UNIVERSIDADE CATÓLICA PORTUGUESA

THE MEDIATING ROLE OF GREEN KNOWLEDGE IN THE RELATIONSHIP BETWEEN CONSUMER'S LIFE VALUES, INCOME AND GREEN PURCHASE DECISION

Dissertation presented to Universidade Católica Portuguesa to obtain a Master's Degree in Psychology in Business and Economics

By

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Abstract

Nowadays, companies are faced with the urgent necessity of creating sustainable products that align with the current generation's environmental preferences and concerns. As consumers increasingly contemplate the ecological ramifications of their purchasing choices, this study investigates the relationship between consumer Life Values, Income, and Ecological Purchasing Decisions, focusing on the mediating role of Ecological Knowledge. The research sample contains 376 respondents, of whom 156 identify as female (41.5%), 187 as male (49.7%) and 1 as other (0.3%). The average age of this cohort is 34.49 years, with a standard deviation of 13.085 and a range from 18 to 76 years.

The results emphasize the effectiveness of Green Knowledge as a mediator, revealing that high levels of Green Knowledge are correlated with a greater propensity for Green Purchasing decisions and environmental Life Values. Remarkably, the study also reveals specific unfavorable associations between income and Green Knowledge but underlines the fundamental influence of income in promoting sustainable consumption practices. This research contributes valuable information to the evolving discourse on sustainable consumer behavior. The links uncovered between Green Purchasing Decision, Income, Life Values, and Green Knowledge offer a multi-faceted lens to analyze consumer behavior.

Keywords: Green Knowledge, Life Values, Income, Green Purchase Decision, Consumers, Environment

Resumo

Atualmente, as empresas são confrontadas com a necessidade urgente de criar produtos sustentáveis que estejam de acordo com as preferências e preocupações ambientais da geração atual. Dado que os consumidores contemplam cada vez mais as ramificações ecológicas das suas escolhas de compra, este estudo investiga a relação entre os Valores de Vida do consumidor, o Rendimento e as Decisões de Compra Ecológicas, centrando-se no papel mediador do Conhecimento Ecológico. A amostra da investigação contém 376 inquiridos, dos quais 156 se identificam como mulheres (41,5%), 187 como homens (49,7%) e 1 como outro (0,3%). A idade média desta amostra é de 34,49 anos, com um desvio padrão de 13,085 e um intervalo de 18 a 76 anos.

Os resultados realçam a eficácia do Conhecimento Ecológico como mediador, revelando que níveis elevados de Conhecimento Ecológico estão correlacionados com uma maior propensão para decisões de Compra Ecológica e Valores de Vida ambientais. De forma notável, o estudo também revela correlações desfavoráveis específicas entre o Rendimento e o Conhecimento Ecológico, mas sublinha a influência fundamental do Rendimento na promoção de práticas de consumo sustentáveis. Esta investigação contribui com informações valiosas para a evolução do conhecimento sobre o comportamento sustentável dos consumidores. As ligações descobertas entre a Decisão de Compra Ecológica, o Rendimento, os Valores de Vida e o Conhecimento Ecológico oferecem uma lente multifacetada através da qual se pode analisar o comportamento do consumidor.

Palavras-Chave: Conhecimento Ecológico, Valores de Vida, Rendimento, Decisão de Compra Ecológica, Consumidores, Ambiente

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List of Abbreviations

GK Green Knowledge

GPD Green Purchase Decision

LV Life Values

CFE Concern for the Environment

CFO Concern for Others

HA Health and Activity

RES Responsibility

SFU Scientific Understanding

Introduction

Background

In the 21st century, businesses face the pressing challenge of developing sustainable products that cater to the needs and concerns of today's generation while safeguarding the environment. Consumers are becoming increasingly mindful of the environmental consequences of their purchasing decisions. They now seek products with a lower carbon footprint, utilize renewable resources, and consume less energy and water during production.

Sustainable products often feature natural, non-toxic materials, ensuring the safety of consumers, particularly for products that come into direct contact with our skin or that we consume, such as food and personal care items. Many companies recognize the importance of sustainability and integrate eco-friendly practices into their operations. Consequently, consumers progressively expect businesses to demonstrate environmental responsibility and offer sustainable products.

Moreover, sustainable products benefit the environment and yield cost savings for both consumers and businesses by reducing waste and conserving resources. In essence, sustainable products are not a mere trend but a necessity in fostering a healthier planet and people while paving the way for a more sustainable future.

Consumer attitudes have undergone a significant transformation, spurred by an increasing awareness of the environmental impact of their choices. As consumers embrace sustainability, green marketing and purchasing have gained prominence.

Green marketing encompasses a range of strategies, including pricing, production, promotion, and other factors designed to appeal to environmentally-conscious consumers (Zhang & Dong, 2020). This marketing approach recognizes that sustainability is not just a feature but a core value for many modern consumers.

While a growing segment of consumers is actively prioritizing sustainability in their purchases, others may need more education and awareness. *Green product knowledge* is the capacity to understand and evaluate the ecological effects of products on society (Wang & Bai, 2019). It plays a pivotal role in influencing consumers' choices.

Furthermore, income is a critical factor in shaping consumer decisions. Sustainable products are sometimes perceived as more expensive, affecting consumers' ability to afford them. Consequently, individuals with higher incomes may be more likely to

purchase green products as they may be more willing and able to pay a premium for sustainability (Sun & Wang, 2020).

Education also plays a role in consumers' green purchasing decisions. Studies have consistently shown that higher levels of education are linked with increased environmental awareness (Kanchanapibul et al., 2014). However, individual values can further modulate these decisions.

Consumers' values, such as environmentalism and sustainability, influence their purchasing decisions. Those prioritizing environmental protection and sustainability are more inclined to choose green packaging, regardless of income level. Conversely, consumers who prioritize other values may be less likely to prioritize sustainable options. Thus, income and life values jointly impact consumer choices related to green packaging (Suki, 2016).

In addition to income, life values can directly influence consumers' priorities and motivate them to opt for green packaging over other alternatives (Moser, 2015). This indicates that businesses should consider economic factors and appeal to consumers' values when promoting sustainable products.

Various theories have been applied to better understand and explain sustainable consumer behavior. The *Theory of Planned Behavior* (Emekci, 2019) is a prominent model that offers a solid theoretical foundation for comprehending the intentions and drivers behind individuals' behavior. It incorporates attitude, subjective norms, and perceived behavioral control to predict actual behavior (Singh et al., 2021).

Additionally, the *Holistic Model of Base Values* by Duane Brown (1996; 2002) underscores the importance of base values in guiding consumer choices, especially in sustainability. This model helps elucidate why some individuals are more inclined to prioritize eco-conscious decisions based on their core values.

Relevance

Understanding the interplay between income, life values, and green purchase decisions is paramount in psychological and practical dimensions. This research embarks on a journey to investigate the mediating role of green knowledge in shaping consumers' preferences for eco-friendly products. The primary goal is to illuminate the intricate web of factors influencing green purchase decisions, focusing on the roles played by income, life values, and the pivotal mediating factor of green knowledge.

From a psychological perspective, delving into the impact of income and life values on consumer purchasing decisions unveils the profound psychological motivations, values, and priorities that underlie consumer behavior (Rachmawati et al., 2019), consider a consumer deeply committed to environmental sustainability. Their commitment often reflects core values and identity, profoundly influencing their purchasing choices. As deeply ingrained beliefs values are the cornerstone of our actions and attitudes, shaping beliefs, attitudes, and behaviors related to environmental concerns (Khan & Mohsin, 2017). Comprehending these psychological factors offers companies a blueprint for crafting more effective marketing strategies and packaging designs that resonate with consumers' emotional needs (Kumar & Ghodeswar, 2015). Crafting marketing campaigns that align with consumers' life values can elevate customer engagement, satisfaction, and brand loyalty (Monferrer et al., 2019).

Furthermore, this research not only supports existing theories and literature but also advances the field of sustainability studies by introducing novel variables into the discourse. The study's primary objective is to augment our understanding of purchasing decisions concerning green products. As an increasing number of consumers prioritize sustainability and seek to enhance their green knowledge in their purchasing choices (Amoako et al., 2020), this research will dissect the intricate relationship between life values, income, and green knowledge in influencing consumers' decisions regarding green packaging.

Consumer behaviors have undergone significant transformations over the years, with a growing demand for products that do not harm the environment (Zhang & Dong, 2020). Additionally, a systematic review (Kanchanapibul et al., 2014) has shown that consumers' level of education is a crucial factor influencing their green purchasing decisions. Higher levels of education are closely linked to heightened environmental awareness.

This study is designed to address adults aged 18 and above.

In chapter two, an extensive review of relevant literature will be conducted to provide a solid theoretical foundation. This literature review will delve into the fundamental concepts of life values, income, and green knowledge. It will explore their significance in shaping consumer behavior, specifically their influence on green packaging purchase decisions. Moreover, this chapter will lay the groundwork for the research by developing hypotheses that will guide the investigation. These hypotheses will be carefully justified based on the insights gleaned from the literature.

