from locations of consumption of wood-based products. | WTP is not covered | WTP is not covered |

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| | | | printed matter and flows of processing residues and recovered paper. | | | |
| Life cycle assessment as a guide for designing circular business models in the wood panel industry: A critical review -Cristiane Karyn de Carvalho Araújo, et al. - 2022 - Journal of Cleaner Production | Circular economy principles already in place in the wood panel industry as well as the potential new measures. Circular business models that can be deployed by the many actors in the value chain of the wood panel industry while reducing environmental impacts of their activities. | Literature review using the PRISMA method. The bibliographic portfolio consisted of 10 studies and other documents included from a Snowball Effect approach | The objective of this study is to use life cycle assessment (LCA) to guide the design and implementation of circular business models (CBM) in the wood panel industry towards a cleaner production. | Potential measures to increase circularity in the wood panel production system, increasing the efficiency of processes and reducing waste, while also reducing potential environmental impacts of the life cycle. | WTP is not covered | WTP is not covered |
| An integrated framework for the assessment of environmental sustainability in wood supply chains -Doraid Dalalah, et al - 2022 - Environmental Technology & Innovation | In the wood industry supply chain and sustainable supply chain operations. Barriers between manufacturing and environmental sustainability in wood furniture industries in the Middle East. Main concerns are waste management and replacing non-renewable resources with renewable ones. | Literature review: triplet of HC–AHP–BWM technique | Identifying the critical factors that prevent environmental sustainability in the manufacturing of wood furniture industries. | It's not the budget nor the government regulations that slow the efforts towards sustainability in the Middle East, but the industrial practices and waste management that need to be reviewed and remodeled. | WTP is not covered | WTP is not covered |

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| <p>Sustainable development or developmental sustainability: Two cases of indigenous knowledge and practices for sustainable sourcing for wood-based design-solutions - Julia Bello-Bravo, Anne Namatsi Lutomia - 2022 - Trees, Forests and People</p> | <p>Notions of sustainability and qualitative exploration of two cases of contemporary-in-digenous forest use with sustainable wood-sourcing use practices. Explicitly holistic, long-term scale of planning; sustainability values and practices wood-based supply / value-chain.</p> | <p>Qualitative research</p> | <p>To identify better sustainable wood-sourcing use practices</p> | <p>Practices for sustainability include: longer-term timeframes of planning and action that achieve the most short-term effective interventions or outcomes with the least long-term disruptive effects; a more holistic or systems-view of the economic, social, and environmental actualities of a setting that includes human and nonhuman stakeholders; and, a stance, attitude, or worldview that narrates forest use not in instrumental terms.</p> | <p>WTP is not covered</p> | <p>WTP is not covered</p> |
| <p>Contribution of certification bodies and sustainability standards to sustainable development goals: An integrated grey systems approach -Muhammad Ikram et al - 2021 - Sustainable Production and Consumption</p> | <p>Sustainable development goals, Certification bodies, Sustainability standards, SOGRI</p> | <p>Literature review, applying the methods Grey Delphi, Grey AHP, and GADA</p> | <p>The study aims to develop a framework to prioritize the most critical attributes for selecting a certification body</p> | <p>Explanation on the right certification bodies' selection to align with and achieve SDGs. Development of a comparison matrix of certification bodies, reputation, payment method, cost, and quality of auditors. The identification of ISO and GRI as the top two standards recommended as sustainability standards/tools.</p> | <p>WTP is not covered</p> | <p>WTP is not covered</p> |
| <p>What does FSC forest certification contribute to biodiversity conservation in relation to national legislation? -Emily Lehtonen et al - 2021 - Journal of Environmental Management</p> | <p>Biodiversity requirements compared between national FSC standards and legislation. FSC is generally more prescriptive in four analyzed northern European countries. Importance of</p> | <p>Qualitative research, analyzing FSC standards in Finland, Sweden, Estonia, and Latvia, carried out in 2012–2017 and updated as of August 1, 2019.</p> | <p>Present a methodological approach to assess the impacts of forest certification on biodiversity on a national level, focusing on FSC as one of the major global certification systems.</p> | <p>Developed a globally applicable and transparent approach to identify FSC certification requirements. Identification of clear differences in the prescriptiveness of certification requirements and the corresponding legislation, and contributions of</p> | <p>WTP is not covered</p> | <p>WTP is not covered</p> |

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| | considering national context indicated by between-country differences. A globally applicable approach to assess impacts of forest certification. Adaptable to revisions and updates in certification as well as legislation. | | | some certification requirements to biodiversity which varied from country to country. | | |
| Towards a sustainable forest-based bioeconomy in Italy: Findings from a SWOT analysis - Pasquale Marcello Falcone et al - 2020 - Forest Policy and Economics | The article is the transition towards a sustainable forest-based bioeconomy in Italy. | SWOT analysis to identify the factors that may affect the development of a bioeconomy in the country. | Provide insights into how Italy can make the most of its forest resources while ensuring their sustainable management. | Italy has significant potential for developing a forest-based bioeconomy, but there are also several challenges to be addressed, such as improving the supply chain and reducing the environmental impact of bio-based products. The authors conclude that a comprehensive policy framework is needed to support the transition towards a sustainable forest-based bioeconomy in Italy. | WTP is not covered | WTP is not covered |
| Behavioral Economics: An Overview Richard E. Hattwick. 1989. Journal of Business and Psychology. | The emerging field of behavioral economics, focusing on how psychological and social factors influence economic decision-making. | Overview and synthesis of existing research and theories in the field of behavioral economics | Key principles and findings of behavioral economics, the impact of heuristics and biases on decision-making , the role of social norms and context, and the importance of framing and defaults, and practical | Behavioral economics provides valuable insights into the factors that drive economic decision-making, and can be used to design more effective policies and interventions. | WTP is not covered | WTP is not covered |

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| | | | applications of behavioral economics | | | |
| Prospect theory: An analysis of decision under risk. Kahneman, D., & Tversky, A. (1979). <i>Econometrica</i> , 47(2), 263-291. | Prospect theory, a descriptive psychological theory of decision making under risk, which aims to explain how people make choices between alternatives that involve risk or uncertainty. | Mathematical model to describe how people evaluate and choose between risky options, based on their subjective perceptions of probabilities and outcomes. | Main concepts and findings of prospect theory, the notions of reference points, value functions, and loss aversion, and its relationship with decision making. | The authors defend that prospect theory offers a better account of people's actual decision behavior than expected utility theory, the traditional economic model, and that it has implications for many areas of economics, finance and policy. | WTP is not covered | WTP is not covered |
| Behavioral Economics: Past, Present, and Future. Richard H. Thaler. 2016. <i>The American Economic Review</i> | The past, present, and future of behavioral economics, including its evolution as a field, major contributions and criticisms, and potential directions for future research. | Narrative review of the history and development of behavioral economics, as well as a discussion of key findings and ongoing debates in the field. | Overview of the evolution of behavioral economics, including its origins, major contributors and theories, and empirical findings. Also some of the criticisms of the field, concerns about the replicability of some studies and debates over the role of behavioral insights in policy-making. It also presents potential future directions for behavioral economics research, including a greater focus on culture, the environment, and social norms. | Conclusion that behavioral economics has made significant contributions to the understanding of economic behavior, and that its insights are increasingly being incorporated into policy-making and business practice. It also notes the scope and limitations of behavioral economics, and the need for further research in the potential role of social and cultural factors in shaping economic behavior. | WTP is not covered | WTP is not covered |

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| Personality in Adulthood: A Five-Factor Theory Perspective. McCrae and Costa 2003. The Guilford Press. | Concepts of the Big Five model and its relevance to understanding personality in adulthood. | Theoretical review and synthesis of existing research on the Big Five personality traits. | Overview of the Big Five traits and how they manifest in adult personality. It also involves its use to assess personality across different cultures and in clinical settings. | The Big Five model is a useful framework for understanding personality in adulthood, as it captures the most important and stable traits that contribute to individual differences in behavior and psychological functioning, in many contexts. | WTP is not covered | WTP is not covered |
| The Big Five personality traits, material values, and financial well-being of self-described money managers. Donnelly, G., Iyer, R., & Howell, R. T. (2012). Journal of Economic Psychology, 33(6), 1129–1142. | The relationship between the big five personality traits and money management | Quantitative. Sample: 936 participants | To examine the Big Five personality traits and material values of those who manage their money and determined the independent effects of money management on wealth, debt, and compulsive buying | Conscientiousness was positively correlated with money management, whereas Neuroticism was negatively correlated with it | WTP is not covered | WTP is not covered |
| Impact of Big-Five Personality on Impulsive Buying Behaviour. Ratnawat, R., & Borgave, S. (2019). International Journal of Multidisciplinary Research Review, 4, 500–505. | The relationship between personality traits and impulsive buying behavior in Indian participants | Quantitative analysis. Sample: 178 participants (89% response rate) in Mumbai and Pune area in India. | Investigation how the Big Five personality traits and impulsive buying behavior are related in the Indian context. | Individuals high in Agreeableness and Neuroticism were found to be significantly correlated with impulsive buying behavior. Extraversion, Openness and Conscientiousness practically did not have correlations with Impulsive buying behavior. | WTP is not covered | WTP is not covered |
| Delay discounting: Interactions between personality and cognitive ability. Hirsh, J. B., Morisano, D., & Peterson, J. B. (2008). Journal of Research in Personality, 42(6), | How personality and cognitive ability interact to predict individual differences in delay discounting. | Quantitative. Sample: 97 undergraduate students from McGill University | How personality and cognitive ability interact to predict individual differences in delay discounting. | Extraversion was found to predict higher discounting rates at the low end of the cognitive distribution, while emotional stability was found to predict lower discounting rates at the high end of the cognitive distribution. | WTP is not covered | WTP is not covered |

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| 1646–1650. | | | | | | |
| The role of personality in household saving and borrowing behaviour. Nyhus, E. K., & Webley, P. (2001). | Investigation of the extent to which personality influences saving and borrowing behavior. | | | Personality factors such as emotional stability, autonomy, and extraversion were robust predictors of saving and borrowing behavior. Agreeableness, inflexibility, and tough-mindedness could explain certain types of saving. Extraversion and Agreeableness were related to less savings and borrowing behavior. | WTP is not covered | WTP is not covered |
| The big five personality dimensions and job performance: a meta-analysis. Barrick, M. R., & Mount, M. K. (1991). Personnel psychology, 44(1), 1-26. | The relationship between the Big Five personality traits and job performance. | Meta-analysis of previous research studies. 17 studies (published 1952–1988) yielded 162 samples totaling 23.994 Ss | Relationship of the big five to 3 job performance criteria (job proficiency, training proficiency, and personnel data) for 5 occupational groups (professionals, police, managers, sales, and skilled/semi-skilled). | Conscientiousness showed consistent relations with all job performance criteria for all occupational groups. Extraversion was a valid predictor for 2 occupations involving social interaction, (managers and sales). Also, openness to experience and extraversion were valid predictors of the training proficiency criterion across occupations | WTP is not covered | WTP is not covered |
| CEO personality, strategic flexibility, and firm performance: The case of the Indian business process outsourcing industry. Nadkarni, S., & Herrmann, P. O. L. (2010). Academy of Management Journal, 53(5), 1050-1073. | The relationship between CEO personality traits, strategic flexibility, and firm performance in the Indian business process outsourcing industry. | Quantitative analysis, structural equation modeling to test the relationships between CEO personality traits, strategic flexibility, and firm performance. | Investigation the impact of CEO personality on the ability of firms to adapt to changes in the market environment and its influence on firm performance. Personality traits such as openness to experience, and extraversion can facilitate strategic | CEO openness to experience and extraversion positively affect strategic flexibility, which, in turn, positively affects firm performance. CEO personality traits can influence strategic flexibility and, ultimately, firm performance in the context of the Indian business process outsourcing industry. | WTP is not covered | WTP is not covered |

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| | | | flexibility, which, in turn, positively affects firm performance. | | | |
| Altruism in Humans. Batson, C. D. (2011). Oxford University Press. | Altruism, behavior that benefits another at some cost to oneself. | Literature review of many theories and empirical evidence regarding the nature of altruism in humans. | Overview of the concept of altruism, different theories on motivation for altruistic behavior, and evidence for the existence of altruism in humans across different domains to provide a comprehensive understanding of the nature of altruism in humans and to highlight the implications of this behavior for individuals and society. | Altruism is a complex behavior that can be motivated by a variety of factors such as empathy, social norms, and self-interest. It's a common and important aspect of human social life, and has personal and societal benefits. | WTP is not covered | WTP is not covered |
| Abnormality as a Positive Characteristic: The Development and Validation of a Scale Measuring Need for Uniqueness. Snyder, C.R., & Fromkin, H.L. (1977). Journal of Abnormal Psychology, 86(5), 518-527 | The development and validation of a scale measuring the need for uniqueness as a positive characteristic. | Quantitative research. Scale development and validation, including exploratory and confirmatory factor analyses, and assessments of reliability and validity. | Development and validation of a scale measuring the need for uniqueness as a positive personality characteristic. Aim to provide a measure that captures a positive and adaptive aspect of personality. | The scale is a reliable and valid measure of the need for uniqueness. The conclusion is that the need for uniqueness is a positive and adaptive characteristic that is associated with creativity and self-expression, and the authors suggest that their scale can be used to measure this trait and explore its effects on behavior and outcomes. | WTP is not covered | WTP is not covered |

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| Individual differences in the pursuit of self-uniqueness through consumption. Lynn, M., & Harris, J. (1997). Journal of Applied Social Psychology, 27(21), 1861–1883. | Individual differences influence the pursuit of self-uniqueness through consumption. | Empirical study; survey to collect data on individuals' self-expression, materialism, and need for uniqueness; examination of their relationships with consumption behaviors. | It aims to understand how the pursuit of self-uniqueness through consumption can differ based on individual differences in self-expression, materialism, and need for uniqueness. Examination on how these variables relate to preferences for unique products and services, brand loyalty, and attitudes towards advertising. | Dispositional tendency to pursue uniqueness through consumption. Individuals with a higher need for uniqueness tend to prefer unique products and services, even if that means to select a less popular brand but conveys more distinctiveness. | WTP is not covered | WTP is not covered |
| Too Much of a Good Thing The Challenge and Opportunity of the Inverted U. Grant, A. M., & Schwartz, B. (2011). Perspectives on Psychological Science, 6(1), 61-76. | The inverted U-shaped relationship between performance and different variables such as stress, motivation, and arousal. | Literature review. | To provide a framework for understanding the inverted U-shaped relationship and its implications for different areas such as work, education, and attitudes. | Finding the optimal level of the relevant variables is important for performance and that different strategies may be needed for individuals at different points on the inverted U-shaped curve. | WTP is not covered | WTP is not covered |
| How consumers' need for uniqueness, self-monitoring, and social identity affect their choices when luxury brands visually shout versus whisper - Kauppinen-Räsänen et al 2018 - Journal of Business Research | How consumers' need for uniqueness, self-monitoring, and social identity affect their choices when luxury brands use more direct approaches, rather than subtle ones. | Experimental, quantitative. | Investigation on how the visual representation of luxury brands (i.e., loud versus subtle branding) influences consumers' brand choices, and how individual factors such as need for uniqueness, self-monitoring, and social identity moderate this effect. | Consumers with high need for uniqueness and high self-monitoring tend to prefer the subtle branding, while those with low need for uniqueness and low self-monitoring tend to prefer the loud branding. | WTP is not covered | WTP is not covered |

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| Brand Familiarity and Invoice Price Effects on Consumer Evaluations: The Moderating Role of Skepticism toward Advertising. David M. Hardesty (2002). Journal of Marketing Research | The effects of brand familiarity and invoice price on consumer evaluations, and how skepticism toward advertising may moderate these effects. | The article presents the results of two studies, each of which uses a different research design to investigate the research questions. | The article explores how brand familiarity and invoice price affect consumers' evaluations of a product, and whether skepticism toward advertising can influence these effects. The first study examines the effect of brand familiarity on consumer evaluations, while the second study examines the effect of invoice price. Both studies also investigate the moderating role of skepticism toward advertising. | The results of both studies suggest that brand familiarity and invoice price have significant effects on consumer evaluations. Consumers rate a product more favorably when it is associated with a familiar brand and when the invoice price is lower. Skepticism toward advertising is an important factor to consider when investigating consumer behavior. The effects of brand familiarity and invoice price on consumer evaluations are not universal but instead depend on individual differences such as skepticism toward advertising. | WTP is not covered | WTP is not covered |
| The Defensive Consumer: Advertising Deception, Defensive Processing, and Distrust. Darke, P. R., & Ritchie, R. J. B. (2007). Journal of Marketing Research, 44(1), 114–127. | Impact of advertising deception on being broadly distrustful of further advertising claim | Quantitative. Sample: 72 participants | Test if advertising deception leads consumers to become defensive and broadly distrustful of further advertising claim | Advertising deception produces a negative bias in consumers' attitudes toward subsequent advertisements. In the studies, bias not only applied to the original source of deception but also generalized from one advertiser to the next, across different geographical regions, across different kinds of products, and across different types of claims. | WTP is not covered | WTP is not covered |
| Hirsh, J. B. (2010). Personality and environmental concern. Journal of Environmental Psychology, 30(2), 245–248. | This study examines the relationship between personality characteristics and environmental | Quantitative. Structural equation modeling. Sample: 2690 adults from Germany. | To examine the relationship between personality characteristics, based on the Big-five) and environmental | Environmental concern positively related to higher levels of Agreeableness and Openness, and to small levels of Neuroticism and | WTP is not covered | WTP is not covered |

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| | concern | | concern | Conscientiousness. | | |
| Unearthing the “green” personality: Core traits predict environmentally friendly behavior. Brick, C., & Lewis, G. J. (2016). Environment and Behavior, 48(5), 635-658. doi.org/10.1177/013916514554695 | Study to find which personality traits are most associated with reducing greenhouse gas emissions, and to test mediation of those effects through attitudes. | 100-item HEXACO personality inventory, a novel self-report measure of behaviors that reduce greenhouse gas emissions, and scales of environmental and political attitudes. Sample: 345 people | To test if environmental attitudes are related to personality traits and environmental behavior | Openness, Conscientiousness, and Extraversion, and these effects of personality were mediated by attitudes towards the natural environment. These observations broaden the understanding of the etiology of environmental attitudes and behavior | WTP is not covered | WTP is not covered |
| In Search of Sustainable Behaviour: The Role of Core Values and Personality Traits. Joel Marcus and Jason Roy (2019). Journal of Business Ethics | The role of core values and personality traits in sustainable behavior. | Quantitative. Empirical study, survey with 411 students and then 639 national sample. | The relationships between core values, personality traits, and sustainable behavior. Survey data analysis to identify the core values and personality traits that are associated with sustainable behavior. | Individuals who score high on measures of openness to experience, agreeableness, and extraversion are more likely to engage in sustainable behavior. Individuals who hold values related to universalism, benevolence, and self-direction are more likely to engage in sustainable behavior. Understanding the relationship between core values, personality traits, and sustainable behavior can help organizations develop effective sustainability strategies. | WTP is not covered | WTP is not covered |