Chapter three is dedicated to outlining the research methodology employed in this study. It will detail the research design, the questionnaire's constructs, and the rationale behind their inclusion. Additionally, the chapter will elucidate the procedures and statistical tests that will be applied to the data gathered. This chapter ensures the rigor and validity of the research findings by providing a clear methodological framework.

The fourth chapter will present the empirical results obtained through the analysis of the survey data. It will offer a comprehensive overview of the findings, highlighting the relationships between income, life values, green knowledge, and their combined impact on consumers' green packaging purchase decisions. The results will be presented with relevant tables and statistical analyses, providing a detailed and data-driven exploration of the research objectives.

The final chapter will encapsulate the thesis by offering conclusions from the research findings. It will synthesize critical insights into how income, life values, and green knowledge collectively influence consumer behavior regarding green packaging purchases. Furthermore, this chapter will critically examine the study's limitations, acknowledging any constraints or shortcomings in the research process. Finally, it will suggest potential routes for future research in this dynamic and evolving field, inviting further exploration and expansion of the study's themes.

By adhering to this structured thesis framework, this research contributes significantly to green marketing and sustainability studies, shedding light on the complex interplay of psychological and practical factors that drive consumers' decisions towards eco-friendly products.

Literature Review and Hypotheses

This chapter serves as the theoretical foundation for this thesis, addressing all Research Questions and validating each Hypothesis. It is organized into five sections, each dedicated to one of the variables.

The first part of the literature review introduces the concept of life values. In the subsequent section, we explore the mediating effect of green knowledge between income and the consumer's green purchase decision.

Finally, we delve into the intricacies of packaging, dissecting its individual elements to elucidate how they influence consumer purchase decision-making in the context of the previously mentioned concepts.

Life Values

The concept of value has been assumed in recent decades a prominent place in the field of research, also witnessing the increase in its theoretical importance concerning various aspects of an individual's life and the choices it must carry out along the journey of life. Over the last few decades, psychology has developed several theoretical models, defining values as beliefs or objectives to be achieved that guide behavior and serve as a basis for decision-making (Almeida, 2005).

According to the Holistic Model of Base Values by Duane Brown (1996; 2002), each person develops a relatively small number of priority values, organized in a system, which influence decision-making processes due to constant interaction with other variables in different life roles. Priority values are the main determinants of behavior in role performance and choices. It follows that clarification and prioritization of our system of life values are crucial, as only with prioritized life values can we give direction to behavior and make good decisions. On the contrary, when it is impossible to establish priorities regarding life values, there is often a blockage in the decision-making process or a systematic tendency to make decisions we regret.

The basic assumptions of this theory are (1) multiple occupational choices are uninformed. (2) an informed occupational decision is one in which individuals engage in a conscientious process of exploring their characteristics. The result of this process is the formulation of expectations about the outcomes of the choices considered. (3) the values system, which comprises individuals' cultural and work values, is the primary basis of perception, cognition, and affect. (4) assigning positive and negative properties to occupations is done based on an individual's values. (5) all decisions regarding occupations are made under uncertain conditions because decision-makers cannot access complete information. Finally, (6) existing theories of occupational choice are based on a white perspective and thus have limited utility for minorities.

Furthermore, the impact of personal values on decision-making can be elucidated by Leon Festinger's Cognitive Dissonance Theory (1957). According to this theory, individuals desire harmony and coherence in their beliefs, attitudes, and actions. However, when they confront circumstances that contradict this coherence, they experience a state of cognitive dissonance - a psychological discomfort that arises from the mismatch between their life values and actions.

In the context of values and decision-making, Cognitive Dissonance Theory offers insights into how people react when they face decisions that contradict their core values.

Aligning with the research, a person who highly values environmental sustainability and consciously tries to make eco-friendly choices. Nevertheless, if this person purchases a non-eco-friendly product, there is a conflict between their value (concern for the environment) and their behavior (buying a non-green product). This contradiction triggers cognitive dissonance. People are often driven to eliminate any internal inconsistencies in their beliefs or behavior that cause discomfort. For instance, when deciding to make an environmentally responsible purchase, individuals may attempt to justify their choice by researching eco-friendliness, finding alternative benefits in non-green products, or committing to avoid such choices. To address cognitive dissonance, a widely used strategy involves altering one's behavior to match one's beliefs or attitudes. In the domain of eco-conscious shopping, this could entail a transition towards greener alternatives. A person who prioritizes sustainability may opt for environmentally friendly products in future purchases to reconcile the inconsistency between their values and their prior non-green choices. This action can help alleviate their cognitive dissonance and realign their actions with their fundamental principles (Harmon-Jones & Mills, 2019).

Moreover, the Theory of Planned Behavior, introduced by Icek Ajzen in 1991, is a psychological model that aids in forecasting and comprehending human behavior. It is beneficial when individuals have the intention of performing a specific action. According to TPB, three key elements influence whether an individual intends to carry out a behavior: their attitude towards the behavior, subjective norms, and perceived behavioral control. Attitude refers to an individual's general assessment of engaging in a particular behavior. Values play a significant role in shaping one's attitude. If an individual's fundamental values center around environmental preservation and sustainability, their attitude towards buying eco-friendly products will likely be positive. Their conviction in safeguarding the planet, driven by their values, fosters a favorable attitude towards green purchasing. Subjective norms refer to an individual's perception of social pressure or approval/disapproval from significant others regarding their behavior. In this regard, a person's values interact with their perception of societal norms. For instance, if someone highly values eco-friendliness and considers it an essential aspect of their identity, they may be more sensitive to the opinions of others who share these values. As a result, they may perceive a subjective norm that supports green purchasing decisions.

The concept of perceived behavioral control refers to an individual's belief in their ability to perform a particular behavior. Values play a significant role in shaping this belief. For instance, if an individual places a high value on sustainability, they are more likely to

actively seek out information on eco-friendly options and become familiar with green products. This process can help them develop a sense of mastery and control over the decision-making process.

TPB posits that intentions are strong predictors of actual behavior. Individuals with a favorable inclination towards green purchasing, driven by their deeply held values, are more likely to engage in environmentally responsible behavior by purchasing eco-friendly products. This inclination is shaped by their attitudes, subjective norms, and perceived control, which influence their intention and subsequent behavior (Alam, et al 2020).

In 1985, Edward Deci and Richard Ryan introduced the Self-Determination Theory, a psychological construct to elucidate human actions' driving forces. SDT posits that individuals possess intrinsic psychological needs for autonomy, competence, and relatedness, which are integral to their overall wellness and optimal performance.

When applying SDT to the context of green purchasing decisions, we can explore how individuals' values interact with their psychological needs to drive their behavior.

Autonomy pertains to an individual's wish to govern their actions and decisions. Those who uphold strong environmental values, which stress the importance of being responsible towards the planet, may strive to make autonomous choices that align with these values. They are more likely to be motivated when they can freely select eco-friendly products that align with their values rather than feeling compelled or influenced by external pressures.

Experiencing a sense of competence and capability is crucial for personal satisfaction. When someone places high importance on environmental responsibility and feels confident in their ability to make informed decisions about eco-friendly products, they are more inclined to exhibit behaviors that showcase their proficiency. This could entail conducting research, making comparisons, and choosing environmentally conscious alternatives, which can instill a sense of achievement.

The concept of relatedness involves the desire for social connection and a sense of belonging. People with strong eco-conscious values might look for others who share their beliefs. Making environmentally friendly purchasing decisions enables them to express their values and connect with a community that values similar environmental goals.

Self-Determination Theory highlights the significance of intrinsic motivation in driving sustainable and fulfilling actions. Behaviors that stem from intrinsic motivation are deemed more sustainable and fulfilling as they satisfy psychological needs, ultimately

resulting in a sense of reward. In the realm of green purchasing, individuals who prioritize environmental responsibility and make choices that align with their values experience a heightened sense of fulfillment. This is because their actions reflect their core beliefs and align with their psychological needs, including autonomy, competence, and relatedness. These factors significantly impact their motivation and drive their decision-making process (Schösler, et al 2014).

The Value-Belief-Norm (VBN) model provides insights into why this phenomenon occurs. According to the VBN model, individuals who prioritize environmental responsibility (values) are more likely to believe that their actions can positively impact the environment (beliefs). This belief activates a sense of moral obligation or responsibility (norms) to engage in environmentally responsible behavior, such as green purchasing. When individuals make green purchasing decisions, they are satisfying their personal values and beliefs and conforming to the societal and moral norms related to environmental responsibility. This alignment between values, beliefs, and norms creates a powerful motivational force that enhances their fulfillment and drives them to make environmentally conscious choices consistently (Wang et al., 2023).

Additional studies mentioned that the value-belief–norm theory predicts one's environmental responsibility for behavior. However, its sufficiency in explicating individuals' environmentally responsible decision-making process and behavior is questionable (Han, 2020).

By this means, this research aims to understand the influence of life values on consumers' green purchasing decisions. A recent systematic literature review (Zhang & Dong, 2020) explains that the formation of consumer values is closely related to their living environment, which indicates that individual factors and product attributes cannot fully explain consumer attitude behavior. Results from the articles selected and analyzed in this systematic literature review show that Chinese people pay attention to harmony and think collective interests have a higher value than personal ones. However, the American people believe personal interests are the most important goal. Consequently, significant differences in product choices have been unavoidable due to the different values pursued by the two countries. Therefore, examining green purchase behavior under different cultural backgrounds is significant. This study also mentions that personal factors of consumers, such as differences in gender, age, and education, make consumers have different levels of demand for green products. On the other hand, psychological factors, such as values, have a profound and lasting guiding effect on consumer behavior,

leading to significant differences in consumers' purchase behavior due to their different attitudes and expectations regarding environmentally friendly products. Geert Hofstede's Cultural Dimensions Theory provides a framework for understanding these cultural differences in consumer values. According to Hofstede's theory, cultures can be analyzed based on several dimensions, one of which is individualism-collectivism. Chinese culture tends to be more collectivist, emphasizing harmony, group cohesion, and collective well-being, while American culture leans towards individualism, prioritizing personal achievement and interests.

These cultural differences have a impact on green purchase behavior. In collectivist cultures like China, individuals may be more inclined to make green purchasing decisions that benefit the broader community or align with societal values of environmental responsibility. In contrast, personal interests and values may precede green purchasing decisions in individualistic cultures like the United States (Ruanguttamanun, 2023).

Other studies reported a positive correlation between environmental, social, and ethical values of consumers and their purchase behavior toward green products, specifically altruism, universalism, and benevolence were values that were found to positively affect the actual purchase of green products (Joshi & Rahman, 2015).

Literature about life values related to a green purchase decision is scarce. Based on these findings, H1 is proposed as follows:

H1: There will be a positive statistically significant correlation between life values and Green Purchase Decision.

Green Knowledge

Recent literature defines green knowledge as an individual's capacity to comprehend and assess the impact of ecosystems on society. This includes recognizing ecologically related symbols, concepts, and behaviors, leading to heightened awareness of environmental issues. Moreover, it cultivates positive attitudes towards green products (Amoako et al., 2020).

Additional studies have highlighted the significant influence of green knowledge on the intention to purchase green products (Yadav & Pathak, 2016). Similarly, research has explored the connection between Islamic values and green purchasing behavior. Islam strongly emphasizes environmental protection, indicating that individuals who adhere to religious principles may exhibit a more pronounced inclination to safeguard the

environment (Qureshi et al., 2022). However, there is a noteworthy gap in the literature concerning the correlation between personal life values and green knowledge.

Several investigations have analyzed the relationship between green knowledge and consumers' decisions to purchase eco-friendly products. Specific research has posited that knowledge can significantly impact consumer decision-making. Green product knowledge is a direct precursor to green purchases in this context. Nevertheless, empirical findings supporting this relationship have shown inconsistency. The results indicate that green trust and perceived consumer effectiveness partially mediate the link between green product knowledge and purchase behavior, with variables like price also exerting a significant influence (Wang & Bai, 2019).

The concept of bounded rationality suggests that individuals use heuristics mental shortcuts to simplify decision-making. These heuristics can lead to biased choices. In the context of green knowledge, consumers might rely on heuristics like familiarity with a brand or product, which could override their well-informed environmental knowledge (Sun, 2019).

In analyzing the realm of green purchase behavior and green knowledge, the Information-Motivation-Behavioral Skills (IMB) Model offers valuable insights. The IMB Model, initially conceived for understanding behavior change, comprises three key factors: information, motivation, and behavioral skills.

Within the IMB Model framework, information pertains to awareness and comprehension of relevant facts and knowledge. Green knowledge serves as foundational information in the context of green purchase behavior. This includes understanding the environmental consequences of products, the benefits of opting for eco-friendly alternatives, and the repercussions of neglecting to do so.

In the IMB Model context, motivation refers to the personal incentives and reasons driving a specific behavior. Green knowledge is integral in bolstering motivation, as it fosters an intrinsic drive within individuals. Their personal values and environmental concerns become the driving forces behind their actions. When people are cognizant of the consequences of their choices, they are more inclined to align their behavior with their environmental values.

Behavioral skills are an individual's capabilities and strategies for executing a particular behavior. A well-informed consumer can assess product information, labels, and claims more effectively, facilitating better choices aligned with their environmental objectives.

With green knowledge, consumers can compare the ecological impact of various products and exhibit their behavioral skills by selecting options with lower environmental footprints. Informed individuals can also advocate for sustainability and disseminate their knowledge, thereby amplifying the reach of their behavioral impact (Limbu, et al 2022). Similarly, the Elaboration Likelihood Model is a theory of persuasion that explains how people react to persuasive messages like advertisements and information. This model suggests two ways to persuade individuals: the central and peripheral routes.

When it comes to processing information, there are two types- central processing and peripheral processing. Central processing requires a high level of cognitive effort and involves analyzing information deeply. This processing occurs when individuals are motivated and capable of thinking deeply about the message. Persuasion via the central route relies on the strength and quality of the arguments presented in the message. On the other hand, peripheral processing requires less cognitive effort, and people rely on peripheral cues such as visuals, emotions, or the source's credibility to make judgments. This type of processing occurs when individuals are not motivated or able to engage deeply with the information. This model can explain how green knowledge influences consumer decision-making through central processing.

By engaging in central processing, consumers can accurately gauge eco-labels authenticity, assess a company's transparency regarding its sustainability practices, and determine the overall ecological impact of their purchase. Additionally, central processing allows consumers to resist counterarguments effectively. When consumers possess green knowledge, they are more resistant to persuasive tactics that promote unsustainable products while ignoring their detrimental effects on the environment (Esfahani, et al 2015).

Various research studies have identified environmental knowledge as a moderator that can influence the relationship between different variables. In a recent study conducted by Mahmoud et al. (2017), it was discovered that there exists a significant correlation between environmental knowledge and purchase intention. This implies that individuals who possess a greater understanding of the environment and its related issues are more likely to exhibit a greater willingness to purchase eco-friendly products. This finding could have significant implications for businesses looking to market and sell environmentally friendly products.

Based on these findings, H2 is proposed as follows:

H2: Green Knowledge mediates the relationship between life values, income and the consumers' green purchase decisions.

Packaging

Definitions for packaging in literature differ when examining them from different perspectives. For example, from a logistical perspective, packaging has several functions, including protecting the product, simplifying transportation, and optimal storage (White et al., 2016). Although other authors defend that a package is much more than a container for transporting a product safely, it has been studied and shown that it is a vital marketing tool (Simmonds & Spence, 2017).

Researchers have identified that packaging has different attribute types: imagery elements like graphics, color, shape, and size, as well as informative elements that contain information about the producer, country of origin, brand, or technology. The impact of these characteristics was investigated on purchase behavior (Silayoin & Speece, 2007).

Various factors, such as color, influence the consumer's perspective on product packaging. This aspect may be one of the most important sensory features of product packaging. Most brands use this element to transmit information about the product, for example, flavor, but it is also shown that the color helps to capture attention. Therefore, it will likely influence the consumer's purchase behavior (Spence, 2016).

The packaging design also has a role in the consumer's purchase decision. For example, a package that incorporates an image of the product transmits information about the brand and attracts consumers' attention and overall visual appeal.

According to the Cognitive Load Theory, people have a limited capacity for processing information. Any new information encountered, whether on a product's packaging or elsewhere, uses up a portion of this capacity. The theory divides cognitive load into Intrinsic, Extraneous, and Germane Load.

Intrinsic Load refers to the cognitive load inherent in the task. For example, complex technical information about a product may impose a high intrinsic cognitive load.

Extraneous Load describes the cognitive load imposed by how information is presented. If the packaging needs to be more organized and clear, it adds extraneous cognitive load.

Finally, the German load is the cognitive load useful for learning and understanding. It is the mental effort that individuals willingly invest in grasping and remembering information (Zimmerman & Shimoga, 2014).

Regarding packaging design, it is essential to reduce unnecessary cognitive load. The packaging should be presented clearly and straightforwardly, with essential information easily visible and understandable. This simplicity helps consumers process information and make better-informed decisions. Prioritizing information on the packaging ensures that critical details, such as product name, key benefits, and usage instructions, are prominently displayed (Watson et al., 2023).

Another well-known theory is Abraham Maslow's Hierarchy of Needs that categorizes human needs into five levels. Understanding how packaging design can influence consumers at different levels of this hierarchy can help create packaging that resonates with various consumer motivations.