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| <p>Personality traits and environmental choices: On the search for understanding. Begonia A. Farizo, David Oglethorpe, and Mario Soliño (2016). Journal of Environmental Management.</p> | <p>The relationship between personality traits and environmental choices.</p> | <p>Literature Review and latent class regression (in Latent Gold® 5.1)</p> | <p>Comprehensive understanding of the relationship between personality traits and environmental choices; specifically alternative options for power generation from wind farms according to their personality profiles.</p> | <p>Significant relationship between personality traits and environmental choices, with certain traits such as openness to experience, agreeableness, and conscientiousness being positively associated with pro-environmental behavior.</p> | <p>WTP is not covered</p> | <p>WTP is not covered</p> |
| <p>Personality predictors of Consumerism and Environmentalism : A preliminary study. Jacob B. Hirsh and Dan Dolderman (2007). Personality and Individual Differences.</p> | <p>The relationship between personality traits and consumerism and environmentalism.</p> | <p>Quantitative, correlational study.</p> | <p>How personality traits relate to consumerism and environmentalism. The authors conducted a survey with participants and used factor analysis to identify personality traits associated with these behaviors.</p> | <p>Materialistic and self-enhancement values were related to consumerism, while self-transcendent and openness to experience values were related to environmentalism. Personality traits such as agreeableness, conscientiousness, and openness to experience were also found to predict environmentalism. These findings suggest that personality plays a role in shaping consumer and environmental behavior.</p> | <p>WTP is not covered</p> | <p>WTP is not covered</p> |
| <p>Consumer behavior in the circular economy: Developing a product-centric framework - Tetiana Shevchenko et al - 2023 - Journal of Cleaner Production</p> | <p>The study employs a semi-systematic literature review and a conceptual analysis to develop an inclusive framework of consumer behaviors relating to CE perspectives in</p> | <p>The study employs a semi-systematic literature review and a conceptual analysis to develop an inclusive framework of consumer behaviors relating to CE perspectives</p> | <p>It aims to clarify, frame and measure consumer contributions to the implementation of the CE in regard to the 10R circular strategies.</p> | <p>The development of a novel product-centric framework of CE-related consumer behavior to monitor and measure product-level consumer contributions to the CE.</p> | <p>WTP is not covered</p> | <p>WTP is not covered</p> |

| | practice. | in practice. | | | | |
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| Consumer awareness of sustainable supply chains: A choice experiment on Parma ham PDO - Chiara Mazzocchi et al - 2021 - Science of The Total Environment | -Italian consumers' preferences and their willingness to pay PDO ham were evaluated. -Different characteristics, amongst which the use of devices for emission abatement | -The discrete choice experiment method was applied. | -To estimate what kinds of attributes in acquiring Parma ham PDO (protected designation of origin) matter for consumers using a survey based on choice experiments (CEs). | -The analysis confirms a consumer's preference for antibiotic-free products. -The use of wet acid air scrubber technology is positively evaluated by consumers. | not specific | not specific |
| How consumers' need for uniqueness, self-monitoring, and social identity affect their choices when luxury brands visually shout versus whisper - Kauppinen-Räsänen et al 2018 - Journal of Business Research | Theorizes and tests the effects of consumers' personality and social traits on preferences for brand prominence, and it explores the mediating effects of gender and culture. It focuses on how consumers' need for uniqueness and self-monitoring affects their choices between luxury brands prominence | Quantitative research - 215 young consumers from Finland, Italy, and France | This study focuses on high-end luxury brands and examines how personality and social traits are linked to consumers' behaviors for such brands. | The need for uniqueness affects self-expression and self-monitoring affects self-presentation. In the case of luxury brands, consumers' social needs impact their use of luxury brands as an extension of their social identity or social traits. | WTP is not covered | WTP is not covered |

KEY RESEARCH QUESTIONS

A research is centered on its research question(s). Based on the literature review presented previously, the main interest of this study is to identify the relationship between the personality and the willingness to pay for sustainable wood-based products (those that come from a sustainable supply chain). The personality will be evaluated based on the Big Five Personality Traits, since there is a gap in the literature available on that subject for this. This research will be limited to the people currently living in Italy and that have been living here for at least the last two years.

Therefore, the key research question this study aims to answer is: How does the personality, based on the Big Five Personality Traits, of Italian residents influence the willingness to pay for wood-based products that come from a sustainable supply chain?

The hypotheses have been formulated considering the scientific articles presented in Table 5, found below. These articles focus on the elements that this research is based upon (consumer's behavior, sustainability, forestry industry, personality traits and WTP). Hence they provide a good base to formulate the hypotheses, since they shed a light on how consumers might behave when it comes to sustainable wood-products.

Table 5. The most relevant scientific articles for this research and how they differ from the key research question. Source: Author, 2023.

| Author, year of publication | Journal | What influences WTP and/or | | | | Consumer WTP | Direction of the influence on WTP | ΔP WTP in % or value, if specified | Environmental Concern and/or Behavior | Direction of the influence on Environmentalism | Type of products | | |
|---|--|---|--------------------------|---|-------------|--|-----------------------------------|------------------------------------|---|--|-----------------------------------|--|--|
| | | Personality | | Socio-demographic and other aspects | Sustainable | | | | | | Others | Non-sustainable | |
| | | Big 5 | Other Traits | | | | | | | | | | |
| Farizo et al - 2016 | Journal of Environmental Management | ☆ | | personal characteristics, income, age, others | ☆ | | | ☆ | Agreeableness + Openness + Conscientiousness + | | | Wind farms | |
| Ratnawat and Borgave - 2019 | International Journal of Multidisciplinary Research Review | ☆ | | | ☆ | | Impulsive buying, not % of WTP | | | | No specific product | | |
| Horton - 1979 | Journal of Marketing Research | Link done by the author of this thesis of anxiety as a facet of | anxiety; self-confidence | | ☆ | positive or negative, depending on the product | | | | | | soap, coffee, toothpaste, aspirin, deodorant | |
| Hirsh - 2010 | Journal of Environmental Psychology | ☆ | | | | | | ☆ | Agreeableness + Openness + Neuroticism + Conscientiousness + | | No specific product | | |
| Brick, C., & Lewis, G. J. - 2016 | Environment and Behavior | ☆ | | | | | | ☆ | Openness + Conscientiousness + Extraversion + | | Reducing greenhouse gas emissions | | |
| Joel Marcus and Jason Roy - 2019 | Journal of Business Ethics | ☆ | | Core values | | | | ☆ | Extraversion + (strong) Openness + Agreeableness + (weak) | | No specific product | | |
| Jacob B. Hirsh and Dan Dolderman - 2007 | Personality and Individual Differences | ☆ | | Environmental attitudes | | | | ☆ | Agreeableness + Openness + Neuroticism - (significant zero-order correlation $r = -0.2$; | | No specific product | | |

| Author, year of publication | Journal | What influences WTP and/or | | | Consume r WTP | Direction of the influence on WTP | ΔP WTP in % or value, if specified | Environme ntal Concern and/or Behavior | Direction of the influence on Environmentalism | Type of products | | | |
|---------------------------------------|---------------------------------------|----------------------------|---------------------|--------------------------------------|---------------|-----------------------------------|------------------------------------|--|--|------------------|------------------------------------|----------------|------------------|
| | | Personality | | Socio-demograph ic and other aspects | | | | | | Wood-ba sed | Sustainable | Others | Non-sust ainable |
| | | Big 5 | Other Traits | | | | | | | | | | |
| Delmas and Burbano - 2011 | California Management Review | | Skepticism | | ☆ | negative | not specified | | | | Sustainabl e products in general | | |
| Goh and Balaji - 2016 | Journal of Cleaner Production | | Skepticism | | ☆ | negative | not specified | | | | Sustainabl e products in general | | |
| Johnstone and Tan - 2015 | Journal of Business Ethics | | Skepticism | | ☆ | negative | not specified | | | | Sustainabl e products in general | | |
| Hardesty - 2002 | Journal of Marketing Research | | Skepticism | | ☆ | negative | not specified | | | | No specific product | | |
| Carla Rossi, Francesca Rivetti - 2023 | Food Quality and Preference | | Skepticism | | ☆ | negative | | ☆ | | | Sustainabl y-labeled food products | | |
| Teresa Panico et al - 2022 | Forest Policy and Economics | | Trust | | ☆ | positive | 5-10% green premium | ☆ | | | ☆ | | |
| Sestino et al - 2022 | Perspectives on Psychological Science | | Need for Uniqueness | | ☆ | positive | not specified | | | | | luxury product | |

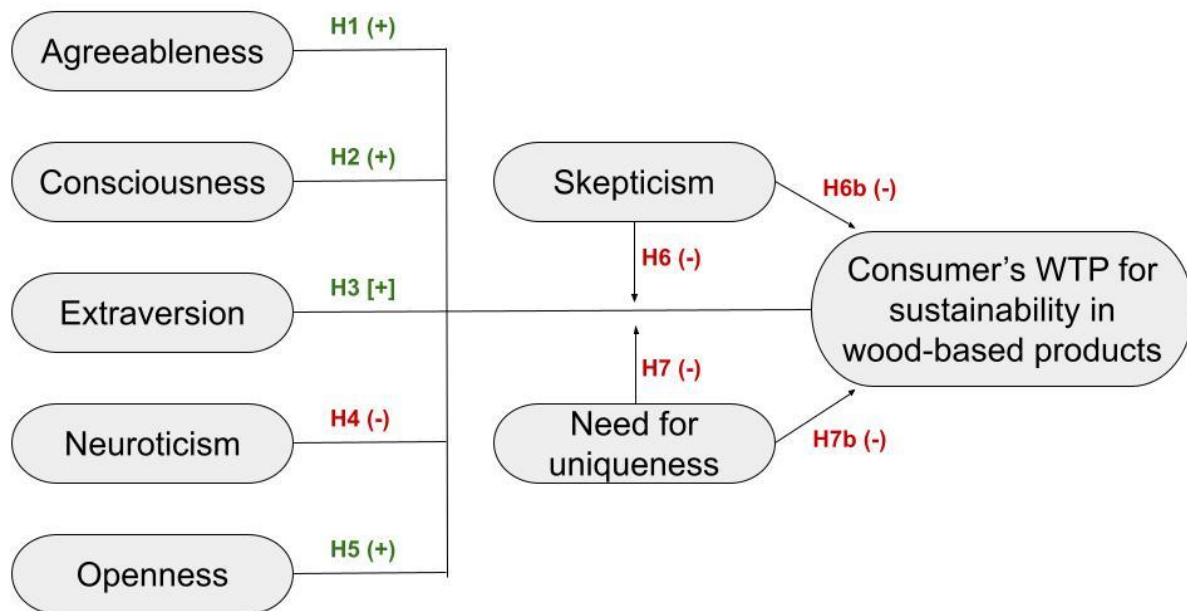
| Author, year of publication | Journal | What influences WTP and/or | | | | Consumer WTP | Direction of the influence on WTP | Δ P WTP in % or value, if specified | Environmental Concern and/or Behavior | Direction of the influence on Environmentalism | Type of products | | |
|--|--|----------------------------|--|--|-------------|---|-----------------------------------|--|---------------------------------------|--|--|-----------------|--|
| | | Personality | | Socio-demographic and other aspects | Sustainable | | | | | | Others | Non-sustainable | |
| | | Big 5 | Other Traits | | | | | | | | | | |
| Polyporitis et al - 2022 | Resources, Conservation and Recycling | | Need for Uniqueness | | ☆ | negative in individual with strong individualism | not specified | | | | recycled products | | |
| Griskevicius et al - 2010 | Journal of Personality and Social Psychology | | Need for Uniqueness, Need for Status | | ☆ | NFU --> no effect Need for Status + | not specified | | | | different product categories, both sustainable and non-sustainable | | |
| Kauppinen-Räsänen et al - 2018 | Journal of Business Research | | Need for Uniqueness | | ☆ | positive | not specified | | | | Luxury brands | | |
| Lynn, M., & Harris, J. - 1997 | Journal of Applied Social Psychology | | Need for Uniqueness | | ☆ | positive for scarce and/or innovative products | not specified | | | | not specified | | |
| Grant, A. M., & Schwartz, B. - 2011 | Psychological Science | | Link made by the author of this thesis with Need for | | ☆ | Inverted-U effect - Up to a certain point it's positive, then it turns negative | | ☆ | | | No specific product | | |
| Raffaella Zanchini, et al - 2022 | Forest Policy and Economics | | | Socio-demographic characteristics; labels | ☆ | positive | not specified | ☆ | | | ☆ | | |
| Francisco X. Aguilar, Richard P. Vlosky - 2007 | Forest Policy and Economics | | | Not personality, but socio-demographic characteristics, especially income and certifications | ☆ | positive for woman | not specified | ☆ | | | ☆ | | |

| Author, year of publication | Journal | What influences WTP and/or | | | Consumer WTP | Direction of the influence on WTP | ΔP WTP in % or value, if specified | Environmental Concern and/or Behavior | Direction of the influence on Environmentalism | Type of products | | | |
|---|---|----------------------------|--------------|--|--------------|-----------------------------------|------------------------------------|---------------------------------------|--|------------------|----------------------------------|--------------------------|-----------------|
| | | Personality | | Socio-demographic and other aspects | | | | | | Sustainable | Wood-based | Others | Non-sustainable |
| | | Big 5 | Other Traits | | | | | | | | | | |
| Ralf Hansmann, Thomas Koellner, Roland W. | Forest Policy and Economics | | | Socioecological and economic orientations, certifications | ☆ | positive | not specified | ☆ | | ☆ | | | |
| Kumar et al - 2021 | Journal of Retailing and Consumer Services | | | Attitude, social norms, perceived behaviour control, environmental consciousness | ☆ | positive | not specified | ☆ | + | | Environmentally friendly apparel | | |
| Esther Calderon-Monoge et al - 2020 | Journal of Business Research | | | Attitude towards social sustainability, labels | ☆ | positive | not specified | ☆ | | | | Manufacturing in general | |
| Lucia Baldi et al - 2021 | Food Quality and Preference | | | Attitude - Psycho-attitudinal propensity towards environmental issues | ☆ | positive | not specified | ☆ | | | | Tomato | |
| Piergiuseppe Morone et al - 2021 | International Journal of Production Economics | | | Interest in green products | ☆ | positive | not specified | ☆ | | | | Bio-based green products | |
| Chiara Mazzocchi et al - 2021 | Science of The Total Environment | | | Production process | ☆ | positive | not specified | ☆ | | | | PDO ham | |

Formulation of the Hypotheses based on the Big Five Personality Traits

First of all, the hypothesized research model is presented in the graph below. It summarizes the hypothesis made based on the assumptions on how each of the five personality traits influence the final consumer's WTP. It also presents the influence of two moderator variables, which will be presented and explained further ahead.

Graph n. 1 - Hypothesized research model



As already mentioned, there are five traits that this model considers to be endogenous and basic tendencies. They are: Agreeableness, Conscientiousness, Extraversion, Neuroticism, and Openness. The concepts of the five personality traits used to formulate the hypothesis of this research are mainly based on the work done by McCrae and Costa (2003), in their book "Personality in Adulthood - A five-factor theory perspective".

We can see these traits as dimensions of individual differences in tendencies to show consistent patterns of thoughts, feelings, and actions. Since trait theory has pointed researchers toward general styles of thinking, feeling, and acting, and has resulted in thousands of interesting and useful findings. That is why most personality

psychologists today prefer trait theory to psychoanalysis (McCrae and Costa, 2003, p.185). Also, each of these traits consists in a range that goes from one extreme to another. Therefore, openness represents an ongoing series between extreme openness and extreme rigidity. In the real world, most people lie somewhere in the middle of the two polar extremes of every dimension. This model also predicts that these five factors will be found in every culture.

Agreeableness

The facets of agreeableness are trust, altruism, friendly compliance and modesty. Agreeable people are trusting and believe the best of others, instead of suspecting hidden intents. Erikson (1950) considered trust as being the earliest and most fundamental outcome of psychosocial development. According to his views, those who do not develop trust can never really advance toward industry, identity, and intimacy (McCrae and Costa, 2003).

Agreeable people are trustworthy and straightforward. They are considerate and enjoy helping people. They tend to have a gentle communication style, where if they don't agree with someone, they defer from that person instead of insisting and pushing their own ideas. Agreeable individuals also show more humbleness and modesty when assessing their own abilities and importance. The opposite of this facet might be considered narcissistic.

As presented in the literature, Agreeableness, along with Openness is associated to positively predict environmentalism (Hirsh and Dolderman, 2007; Hirsh, 2010), and these two traits, along with extraversion point out to be predictors of sustainable behavior, according to Marcus and Roy (2019).

So, considering all of this, for the sake of this research, the hypothesis elaborated for this trait is that:

(H1): There is a **positive** relationship between agreeableness and the willingness to pay for sustainable wood-based products.

Conscientiousness

A strong characteristic in Conscientious people is that they are rational, informed and tend to have a self concept of being high in competence. They usually appreciate organization and order, which can explain their efficiency and success in work. They strive for achievement and like to pursue excellence in everything they do. This facet is usually accompanied by a strong self-discipline, which allows them to accomplish their goal.

Individuals who score high in this trait also tend to be very attached to their values, moral precepts and beliefs. So they have a strong sense of dutifulness (Costa & McCrae, 1998a). They are more prone to engage in money management, opposed to impulsive buying (Donnelly et al, 2012), and have a strong positive relationship with environmentally responsible behavior, along with openness and agreeableness (Farizo et al, 2016), and openness and extraversion (Brick and Lewis, 2016).

Finally, another facet of this trait is deliberation, meaning that they tend to think carefully before acting and make plans in advance, resulting in a life clearly directed throughout the paths they choose.

Given all of this, especially regarding their tendency to have environmentally responsible behavior, their appreciation for making informed decisions and sticking to a sense of moral and rightness. The hypothesis made regarding this trait is that:

(H2): There is a **positive** relationship between conscientiousness and the willingness to pay for sustainable wood-based products.

Extraversion

According to McCrae and Costa (2003), the facets of Extraversion can be subdivided into three interpersonal and three temperamental traits. The interpersonal traits are namely, warmth (or attachment), gregariousness (the desire to be with other people) and assertiveness. The temperamental traits are namely, activity, excitement seeking, and positive emotions.

On the interpersonal side, extraverts (people high in extroversion) tend to be friendly, cordial and interact. They are very sociable, enjoy being in a crowd and social stimulation. Assertiveness makes them prone to be leaders, easily making decisions, expressing their feelings and desires and taking charge. Whereas on the other end, introverts are more likely to be formal and impersonal and form weak attachments to others.

On the temperamental side, extraverts like to stay busy and everything related to being active and in movement. They have an energetic and forceful way of being, vigorous behavior and rapid talking. They prefer environments that stimulate them, that are exciting, and this reflects in their inner experience as positive emotions, like joy, delight and jocularity. All of these traits work together in forming someone's personality. Activity leads to excitement and excitement to happiness; the happy person finds others easier to get along with, and congeniality easily turns to leadership (McCrae and Costa, 2003). Also, extraversion, along with openness and agreeableness are related to environmentally responsible behavior (Brick and Lewis, 2016).

Since the traits of extraverts allow them to be more connected to the outside world and other people. For the sake of this research it will be hypothesized that they will be more prone to support sustainability causes that imply in promoting the common good. Therefore, the hypothesis regarding this trait is that:

(H3): There is a **positive** relationship between extraversion and the willingness to pay for sustainable wood-based products.

Neuroticism

The two facets of Neuroticism are “hostile” and “anxious”. People with high levels of the trait neuroticism tend to be also high in those two traits (McCrae and Costa, 2003). The inner experience of those high in neuroticism is more prone to violent and negative emotions that come in the way of their ability to deal with their problems and socialize peacefully. These range from loads of anxiety and embarrassment in social situations, as well as frustration when dealing with others, which may make them hostile, further complicating matters. The emotions and impulses that disturb them don't necessarily occur simultaneously, but they account for regular distress in the person.