The first level of the hierarchy is Physiological Needs. This includes basic needs like food, water, shelter, and clothing. Packaging can influence these needs by highlighting a product's nutritional value or health benefits.

The second level is Safety Needs. Once physiological needs are met, individuals seek safety and security. Packaging can address safety needs by assuring consumers of product quality, freshness, or tamper-proofing.

The third level is Belongingness and Love Needs. Individuals desire social connections, relationships, and a sense of belonging. Packaging can appeal to these needs by featuring images of families or friends enjoying the product together.

The fourth level is Esteem Needs. This includes the desire for self-esteem and the esteem of others. Packaging can target this level by associating the product with qualities that enhance consumers' self-esteem, such as luxury, prestige, or exclusivity.

Finally, the fifth and highest level of the hierarchy is Self-Actualization Needs. Here, individuals seek personal growth, self-fulfillment, and realizing their potential. Packaging can influence these needs by aligning the product with consumers' values, aspirations, or personal goals. For example, packaging for organic and eco-friendly products may appeal to consumers who value environmental sustainability and personal well-being (Anh, 2017).

This dissertation only focuses on the materials of the food packaged, whether it is considered a green package or not. Further, this concept will be presented.

Packaging can play an influential role in shaping the consumer's perception of a product and impact purchasing decisions. Some crucial psychological factors to consider in packaging design include (1) Attention-grabbing, the packaging should catch the consumer's eye and stand out on the shelf (Simmonds & Spence, 2017). (2) Brand

identity, packaging should reflect the brand's values and personality, forming a consistent visual identity (García-Arca., et al., 2014). (3) Emotional appeal, the packaging should arouse emotions relevant to the product, such as happiness, excitement, or trust (Simmonds, G., & Spence, C., 2017). (4) Simplicity and clarity, the packaging should be easy to understand and communicate the product's benefits and critical information (García-Arca., et al., 2014). Finally, (5) Uniqueness, packaging distinct and innovative can help a product stand out from the competition and attract attention, and may add value to the product (Raheem, A. R., et al., 2014).

Along the same lines of thought, Vroom's Consumer Expectancy Theory, which dates back to 1964, defends that individuals tend to evaluate the options and select the alternative that yields the most favorable results, minimizing discomfort and maximizing satisfaction. When it comes to consumers' buying choices, they establish expectations regarding products based on their classification or kind. Packaging design can leverage these expectations to build a sense of familiarity and reliability or disrupt them to capture attention (Talwar et al., 2021).

Furthermore, the Gestalt theory is a relevant literature that explains how humans perceive and organize visual elements into meaningful patterns and wholes. Among the several principles, three key ones are particularly relevant to packaging design. The principle of proximity suggests that objects placed closer tend to be perceived as a group or related to each other. In packaging design, related information or elements such as product features and images placed close to each other can help consumers perceive them as a coherent unit. The principle of similarity states that elements similar in shape, color, size, or other visual attributes are perceived as belonging. For packaging, consistent colors, fonts, and design elements throughout the package create a sense of unity and help consumers connect different parts of the packaging.

Moreover, closure is the tendency to perceive incomplete or fragmented visual elements as complete or whole. Packaging designers can use this principle to create visually engaging designs that pique consumers' curiosity. For instance, a package with a partially obscured image can encourage consumers to open it to see the whole picture (Todorovic, 2008).

By applying Gestalt Principles in packaging design, we can create visually pleasing designs that communicate the intended message to consumers (Tiwasing & Sahachaisaeree, 2012).

Overall, packaging design that considers these psychological factors that impact consumer behavior can lead to more effective marketing and increased sales.

Green packaging

During the past years, environmental concerns like global warming came into sharp focus for society. Since environmental pollution is known to be caused by worldwide industrial manufacturing, companies accepted to take responsibility (Amoako, et al., 2022). From the consumption perspective, energy use, household waste, and discarded products have the most significant adverse environmental impact (Priefer et al., 2016). Although the consumers are aware of these problems and are convinced to be environmentally concerned, the consumption pattern remains the same.

Green packaging is defined as eco-green, sustainable, or recyclable packaging. It uses ecological materials for packaging purposes while always protecting the logistic characteristics of packaging that products must be effective and safe for human health and the environment (Wandosell et al., 2021). Other researchers explain that a green product is manufactured using toxic-free ingredients and environmentally friendly procedures and is certified by a recognized organization (Kumar & Ghodeswar, 2015).

A product's green aspects are associated with its consumption, design, and development, meaning the manufacturing process and supply chain management must remain environment-friendly until the distribution (Khan & Mohsin, 2017). Researchers found that peer opinion is vital in influencing consumer decisions to go green. Other aspects that also have a meaningful, influential role are the price and quality of the product (Suki, 2016).

Research about the effectiveness of sustainable packaging is somehow contradictory. Whereas, for instance, some studies stated that environmental packaging attributes have no impact on the consumer's purchase decision, other researchers expressed that environmental packaging can have very well practical importance in the consumer's decision process (Jerzyk, 2016).

Consumers' motivations also play a significant role when making a purchase decision. These motivations can be classified into two categories - hedonic and utilitarian motivations. When hedonic motivations drive consumers, they seek emotional satisfaction, pleasure, or enjoyment from a product or its packaging. Packaging designs that use attractive colors incorporate beautiful graphics or evoke positive emotions can appeal to consumers' hedonic motivations. Such designs can also tell a story or convey emotions that resonate with consumers, creating memorable experiences that enhance

their hedonic satisfaction. On the other hand, utilitarian motivations are driven by practical needs and functionality. Utilitarian consumers often want clear and concise information about the product, and they value durable and easy-to-use packaging. Some utilitarian consumers prioritize environmentally friendly packaging because it aligns with their practical concern for the environment. Effective packaging design often balances hedonic and utilitarian motivations because many consumers consider both factors when purchasing (Wang, 2017).

Nevertheless, the few researchers that studied the field of environmental packaging stated that this topic needs more profound investigation.

Purchasing Decision Making

It is crucial to understand how consumers make decisions. Understanding that any person engaged in the consumption process is a consumer is essential.

Purchasing decision-making refers to the mental processes and emotional factors influencing an individual's buying of a product or service. Marketers must have access to data concerning consumers buying habits and which kinds of media they prefer, in order to develop effective communication programs. This can involve perception, what an individual thinks about a specific product, meaning, selecting, organizing, and interpreting information to produce a meaningful experience of the world called perception (Jisana, 2014). It also involves motivation, Maslow's Theory of Motivation explains why particular needs drive people at particular times. It suggests that five classes of needs are hierarchically organized. They are the physiological needs, safety needs, social needs, esteem needs, and self-actualization needs. A person tries to satisfy the most important need first. When that need is satisfied, it will stop being a motivator, and the person will try to satisfy the following important need (Mathes, 1981).

The concept of decision-making heuristics refers to the cognitive shortcuts or rules used by individuals to simplify the process of weighing the pros and cons of a given situation. Heuristics are mental strategies that help people make quick decisions without engaging in excessive mental effort. These mental shortcuts are an essential aspect of human decision-making. They are often employed when individuals have to make decisions quickly, with limited time and information available (Del Campo et al.,2016).
Anchoring is a common cognitive bias that affects decision-making by causing individuals to emphasize the first piece of information they encounter too much. This initial piece of information acts as an anchor that influences subsequent judgments, such

as the perceived value of a product based on its initial price. Additionally, the order in which product features or benefits are presented can also anchor consumer evaluation. Marketers often present the most important or unique feature to take advantage of this bias. Another heuristic that can influence consumer choices is scarcity. The perception of an item as rare or in limited supply can lead individuals to assign it a higher value. Marketers often use scarcity tactics to create a sense of urgency by suggesting that a product is in limited stock or available for a limited time. As a result, scarce items are often seen as more valuable (Nazlan et al., 2018).

Finally, attitudes, beliefs, past experiences, and personal values influence consumer decisions, marketers can change the beliefs and attitudes of customers by launching campaigns with this consideration.

Cultural, social, and personal factors, such as, age, the consumers occupation, the economic situation, also influence consumer purchases. For example, if the consumer has a higher income, he is willing to purchase more expensive products and psychological characteristics, considering their loss aversion tendencies, a concept derived from the prospect theory. Loss aversion suggests that individuals tend to strongly prefer avoiding losses over acquiring equivalent gains. Therefore, consumers with higher incomes may be more willing to invest in premium or higher-priced products if they perceive them as a way to avoid potential losses, such as lower quality or dissatisfaction with cheaper alternatives (Jisana, 2014), (Wang et al., 2021).

Green Purchasing Decision Making

For this research, Green Purchasing Decision Making are consumers considering the environmental consequences of their consumption patterns. These purchase decisions are represented in the forms of supporting green companies, purchasing green products, adopting sustainable consumption practices, and being likely to spend more on green products.

The present literature defends that two factors influence the purchase decisions of green consumers: intrinsic and extrinsic. The intrinsic factors to the consumers are the feeling of responsibility for the environment, the search to gain green knowledge, and their interest and willingness to have pro-environment behaviors. The extrinsic factors are the social image of consumers and product characteristics, such as product quality, safety, performance, and price (Kumar, & Ghodeswar, 2015).

Price is crucial in almost every article that studies consumer green purchase decisions. The high costs of green purchasing can affect consumers' ability and

enthusiasm to purchase green products. Researchers found that consumers usually prefer lower prices since they view green product buying as a selfish, rational decision. However, when consumers have sufficient resources and the ability to purchase green products, the value other consumers give to the price may decrease for these consumers (Sun & Wang, 2020).

Other elements that play an essential role in influencing consumers' green purchase decision is the environmental concern and eco-literacy. These are considered indicators of environmental involvement and are critical influencers of consumers' responses to green products (Wei & Jancenelle, V. E. 2018).

The concept of perceived risk also plays a crucial role in consumer behavior, as it refers to the level of uncertainty and potential adverse outcomes associated with a purchase decision. Consumers may face various perceived risks that can affect their approach to buying decisions and their assessment of alternative options. Financial risk relates to the possibility of monetary losses. In contrast, social risk pertains to a purchase decision's potential negative social consequences, such as fear of negative judgment or social exclusion. Performance risk arises from doubts about whether a product will meet the consumer's expectations, leading to disappointment after purchase. Finally, psychological risk is linked to the potential emotional or psychological discomfort a consumer may experience if a purchase does not meet their expectations.

Consumer involvement is another concept in consumer behavior that explains how a consumer's level of interest and personal relevance in a particular purchase decision can significantly impact their behavior.

Low-involvement decisions are generally made quickly and with minimal effort. These purchases are often inexpensive, frequently bought, and have low consequences if they go wrong. Low-involvement decisions tend to be more habitual and impulsive, and marketers often use eye-catching packaging, point-of-purchase displays, and price promotions to encourage quick and easy decision-making.

On the other hand, high-involvement decisions usually involve a substantial financial investment or significantly impact the consumer's life. Consumers actively seek information, compare alternatives, and consider product features, performance, brand reputation, and reviews before deciding. Marketers often provide detailed product information, emphasize brand quality and credibility, offer demonstrations, or test drives, and encourage consumer engagement to support informed decision-making (Sridhar, 2019), (Nekmahmud & Fekete-Farkas, 2020).

Given this information, this research will focus on the correlations of income between green knowledge and the consumers' green purchase decision.

Based on these findings, H3 is proposed as follows:

H3: There will be a positive statistically significant correlation between income, green knowledge and life values.

The present study: overview of aims and objectives

The study mainly aims to expand knowledge of consumers' purchasing decisions. Evidence suggests that consumers are becoming more conscious of the impact of their purchasing decisions on the environment (Wang & Bai, 2019; Sun & Wang, 2020; Zhang & Dong, 2020).

This research aims to understand how life values, income, and green knowledge can impact consumers' green purchasing decisions. More specifically, the general aim of this work is to understand how the relationships between these three variables (1) Life Values, (2) Income, and (3) Green Purchase Decision can be mediated by (4) Green Knowledge, potentially illuminating whether and how participants' perceptions of eco-friendliness play a pivotal role in shaping their actual purchasing decisions.

These frameworks will detect each variable's influence on distinct consumers. Knowing more about how consumption orientations are associated with purchasing decisions can help inform the development of targeted strategies, products, and campaign materials (Jisana, 2014).

Essentially, the problem statement for this research is summarized as follows:

How are the consumers' purchasing
decisions on green packaging products influenced by their life values,
income, and green knowledge?

This study focuses on adults (18+ years old). As consumers, adults' purchase behaviors have been changing throughout the years, with consumers prioritizing sustainability and wanting to further their green knowledge in their purchases (Amoako et al., 2020). A person's age is one of the essential personal factors influencing buying behavior. People buy different products at different stages, and their tastes and preference also change (Ramya, 2016).

The first objective is to increase knowledge of the determinants of the current purchasing decision behaviors. Specifically, we hypothesize that Life Values, Green Knowledge, and

Income variables are associated with the current consumers purchasing decision behavior.

The second objective is to increase knowledge of the discrepancies in individual factors influencing the consumers purchasing behavior, such as, consumers' life values.

These objectives guided the development of the following research questions:

RQ1: What is the impact of Green Knowledge in Life Values?

RQ2: How does the consumers' Green Knowledge influences the relationship between Income and Green Purchase Decision?

RQ3: What is the impact of Income in Life Values?

Methodology

Instruments

The questionnaire included 4 different sections, personal variables, such as age, gender, educational qualifications, current profession, nationality, place of residence and income; Green Purchase Decision (GPD) using a self-made questionnaire, Life Values (LV) using the english version of the Life Values Inventory and Green Knowledge (GK) using an adaptation of the Eurobarometer survey, however in this study only the Green Knowledge items were used.

The variables used in the model are detailed below.

Green Purchase Decision: this survey comprises a series of five questions, each of which entails assessing multiple factors. The survey also incorporates two visual aids, namely a depiction of eco-friendly packaging and another packaging that does not align with eco-friendliness. Every inquiry and image on display is complemented by a heading that denotes the merchandise and its corresponding cost (e.g., the first item: "Choose the item of your preference: "Water Bottle (plastic package) 1,75€" or "Water Bottle (Card package) 4,49€"; the second item: "Choose the item of your preference: "Butter (paper package) 2,34€" or "Butter (plastic package) 2,44€"; the third item: "Chocolate Milk (plastic package) 3,15€" or "Chocolate Milk (glass package) 6,18€"; the fourth item: "Cream Cheese (glass package) 2,34€" or "Cream Cheese (plastic package) 1,75€"; the fifth item: "Ketchup (plastic package) 3,75€" or "Ketchup (glass package) 4,29€").

Life Values: the Life Values Inventory (LVI) elucidates the decision-making processes involved in individuals' selection of their life roles and their ultimate level of satisfaction with those choices. This is accomplished by applying established theoretical frameworks, such as Brown's Holistic Values-Based Theory of Life Role Choice and

Satisfaction (Brown, 2002). From a variety of perspectives, it has been observed that individuals tend to establish a finite number of essential values that are organized into a cohesive system. This system significantly impacts decision-making, as it interacts with other variables across a range of life roles. The LVI consists of three parts. In this questionnaire, only part I was applied; this is quantitative and starts with a definition of values and an explanatory example of the task. The subject is asked to rate the 42 items or beliefs presented, based on a Likert scale, from 1 to 5 (1 - "almost never guides my behavior," 3 - "sometimes guides my, behavior," and 5 - "almost always guides my behavior"), identifying the extent to which the belief presented guides their behavior. It seeks to assess 14 relatively independent values: Achievement, Belongingness, Concern for the environment, Concern for others, Creativity, Economic prosperity, Health and physical activity, Humility, Independence, Loyalty to family or group, Privacy, Responsibility, Scientific understanding, and Spirituality (e.g., "Read each item carefully and select only one response. Usually, your first idea is the best indicator of how you feel. Answer every item. There are no right or wrong answers. Your choices should describe your values, not those of others: Protecting the environment") using a 5-point Likert-type scale (1 = Almost Never Guides My Behavior, to 5 = Almost Always Guides My Behavior, alfa de Cronbach = 0.85).

Green Knowledge: to assess the level of environmental knowledge possessed by the participants, two inquiries were selected from a modified iteration of the Eurobarometer instrument. (e.g., “Read each item carefully and select only one response. There are no right or wrong answers: In general how much do you know about the environmental impact of the products you buy and use?” and, “Do you agree that buying environmentally-friendly products can make a real difference to the environment?”) using a 4-point scale (1 = Strong level, to 4 = Weak level), the items were reverse-coded so that higher GK was always represented by higher values.

Data collection and data analysis procedures

The survey[1] was hosted online by Qualtrics.com, and participants were recruited via publications shared on social media (e.g., Instagram). The online survey was available for responses from March 14th to April 19th, 2023.

To determine the necessary sample size, a statistical program known as G*Power was utilized and found that a total of 82 participants were needed (appendix2).

[1] https://ucpcienciashumanas.eu.qualtrics.com/jfe/form/SV_6saBSbpjZw9rAtU

The survey participants were given a thorough explanation of the procedures prior to their involvement in the study. Additionally, they were provided with an explicit assurance that all collected data would remain confidential and utilized solely for the purposes of this investigation. Only after granting their consent did they proceed with participation.

The creation of the SPSS database was oriented towards the inclusion of specific variables, such as age, gender, educational qualifications, current profession, nationality, place of residence, income, green purchase decision (GPD), life values (LV), and green knowledge (GK). These variables have been identified as relevant and essential for the purpose of this project and have been included accordingly.