Even though the image of a neurotic person is usually portrayed in a comedic or ridiculous manner, and it's fairly common to feel short in patience when being around people high in this trait, it is actually a very big burden that deserves compassionate understanding (McCrae and Costa, 2003). So, we can see a person high in this trait as someone who won't trust easily and might have concerns about the truthfulness of something.

So, regarding the subject of this research, they might be prone to doubting claims of sustainability and sustainable systems, or to decide not to consume the product at all in order to support the cause. Neuroticism also had a significant zero-order correlation with environmentalism, $r = -0,2$ and $p < 0,05$ (Hirsh and Dolderman, 2007). Another point taken in consideration is that one of the facets of this trait is Anxiety. In a study conducted by Horton (1979), two forms of anxiety appeared to negatively impact the willingness to buy for many product categories of the study, social anxiety and general anxiety.

Therefore, for the sake of this research, we hypothesize that:

(H4): There is a **negative** relationship between neuroticism and the willingness to pay for sustainable wood-based products.

Openness

Openness refers to how willing someone is to engage in new experiences, situations, and develop and consider other concepts and points of view. It can be measured in six areas: fantasy, aesthetics, feelings, actions, ideas and values. People high in this trait present more vivid imagination, vivid daydreams, sensitivity to arts, preference for artistic activities.

The opposite of openness is rigidity. So, they are also more willing to try new things, such as food, or visit a foreign country. They are curious and value knowledge for its own sake. Individuals high in this trait also tend to be liberal in values, seeing that the concepts of right and wrong are not a given and unconditional to any circumstance. This is probably due to their willingness to think of different possibilities and to empathize with others in different circumstances. Also, as cited by McCrae and Costa (2003, p. 49) that Carl Rogers (1961) might have predicted, Open individuals experience their own feelings strongly, and they value the experience, seeing it as a source of meaning in life.

In terms of sustainability, Openness is shown to have a significant positive relationship with environmentalism (Hirsh and Dolderman, 2007), and environmentally responsible behavior, along with agreeableness and conscientiousness (Farizo et al, 2016).

Since the literature supports a positive relationship of openness and environmentalism, and people high in this trait are more prone to viewing the same issue from different point of views, are more flexible with the concept they have of something, never assuming something is unconditionally one thing, but a matter that depends on the point of view, for the sake of this research the hypothesis formulated from this trait is that:

(H5): There is a **positive** relationship between openness and the willingness to pay for sustainable wood-based products.

Moderator Variables

A moderating variable refers to a variable that regulates the relationship between the dependent and independent variables, by strengthening or weakening it. Moderating variables, or simply “moderators”, can also change the direction of this relationship. Therefore, when moderation is present, the strength or even the direction of a relationship between two constructs depends on this third variable. As such, moderation can (and should) be seen as a means to account for heterogeneity in the data (Hair et al. 2017). Hence, they are useful because they help explain the links between the independent and dependent variables, as well as provide additional information regarding the association between them.

Skepticism

As presented in the literature review, sustainability is communicated to the customer mainly through labels and certificates, whether they are made by third parties, which increases credibility (Rossi and Rivetti, 2023), or self-claimed. However, some consumer confusion can be caused by the excess of labels on the market that offer unclear and conflicting criteria (Brécard, 2014) and increased consumer search leads to the perceived sensation of being "greenwashed" (Delmas & Burbano, 2011). Meaning that they sense the industry is somehow taking advantage of their values and beliefs towards a sustainable lifestyle as a marketing strategy based on fake data. As presented by Darke and Ritchie (2007), advertising deception evokes a general negative posture towards further advertising and generalized mistrust.

This is where skepticism comes in, weakening the positive effects the other personality traits might have on the WTP for sustainable wood-based products and strengthening the negative effects Neuroticism might have on the WTP.

Therefore, as a moderator variable it is stated that:

(H6): Skepticism **negatively** moderates the effect of the Big Five on WTP for sustainable wood-based products

Need for Uniqueness

The need for uniqueness reflects consumers' search to establish and keep a sense of moderate self distinctiveness (Snyder and Fromkin, 1980). This need has to do with self-expression and individuality, and one way to differentiate the self from others is by possessing unique consumer products (Fromkin, 1971 ; Snyder, 1992). Consumers who have a strong need for uniqueness are found to place more value on self-expression, developing a distinct personality, and using distinctive brands (Shavitt, 1989). Because material possessions are regarded as an extension of the self (Belk, 1989), material goods are used to express one's identity.

As presented before, studies that link individuals who score high in this trait to the likelihood of engaging in pro-environmental behaviors, show that this happens if sustainable behavior is framed in a way that emphasizes their uniqueness or individualism (Sestino et al, 2022; Polyportis et al, 2022). However, as presented in the literature review, studies also point that environmental causes can actually be seen as mainstream or not unique. In the case of wood-based products, the forestry industry is already highly regulated in terms of sustainability. Therefore it is possible that said products might not inspire a sense of uniqueness, since the standard expectation is that they would be from a sustainable supply chain.

Moreover, NFU is also associated with the endorsement of conspiracy beliefs (Imhoff and Lamberty, 2017), and as it was presented green skepticism appears to be present among consumers. This leads me to think that individuals high in NFU might actually be less prone to buying sustainable wood-based products if their green skepticism is funded in conspiracy beliefs.

Hence, in the case of this research, the Need for Uniqueness is hypothesized to moderate the Big Five personality traits by weakening the ones that have a positive relationship to the WTP for wood-based products and strengthening the negative relationship of the trait Neuroticism with WTP.

Therefore, it is stated the following:

(H7): Need for uniqueness **negatively** moderates the effect of the Big Five on WTP for sustainable wood-based products

Moderators that also function as independent variables

One more remark about these personality traits that are being used as moderators is the following, according to the literature, these traits also play a direct role in influencing the Willingness to Pay whether it is for Sustainability or any other product or service where the consumer doubts its consistency of the proposal (in the case of skepticism), or where the consumer feels like it will jeopardize their individuality (in the case of need for uniqueness). Therefore, it makes sense that these traits are also treated as independent variables to be tested on their influence on the WTP for wood-based products.

So, there are two more hypothesis added to this model:

(H6b): Skepticism has a **negative** relationship with the willingness to pay for wood-based products.

(H7b): Need for uniqueness has a **negative** relationship with the willingness to pay for wood-based products.

RESEARCH METHODOLOGY AND DATA COLLECTION

Methodology

This research is an exploratory one, meaning that the research question is being used to identify data patterns of how the variables are related, rather than confirm an established theory. Data from exploratory research is usually analyzed through a structural equation modeling (SEM), which can be covariance-based SEM (CB-SEM) or partial least squares SEM (PLS-SEM; also called PLS path modeling). Model estimation delivers empirical measures of the relationships between the indicators and the constructs (measurement models), as well as between the constructs - structural model (Hair et al. 2017).

Assessment of PLS-SEM outcomes can be extended to more advanced analyses such as examining mediating or moderating effects, estimating nonlinear effects (e.g., Rigdon, Ringle, & Sarstedt, 2010), conducting an importance-performance matrix analysis (PLS-IPMA; e.g., Rigdon, Ringle, Sarstedt, & Gudergan, 2011; 110 A Primer on Partial Least Squares Schlomerer et al., 2014), assessing the mode of measurement model by using the confirmatory tetrad analysis (CTA-PLS; Gudergan et al., 2008), analyzing hierarchical component models (e.g., Becker, Klein, & Wetzels, 2012; Ringle et al., 2012), considering heterogeneity (e.g., Becker, Rai, Ringle, & Völckner, 2013; Sarstedt & Ringle, 2010), executing multigroup analyses (Sarstedt, Henseler, & Ringle, 2011), and assessing measurement model invariance (Henseler, Ringle, & Sarstedt, in press).

PLS-SEM is the most adequate for exploratory research because it focuses on explaining the variance in the dependent variables when examining the model (Hair et al. 2017). Researchers have increasingly been turning to SEM in the past years. In this research, that is the one being used, PLS-SEM, and in order to do so, the tool used is called Smart-PLS. A software that uses the method of Structural Equation Modeling (SEM).

Data collection

The hypotheses formulated in this research, as previously presented, derive from a deep analysis and interpretation on the existing literature regarding the subject in study. The scales used to measure and test these hypotheses are based on official marketing scales of measurement and existing research.

The personality traits being used in this research are the famous Big Five personality traits. The hypotheses assume a positive relationship between the traits: agreeableness, consciousness, extraversion, openness, and the dependent variable “willingness to pay for sustainable wood-based products”. One of the hypothesis assumes a negative relationship between neuroticism and the dependent variable.

As moderators, we have skepticism and need for uniqueness. The former is assumed to have a negative moderator effect on the dependent variable, based on the analysis of the existing literature on the consumption of sustainable produce, where consumers tend to be skeptic towards eco-certification institutions. In this case, the moderating effect of “skepticism” will weaken the effects of agreeableness, consciousness, extraversion, openness on the WTP, and it will strengthen even more the negative relation between neuroticism and WTP.

The latter is assumed to have a positive moderator effect on the dependent variable, based on the analysis of the literature where it shows that people with personality attributes regarding appreciation for uniqueness, personal branding and standing out from others are more prone to consume products defending the environmental cause. This moderator will counterbalance the personality traits “neuroticism” that is being hypothesized to have a negative relationship with the WTP, and strengthen the positive relationship of the other personality traits already mentioned with the dependent variable.

The data for this research has been collected through a survey addressed to final consumers of wood-based products that have been living in Italy for at least two years, regardless of their nationality, and are 18-year-olds or above. For that matter, this survey has been issued to friends and acquaintances living in Italy.

The questionnaire was written in Italian, since it is expected that most, if not all, participants will be Italian-native speakers.

The survey is separated into four different blocks.

- 1) First block: Presentation of the research and the objectives of the survey. The concept of “wood-based product” is presented and some examples of them are given;
- 2) Second block: Demographic questions (age, gender, country of origin, etc) and a filter question. The latter is a question destined to identify how often the respondent buys wood-based products, and can be answered with: never, hardly-ever, sometimes, usually, often or always;
- 3) This is done in order to be able to filter from the sample people who don't consume wood-based products, since that would deviate the results from the object of study of this research. If the person being questioned doesn't consume wood-based products, then it's not possible to attribute their personality to their WTP for something they don't even consume;
- 4) Third block: Questions related to the dependent variable, Willingness to Pay, are presented, measured according to a 5-point likert-type scale;
- 5) Fourth block: Questions related to the independent variables, the Big Five personality traits and the two moderators are presented, measured according to a 5-point likert-type scale.

Measures and Scales

Measurement is the process of assigning numbers to a variable based on a set of rules (Hair, Celsi, Money, Samouel, & Page, 2016). A measurement scale is a tool with a predetermined number of closed-ended responses that can be used to obtain an answer to a question (Hair et al. 2017). It is of imperative importance to choose adequate scales to measure the variables being analyzed.

In this study, the questions made in the survey were formulated based on official scales of the scientific research area. However, a few modifications and additions were made in the wording of some measurements in order for them to be suitable to the context of this specific research. In total there are 41 measurements that compose the questionnaire of the survey. The measurements instruments and their sources are presented in the table below, and they were answered on a 5-point likert-type scale, as follows:

(1) Strongly disagree;

- (2) Disagree;
 (3) Neither agree nor disagree;
 (4) Agree;
 (5) Strongly agree.

Table 6. Measurement instruments and their sources. Source: Author, 2023.

| Measures | Items | Sources |
|-------------------------|---|---|
| Willingness to pay more | 1. I am willing to pay a higher price for sustainably certified wood-based products, compared to non-certified ones. 2. I would like to keep buying sustainably certified wood-based products, even if non-certified ones were cheaper. 3. For the benefits the planet has with the consumption of sustainable wood-based products, I would be willing to pay a higher price. | 3 items, modified to adapt the object of this study. 5-point likert-type scale. (Habel et al. 2016) |
| Agreeableness | A1. I trust other people. A2. I trust what people say. A3. I like to help others. A4. I believe people usually have good intentions. | 4 items. 5-point likert-type scale. (Mahlamäki et al. 2019) |
| Conscientiousness | C1. I am conscientious about the things I do. C2. I finish my work on time. C3. I am deliberate in my decisions. C4. I obey the rules the best I can. | 4 items. 5-point likert-type scale. (Mahlamäki et al. 2019) |
| Extraversion | E1. In unclear situations, I usually take control of things. E2. It is easy for me to get to know other people. E3. I usually let others make the decisions. (R) E4. Can talk others into doing things. | 4 items. 5-point likert-type scale. (Mahlamäki et al. 2019) |

| | | |
|------------------------|--|--|
| Neuroticism | <p>ES1. I feel that I can handle any situation.</p> <p>ES2. It is hard for me to take criticism. (R)</p> <p>ES3. It is easy to hurt me emotionally. (R)</p> <p>ES4. I get very nervous before important meetings. (R)</p> | <p>4 items.</p> <p>5-point likert-type scale. (Mahlamäki et al. 2019)</p> |
| Openness to experience | <p>OE1. I have a vivid imagination.</p> <p>OE2. I greatly appreciate poetry.</p> <p>OE3. I enjoy wild flights of fantasy.</p> <p>OE4. I see beauty in things that others might not notice.</p> | <p>4 items.</p> <p>5-point likert-type scale. (Mahlamäki et al. 2019)</p> |
| Skepticism | <p>S1. We can depend on getting the truth in most advertising.</p> <p>S2. Advertising's aim is to inform the consumer.</p> <p>S3. I believe advertising is informative.</p> <p>S4. Advertising is generally truthful.</p> <p>S5. Advertising is a reliable source of information about the quality and performance of products.</p> <p>S6. Advertising is truth well told.</p> <p>S7. In general, advertising presents a true picture of the product being advertised.</p> <p>S8. I feel I've been accurately informed after viewing most advertisements.</p> <p>S9. Most advertising provides consumers with essential information.</p> | <p>9 items.</p> <p>5-point likert-type scale. (Obermiller et al, 1998)</p> |
| Need for uniqueness | <p>NU1. I am very attracted to rare objects.</p> <p>NU2. I tend to be a fashion leader rather than a fashion follower.</p> <p>NU3. I am more likely to buy a product if it is scarce.</p> <p>NU4. I would prefer to have things custom-made than to have them ready-made.</p> <p>NU5. I enjoy having things that others do not.</p> <p>NU6. I rarely pass up the opportunity to order custom features on the products I</p> | <p>8 items.</p> <p>5-point likert-type scale. (Lynn and Harris, 1997)</p> |

| | | |
|--|---|--|
| | buy. NU7. I like to try new goods and services before others do. NU8. I enjoy shopping at stores that carry merchandise which is different and unusual. | |
|--|---|--|

*(R) = Reverse coded item

Some highlights are presented about the measurements used and some wording modification done to them, as already mentioned previously.

- Willingness to pay - So far, there is no official scale that can be attributed to willingness to pay alone. So, in this research it is being used “Willingness to pay for more”, which measures a person’s desire to remain a customer of a retail business and willingness to pay more rather than buying from the competitors (Habel et al. 2016). It was judged appropriate to use this scale of measurement for this research since products with some sustainability attribute tend to be more expensive than those without them. The items of the original scale referred to a generic purchase, so the wording has been slightly modified in order to be suitable to this research’s topic, sustainable wood-based products.
- Big Five personality traits: the original scaling to measure these traits is from the original International Personality Item Pool (IPIP). The model includes 50 items in total (10 items for each trait). In order to produce a questionnaire that is engaging to the respondent and avoid having the respondent give up mid-way, this research used a shorter version of these scales, developed by Mahlamäki, T., Rintamäki, T., & Rajah, E. (2019), based on Goldberg (1999). This model contains 4 items per trait, resulting in a total of 20 items.
- The scales used here can be positively keyed, meaning that a high score indicates a high level of that trait, or negatively keyed where the contrary occurs, a high score means a low level of the trait. In this case, they are indicated with an “R” next to it, written in parenthesis.
- Skepticism towards advertising is being used as the scale for the personality trait “Skepticism”. It is defined as the general tendency toward disbelief of advertising claims (Obermiller et al, 1998). Skepticism is hypothesized in this scale as a general trait that varies across individuals and is related to general

persuadability. The measure assesses a generalizable characteristic rather than responses to specific ads or ad claims. Moreover, the construct is more limited than concepts such as attitudes toward advertising in general and attitudes toward marketing (Obermiller et al, 1998).

- Neuroticism is represented in the scale by measurements of Emotional Stability, based on Warren Norman (1963) taxonomy, but it is simply the opposite pole of neuroticism (McCrae and Costa, 2003).
- Openness is being presented as Openness to experience, based in the model by Mahlamäki et al. 2019, as already mentioned.
- This scale was used because, according to the existing literature, for the topic of this research, skepticism is related to the disbelief in the truthfulness of the certifications and labels attributed to sustainability in retail. These certificates and labels are often used strategically for marketing purposes to increase the value perception of the product among clients who value sustainability-related matters.
- Need for uniqueness - Scale by Lynn and Harris (1997). It measures the degree to which a person expresses the motivation to have unique consumer products that few others possess. The full name of the scale is “desire for unique consumer products”, or DUCP by Lynn and Harris (1997).

Reliability of responses

In order to ensure the reliability of the respondents answers, throughout the questionnaire there have also been added three attention-check questions. The intention of those is to ensure that the respondents are actually paying attention when answering the questions and not just clicking responses randomly. That way, it is possible to identify unreliable responses that would deteriorate the quality of the final results. Therefore, the responses in which the attention checks were not passed, or the redundant question answer is different from the original one, have been removed from the analysis.

The attention check questions added were:

- A request to select the number 9 among a set of numbers available in a multiple-choice type of scale;
- A request to select the letter G among a set of letters available in a multiple-choice type of scale;
- A redundant question requesting to repeat the respondent's age, which had already been asked at the beginning of the questionnaire.

Sample

The questionnaire was published on March 28th 2023 and closed on April 20th 2023, generating 180 responses. It was distributed through an anonymous link generated by the platform "Qualtrics" (qualtrics.com). The data was collected through the "snowball sampling" method, starting a chain diffusion online. This method gets its name from the phenomenon that happens to snowballs in the winter: when you set one rolling, it will gather more snow as it goes and increase its size. This analogy is made for this data collection method, because the researcher identifies a small group of participants that will "pass on" the questionnaire to other participants, and so on. Hence, the sample population or snowball grows bigger until the researcher has enough data to work with. It is also called the "chain-referral" sampling method. For this research, the questionnaire link has been forwarded to my friends and acquaintances through whatsapp, personal instagram profile and also published on university students pages on instagram and facebook. I made a request that the respondents forwarded the link to their own acquaintances, starting a chain of diffusion online.

This method has advantages and disadvantages. Some advantages are:

- It allows the researcher to reach a greater number of people for the sample population;
- It is faster than other methods in increasing the sample size;
- It is low-cost.

Some disadvantages are:

- It could result in a less diverse sample, since respondents could share the link with acquaintances that have similar traits, reducing the sample's

representativeness of the population. Hence, that could increase the sampling bias and margin of error;

- The researcher is subjected to the will of the potential respondents to participate without any type of compensation or reward;
- There is also the risk of fraud, where participants fill out the questionnaire more than once instead of distributing it, resulting in fake and unreliable responses.

These risks have been mitigated by forwarding the link to people of different age groups, occupations and parts of Italy. The people I reached out to are of my trust and I explained to them the importance of the transparency of their responses, so that reduces the chances of them answering randomly. And the risk of fraud has been mitigated by checking the IP address number of the responses. All of the responses collected were from different IP addresses. The IP address doesn't allow me to know who exactly answered it, so the anonymity of the respondents is preserved, and at the same time it allows me to reduce the chances of having more than one answer done by the same person.

Data examination

As mentioned in Hair et al (2017), when empirical data is collected using questionnaires, there may be data collection issues that must be addressed after the data is collected. The main possible issues are missing data, suspicious response patterns (straight lining or inconsistent answers), outliers, and data distribution. In addition, other aspects were also evaluated regarding the requirements specific to this research, such as the answers to the filter and attention-check questions, age and place of residence.

Missing data

Missing data happens when a respondent fails to answer one or more question(s), whether that is purposely or inadvertently . When the amount of missing data on a

questionnaire exceeds 15%, the entire response is typically removed from the data file. However, it can also be removed from the data file even if it doesn't exceed 15%. In this research, all responses that didn't get 100% of questions answered have been removed regardless. Therefore, out of the total of 180 responses, 71 of them were removed from the data file.

An important observation is that the questionnaire was made in a manner that the respondent couldn't pass to the next question without answering the current question he/she was on. Therefore all missing data is due to abandonments of the questionnaire done before completion. The qualtrics platform registers the responses even if the respondent doesn't follow through until the end. This is why all incomplete responses have been excluded. I'm considering the premise that if the person didn't follow through until the end, their answers until that point might have been done in a hurry or without much attention, and thus risk not being consistent or reliable.

Research requirements

The next examination consisted of checking the filter question "How often do you buy wood-based products?". The answer options were: never, hardly ever, sometimes, usually, often & always. All responses with the answer "never" were excluded. This applied to three of the total responses. Following this, the attention-check question answers were analyzed, and four responses were removed because they didn't pass this step.

The research had two more requirements explained in the data collection segment, one is that respondents must be 18 years of age or older; and the second one is that they must have been living in Italy for at least two years, regardless of their nationality. Hence, due to those requirements, one more response was removed because the respondent alleged to be 16 years old, whereas this study is aimed at people that are at least 18 years old. All respondents fulfilled the requirement regarding the time living in Italy, so no responses had to be removed due to this.

Table 7 below summarizes all the removed responses from the data file.

Table 7. Summary of removed responses. Source: Author, 2023.

| | Qty. | %* |
|------------------------|------------|----------------|
| Total Responses | 180 | 100,00% |

| | | |
|---------------------------|------------|---------------|
| <i>Missing data</i> | -71 | -39,44% |
| Complete responses | 109 | 60,56% |
| <i>Filter question</i> | -3 | -1,67% |
| <i>Attention-checks</i> | -4 | -2,22% |
| <i>Age limitation</i> | -1 | -0,56% |
| <i>Residence (IT)</i> | 0 | 0,00% |
| Valid responses | 101 | 56,11% |

Data distribution

PLS-SEM is a nonparametric statistical method, meaning that it does not require the data to be normally distributed. Nevertheless, it is important to verify that the data are not too far from normal as extremely nonnormal. This is because extremely nonnormal data inflate standard errors obtained from bootstrapping (to be explained in the data analysis segment), decreasing the likelihood that some relationships will be assessed as significant (Hair et al., 2011; Henseler et al., 2009).

Therefore, two measures of distributions are examined, **kurtosis and skewness**. Kurtosis measures whether the distribution is too peaked. Skewness assesses the symmetry of the variable's distribution. Both measures should be between -1 and 1 each, otherwise they are considered non normal.

As it is possible to see in Table 8, these measures are within the acceptable range for this data.

Table 8. Kurtosis and Skewness of the data collected, extracted from Smart-PLS4. Source: Author, 2023.

| | Kurtosis | Skewness |
|---------------------|----------|----------|
| Agreeableness | -0,398 | 0,182 |
| Conscientiousness | 0,661 | -0,656 |
| Extraversion | 0,562 | -0,670 |
| Need for Uniqueness | -0,392 | 0,042 |
| Neuroticism | -0,519 | 0,210 |
| Openness | -0,725 | -0,158 |
| Skepticism | -0,314 | 0,236 |
| WTP | -0,339 | -0,145 |

Socio-demographic characteristics

The socio-demographic characteristics of the valid responses is summarized in Table 9. As it is possible to see, most of the respondents were females and the main age group of respondents was 18-25 year-olds. The age groups of 56-65 and 46-55 year-olds are in second and third place. The distribution of gross family income groups is balanced among the first three groups, with 30-34% of respondents in each group. The country of origin of most of the respondents is Italy (86%), but there have also been participants from Albany, Brazil, Kyrgyzstan, Morocco, Moldavia, Russia, Ukraine, and one participant didn't specify his/her country of origin. As expected, the region of residence with the most respondents was Veneto (61%), due to the fact that my acquaintances are mainly from this region. There has also been a considerable participation of respondents from Calabria and Friuli Venezia Giulia, which together sum-up 18% of all participants.

Table 9. Summary of socio-demographic aspects of the respondents. Source: Author, 2023.

| Socio-demographic Aspect | | Qty | % total |
|--|----------------------|-----|---------|
| Gender | Female | 77 | 76% |
| | Male | 21 | 21% |
| | Prefer not to answer | 3 | 3% |
| | Total | 101 | 100% |
| Age | < 18 | 0 | 0% |
| | 18-25 | 56 | 55% |
| | 26-35 | 9 | 9% |
| | 36-45 | 6 | 6% |
| | 46-55 | 13 | 13% |
| | 56-65 | 14 | 14% |
| | > 66 | 3 | 3% |
| | Total | 101 | 100% |
| Gross Family Income (ISEE lordo familiare) | €24.000,01-€30.000 | 34 | 34% |
| | €30.000,01-€60.000 | 30 | 30% |
| | Inferiore a € 24.000 | 31 | 31% |
| | Oltre € 60.000 | 6 | 6% |

| | | | |
|-----------------------------|---|-----|------|
| | Total | 101 | 100% |
| Country of origin | Italy | 87 | 86% |
| | Other* | 14 | 14% |
| | Total | 101 | 100% |
| | *Albany, Brazil, Kyrgyzstan, Morocco, Moldavia, Russia, Ukraine, not specified. | | |
| Italian Region of Residence | Veneto | 62 | 61% |
| | Calabria | 10 | 10% |
| | Friuli Venezia Giulia | 8 | 8% |
| | Lombardia | 5 | 5% |
| | Toscana | 3 | 3% |
| | Piemonte | 3 | 3% |
| | Lazio | 3 | 3% |
| | Emilia Romagna | 2 | 2% |
| | Trentino Alto Adige | 1 | 1% |
| | Provincia autonoma di Trento | 1 | 1% |
| | Liguria | 1 | 1% |
| | Campania | 1 | 1% |
| | Abruzzo | 1 | 1% |
| | Total | 101 | 100% |

DATA ANALYSIS AND RESULTS

PLS-SEM and Path Model

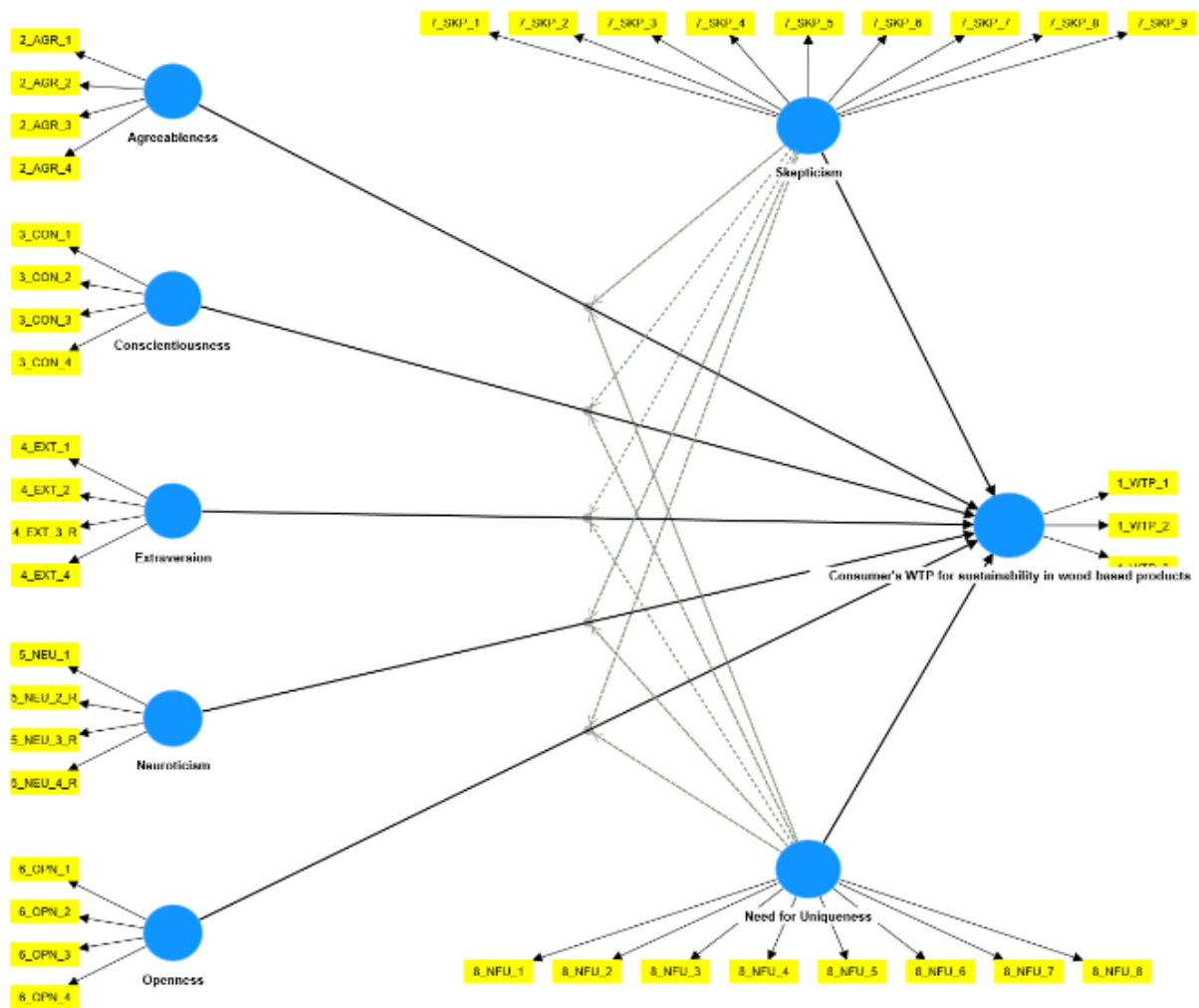
As mentioned previously, the approach used to estimate the relationships in this structural equation model (SEM) is the PLS-SEM, since it is the best option to develop theories in exploratory research by explaining the variance in the dependent variables in the examination of the model. The other type of SEM is CB-SEM, which is mostly used when intending to confirm or reject existing theories.

The software used for the development of this model is Smart-PLS4, a modeling tool of the structural equation based on variance. This software was chosen for its quality and user-friendliness. Among its features, it generates a visual display of the path model, clearly presenting the hypotheses and variable relationships to be examined. The Path Model is developed in a manner to reflect the hypotheses formulated on the basis of the scientific study it refers to, aiming to predict and explain specific outcomes. The PLS path model has two main elements: a structural model and a measurement model. The first one is also known as the “inner model”, and it represents the constructs and tests the relationship among them. The latter is also known as “outer model”, and displays the relationships between the constructs and their indicator variables. This includes the quality of the criteria, meaning it is possible to test the reliability and validity of constructs.

The Big-Five personality traits are the **constructs** of our model, namely agreeableness, conscientiousness, extraversion, neuroticism, openness to experience. The constructs are the variables that are not directly measured. They are being represented as blue circles. The **indicators**, also called items or manifest variables, are variables that are directly measured. They are represented as rectangles in our path model. The relationships between the constructs, and also between the constructs and their own indicators are indicated with single-headed arrows, which represent directional relationships.

In Exhibit 1 it is possible to see the PLS path model of this research.

Exhibit 1. Path model presentation indicating the relationship among variables using Smart-PLS. Source: Author, 2023.



Measurement model & Analysis

In order to evaluate the model, the next step necessary is to define the measurement model. There are two different types of models to measure unobservable variables, formative measurement and reflective measurement. In this study the one being used is the **reflective measurement**, meaning that the construct causes the measurement of the indicator variables, so the direction of the arrows is from the construct to the items. This can also be seen in Exhibit 1 presented above. The other type of measurement doesn't apply in this study, because that would mean that there is a causal (predictive) relationship from the item to the construct by means of linear

combinations (Hair, 2017), which is not the case. This would be expressed by the direction of the arrows pointing from the items to the construct.

To review the relevant measurement model evaluation criteria and later on, the appropriate reporting of results, a two-step systemic evaluation process is used, as presented below:

Step 1 - Reflective Measurement Model

- Reliability or internal consistency (Cronbach's alpha, composite reliability)
- Convergent validity (indicator reliability, average variance extracted)
- Discriminant validity

Step 2 - Evaluation of the Structural Model

- Collinearity assessment
- Coefficients of determination (R^2)
- f^2 effect sizes
- Significance of path coefficients

Hence, now that the measurement model has been defined, the next step is to evaluate the reliability, which refers to the consistency of the constructs, and validity, which is related to their accuracy.

Step 1 - Reflective Measurement Model

Reliability

To assess the reliability of the reflective measurement model, that is, to evaluate the internal consistency of it, two main indicators are used. Cronbach's alpha is a traditional criterion for internal consistency, which provides an estimate of the reliability based on the intercorrelations of the observed indicator variables (Hair, 2017).

The other indicator of internal consistency reliability used, due to Cronbach's alpha's limitations, is referred to as "composite reliability". This measure of reliability takes into account the different outer loadings of the indicator variables. Moreover, as

opposed to Cronbach's alpha, the composite reliability tends to overestimate the internal consistency reliability, hence the results are higher in comparatively reliability estimates.

Cronbach's alpha should be greater than 0,7 in order to be reliable. Whereas, the composite reliability can be between 0 and 1, but to be acceptable it should range between 0,60 to 0,70. Values higher than 0,70 are excellent. However, values higher than 0.95 are not desirable because it represents that the indicators are measuring the same phenomenon.

To assess the reliability of this model, both indicators are presented and analyzed in Table 10 below. The true reliability usually lies between these two indicators. The results of this study present some values that satisfy the requirements of each indicator as explained above, and others that don't reach the necessary threshold. The values in red are the ones that don't satisfy the requirements of each indicator. Whereas values in green, do.

Table 10. Cronbach's alpha and Composite reliability, extracted from Smart-PLS. Source: Author, 2023.

| | Cronbach's alpha | Composite reliability |
|---------------------|------------------|-----------------------|
| Agreeableness | 0,576 | 0,618 |
| Conscientiousness | 0,564 | 0,441 |
| Extraversion | 0,656 | 0,637 |
| Need for Uniqueness | 0,773 | 0,823 |
| Neuroticism | 0,586 | 0,742 |
| Openness | 0,660 | 0,511 |
| Skepticism | 0,871 | 0,743 |
| WTP | 0,801 | 0,882 |

- Cronbach's alpha: The values range between 0.564 and 0.871. Five of them don't satisfy the requirement of being > 0.70. This suggests that we should eliminate them from the model, namely agreeableness, conscientiousness, extraversion, neuroticism, openness. But first, let's take a look at the composite reliability.

- Composite reliability: The values here have a broader range, from 0,441 to 0,882. In this variable, only two constructs don't satisfy the requirement of being between 0,6 and below 0,95, namely conscientiousness and openness.

Considering that the true reliability usually lies between these two indicators, the variables that could be eliminated because they don't attend either indicator are **conscientiousness and openness**. That is because the others were either just a bit below 0,7 , or the value in the composite reliability was consistently within the value requirements. With this, they will be compensated by the effect of the composite reliability, still maintaining a good reliability. But before deleting them from the model, let's analyze the outer loadings of the indicators in the next block, convergent validity.

Convergent Validity

Assessment of reflective measurement models includes the convergent validity and discriminant validity (Hair, 2017). The first one to be analyzed is the convergent validity. It is called that way because all items should work together to represent the underlying construct, converging in measurement of the latent construct. To evaluate convergent validity of a reflective model, it is used the the average variance extracted (AVE) and the outer loadings of the indicators.

The latter is a common measure to establish convergent validity on the construct level. It is the sum of the squared loadings divided by the number of indicators. The value requirement for AVE is that it should be greater than 0,50. Table 11 presents the AVE for this model. As it is possible to see, only WTP attends the requirement.

Table 11. Cronbach's alpha, Composite reliability and Average Variance Extracted (AVE), extracted from Smart-PLS. Source: Author, 2023.

| | Cronbach's alpha | Composite reliability | Average variance extracted (AVE) |
|---------------------|------------------|-----------------------|----------------------------------|
| Agreeableness | 0,576 | 0,618 | 0,319 |
| Conscientiousness | 0,564 | 0,441 | 0,283 |
| Extraversion | 0,656 | 0,637 | 0,371 |
| Need for Uniqueness | 0,773 | 0,823 | 0,380 |
| Neuroticism | 0,586 | 0,742 | 0,433 |
| Openness | 0,660 | 0,511 | 0,302 |

| | | | |
|------------|-------|-------|-------|
| Skepticism | 0,871 | 0,743 | 0,266 |
| WTP | 0,801 | 0,882 | 0,714 |

Now, we must first look at the outer loadings of the indicators.

The factor loading indicates how well a particular item represents a latent construct. High outer loadings on a construct indicate the associated indicators have much in common, which is captured by the construct (Hair, 2017). The size of the outer loading is also commonly called indicator reliability. At a minimum, the outer loadings of all indicators should be statistically significant. A common rule states that the standardized outer loadings should be 0,708 or higher.

However, in social science studies it is common to obtain weaker outer loadings (<0,70), especially when newly developed scales are used (Hulland, 1999). So, instead of automatically eliminating indicators when their outer loading is below 0.70, it is advised to carefully examine the effects of item removal on the composite reliability, as well as on the content validity of the construct. Indicators with outer loadings between 0,40 and 0,70 should be considered for removal from the scale only when deleting the indicator leads to an increase in the composite reliability (or the average variance extracted) above the suggested threshold value. Indicators with very low outer loadings (below 0,40) should, however, always be eliminated from the construct.

In the Table 12 below it is possible to see all the outer loadings. In green, those above 0,708. In yellow, the ones between 0,4 and 0,7 that are to be examined. And, in red, the ones that are to be definitely eliminated.