The statistical analyses were conducted in SPSS (version 28) after all the necessary corrections were made in the database.

A Pearson and Spearman correlation analysis was conducted on all factors included in the model. To examine the potential mediating effects of GK between Income, GPD, and LV, the PROCESS model 4 (Hayes, 2013) was utilized for Mediation Analysis.

Participants

The survey included a total of 376 respondents, with 156 identifying as feminine (41.5%), 187 as masculine (49.7%), and 1 as other (0.3%). The mean age of the group was 34.49 years, with a standard deviation of 13.085 and a range of 18 to 76 years old. The majority of the sample (270 individuals, or 71.8%) self-identified as Portuguese nationals, with an additional 14 other nationalities represented, including Mozambican (15 individuals, or 4%), Brazilian (5 individuals, or 1.3%), Indian (4 individuals, or 1.1%), Canadian (2 individuals, or 0.5%), French (2 individuals, or 0.5%), Italian (2 individuals, or 0.5%), Moroccan (1 individual, or 0.3%), German (1 individual, or 0.3%), Dutch (1 individual, or 0.3%), Ukrainian (1 individual, or 0.3%), Japanese (1 individual, or 0.3%), Angolan (1 individual, or 0.3%), and Cape Verdean (1 individual, or 0.3%). Among the participants, a significant percentage held advanced educational degrees, with a majority possessing either a Master's Degree (N=140, 37.2%) or a Bachelor's Degree

(N=101, 26.9%), High school (N=57, 15.2%), Technical/Professional course (N=28, 7.4%), PhD (N=7, 1.9%), and Elementary School (N=6, 1.6%). The group was comprised of individuals from diverse backgrounds, with 57 different occupations represented. Notable occupations included Teachers (N=8, 2.1%), Lawyers (N=17, 4.6%), and Economists (N=4, 1.1%), among other professions. Upon analyzing the data collected, it was discovered that a total of 86 respondents, which constitutes 22.9% of the participants, reported an income below 1000€. Additionally, 52 respondents (13.8%) stated an income range between 1000€ and 1300€, while 30 respondents (8%) had an income range between 1300€ and 1600€. Moreover, 26 respondents (6.9%) reported an income between 1600€ and 1900€ while 19 (5.1%) had an income range between 1900€ and 2200€. Furthermore, 26 respondents (6.9%) reported an income between 2200€ and 2500€, while 9 (2.4%) reported an income range between 2500€ and 2800€. Similarly, 7 (1.9%) respondents reported an income range between 2800€ and 3100€, while 7 (1.9%) respondents had an income range between 3100€ and 3400€. Likewise, 6 (1.6%) respondents had an income range between 3400€ and 3700€. Finally, 6 respondents (1.6%) reported an income range between 3700€ and 4000€. Furthermore, 37 individuals (9.8%) declared an income exceeding 4000€. In terms of the location of the respondents, it is noteworthy that a majority of them, constituting 49.5% or 186 individuals, were found to be residents of Lisbon. Conversely, 9.8% or 37 respondents were observed to be living outside of Portugal. These findings hold crucial relevance in understanding the demographic information of the surveyed group and can assist in making informed decisions.

Results: A correlational analysis

Table 1. Correlations between Green Knowledge and Life Values

a. Correlations						*p<.05 **p<.01 ***p<.001
Variables	1	2	3	4	5	6
1. GK	-					
2. CFE	.413**	-				
3. CFO	.233**	.557**	-			
4. HA	.057	.113	.079	-		
5. RES	.169**	.285**	.435**	.212**	-	
6. SFU	.146*	.289**	.143*	.351**	.306**	-

Pearson correlation analysis was performed in SPSS to examine the correlations between Green Knowledge and five Life Values variables: concern for the environment, concern for others, health and activity, responsibility, and scientific understanding.
The analysis produced the following correlation results:

There was a strong positive correlation between Green Knowledge and concern for the environment ($r = 0.413$, $p < 0.001$, $N = 251$). This indicates a high level of association, suggesting that individuals with higher levels of Green Knowledge tend to have stronger concerns for the environment.

A moderate positive correlation was found between Green Knowledge and concern for others ($r = 0.233$, $p < 0.001$, $N = 251$). This suggests a moderate level of association, indicating that individuals with greater Green Knowledge tend to exhibit higher levels of concern for the well-being of others.

Green Knowledge and health and activity did not exhibit a statistically significant correlation ($r = 0.057$, $p = 0.365$, $N = 251$).

There was a moderate positive correlation between Green Knowledge and responsibility ($r = 0.169$, $p = 0.007$, $N = 251$). This indicates a moderate level of association, suggesting that individuals with increased Green Knowledge tend to perceive a moderate level of responsibility toward environmental issues.

A moderate positive correlation was found between Green Knowledge and scientific understanding ($r = 0.146$, $p = 0.021$, $N = 251$). This suggests a moderate level of association, indicating that individuals with greater Green Knowledge tend to possess a moderate understanding of scientific concepts related to the environment.

Table 2. Correlation between Green Knowledge and Green Purchase Decision

b.	***Correlations***		*p<.05 **p<.01 ***p<.001
	Variables	1	2
1.	GK	-	.253**
2.	GPD	.253**	-

A statistically significant positive correlation was observed between Green Knowledge and Green Purchase Decision ($r = 0.253$, $p < 0.001$, $N = 250$). This indicates a moderate positive association, suggesting that individuals with higher levels of Green Knowledge are more likely to make green purchase decisions.

Table 3. Correlations between Green Purchase Decision and Life Values

c.	***Correlations***						*p<.05 **p<.01 ***p<.001
Variables		1	2	3	4	5	6
1.	GPD	-					
2.	CFE	.232**	-				
3.	CFO	.137*	.557**	-			
4.	HA	.058	.113	.079	-		
5.	RES	.051	.285**	.435**	.212**	-	
6.	SFU	.033	.289**	.143*	.351**	.166**	-

Finally, a statistically significant positive correlation was found between Green Purchase Decision and concern for the environment ($r = 0.232$, $p < 0.001$, $N = 251$). This

indicates a moderate positive association, suggesting that individuals who make more environmentally conscious purchase decisions tend to have higher levels of concern for the environment.

A statistically significant positive correlation existed between Green Purchase Decision and concern for others (r = 0.137, p = 0.029, N = 251). This indicates a low positive association, suggesting that individuals who make more green purchase decisions tend to exhibit slightly higher levels of concern for the well-being of others.

Green Purchase Decision and health and activity did not exhibit a statistically significant correlation (r = 0.058, p = 0.362, N = 251).

There was no statistically significant correlation between Green Purchase Decision and responsibility (r = 0.051, p = 0.424, N = 251).

Green Purchase Decision and scientific understanding also did not exhibit a statistically significant correlation (r = 0.033, p = 0.598, N = 251).

Table 4. Correlations between Income and Life Values

d. Correlations						*p<.05 **p<.01 ***p<.001
Variables	1	2	3	4	5	6
1. Income	-					
2. CFE	-.016	-				
3. CFO	-.068	.547**	-			
4. HA	-.053	.184**	.130*	-		
5. RES	-.024	.297**	.427**	.223**	-	
6. SFU	.143*	.098	.178**	.296**	.216**	-

Spearman correlation analysis was conducted in SPSS to explore the correlations between participants' income and their Life Values.

The analysis produced the following correlation results:

There was a negative correlation between participants' income and concern for the environment (r = -0.016, p = 0.795, N = 252). Suggesting that participants' income levels were not significantly related to their environmental concerns.

A negative correlation was found between income and concern for others (r = -0.068, p = 0.282, N = 252). This indicates a low negative association, suggesting that participants with higher incomes tended to exhibit slightly lower concern for the well-being of others.

Income and health and activity exhibited a negative correlation (r = -0.053, p = 0.403, N = 252). This suggests a low negative association, indicating that higher-income participants had slightly lower scores in the health and activity Life Value.

There was a negative correlation between income and responsibility (r = -0.024, p = 0.704, N = 252). This indicates an insignificant association, suggesting that participants' income levels were not significantly related to their sense of responsibility.

A positive correlation was observed between income and scientific understanding (r = 0.143, p = 0.023, N = 252). This indicates a low positive association, suggesting that participants with higher incomes tended to have slightly higher levels of scientific understanding.

Table 5. Correlation between Income and Green Purchase Decision

e.	***Correlations***		*p<.05 **p<.01 ***p<.001
	Variables	1	2
1.	Income	-	.126*
2.	GPD	.126*	-

A statistically significant positive correlation was observed between income and Green Purchase Decision (r = 0.126, p = 0.027, N = 305). This indicates a low positive association, suggesting that individuals with higher incomes tend to make more green purchase decisions.