Table 12. Outer loadings, extracted from Smart-PLS. Source: Author, 2023.

| | Outer loadings |
|--------------------------|----------------|
| 1_WTP_1 <- WTP | 0,871 |
| 1_WTP_2 <- WTP | 0,818 |
| 1_WTP_3 <- WTP | 0,844 |
| 2_AGR_1 <- Agreeableness | 0,371 |
| 2_AGR_2 <- Agreeableness | 0,576 |
| 2_AGR_3 <- Agreeableness | 0,306 |

| | |
|--------------------------------|-------|
| 2_AGR_4 <- Agreeableness | 0,845 |
| 3_CON_1 <- Conscientiousness | 0,348 |
| 3_CON_2 <- Conscientiousness | 0,117 |
| 3_CON_3 <- Conscientiousness | 0,041 |
| 3_CON_4 <- Conscientiousness | 0,997 |
| 4_EXT_1 <- Extraversion | 0,721 |
| 4_EXT_2 <- Extraversion | 0,414 |
| 4_EXT_3_R <- Extraversion | 0,885 |
| 4_EXT_4 <- Extraversion | 0,081 |
| 5_NEU_1 <- Neuroticism | 0,375 |
| 5_NEU_2_R <- Neuroticism | 0,761 |
| 5_NEU_3_R <- Neuroticism | 0,637 |
| 5_NEU_4_R <- Neuroticism | 0,779 |
| 6_OPN_1 <- Openness | 0,134 |
| 6_OPN_2 <- Openness | 0,996 |
| 6_OPN_3 <- Openness | 0,167 |
| 6_OPN_4 <- Openness | 0,413 |
| 7_SKP_1 <- Skepticism | 0,180 |
| 7_SKP_2 <- Skepticism | 0,397 |
| 7_SKP_3 <- Skepticism | 0,507 |
| 7_SKP_4 <- Skepticism | 0,408 |
| 7_SKP_5 <- Skepticism | 0,374 |
| 7_SKP_6 <- Skepticism | 0,802 |
| 7_SKP_7 <- Skepticism | 0,690 |
| 7_SKP_8 <- Skepticism | 0,534 |
| 7_SKP_9 <- Skepticism | 0,483 |
| 8_NFU_1 <- Need for Uniqueness | 0,726 |
| 8_NFU_2 <- Need for Uniqueness | 0,693 |
| 8_NFU_3 <- Need for Uniqueness | 0,467 |
| 8_NFU_4 <- Need for Uniqueness | 0,570 |
| 8_NFU_5 <- Need for Uniqueness | 0,650 |
| 8_NFU_6 <- Need for Uniqueness | 0,338 |
| 8_NFU_7 <- Need for Uniqueness | 0,586 |
| 8_NFU_8 <- Need for Uniqueness | 0,780 |

After examining, I eliminated the ones below 0,4. I also decided to keep the indicators with outer loadings between 0,4 and 0,7 because this would lead to an increase in the composite reliability or AVE.

With that being said, out of the 40 indicators, I eliminated 13, which are the following:

2_AGR_1
2_AGR_3
3_CON_1
3_CON_2
3_CON_3
4_EXT_4
5_NEU_1,
6_OPN_1
6_OPN_3
7_SKP_1
7_SKP_2
7_SKP_5
8_NFU_6

Single-item Scale

By doing this, the construct **Conscientiousness** has transformed into a single-item scale. So, this is what made me decide to officially remove it from the model. Not only it didn't meet the requirements for reliability, but also analyzing the convergent validity of their indicators, the best option is to eliminate it from the model since it turns into a single-item scale. McIver and Carmines (1981, p.15) affirm that, "It is very unlikely that a single item can fully represent a complex theoretical concept or any specific attribute for that matter".

Consequently, it is already possible to state that the **hypotheses linked to conscientiousness (H2) cannot be demonstrated.**

I've kept the construct Openness though, because after removing the outer loadings, it passed the test for reliability and validity. This can be seen in table 9 below.

After these steps, I have obtained an improvement in the results in terms of reliability and composite reliability and AVE as shown in Table 13.

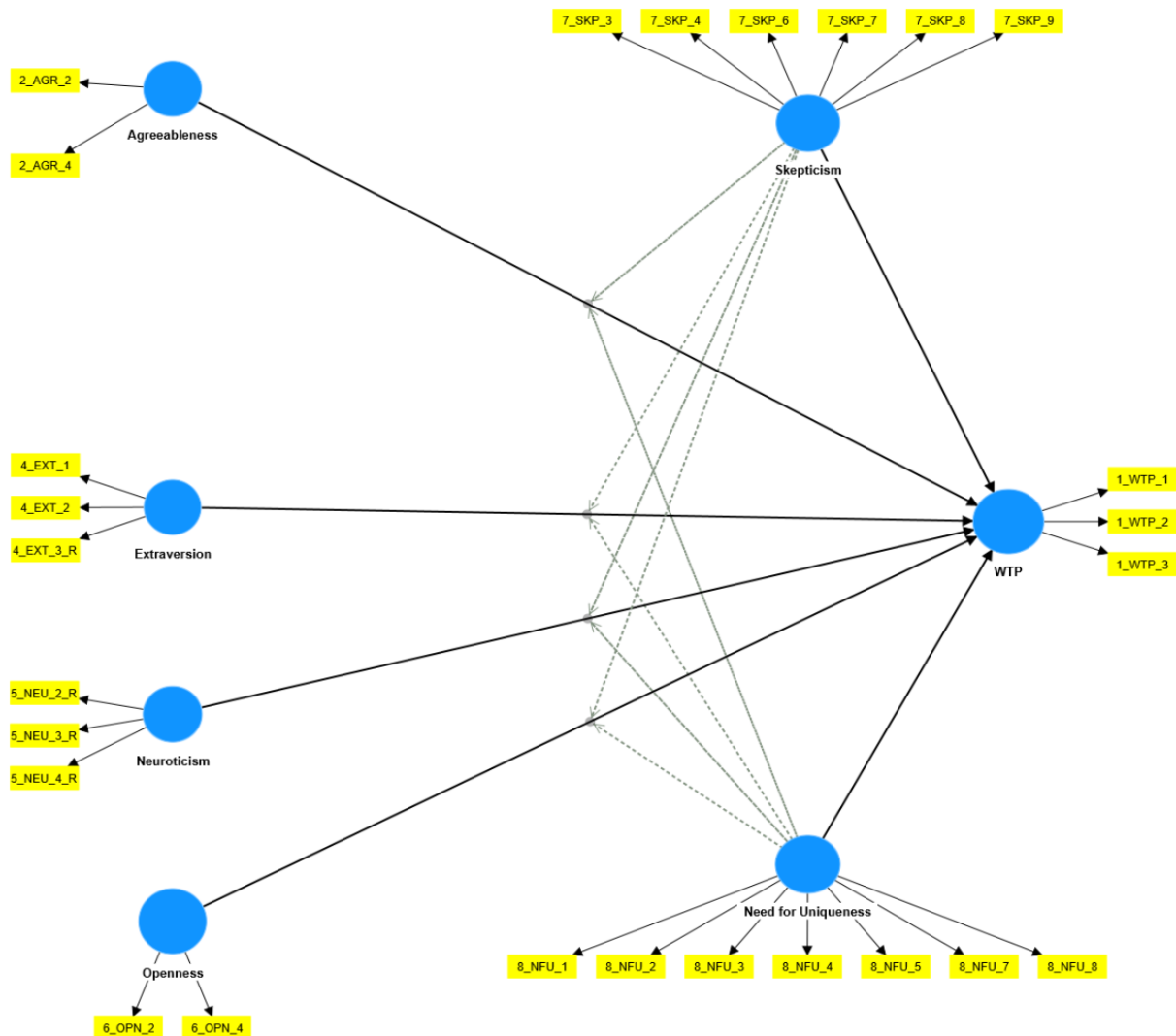
Table 13. Second version of Cronbach's alpha, Composite reliability and Average Variance Extracted (AVE), extracted from Smart-PLS. Source: Author, 2023.

| | Cronbach's alpha | Composite reliability | Average variance extracted (AVE) |
|---------------------|------------------|-----------------------|----------------------------------|
| Agreeableness | 0,102 | 0,679 | 0,524 |
| Extraversion | 0,625 | 0,763 | 0,534 |
| Need for Uniqueness | 0,782 | 0,833 | 0,421 |
| Neuroticism | 0,601 | 0,779 | 0,543 |
| Openness | 0,513 | 0,712 | 0,588 |
| Skepticism | 0,811 | 0,832 | 0,458 |
| WTP | 0,801 | 0,881 | 0,711 |

Agreeableness, Extraversion and Openness have Cronbach's alphas below 0,7 , but I've decided to keep them because their composite reliability is very high. So this balances it out, and, as mentioned before, the true reliability usually lies between these two indicators.

Also, with the changes made, the new current path model can be observed in Exhibit 2 as follows.

Exhibit 2. Second path model presentation indicating the relationship among variables using Smart-PLS. Source: Author, 2023.



Discriminant Validity

Assessment of reflective measurement models also includes discriminant validity. Discriminant validity is the extent to which a construct is truly distinct from other constructs by empirical standards, meaning it is unique and captures phenomena not represented by other constructs in the model. The Fornell-Larcker criterion, cross-loadings, and especially the heterotrait-monotrait (HTMT) ratio of correlations can be used to examine discriminant validity (Hair, 2017).

Cross-loadings

The cross loadings are typically the first approach to assess discriminant validity. This method consists in verifying that an indicator's outer loading on the correspondent construct is greater than any of its cross-loadings on other constructs. According to Hair et al (2017), the best way to assess and report cross-loadings is in a table with rows for the indicators and columns for the latent variable. Below it is possible to find this in Table 14 and we can see that the requirement of the cross-loading values is verified.

Table 14. Cross-loadings of the items of each variable, extracted from Smart-PLS. Source: Author, 2023.

| | Agreeableness | Extraversion | Need for Uniqueness | Neuroticism | Openness | Skepticism | WTP |
|-----------|---------------|--------------|---------------------|-------------|----------|------------|--------|
| 1_WTP_1 | 0,142 | -0,127 | 0,191 | -0,095 | 0,321 | 0,029 | 0,859 |
| 1_WTP_2 | 0,155 | -0,110 | 0,192 | -0,022 | 0,263 | 0,096 | 0,811 |
| 1_WTP_3 | 0,377 | -0,050 | 0,247 | -0,179 | 0,168 | 0,198 | 0,859 |
| 2_AGR_2 | 0,560 | 0,075 | 0,016 | 0,015 | 0,008 | 0,096 | 0,155 |
| 2_AGR_4 | 0,857 | 0,247 | 0,214 | -0,048 | 0,179 | -0,270 | 0,249 |
| 4_EXT_1 | 0,329 | 0,732 | -0,060 | 0,190 | 0,103 | -0,172 | -0,056 |
| 4_EXT_2 | 0,264 | 0,467 | 0,119 | 0,450 | -0,048 | -0,039 | -0,024 |
| 4_EXT_3_R | 0,120 | 0,921 | -0,084 | 0,307 | 0,012 | -0,250 | -0,115 |
| 5_NEU_2_R | -0,040 | 0,193 | -0,039 | 0,788 | -0,091 | -0,206 | -0,110 |
| 5_NEU_3_R | -0,085 | 0,178 | -0,082 | 0,639 | -0,129 | 0,030 | -0,051 |
| 5_NEU_4_R | 0,023 | 0,395 | -0,097 | 0,774 | 0,101 | -0,090 | -0,104 |
| 6_OPN_2 | 0,148 | 0,027 | 0,228 | -0,039 | 0,996 | -0,096 | 0,294 |
| 6_OPN_4 | 0,109 | 0,131 | 0,350 | 0,070 | 0,430 | -0,268 | 0,030 |
| 7_SKP_3 | -0,075 | -0,062 | 0,016 | -0,207 | -0,073 | 0,591 | 0,044 |
| 7_SKP_4 | -0,135 | -0,073 | 0,085 | -0,075 | -0,244 | 0,616 | -0,015 |
| 7_SKP_6 | -0,197 | -0,244 | 0,061 | -0,001 | -0,122 | 0,853 | 0,150 |
| 7_SKP_7 | -0,063 | -0,147 | -0,016 | -0,192 | -0,114 | 0,774 | 0,095 |
| 7_SKP_8 | -0,235 | -0,161 | 0,047 | -0,171 | -0,010 | 0,641 | 0,044 |
| 7_SKP_9 | 0,021 | -0,194 | -0,011 | -0,186 | -0,070 | 0,533 | 0,035 |
| 8_NFU_1 | 0,144 | 0,037 | 0,736 | -0,023 | 0,238 | -0,029 | 0,197 |
| 8_NFU_2 | 0,134 | 0,001 | 0,700 | 0,051 | 0,141 | 0,001 | 0,156 |
| 8_NFU_3 | -0,046 | -0,316 | 0,468 | 0,013 | 0,082 | 0,174 | -0,005 |
| 8_NFU_4 | 0,145 | -0,079 | 0,565 | 0,017 | 0,187 | -0,103 | 0,127 |
| 8_NFU_5 | 0,169 | -0,089 | 0,658 | -0,217 | 0,090 | 0,090 | 0,134 |
| 8_NFU_7 | 0,090 | 0,109 | 0,580 | -0,107 | 0,140 | 0,166 | 0,128 |
| 8_NFU_8 | 0,096 | -0,186 | 0,781 | -0,107 | 0,202 | 0,036 | 0,239 |

Fornell-Larcker criterion

The Fornell-Larcker criterion is the second approach used to assess discriminant validity. It compares the square root of the AVE values with the correlation among the latent variables. Thus, the square root of each construct's AVE should be greater than its highest correlation with any other construct. The idea that a construct should share more variance with its associated indicators than with any other construct is the logic behind where this method derives from.

Table 15 presents the Fornell-Larcker approach applied to the data of this sample. The values found in the principal diagonal, which are highlighted in yellow, correspond to the square root of their AVE of each variable. As mentioned before, to establish discriminant validity, the square root of each construct's AVE must be larger than its correlation with other constructs. For example, the correlation between agreeableness and extraversion (0.244), has to be lower than the agreeableness AVE square root which is 0.724.

Therefore, we can conclude that the discriminant validity of this model is demonstrated also through the Fornell-Larcker criterion.

Table 15. Fornell-Larcker coefficients, extracted from Smart-PLS. Source: Author, 2023.

| | Agreeableness | Extraversion | Need for Uniqueness | Neuroticism | Openness | Skepticism | WTP |
|---------------------|---------------|--------------|---------------------|-------------|----------|------------|-------|
| Agreeableness | 0,724 | | | | | | |
| Extraversion | 0,244 | 0,731 | | | | | |
| Need for Uniqueness | 0,186 | -0,065 | 0,649 | | | | |
| Neuroticism | -0,032 | 0,358 | -0,093 | 0,737 | | | |
| Openness | 0,153 | 0,039 | 0,253 | -0,030 | 0,767 | | |
| Skepticism | -0,175 | -0,249 | 0,033 | -0,152 | -0,119 | 0,677 | |
| WTP | 0,286 | -0,107 | 0,254 | -0,128 | 0,286 | 0,139 | 0,843 |

Recent research that critically examined the performance of cross-loadings and the Fornell-Larcker criterion for discriminant validity assessment has found that neither approach reliably detects discriminant validity issues (Henseler et al., 2015). Specifically, cross-loadings fail to indicate a lack of discriminant validity when two constructs are perfectly correlated (which is not the case in this research), which renders this criterion ineffective for empirical research.

Similarly, the Fornell-Larcker criterion performs very poorly, especially when indicator loadings of the constructs under consideration differ only slightly, for instance when all indicator loadings vary between 0.60 and 0.80. This is not the case of this research either, however, even though the Fornell-Larcker criterion's performance in detecting discriminant validity issues improves when indicator loadings vary more strongly, it is still rather poor overall. Hence, a third assessment is made, the heterotrait-monotrait ratio (HTMT) of the correlations (Henseler et al, 2015), which is presented up next.

The heterotrait-monotrait (HTMT)

HTMT is the ratio of the between-trait correlations to the within-trait correlations. So, it is the mean of all correlations of indicators across constructs measuring different constructs, relative to the mean of the average correlations of indicators measuring the same construct. The goal of the HTMT approach is to estimate the true correlation between two constructs, also called disattenuated correlation, if they were perfectly measured (perfectly reliable).

The exact threshold level of the HTMT is debatable. Henseler et al. (2015) suggest a threshold value of 0,90. So, we would say that an HTMT value above 0,90 suggests a lack of discriminant validity. Therefore, in order to establish discriminant validity using HTMT, the ratio of the values should be **less than 0,90**. The values are presented in Table 16 below.

Table 16. HTMT Coefficients, extracted from Smart-PLS. Source: Author, 2023.

| | Agreeableness | Extraversion | Need for Uniqueness | Neuroticism | Openness | Skepticism | WTP |
|---------------------|---------------|--------------|---------------------|-------------|----------|------------|-----|
| Agreeableness | 1 | | | | | | |
| Extraversion | 1,157 | 1 | | | | | |
| Need for Uniqueness | 0,694 | 0,277 | 1 | | | | |
| Neuroticism | 0,399 | 0,666 | 0,215 | 1 | | | |
| Openness | 0,962 | 0,275 | 0,527 | 0,254 | 1 | | |
| Skepticism | 0,794 | 0,265 | 0,250 | 0,344 | 0,364 | 1 | |
| WTP | 0,899 | 0,146 | 0,277 | 0,208 | 0,321 | 0,127 | 1 |

In this case, by the HTMT coefficients, the discriminant validity is not fully established, because two values are above 0,90. However, we must also analyze the confidence interval into which the true HTMT population values fall. A confidence interval containing the value 1 indicates a lack of discriminant validity. On the other hand, if the value 1 falls outside the interval's range, this suggests that the two constructs are empirically distinct.

In Table 17 below, the columns labeled 2.5% and 97.5% show the lower and upper bounds of the 95% (bias-corrected and accelerated) confidence interval.

Table 17. Confidence intervals bias corrected, extracted from Smart-PLS. Source: Author, 2023.

| | Original sample (O) | Sample mean (M) | 2.5% | 97.5% |
|---------------------------------------|---------------------|-----------------|-------|-------|
| Extraversion <-> Agreeableness | 1,157 | 1,481 | 0,461 | 5,277 |
| Need for Uniqueness <-> Agreeableness | 0,694 | 1,049 | 0,339 | 3,637 |
| Need for Uniqueness <-> Extraversion | 0,277 | 0,379 | 0,246 | 0,553 |
| Neuroticism <-> Agreeableness | 0,399 | 0,840 | 0,221 | 3,158 |
| Neuroticism <-> Extraversion | 0,666 | 0,713 | 0,508 | 0,940 |
| Neuroticism <-> Need for Uniqueness | 0,215 | 0,337 | 0,209 | 0,515 |
| Openness <-> Agreeableness | 0,962 | 1,324 | 0,305 | 4,764 |
| Skepticism <-> Neuroticism | 0,344 | 0,393 | 0,234 | 0,603 |
| Skepticism <-> Openness | 0,364 | 0,432 | 0,227 | 0,703 |
| WTP <-> Agreeableness | 0,899 | 1,104 | 0,361 | 3,821 |
| WTP <-> Extraversion | 0,146 | 0,236 | 0,109 | 0,404 |
| WTP <-> Need for Uniqueness | 0,277 | 0,335 | 0,193 | 0,523 |
| WTP <-> Neuroticism | 0,208 | 0,271 | 0,130 | 0,475 |
| WTP <-> Openness | 0,321 | 0,405 | 0,203 | 0,684 |
| WTP <-> Skepticism | 0,127 | 0,213 | 0,126 | 0,343 |

Since the HTMT-based assessment using a confidence interval relies on inferential statistics, one should primarily rely on this criterion, especially in light of the limitations of cross-loadings and the Fornell-Larcker criterion. However, the latter two measures still constitute standard means for discriminant validity assessment. Therefore, since in this model, both the cross-loadings and the Fornell-Larcker criterion were satisfied, I have decided to not remove anything from this model regardless.

Step 2 - Evaluation of the Structural Model

Collinearity Assessment

The first step in the evaluation is to examine the structural model for collinearity (VIF), because the estimation of path coefficients in the structural models is based on OLS regressions of each endogenous latent variable on its corresponding predecessor constructs. The threshold for VIF estimates is 5, meaning that values greater than this indicate collinearity issues. If that is the case, then the construct should be removed.

In Table 18 we have the VIF values of the combinations of the dependent variables and the corresponding predictor variables. We can conclude that this structural model has no critical collinearity issues, since all values are below 5.

Table 18. Inner VIF values to assess the presence of collinearity issues, extracted from Smart-PLS. Source: Author, 2023.

| | Agreeableness | Extraversion | Need for Uniqueness | Neuroticism | Skepticism | WTP |
|---------------------|---------------|--------------|---------------------|-------------|------------|-------|
| Agreeableness | | | | | | 1,303 |
| Extraversion | | | | | | 1,477 |
| Need for Uniqueness | | | | | | 1,251 |
| Neuroticism | | | | | | 1,286 |
| Skepticism | | | | | | 1,242 |
| WTP | | | | | | |

Coefficient Of Determination, The R² Value

The most commonly used measure to evaluate the structural model is the coefficient of determination (R² value). This coefficient represents the exogenous latent variables' combined effects on the endogenous latent variable. Therefore, it is a

measure of the model's predictive power, since it represents the amount of variance in the dependent variable explained by all of the constructs connected to it.

The R^2 value ranges from 0 to 1, the higher the value, the higher the level of predictive accuracy. It is difficult to provide a threshold for which the R^2 can be considered acceptable or not. According to Hair et al (2017, p.199), the acceptable R^2 value threshold depends on the type of study. In disciplines such as consumer behavior, as it is this case, the value of 0,20 is considered high.

For this model, the value of R^2 obtained from Smart-PLS is **0,196** for the dependent variable "Willingness to pay" for wood-based products. Since the value of R^2 is just 0,004 below the limit, it will be accepted as good enough and demonstrative of an efficient predictive power.

The Effect Size f^2

After evaluating the R^2 values, it is also important to evaluate the change in the R^2 value when a specified exogenous construct is excluded from the model. This can be used to evaluate whether the excluded construct has a substantive impact on the endogenous constructs. This is done through the measure referred to as the f^2 effect size. When the f^2 value is lower than 0,02, it indicates that *there is no effect*.

In Table 19 it is possible to see the effect size and the impact constructs have on the endogenous latent variables. According to the results, **extraversion and neuroticism have no effect on consumer's willingness to pay.**

Table 19. f^2 effect size, extracted from Smart-PLS. Source: Author, 2023.

| | Agreeableness | Extraversion | Need for Uniqueness | Neuroticism | Skepticism | WTP |
|---------------------|---------------|--------------|---------------------|-------------|------------|-------|
| Agreeableness | | | | | | 0,097 |
| Extraversion | | | | | | 0,010 |
| Need for Uniqueness | | | | | | 0,032 |
| Neuroticism | | | | | | 0,002 |
| Skepticism | | | | | | 0,029 |
| WTP | | | | | | |

Structural Model Path Coefficients

By running the PLS-SEM algorithm in the software Smart-PLS, estimates are also obtained for the structural model relationships. These represent the hypothesized relationships among the constructs. The path coefficients have standardized values approximately between -1 and $+1$, where estimated path coefficients close to $+1$ represent strong positive relationships (and vice versa for negative values) that are usually statistically significant.

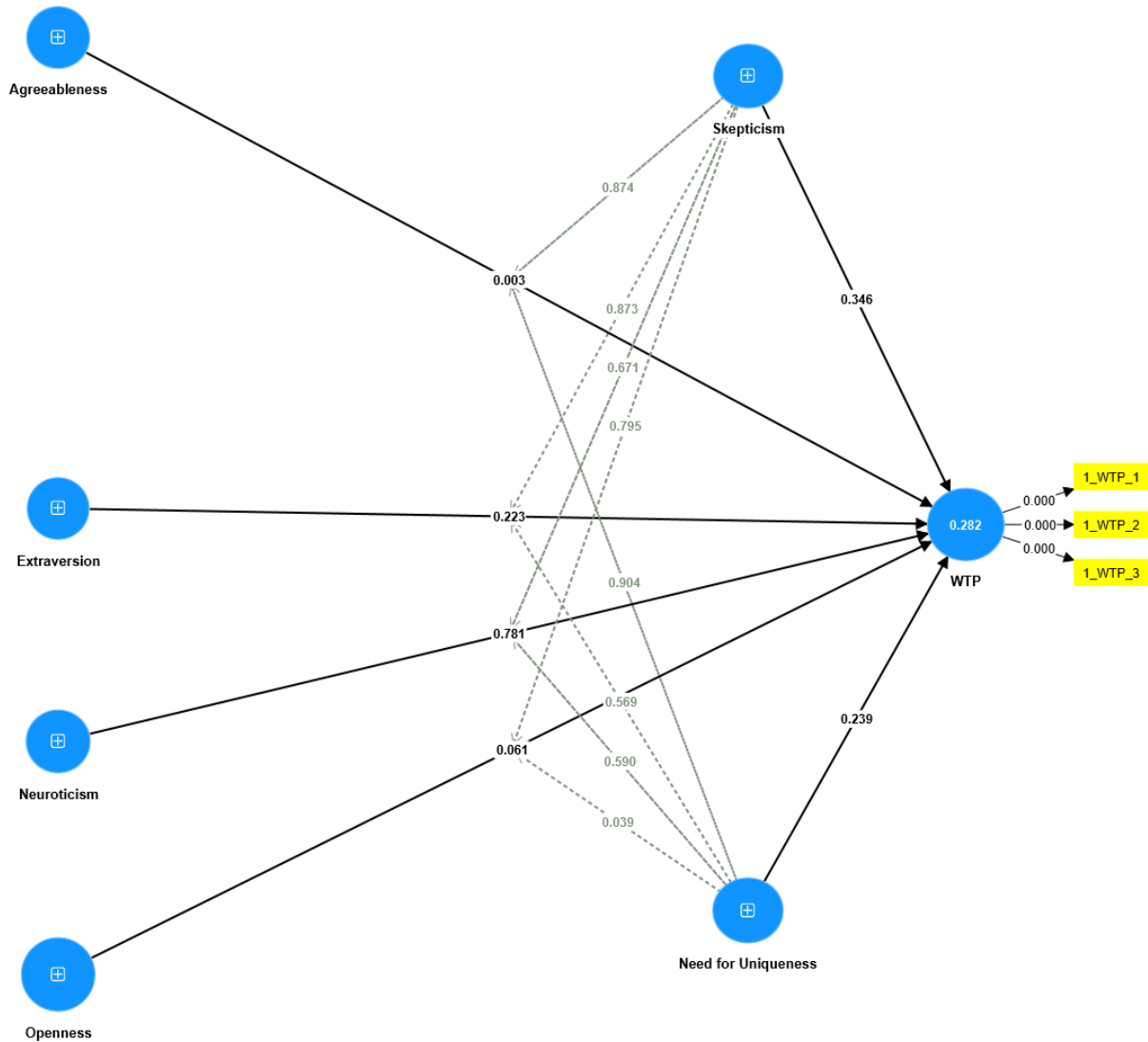
On the other hand, the closer the estimated coefficients are to 0, the weaker are the relationships. Meaning that very low values close to 0 are usually not significantly different from zero.

When initially assessing the PLS-SEM path coefficients for the structural model, the first measures to examine are the **significance** and the **relevance** of coefficients. The significance is verified by analyzing the t values, p values, or bootstrapping confidence intervals, obtained through the bootstrapping routine.

The bootstrapping routine randomly amplifies the existing data to a number of samples (5,000 bootstrap samples in this case). To do that in the Smart-PLS software, we go to the advanced settings, choose Bias-Corrected and Accelerated (BCa) Bootstrap, two-tailed testing, and a significance level of 0,05. This will return the empirical t and p values for all structural path coefficients.

If the **t value** is larger than the critical one, we can say that the coefficient is **statistically significant** at a certain error probability or significance level. For this model, we are assuming a **significance level of 5%**, meaning that the **t value needs to be larger than 1,96** (critical value) and, therefore, the **p value must be smaller than 0,05** to affirm that the statement in stake is **significant at 5% level**.

Exhibit 3 - Path coefficients and p values for the structural model relationships as resulting from the bootstrapping procedure, extracted from Smart-PLS. Source: Author, 2023.



Down below, in Table 20 it is possible to see the bootstrapping results, as well as the t values and p values. It is also possible to see the Original sample, or Beta value. This indicates the weight that an independent variable has on a dependent variable. In order for the relationship between two variables to be significant, the **Beta value** needs to be **higher than 0,20**.

Table 20. Path coefficients: Significance test. Beta value, Standard dev., t value and p value. Extracted from Smart-PLS. Source: Author, 2023.

| Original sample (O) | Standard deviation (STDEV) | T statistics (O/STDEV) | P values | Significance |
|---------------------|----------------------------|--------------------------|----------|--------------|
|---------------------|----------------------------|--------------------------|----------|--------------|

| | | | | | |
|--------------------------------|---------------|-------|--------------|--------------|------------|
| Agreeableness -> WTP | 0,338 | 0,114 | 2,972 | 0,003 | Yes |
| Extraversion -> WTP | -0,173 | 0,142 | 1,218 | 0,223 | No |
| Need for Uniqueness -> WTP | 0,145 | 0,123 | 1,179 | 0,239 | No |
| Neuroticism -> WTP | 0,033 | 0,119 | 0,277 | 0,781 | No |
| Openness -> WTP | 0,220 | 0,117 | 1,872 | 0,061 | No |
| Skepticism -> WTP | 0,172 | 0,182 | 0,942 | 0,346 | No |

Considering a 5% significance level, the only significant relationship in the structural model is **Agreeableness → WTP**.

The other ones, nor do they reach the Beta of at least 0,2, but also their *t* values are smaller than 1,96 and, consequently, their *p* values are considerably higher than 0,05. Therefore all the other constructs are not significant.

However, it is important to point out that this result is considering a 5% significance level, which is in line with the recommendation in the methodology by Hair et al (2017), which is the one this study's analysis is being based on. Although, regarding the choice of significance level, the authors also specify that researchers who are very strict or conservative in their testing of relationships set the significance level to 1%. However, **in studies that are exploratory, a significance level of 10% is also accepted**. An example is the exploratory analysis by Horton (1979) called "Some Relationships between Personality and Consumer Decision Making", where the results showing the relationship between each trait to consuming decision-making are specified in regards to their the level of significance, highlighting but not excluding the results that turned out to be significant at a 10% significance level or close to 10%.

If we consider a 10% significance level, then "**Openness → WTP**" also presents a significant relationship in the structural model (Beta 0,22; *p*-value 0,061).

Moving on, another important assessment is the relevance of significant relationships. However this is a test that should be used when hypotheses relate to differences in path coefficients in the model, for example in cases where there is

mediation. Since this is not the case for the model in stake, this assessment is not necessary.

Moderation

As mentioned in the hypotheses formulation, moderation describes a situation in which the relationship between two constructs is not constant but depends on the values of a third variable, which is the “moderator variable”. The moderator variable changes the strength and/or the direction of a relationship between two constructs in a model. If the moderator effect were not to be present, that would be interpreted that the strength of the relationship between constructs is constant.

According to Hair et al (2017), when interpreting the results of a moderation analysis, the primary interest is with the significance of the interaction term. It is possible to conclude that the moderator M has a significant moderating effect on the relationship between Y_1 and Y_2 , for example, if the interaction term’s effect on the endogenous construct is significant. However, despite the understanding of the moderator analysis, the interpretation of moderation results is nonetheless quite challenging. Therefore, graphical illustrations of results help understand them and reach conclusions. A common way to illustrate the results of a moderation analysis is by slope plots.

The moderators were specified in the hypotheses formulation stage. For this study, there have been included two “continuous moderator variables”, namely Skepticism and Need for Uniqueness. The slope plots for these two moderator variables are presented below, and afterwards it is also presented the significance of the moderating effect on each construct.

Skepticism as a moderator variable

The way we interpret the slopes plot is the following:

- The three lines shown in each graphic represent the relationship between the variable in the x-axis and the variable in the y-axis;

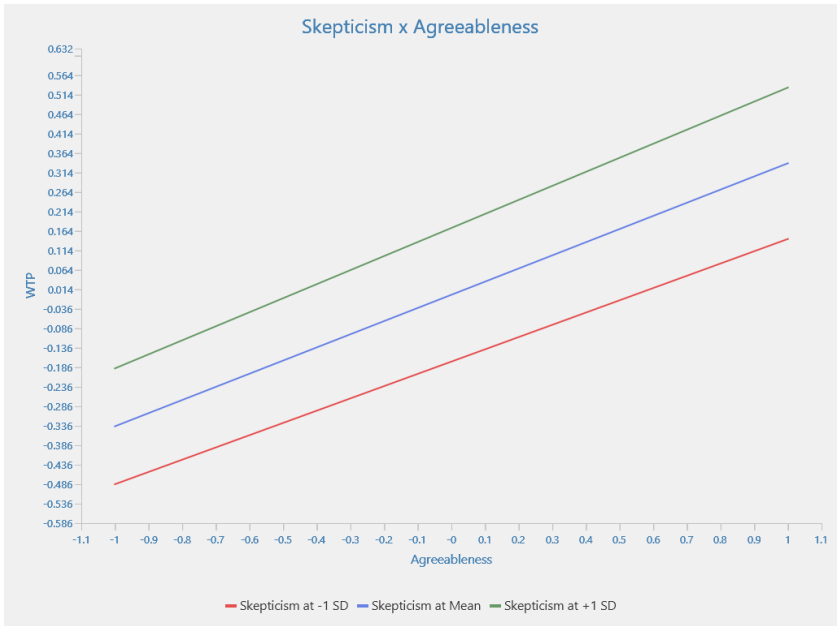
- The middle line represents the relationship for an average level of the moderator variable;
- The other two lines represent the relationship between between the variable in the x-axis and the variable in the y-axis for a higher level of the moderator variable (equal to its average plus one standard deviation unit) and lower level (equal to its average minus one standard deviation unit) of said moderator.

Therefore,

- The upper line represents a high level of the moderator construct in stake. Hence, if it has a flatter slope when compared to the lower line, it means the interaction effect exists and it is negative. Whereas if it has a steeper slope when compared to the lower line, it means the interaction effect is positive;
- The lower line represents a low level of the moderator construct in stake. Hence, if it has a flatter slope when compared to the upper line, it means the interaction effect exists and it is positive. Whereas if it has a steeper slope when compared to the upper line, it means the interaction effect is negative;
- If the slope doesn't change among the upper, mean and lower lines, it means the moderation effect is not present or is very low.

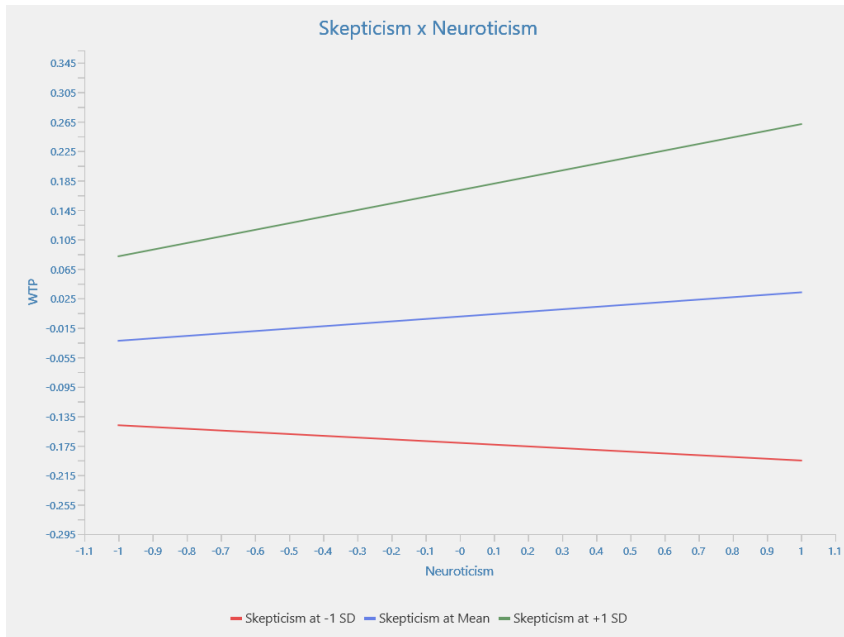
With that being said, the slope plots for Skepticism as a moderator are presented below.

Graph 1. Skepticism as a moderator of Agreeableness on WTP, extracted from Smart-PLS.
Source: Author, 2023.



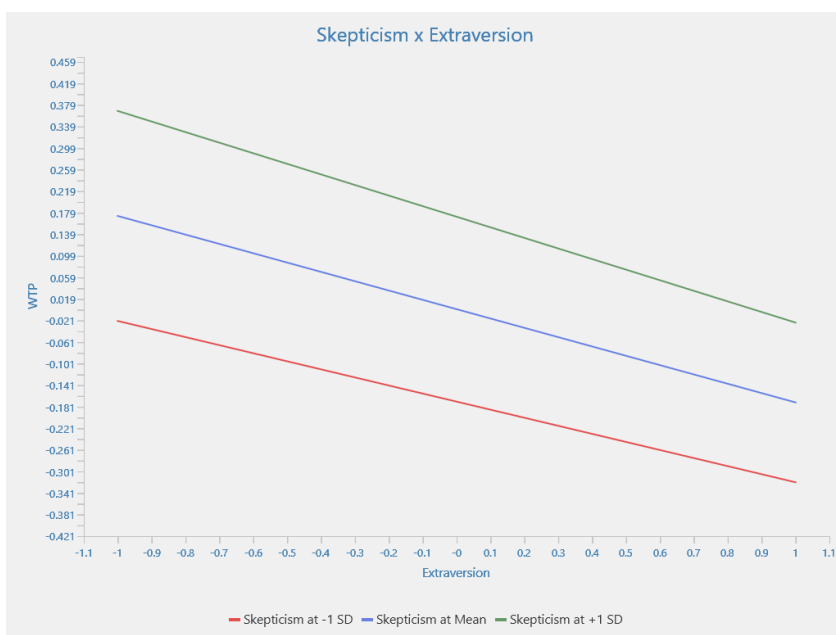
The upper line has a slightly steeper slope when compared to the lower line, and the lower line has a slightly flatter slope when compared to the upper line. This means that Skepticism has a positive moderator effect, as it intensifies (even if slightly) the relationship between Agreeableness and WTP.

Graph 2. Skepticism as a moderator of Neuroticism on WTP, extracted from Smart-PLS.
Source: Author, 2023.