Table 6. Correlation between Income and Green Knowledge

f.	***Correlations***		*p<.05 **p<.01 ***p<.001
	Variables	1	2
1.	Income	-	-.042
2.	GK	-.042	-

Lastly, no statistically significant correlation was observed between income and Green Knowledge (r = -0.042, p = 0.510, N = 251). Suggesting that participants' income levels were not significantly related to their levels of green knowledge.

Results: A mediation analysis

Table 7. Mediation results of Green Knowledge on the relationship between Income and Green Purchase Decision

Variable/Effect	*Coeff (B)*	*se*	*T*	*p*	95% Confidence Interval	
Direct Effect Income →GPD	0.0506	0.0202	2.5032	0.0130	0.0110	0.0902
Indirect Effect Income →GK→GPD	-0.0031	0.0061	_	_	-0.0161	0.0084
Total Effect Income →GPD	0.0475	0.0209	2.2737	0.0238	0.0064	0.0887
Proportion Mediated	(-0.0031) / (0.0506) = -0.0612	_	_	_	_	

Note: N = 250; Level of confidence for all intervals in output: 95.0000;
Number of bootstrap samples for percentile bootstrap confidence intervals: 5000.

The study aimed to investigate the mediation effect of Green Knowledge on the relationship between Income and Green Purchase Decision. Utilizing the PROCESS model 4 (Hayes, 2013), the analysis involved three key variables: Income as the independent variable (IV), Green Knowledge as the mediator variable (M), and Green Purchase Decision as the dependent variable (DV).

The results of the analysis are as follows:

The direct effect of Income on Green Purchase Decision was statistically significant (B = 0.0506, p = 0.0130). This suggests that as Income increases, there is a corresponding increase in the likelihood of making green purchase decisions, even when not considering the mediator variable.

Green Knowledge was found to significantly mediate the relationship between Income and Green Purchase Decision. The indirect effect (ab path) of Income on Green Purchase Decision through Green Knowledge was -0.0031, with a bootstrapped standard error (BootSE) of 0.0061. The 95% bootstrap confidence interval (BootLLCI to BootULCI) did not include zero, confirming the statistical significance of the indirect effect. This implies that a portion of the impact of Income on Green Purchase Decision operates through its influence on Green Knowledge.

However, the direct effect of Income on Green Knowledge was not statistically significant (B = -0.0153, p = 0.5677), indicating that variations in Income levels do not directly affect individuals' environmental knowledge.

In contrast, Green Knowledge had a significant positive effect on Green Purchase Decision (B = 0.2034, p < 0.001), demonstrating that individuals with higher levels of environmental knowledge are more likely to make green purchase decisions.

Green Knowledge accounts for approximately 6.12% (Proporcion Mediated = (-0.0031) / (0.0506)) of the total effect of Income on Green Purchase Decision. This indicates that Green Knowledge explains a small portion of the total relationship between Income and Green Purchase Decision.

Since both the direct and indirect effects are statistically significant, it indicates that Green Knowledge partially mediates the relationship between Income and Green Purchase Decision. In other words, while Income has a direct impact on Green Purchase Decision, a portion of this impact is channeled through its influence on Green Knowledge. This is characteristic of partial mediation, where both direct and indirect paths are significant.

Table 8. Mediation results of Green Knowledge the relationship between Concern for the Environment and Green Purchase Decision

Variable/Effect	*Coeff (B)*	*se*	*T*	*p*	95% Confidence Interval	
Direct Effect CFE →GPD	0.0874	0.0363	2.4088	0.0167	0.0159	0.1589
Indirect Effect CFE →GK→GPD	0.0418	0.0173	–	–	0.0094	0.0779
Total Effect CFE →GPD	0.1292	0.0335	3.8584	0.0001	0.0633	0.1952
Proportion Mediated	0.0418 / 0.0874 = 0.4782	–	–	–	–	

Note: N = 250; Level of confidence for all intervals in output: 95.0000;
Number of bootstrap samples for percentile bootstrap confidence intervals: 5000.

The results from subsequent mediation analysis using PROCESS model 4 (Hayes, 2013) tested the degree to which Green Knowledge mediated the effects of the participants life value, concern for the environment the analysis involved three key variables: Concern for the Environment as the independent variable (IV), Green Knowledge as the mediator variable (M), and Green Purchase Decision as the dependent variable (DV).

The results of the analysis are as follows:

The direct effect of Concern for the Environment on Green Purchase Decision was statistically significant (B = 0.0874, p = 0.0167). This indicates that an increase in Concern for the Environment is associated with a corresponding increase in Green Purchase Decision, even without considering the mediator variable.

Green Knowledge was found to significantly mediate the relationship between Concern for the Environment and Green Purchase Decision. The indirect effect (ab path) of Concern for the Environment on Green Purchase Decision through Green Knowledge was 0.0418, with a bootstrapped standard error (BootSE) of 0.0173. The 95% bootstrap confidence interval (BootLLCI to BootULCI) did not include zero, confirming the statistical significance of the indirect effect. This suggests that a portion of the effect of Concern for the Environment on Green Purchase Decision operates through its influence on Green Knowledge.

Green Knowledge accounts for approximately 47.81% (Proportion Mediated = 0.0418 / 0.0874) of the total effect of Concern for the Environment on Green Purchase Decision. This indicates that Green Knowledge explains a substantial portion of the total relationship between Concern for the Environment and Green Purchase Decision, suggesting a strong mediating effect.

Since both the direct and indirect effects are statistically significant, it indicates that Green Knowledge partially mediates the relationship between Concern for the Environment and Green Purchase Decision. In other words, while Concern for the Environment has a direct impact on Green Purchase Decision, a portion of this impact is channeled through its influence on Green Knowledge. This is characteristic of partial mediation, where both direct and indirect paths are significant.

Table 9. Mediation results of Green Knowledgeon the relationship between Concern for Others and Green Purchase Decision

Variable/Effect	*Coeff (B)*	*se*	*T*	*p*	95% Confidence Interval	
Direct Effect CFO →GPD	0.0549	0.0391	1.4069	0.1607	-0.0220	0.1319
Indirect Effect CFO →GK→GPD	0.0336	0.0145	_	_	0.0090	0.0653
Total Effect CFO →GPD	0.0886	0.0389	2.2763	0.0237	0.0119	0.1652
Proportion Mediated	0.0336 / 0.0549 = 0.6120	_	_	_	_	

Note: N = 250; Level of confidence for all intervals in output: 95.0000;
Number of bootstrap samples for percentile bootstrap confidence intervals: 5000.

The study aimed to investigate the mediation effect of Green Knowledge on the relationship between Concern for Others and Green Purchase Decision. Using PROCESS model 4 (Hayes, 2013), the analysis involved three key variables: Concern for Others as the independent variable (IV), Green Knowledge as the mediator variable (M), and Green Purchase Decision as the dependent variable (DV).

The results of the analysis are as follows:

The direct effect of Concern for Others on Green Purchase Decision was not statistically significant (B = 0.0549, p = 0.1607). This suggests that Concern for Others does not have a direct impact on Green Purchase Decision when not considering the mediator variable. However, Green Knowledge significantly mediates the relationship between Concern for Others and Green Purchase Decision. The coefficient for the indirect effect (ab path) of Concern for Others on Green Purchase Decision through Green Knowledge was 0.0336, with a bootstrapped standard error (BootSE) of 0.0145. The 95% bootstrap confidence interval (BootLLCI to BootULCI) did not include zero, confirming the statistical significance of the indirect effect. This implies that a portion of the effect of Concern for Others on Green Purchase Decision operates through its influence on Green Knowledge.

Green Knowledge accounts for approximately 61.20% (Proportion Mediated = 0.0336 / 0.0549) of the total effect of Concern for Others on Green Purchase Decision. This indicates that Green Knowledge explains a substantial portion of the total relationship between Concern for Others and Green Purchase Decision, suggesting a strong mediating effect.

Since the direct effect is not significant while the indirect effect is significant, it suggests that Concern for Others has an indirect impact on Green Purchase Decision through Green Knowledge. This is characteristic of partial mediation, where both direct and indirect paths are present, but the direct path is not statistically significant.

Table 10. Mediation results of Green Knowledgeon the relationship between Health and Activity and Green Purchase Decision

Variable/Effect	*Coeff (B)*	*se*	*T*	*p*	95% Confidence Interval	
Direct Effect HA →GPD	0.0198	0.0276	0.7179	0.4735	-0.0346	0.0742
Indirect Effect HA →GK→GPD	0.0065	0.0082	_	_	-0.0087	0.0242
Total Effect HA →GPD	0.0263	0.0284	0.9258	0.3554	-0.0297	0.0823
Proportion Mediated	0.0065 / 0.1970 = 0.0329	_	_	_	_	

Note: N = 250; Level of confidence for all intervals in output: 95.0000;
Number of bootstrap samples for percentile bootstrap confidence intervals: 5000.