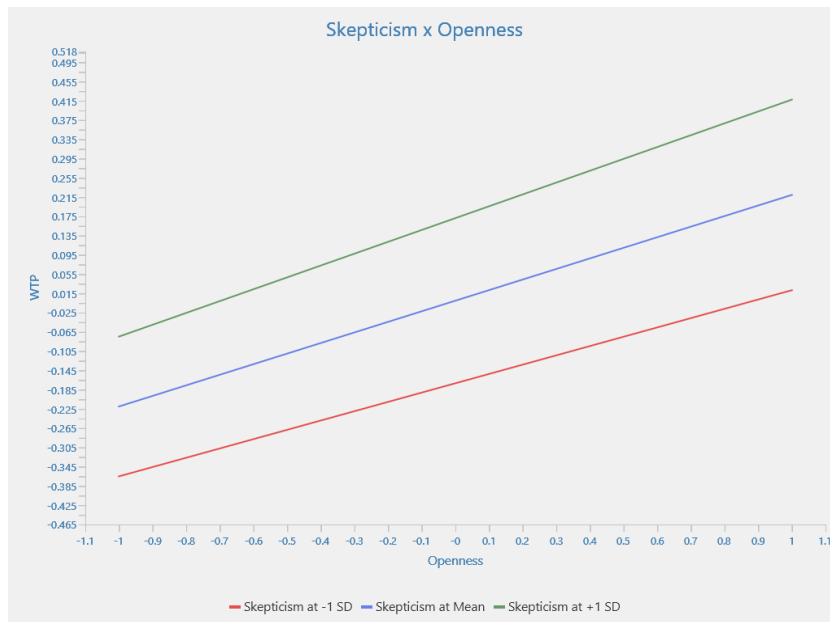
The upper line has a steeper slope when compared to the lower line, and the lower line actually changed the direction of the slope. This means that the interaction effect of the moderator is positive, as it intensifies and even changes the vector in the relationship between Neuroticism and WTP.

Graph 3. Skepticism as a moderator of Extraversion on WTP, extracted from Smart-PLS.
Source: Author, 2023.



The upper line has a slightly steeper slope when compared to the lower line, and the lower line has a slightly flatter slope when compared to the upper line. This means that the interaction effect of the moderator is positive, as it intensifies (even if slightly) the relationship between Extraversion and WTP.

Graph 4. Skepticism as a moderator of Openness on WTP, extracted from Smart-PLS.
Source: Author, 2023.

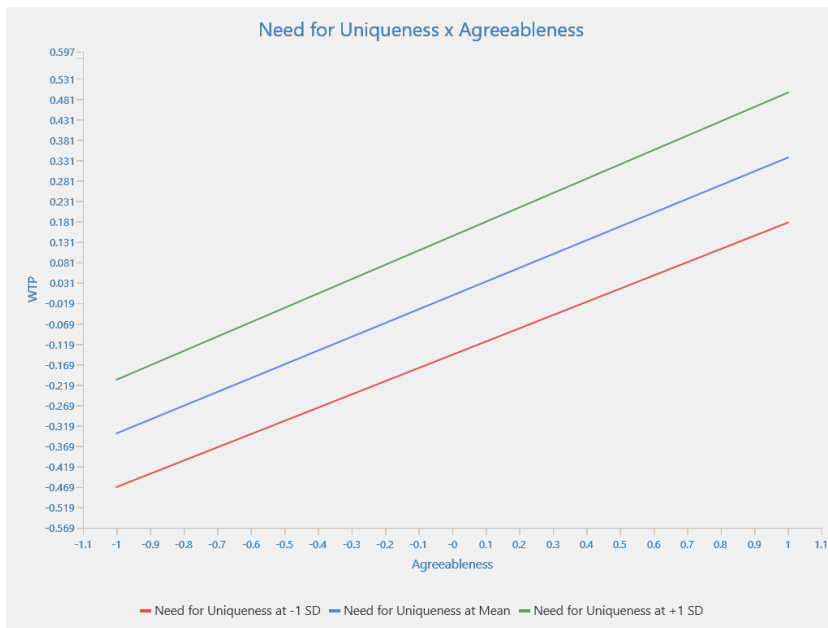


The upper line has a slightly steeper slope when compared to the lower line, and the lower line has a slightly flatter slope when compared to the upper line. This means that the interaction effect of the moderator is positive, as it intensifies the relationship between Openness and WTP

Need for Uniqueness as a moderator variable

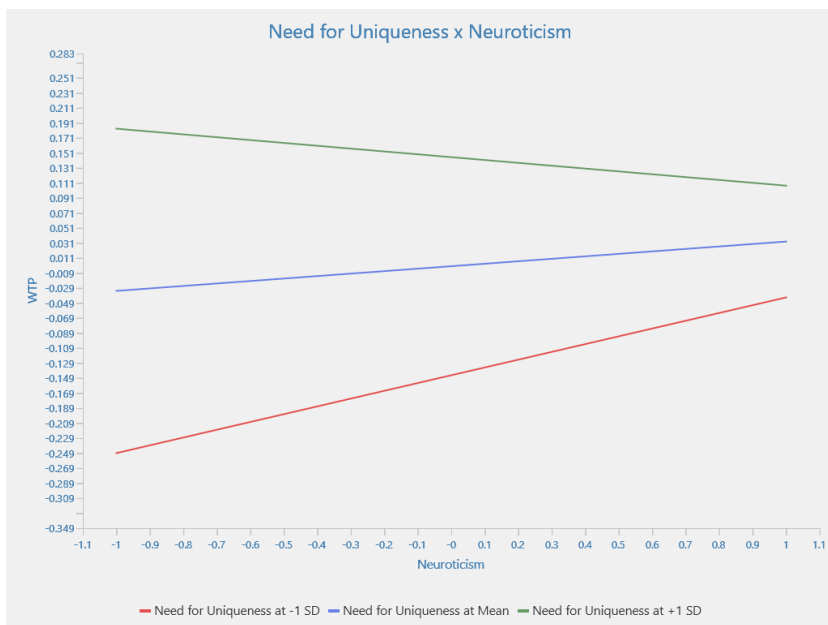
Up next, the slope plots for Need for Uniqueness as a moderator are presented below.

Graph 5. Need for Uniqueness as a moderator of Agreeableness on WTP, extracted from Smart-PLS. Source: Author, 2023.



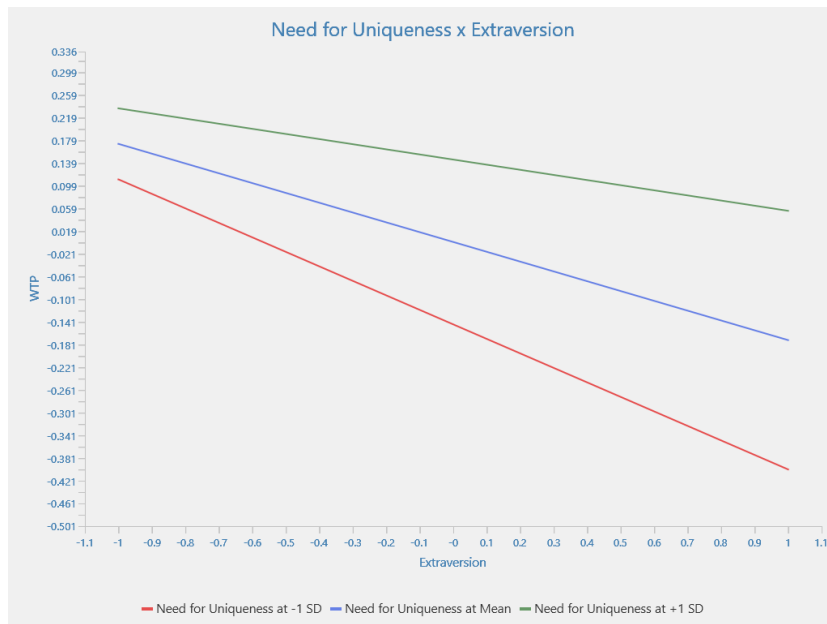
The slopes barely vary among the higher, middle and lower lines, meaning that there is little to no moderating effect by NFU, as it doesn't affect the relationship between Agreeableness and WTP.

Graph 6. Need for Uniqueness as a moderator of Neuroticism on WTP, extracted from Smart-PLS. Source: Author, 2023.



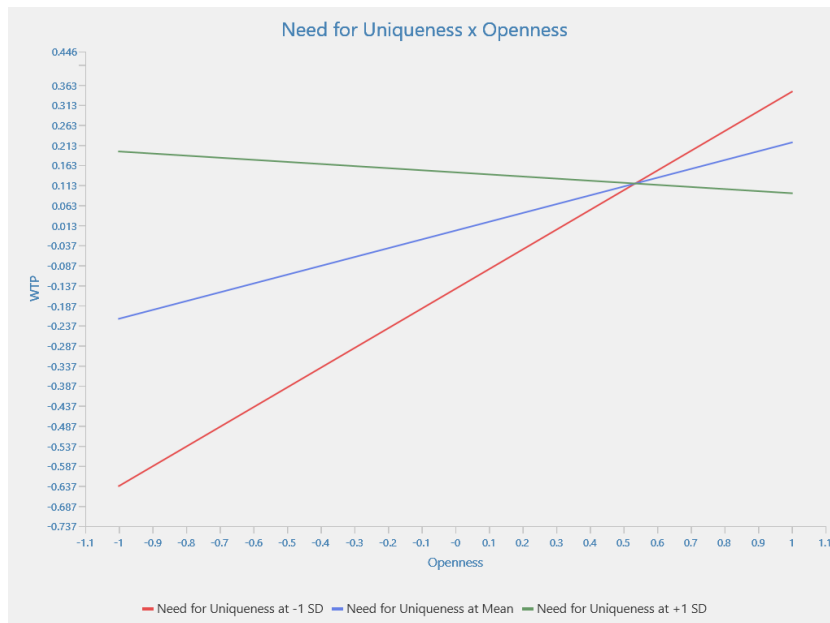
The upper line has a flatter slope when compared to the lower line, and the lower line changes its direction when compared to the upper line. This means that the interaction effect of the moderator is negative, as it intensifies and even changes the vector of the relationship between Neuroticism and WTP.

Graph 7. Need for Uniqueness as a moderator of Extraversion on WTP, extracted from Smart-PLS. Source: Author, 2023.



The upper line has a flatter slope when compared to the lower line, and the lower line has a steeper slope when compared to the upper line. This means that the interaction effect of the moderator is negative, as it weakens the relationship between Extraversion and WTP.

Graph 8. Need for Uniqueness as a moderator of Openness on WTP, extracted from Smart-PLS. Source: Author, 2023.



The upper line has a flatter slope when compared to the lower line, and the lower line actually changes its direction when compared to the upper line. This means that the interaction effect of the moderator is negative, as it weakens and even changes the vector of the relationship between Openness and WTP.

Significance of the moderating effect

Next, we assess whether the interaction terms are significant by analyzing the Original Sample (Beta values) and their *p* values. Table 21 below shows all values for each construct.

Table 21. Results of hypothesis testing with the moderation effect, extracted from Smart-PLS. Source: Author, 2023.

| | Original sample (O) | Standard deviation (STDEV) | T statistics (O/STDEV) | P values | Significance |
|---|---------------------|----------------------------|--------------------------|----------|--------------|
| Need for Uniqueness x Extraversion -> WTP | 0,083 | 0,145 | 0,569 | 0,569 | No |
| Skepticism x Openness | 0,026 | 0,102 | 0,260 | 0,795 | No |

| | | | | | |
|---|---------------|--------------|--------------|--------------|------------|
| -> WTP | | | | | |
| Need for Uniqueness x Openness -> WTP | -0,272 | 0,132 | 2,061 | 0,039 | Yes |
| Need for Uniqueness x Agreeableness -> WTP | 0,014 | 0,114 | 0,121 | 0,904 | No |
| Need for Uniqueness x Neuroticism -> WTP | -0,071 | 0,132 | 0,539 | 0,590 | No |
| Skepticism x Agreeableness -> WTP | 0,023 | 0,144 | 0,159 | 0,874 | No |
| Skepticism x Neuroticism -> WTP | 0,057 | 0,134 | 0,424 | 0,671 | No |
| Skepticism x Extraversion -> WTP | -0,023 | 0,146 | 0,160 | 0,873 | No |

As it is possible to see, the moderating effect of **Need for Uniqueness on the relationship between Openness and WTP is the only one statistically significant**. The moderation effect on the other independent variables turned out to be not statistically significant. Therefore it is not possible to affirm that their relationship with WTP is moderated by Need for Uniqueness, nor by Skepticism. These moderator variables aren't statistically significant either when assuming a direct relationship with WTP, as seen in the table presented in the section of Evaluation of the Structural Model Path Coefficients.

Hence, at a first glance, we could conclude that only an open buyer who also has a high need for uniqueness will have his/her WTP for sustainable wood-based products affected in a decreasing manner. **However, the construct Openness turned out to be not statistically significant as an independent variable at a 5% significance level** in its relationship with WTP, as it was presented in the Evaluation of the Structural Model Path Coefficients. Therefore, **at a 5% significance level, this moderating effect cannot be confirmed either**.

However, if we consider a **10% significance level, the construct Openness is significant as an independent variable (p -value = 0,061)**. Therefore, at a 10% level of significance, **we can also confirm the negative moderating effect of Need for Uniqueness**, weakening the relationship between Openness and WTP.

Hypotheses testing

In this segment, a summary will be presented of the results of the hypotheses testing that has been evaluated throughout the structural model analysis. As it has been mentioned before, the hypothesized relationships are inferred from the results obtained through the partial least squares structural equation modeling technique and based on the interpretation of the path coefficients reported in Table 22 in the previous section, along with the significance of the relationship through the evaluation of the t value (between -1.96 and + 1.96) and p value ($> 0,05$) in order for it to be considered within the acceptance region of a two-tail test with significance level of 5%.

Also, some hypotheses could not be confirmed as they didn't even pass the reliability, convergent validity and f^2 effect size assessments. In Table 22 we have a summary of the hypotheses results, and further on the explanation for each hypothesis.

Table 22. Summary of hypotheses testing results. Source: Author, 2023.

| Hypothesis | Independent Construct | Impact on WTP | Result |
|------------|-----------------------|---------------|--|
| H1 | Agreeableness | + | Possible to confirm at a 5% level of significance |
| H2 | Conscientiousness | + | Didn't pass reliability / validity assessment |
| H3 | Extraversion | + | $f^2 < 0.02$ - There is no effect on WTP |
| H4 | Neuroticism | - | $f^2 < 0.02$ - There is no effect on WTP |
| H5 | Openness | + | Possible to confirm only at a 10% level of significance |
| H6b | Skepticism | - | Path coefficients NOT statistically significant |
| H7b | Need for Uniqueness | - | Path coefficients NOT statistically significant |
| Hypothesis | Moderators | Effect | Result |
| H6 | Skepticism | - | Not statistically significant |

| | | | |
|-----------|----------------------------|---|---|
| H7 | Need for Uniqueness | - | Negative moderator effect NFU x Openness is possible to confirm only at a 10% level of significance. |
|-----------|----------------------------|---|---|

(H1): There is a positive relationship between agreeableness and the willingness to pay for sustainable wood-based products.

Table 23. Path coefficients for hypothesis testing results, extracted from Smart-PLS. Source: Author, 2023.

| | Direction | Original sample (O) | Standard deviation (STDEV) | T statistics (O/STDEV) | p values | Significance ($p < 0,05$) |
|----------------------|-----------|---------------------|----------------------------|--------------------------|----------|-----------------------------|
| Agreeableness -> WTP | + | 0,338 | 0,114 | 2,972 | 0,003 | Yes |

Agreeableness has resulted statistically significant as an independent variable, presenting a p -value $< 0,05$ and t -statistics equal to 2,972 (t -value $> 1,96$). Also, the beta value is positive and higher than 0,2 (reaching the required threshold). Therefore, it is **possible to confirm the hypothesis H1**.

(H2): There is a positive relationship between conscientiousness and the willingness to pay for sustainable wood-based products.

The construct was **eliminated from the model** in the **reliability and convergent validity** assessment.

It didn't pass the reliability assessment, with a Cronbach's alpha $< 0,7$; and a composite reliability $< 0,6$. But before deleting it from the model, I also analyzed the average variance extracted (AVE) in the convergent validity assessment, which also didn't reach the required threshold (should be $> 0,5$).

Table 24. Conscientiousness - Reliability and Convergent validity assessment, extracted from Smart-PLS. Source: Author, 2023.

| | Cronbach's alpha | Composite reliability | Average variance extracted (AVE) |
|-------------------|------------------|-----------------------|----------------------------------|
| Conscientiousness | 0,564 | 0,441 | 0,283 |

After eliminating the indicators with very low outer loadings (below 0,40) this construct turned into a **single-item scale**. This is what made me officially decide to **remove it from the model**, since, “It is very unlikely that a single item can fully represent a complex theoretical concept or any specific attribute for that matter” (McIver and Carmines, 1981, p.15).

(H3): There is a positive relationship between extraversion and the willingness to pay for sustainable wood-based products.

This construct “extraversion” **didn’t pass the f^2 Effect Size Assessment**.

The f^2 coefficient for this construct is equal to 0,010. When the f^2 value is lower than 0,02, it indicates that *there is no effect*. Therefore we can conclude that **extraversion has no effect on the consumer’s willingness to pay** for sustainable wood-based products.

(H4): There is a negative relationship between neuroticism and the willingness to pay for sustainable wood-based products.

This construct “neuroticism” also **didn’t pass the f^2 Effect Size Assessment**.

The f^2 coefficient for this construct is equal to 0,002. When the f^2 value is lower than 0,02, it indicates that *there is no effect*. Therefore we can conclude that **neuroticism has no effect on consumer’s willingness to pay** for sustainable wood-based products.

(H5): There is a positive relationship between openness and the willingness to pay for sustainable wood-based products.

Table 25. Path coefficients for hypothesis testing results, extracted from Smart-PLS. Source: Author, 2023.

| | Direction | Original sample (O) | Standard deviation (STDEV) | T statistics ((O/STDEV)) | p values | Significance (p < 0,05) |
|-----------------|-----------|---------------------|----------------------------|--------------------------|----------|-------------------------|
| Openness -> WTP | + | 0,220 | 0,117 | 1,872 | 0,061 | No |

The hypothesis **H5 is not confirmed** since the variable “openness” has resulted not statistically significant in the analysis (p-value should be < 0,05). The same can be seen by analyzing the t-statistic equal to 1,872 (t-value should be > 1,96).

(H6): Skepticism negatively moderates the effect of the Big Five on WTP for sustainable wood-based products

Table 26. Skepticism - Hypotheses testing with the moderation effect, extracted from Smart-PLS. Source: Author, 2023.

| | Original sample (O) | Standard deviation (STDEV) | T statistics ((O/STDEV)) | P values | Significance |
|-----------------------------------|---------------------|----------------------------|--------------------------|----------|--------------|
| Skepticism x Openness -> WTP | 0,026 | 0,102 | 0,260 | 0,795 | No |
| Skepticism x Agreeableness -> WTP | 0,023 | 0,144 | 0,159 | 0,874 | No |
| Skepticism x Neuroticism -> WTP | 0,057 | 0,134 | 0,424 | 0,671 | No |
| Skepticism x Extraversion -> WTP | -0,023 | 0,146 | 0,160 | 0,873 | No |

The moderation effect of Skepticism on all the independent variables turned out to be **not statistically significant**. Therefore **H6 cannot be confirmed**.

(H7): Need for uniqueness negatively moderates the effect of the Big Five on WTP for sustainable wood-based products

Table 27. NFU - Hypotheses testing with the moderation effect, extracted from Smart-PLS. Source: Author, 2023.

| | Original sample (O) | Standard deviation (STDEV) | T statistics (O/STDEV) | P values | Significance |
|---|---------------------|----------------------------|--------------------------|--------------|--------------|
| Need for Uniqueness x Extraversion -> WTP | 0,083 | 0,145 | 0,569 | 0,569 | No |
| Need for Uniqueness x Openness -> WTP | -0,272 | 0,132 | 2,061 | 0,039 | Yes |
| Need for Uniqueness x Agreeableness -> WTP | 0,014 | 0,114 | 0,121 | 0,904 | No |
| Need for Uniqueness x Neuroticism -> WTP | -0,071 | 0,132 | 0,539 | 0,590 | No |

As presented previously, only the moderating effect of Need for Uniqueness on the relationship between Openness and WTP is statistically significant. The moderation effect of NFU on the other independent variables turned out to be not statistically significant. However, as it was presented in H5, the construct Openness turned out to be not statistically significant as an independent variable in its relationship with WTP. Therefore, **H7 cannot be confirmed**.

(H6b): Skepticism has a negative relationship with the willingness to pay for wood-based products.

Table 28. Skepticism - Path coefficients for hypothesis testing results, extracted from Smart-PLS. Source: Author, 2023.

| | Direction | Original sample (O) | Standard deviation (STDEV) | T statistics (O/STDEV) | p values | Significance (p < 0,05) |
|-------------------|-----------|---------------------|----------------------------|--------------------------|----------|-------------------------|
| Skepticism -> WTP | + | 0,172 | 0,182 | 0,942 | 0,346 | No |

The hypothesis **H6b is not confirmed** since the variable “Skepticism” as an independent variable has resulted **not statistically significant** in the analysis (p-value should be < 0,05). The same can be seen by analyzing the t-statistic equal to 0,942 (t-value should be > 1,96).

(H7b): Need for uniqueness has a negative relationship with the willingness to pay for wood-based products.

Table 29. NFU - Path coefficients for hypothesis testing results, extracted from Smart-PLS.
Source: Author, 2023.

| | Direction | Original sample (O) | Standard deviation (STDEV) | T statistics (O/STDEV) | p values | Significance ($p < 0,05$) |
|-------------------------------|-----------|---------------------|----------------------------|--------------------------|----------|-----------------------------|
| Need for Uniqueness -> WTP | + | 0,145 | 0,123 | 1,179 | 0,239 | No |

The hypothesis **H7b is also not confirmed** since the variable “Need for Uniqueness” as an independent variable has also resulted **not statistically significant** in the analysis (p -value should be $< 0,05$). The same can be seen by analyzing the t -statistic equal to 1,179 (t -value should be $> 1,96$).

CONCLUSION

This study is a quantitative exploratory research that aims to measure the relationship between personality traits and the willingness to pay (WTP) for sustainable wood-based products by consumers living in Italy. For that, the first step was to make a thorough review of the available literature on the subject. This involved a comprehensive analysis of how the forestry industry works and complies to sustainability requirements and regulations; the importance of communication of efforts towards sustainability, whether it's through self-made labels or international certifications; how sustainability can be used as a marketing opportunity to leverage sales; and what aspects regarding the industry and/or the consumer influence the willingness to pay for a green premium by the final consumer.

Some important concepts that were brought up in this part of the process include sustainability, sustainable development, willingness to pay, green premium, green consumerism, the five-factor personality model, need for uniqueness, skepticism and socio-demographic aspects. There is also a big focus on how personality influences behavior in general and consumer behavior, and specifically green consumerism. The main insights obtained were the many ways all these factors can relate and/or complement each other in the customer decision-making process when purchasing a sustainable product, over an alleged non-sustainable one. The literature review also set the foundation for the development of the hypotheses tested in this research.

In comparison to other similar studies, this research provides a comprehensive outlook gathering the findings of the existing studies on the topics just mentioned, and expanding the available literature by including the influences on the willingness to pay for a green premium for wood-based products in Italy, from a personality-trait perspective. The personality traits model used in this research is based on the Big-Five Personality traits, also known as The Five-Factor Model, by McCrae and Costa (2003). The traits of this model are Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. This study also considers two other personality traits, which the literature points as being very relevant when studying the influence of personality on sustainable consumer behavior, which are Need For Uniqueness and Skepticism.

The second step was to develop the hypothesized research model. In this research, nine hypotheses were tested, which derived from the deep analysis and interpretation of the existing literature regarding the subject in study. They were:

(H1): There is a positive relationship between agreeableness and the willingness to pay for sustainable wood-based products.

(H2): There is a positive relationship between conscientiousness and the willingness to pay for sustainable wood-based products.

(H3): There is a positive relationship between extraversion and the willingness to pay for sustainable wood-based products.

(H4): There is a negative relationship between neuroticism and the willingness to pay for sustainable wood-based products.

(H5): There is a positive relationship between openness and the willingness to pay for sustainable wood-based products.

(H6): Skepticism negatively moderates the effect of the Big Five on WTP for sustainable wood-based products

(H7): Need for uniqueness negatively moderates the effect of the Big Five on WTP for sustainable wood-based products

(H6b): Skepticism has a negative relationship with the willingness to pay for wood-based products.

(H7b): Need for uniqueness has a negative relationship with the willingness to pay for wood-based products.

The third step was to collect the data. This was made through a questionnaire distributed, accounting for the “snowball sampling” method. The scales used to measure and test these hypotheses are based on official marketing scales of measurement and existing research. This research counted with a total of 180 respondents, out of which 101 responses were valid and analyzed through a partial least squares structural equation modeling (PLS-SEM), also called PLS path modeling.

Regarding the independent variables, the main finding of this research is **confirming the hypotheses H1 at a 5% significance level** (there is a positive relationship between agreeableness and the WTP for sustainable wood-based products), and

confirming H5 at a 10% significance level (there is a positive relationship between openness and the WTP for sustainable wood-based products). Since this is an exploratory research, a 10% level of significance is also accepted (Hair et al, 2017). These findings are in line with other studies that also found Agreeableness and Openness to be positively related to environmentalism (Hirsh and Dolderman, 2007; Hirsh, 2010), and these two to be predictors of sustainable behavior, along with extraversion (Marcus and Roy, 2019).

Regarding moderator effects, this research was **able to confirm the H7 at a 10% significance level**. H7 states that Need for uniqueness negatively moderates the effect of the Big Five on WTP for sustainable wood-based products. This hypothesis was only possible to confirm for the **negative moderator effect that Need for Uniqueness has on the relationship between Openness and WTP** for sustainable wood-based products (at a 10% significance level). The moderator effect on the other independent variables resulted statistically not significant at any significance level. Nevertheless, this finding is in line with the literature, where the moderator effect of NFU only presents itself as positive when the green product gives a sense of uniqueness and individualism, otherwise not (Sestino et al, 2022; Polyportis et al, 2022; Griskevicius et al, 2010).

Regarding the rest of the hypotheses, H2 didn't pass the reliability/validity assessment. Hypotheses H3 and H4 resulted in an $f^2 < 0,02$, therefore there is no effect of the constructs associated with these hypotheses on WTP. For hypotheses H6b and H7b, the path coefficients didn't result to be statistically significant, therefore it is not possible to confirm those hypotheses either.

As for the other moderator effect hypothesized in H6 (Skepticism negatively moderates the effect of the Big Five on WTP for sustainable wood-based products), it was not possible to be confirmed because it resulted to be not statistically significant. All tests of the moderator effect of Skepticism on each independent variable resulted in a p -value greater than 0,05 and 0,10.

Practical uses and implications

As mentioned in the section above, the main findings of this research are confirming the hypotheses H1, H5 and H7, at different levels of significance. Hence, it was

possible to confirm that there is a positive relationship between the independent variables agreeableness and openness, and the dependent variable WTP for sustainable wood-based products. In terms of moderation, it was possible to confirm that the relationship between openness and WTP is negatively moderated by NFU. The other hypotheses could not be confirmed for different reasons.

These findings not only contribute to the existing literature, but they also have practical uses for industries in general that offer products from a sustainable supply chain, and especially the forestry industry that offers sustainable wood-based products. Departments that might make the most use of this research's findings are product portfolio planning, pricing, marketing and sales.

The contributions of this research allow companies to have a broader outlook that enables them to plan their product portfolio based on what their potential market is more prone to consume based on their personalities. The same broader outlook also allows them to develop a more accurate strategy on how to approach their clients, by taking into account their personality type and how it interacts with all the other aspects that influence their willingness to pay for sustainable wood-based products. Consequently, it also fosters the improvement of their pricing strategy.

Also regarding the use of this research in communication strategies, the literature review presented regarding the main finding of this research, which is that Agreeableness has a positive relationship with WTP for sustainable wood-based products, fosters another important insight. It sheds light on how to use communication strategies to increase the WTP of individuals who score low in said trait. One of the facets of Agreeableness is "Trusting" on one end, and "Suspicious" on the other (McCrae and Costa, 2003). So, individuals who score low on Agreeableness, tend to be less trusting and more suspicious.

With this in mind, in terms of communication for sustainable products, there is extensive literature regarding the importance of labels and certifications in influencing the WTP for a green premium by consumers. But it also highlights the existence of skepticism towards the truthfulness of such sustainability claims (Rossi and Rivetti, 2023; Calderon-Monge et al, 2020). Hence, the way they are communicated might also play a very important role in influencing people who score low in Agreeableness, by dribbling any possible skepticism towards the likelihood of being green-washed or scammed. This insight also constitutes a contribution to the industry in terms of orienting marketing and sales campaigns.

Understanding the green consumer behavior and preferences based on personality traits also can be useful to companies by functioning as a framework when engaging in a research to identify which personality traits are more prominent in their client base. This could allow them to direct efforts in reinforcing products and campaigns that have a higher chance of having success with their public and, therefore, enhance their sales.

Regarding the profiling and/or predicting of individual's personality traits, in more recent years, research has developed studies involving the predictability of personality traits based on digital footprints, especially on social media use (Azucar et al, 2018), big-data analysis (Bleidorn et al, 2017) and machine learning (Patil et al, 2021). These findings can be used for many commercial purposes, such as user experience improvement by personalizing online services, enhancement of recommender systems, and as a possible screening and implementation tool for public health (Azucar et al, 2018).

Grover and Mark (2017) presented a paper at the 2017 ACM International Joint Conference on Pervasive and Ubiquitous Computing and the 2017 ACM International Symposium on Wearable Computers, where their "initial findings suggest that Extroversion, Openness, Agreeableness, and Neuroticism can be classified using temporal patterns of digital traces at a similar accuracy to previous research that classified personality traits using different types of digital traces". This is very useful, since the prediction of the applicant's personality can be done to understand the applicant's behavior and save resources, such as time and capital, for the organization (Patil et al, 2021).

In the case of the forestry industry, established companies and start-ups in this area could use this methodology of predicting their market's personality traits, and plan their product portfolio and sales strategy based on it. And, in order to do so, they would need to be able to link the personality traits mapped to the WTP for their products.

This is one more situation where this research could pose as an important asset to the industry and the academic world, since it gathers and expands the available literature regarding WTP by including a perspective from a personality-trait point of view, and applying it to the forestry industry (wood-based products) and sustainability which is also hard to find in the literature from a personality stand-point. With this study, they will be able to know which personality traits influence the WTP for

sustainable wood-based products, and which ones don't have enough significant evidence so far to do so.

Limitations and future research directions

Even though this study presents a contribution to the existing literature and practical implications, it also presents some limitations that should be taken into account for further research. The limitations addressed in this segment include the following topics: sample; the big-five personality traits model; and, the measurement scale for willingness to pay.

In terms of the sample, the first limitation to mention is the sample size being too small. If the number of valid responses were higher, or if it had more respondents, the survey probably would have resulted in more statistically significant variables and reliable results. This limitation was the result of the available resources for the distribution of the questionnaire and data collection.

This is also connected to the second limitation regarding the sample, which is the choice of the snowball sampling method. This method limits the potential of the total number of people reached, since initially it depends on the number of acquaintances I have in Italy and then on their willingness to forward it to their network. Also, due to this method, the respondents tend to have similar profiles. This resulted in a fairly homogeneous group, especially regarding gender, age and region of residence.

This is not necessarily a problem, since according to the literature personality traits do not depend mainly on socio-demographic characteristics. However, it would have been interesting to obtain a more heterogeneous group of respondents. That would have allowed me to further examine their influence on the WTP for sustainable wood-based products.

All limitations regarding the sample could be overcome in future research with the advances in the use of Big data, where the available sample of individuals researched through the analysis of their digital footprints could be considerably larger. According to Bleidorn et al (2017), one of the most exciting applications of big-data and machine learning in psychological science has been to advance personality theory through the development of computer-based assessment tools to assess human behavior and personality traits. However, a big debate is in place

regarding these advancements is the stance of privacy and security issues (Muhammad et al, 2018).

Regarding the Five-Factor model, or “Big-five” personality traits, at the same time that it is a very consistent model to use in research, it also has some limitations. The summary of all the infinite facets that compound someone’s personality in five categories can be somewhat reductive in capturing all the complexity involved in it. It also might leave out the weight each facet plays in the overall score of each trait. An example of this limitation is the trait Altruism. The literature pointed it to play an important role in green consumerism in general. However, altruism is already a facet of Agreeableness, so treating it as a separate trait would have been redundant.

Nevertheless, this study tried to overcome this limitation by including in the analysis two other personality traits that were also highly mentioned in the available literature, Need for Uniqueness and Skepticism. Hence, future research could further extend the findings of this study by using more varied measures of personality traits in order to better capture all of the dimensions that influence sustainable purchase decision-making.

One more limitation is regarding the assessment of the willingness to pay. In this research, the measurement scale used was “Willingness to pay more”. This is useful in exploring if a person is willing to pay a price premium for sustainable wood-based products, over a non-sustainable one. However, it does not capture the exact price the person’s willing to pay for each product, or the value/percentage of this premium. Therefore, for further research, an interesting improvement could be the use of a single-item scale that objectively addressed this topic.

Hence, extending further the research on this subject and overcoming the limitations mentioned in this section, could contribute even more to the literature and practical uses for companies. Especially the latter, as it would provide more insights and clearer directions for managers regarding pricing strategies.

Tables

| | |
|---|-----|
| Table 1. Consumption of finished paper products in 2018 (in 1.000 m ³ (f)). Source: Where does the wood come from? A physical accounting model to trace the origin of wood-based products. Bosch et al, 2023..... | 11 |
| Table 2. SWOT strategies for the Italian forestry sector. Source: Towards a sustainable forest-based bioeconomy in Italy: Findings from a SWOT analysis. Falcone et al, 2020..... | 20 |
| Table 3. Overview of the moderating factors of the labelling effects. Source: The effects of visual sustainability labels on consumer perception and behavior: A systematic review of the empirical literature. Majer et al, 2022..... | 38 |
| Table 4. The most significant scientific articles related to sustainable consumerism, willingness to pay and personality traits. Source: Author, 2023..... | 44 |
| Table 5. The most relevant scientific articles for this research and how they differ from the key research question. Source: Author, 2023..... | 66 |
| Table 6. Measurement instruments and their sources. Source: Author, 2023..... | 83 |
| Table 7. Summary of removed responses. Source: Author, 2023..... | 89 |
| Table 8. Kurtosis and Skewness of the data collected, extracted from Smart-PLS4. Source: Author, 2023..... | 90 |
| Table 9. Summary of socio-demographic aspects of the respondents. Source: Author, 2023..... | 91 |
| Table 10. Cronbach's alpha and Composite reliability, extracted from Smart-PLS. Source: Author, 2023..... | 96 |
| Table 11. Cronbach's alpha, Composite reliability and Average Variance Extracted (AVE), extracted from Smart-PLS. Source: Author, 2023..... | 97 |
| Table 12. Outer loadings, extracted from Smart-PLS. Source: Author, 2023..... | 98 |
| Table 13. Second version of Cronbach's alpha, Composite reliability and Average Variance Extracted (AVE), extracted from Smart-PLS. Source: Author, 2023..... | 101 |
| Table 14. Cross-loadings of the items of each variable, extracted from Smart-PLS. Source: Author, 2023..... | 103 |
| Table 15. Fornell-Larcker coefficients, extracted from Smart-PLS. Source: Author, 2023..... | 104 |
| Table 16. HTMT Coefficients, extracted from Smart-PLS. Source: Author, 2023..... | 105 |

| | |
|--|-----|
| Table 17. Confidence intervals bias corrected, extracted from Smart-PLS. Source: Author, 2023..... | 106 |
| Table 18. Inner VIF values to assess the presence of collinearity issues, extracted from Smart-PLS. Source: Author, 2023..... | 107 |
| Table 19. f^2 effect size, extracted from Smart-PLS. Source: Author, 2023..... | 108 |
| Table 20. Path coefficients: Significance test. Beta value, Standard dev., t value and p value. Extracted from Smart-PLS. Source: Author, 2023..... | 111 |
| Table 21. Results of hypothesis testing with the moderation effect, extracted from Smart-PLS. Source: Author, 2023..... | 119 |
| Table 22. Summary of hypotheses testing results. Source: Author, 2023..... | 121 |
| Table 23. Path coefficients for hypothesis testing results, extracted from Smart-PLS. Source: Author, 2023..... | 122 |
| Table 24. Conscientiousness - Reliability and Convergent validity assessment, extracted from Smart-PLS. Source: Author, 2023..... | 123 |
| Table 25. Path coefficients for hypothesis testing results, extracted from Smart-PLS. Source: Author, 2023..... | 124 |
| Table 26. Skepticism - Hypotheses testing with the moderation effect, extracted from Smart-PLS. Source: Author, 2023..... | 124 |
| Table 27. NFU - Hypotheses testing with the moderation effect, extracted from Smart-PLS. Source: Author, 2023..... | 125 |
| Table 28. Skepticism - Path coefficients for hypothesis testing results, extracted from Smart-PLS. Source: Author, 2023..... | 125 |
| Table 29. NFU - Path coefficients for hypothesis testing results, extracted from Smart-PLS. Source: Author, 2023..... | 126 |

Exhibits

| | |
|--|-----|
| Exhibit 1. Path model presentation indicating the relationship among variables using Smart-PLS. Source: Author, 2023..... | 94 |
| Exhibit 2. Second path model presentation indicating the relationship among variables using Smart-PLS. Source: Author, 2023..... | 102 |
| Exhibit 3. Path coefficients and p values for the structural model relationships as resulting from the bootstrapping procedure, extracted from Smart-PLS. Source: Author, 2023..... | 110 |

Graphs

| | |
|---|-----|
| Graph 1. Skepticism as a moderator of Agreeableness on WTP, extracted from Smart-PLS. Source: Author, 2023..... | 114 |
| Graph 2. Skepticism as a moderator of Neuroticism on WTP, extracted from Smart-PLS. Source: Author, 2023..... | 115 |
| Graph 3. Skepticism as a moderator of Extraversion on WTP, extracted from Smart-PLS. Source: Author, 2023..... | 115 |
| Graph 4. Skepticism as a moderator of Openness on WTP, extracted from Smart-PLS. Source: Author, 2023..... | 116 |
| Graph 5. Need for Uniqueness as a moderator of Agreeableness on WTP, extracted from Smart-PLS. Source: Author, 2023..... | 117 |
| Graph 6. Need for Uniqueness as a moderator of Neuroticism on WTP, extracted from Smart-PLS. Source: Author, 2023..... | 117 |
| Graph 7. Need for Uniqueness as a moderator of Extraversion on WTP, extracted from Smart-PLS. Source: Author, 2023..... | 118 |
| Graph 8. Need for Uniqueness as a moderator of Openness on WTP, extracted from Smart-PLS. Source: Author, 2023..... | 119 |

Figures

Figure 1. Industrial roundwood and derived products in the global forest-based sector. Source: Where does the wood come from? A physical accounting model to trace the origin of wood-based products. Bosch et al, 2022.....10

Figure 2. The pyramid of CE-related products. Source: Consumer behavior in the circular economy: Developing a product-centric framework. Shevchenko et al. (2023)..... 16

Figure 3. Logos os certifications in the forestry industry. Sources: SFI, FSC, PEFC.....19

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