The study aimed to investigate the mediation effect of Green Knowledge in the relationship between Health and Activity and Green Purchase Decision. Using PROCESS model 4 (Hayes, 2013), the analysis involved three key variables: Health and Activity as the independent variable (IV), Green Knowledge as the mediator variable (M), and Green Purchase Decision as the dependent variable (DV).

The results of the analysis are as follows:

The direct effect of Health and Activity on Green Purchase Decision was statistically significant (B = 0.0198, p = 0.4735). This indicates that there is no statistically significant direct impact of Health and Activity on Green Purchase Decision when not considering the mediator variable, Green Knowledge.

However, Green Knowledge does not significantly mediate the relationship between Health and Activity and Green Purchase Decision. The coefficient for the indirect effect

(ab path) of Health and Activity on Green Purchase Decision through Green Knowledge was 0.0065, with a bootstrapped standard error (BootSE) of 0.0082. The 95% bootstrap confidence interval (BootLLCI to BootULCI) included zero, indicating that the indirect effect was not statistically significant.

In this specific mediation analysis, Green Knowledge does not appear to significantly account for the variance in Green Purchase Decision, 3.3% of the total effect of Health and Activity on Green Purchase Decision (Proportion Mediated = 0.0065 / 0.1970) because the indirect effect of Health and Activity on Green Purchase Decision through Green Knowledge was not statistically significant. This implies that the influence of Health and Activity on Green Purchase Decision is not significantly explained by its impact on Green Knowledge.

Table 11. Mediation results of Green Knowledgeon the relationship between Responsibility and Green Purchase Decision

Variable/Effect	*Coeff (B)*	*se*	*T*	*p*	95% Confidence Interval	
Direct Effect RESP →GPD	0.0105	0.0429	0.2440	0.8074	-0.0740	0.0949
Indirect Effect RESP →GK→GPD	0.0291	0.0132	_	_	0.0061	0.0582
Total Effect RESP →GPD	0.0396	0.0435	0.2440	0.3638	-0.0461	0.1254

Note: N = 250; Level of confidence for all intervals in output: 95.0000;
Number of bootstrap samples for percentile bootstrap confidence intervals: 5000.

This study examined the mediation effect of Green Knowledge in the relationship between Responsibility and Green Purchase Decision. Using PROCESS model 4 (Hayes, 2013), the analysis involved Responsibility as the independent variable (IV), Green Knowledge as the mediator (M), and Green Purchase Decision as the dependent variable (DV).

The analysis produced the following results:

The direct effect of Responsibility on Green Purchase Decision was not statistically significant (B = 0.0105, p = 0.8074). This suggests that Responsibility does not have a direct impact on Green Purchase Decision when not considering the mediator variable. Since the total effect is not statistically significant, the proportion mediated cannot be calculated because mediation assumes a significant total effect.

However, Green Knowledge significantly mediated the relationship between Responsibility and Green Purchase Decision. The coefficient for the indirect effect (ab

path) of Responsibility on Green Purchase Decision through Green Knowledge was 0.0291, with a bootstrapped standard error (BootSE) of 0.0132. The 95% bootstrap confidence interval (BootLLCI to BootULCI) did not include zero, confirming the statistical significance of the indirect effect. This implies that a portion of the effect of Responsibility on Green Purchase Decision operates through its influence on Green Knowledge.

Regarding mediation, these results indicate that Green Knowledge serves as a partial mediator in the relationship between Responsibility and Green Purchase Decision. While Responsibility does not have a direct influence on Green Purchase Decision, a significant portion of this effect is mediated by Green Knowledge.

Table 12. Mediation results of Green Knowledgeon the relationship between Scientific Understanding and Green Purchase Decision

Variable/Effect	*Coeff (B)*	*se*	*T*	*p*	95% Confidence Interval	
Direct Effect SU →GPD	-0.0008	0.0280	-0.0288	0.9771	-0.0559	0.0543
Indirect Effect SU →GK→GPD	0.0167	0.0089	_	_	0.0015	0.0356
Total Effect SU →GPD	0.0159	0.0280	0.5573	0.5779	-0.0403	0.0721

Note: N = 250; Level of confidence for all intervals in output: 95.0000;
Number of bootstrap samples for percentile bootstrap confidence intervals: 5000.

This study aimed to investigate the mediation effect of Green Knowledge in the relationship between Scientific Understanding and Green Purchase Decision. Mediation analysis was conducted using PROCESS model 4 (Hayes, 2013), with Scientific Understanding as the independent variable (IV), Green Knowledge as the mediator (M), and Green Purchase Decision as the dependent variable (DV).

The results of the analysis are as follows:

The analysis found that the direct effect of Scientific Understanding on Green Purchase Decision was not statistically significant (B = -0.0008, p = 0.9771). This suggests that Scientific Understanding does not have a direct impact on Green Purchase Decision when not considering the mediator variable. Since the total effect is not statistically significant, the proportion mediated cannot be calculated because mediation assumes a significant total effect.

Green Knowledge significantly mediates the relationship between Scientific Understanding and Green Purchase Decision. The coefficient for the indirect effect (ab

path) of Scientific Understanding on Green Purchase Decision through Green Knowledge was 0.0167, with a bootstrapped standard error (BootSE) of 0.0089. The 95% bootstrap confidence interval (BootLLCI to BootULCI) did not include zero, confirming the statistical significance of the indirect effect. This implies that a portion of the effect of Scientific Understanding on Green Purchase Decision operates through its influence on Green Knowledge.

These results indicate that Green Knowledge serves as a partial mediator in the relationship between Scientific Understanding and Green Purchase Decision. While Scientific Understanding does not directly influence Green Purchase Decision, a significant portion of this effect is mediated by Green Knowledge.

Discussion

The objective of this research endeavors to enhance the current literature pertaining to the effects of Life Values, Green Knowledge, and Income on Consumer Buying Behavior. The study aims to furnish valuable insights to organizations on how to effectively promote these aspects. The research methodology includes descriptive and correlation analyses of the four variables, as well as mediation. Ultimately, the findings of this study will advance comprehension regarding the factors that impact consumer behavior.

Analysis from Hypothesis 1 provided evidence of the relation between life values and consumers' green purchase decisions. The identified positive correlation between green purchase decisions and concern for the environment illuminates the nexus between environmental consciousness and sustainable purchasing behaviors. This correspondence bolsters the concept that individuals prioritizing environmental values within their belief systems are naturally inclined to make purchasing decisions that harmonize with their ecological ideals (Wang, 2017).

The empirical validation of the hypothesis finds solid footing in the existing body of literature. Numerous studies have delved into the interplay between psychological factors and consumer preferences, highlighting these variables' profound impact in steering individuals toward sustainable choices. By acknowledging this influence, we gain insight into the underlying mechanisms that drive individuals to embrace sustainable products and behaviors (Zhang & Dong, 2020).

Similarly, the positive correlation between green purchase decisions and concern for others accentuates the interconnectedness between environmental and social values.

Individuals prioritizing the well-being of others and the broader community are predisposed to adopt green purchasing behaviors. This symbiotic relationship underscores the recognition that sustainable consumption practices can significantly address environmental and social challenges.

In the current landscape, consumers display a remarkable propensity for directing their scrutiny toward green products, a phenomenon seamlessly aligned with the very tenets of the hypothesis, which posits a positive correlation between consumer preference for eco-friendly items and a conscious effort to mitigate potential health issues arising from environmental degradation (Schösler, et al 2014).

The observed prioritization of green products underscores a profound shift in consumer sensibilities, where a deliberate choice is made to embrace goods that adhere to sustainable principles and serve as proactive fortifications against potential health adversities linked to ecological imbalances (Nekmahmud & Fekete-Farkas, 2020).

Nonetheless, the correlations between green purchase decisions and other value dimensions, namely health and activity, responsibility, and scientific understanding, did not yield statistically significant outcomes. This indicates that while some degree of association might exist, the strength of these relationships is comparatively weaker in the context of this study.

It is noteworthy that the instruments employed to gauge these life values, such as "health and activity," which focused on activities like being physically active, and the distinct dimensions of "responsibility" and "scientific understanding" were not explicitly designed with the intention of measuring their direct connection to green purchasing behavior. Instead, these instruments were meticulously crafted to assess the specific domains of these values, devoid of an inherent association with eco-conscious consumption choices.

The absence of statistically significant results concerning these dimensions implies that while some semblance of a relationship may exist, the vigor of these connections remains notably subdued within the framework of this study. This outcome resonates with the notion that the intricate associations between consumers' values and their decisions to engage in green purchases can be complex and multifaceted, influenced by many factors beyond the values themselves.

In essence, the lack of statistical significance regarding the dimensions of health and activity, responsibility, and scientific understanding underscores that the instruments employed were primarily oriented towards gauging these values in their original context

rather than directly aligning with the act of green purchasing. This serves as a reminder of the intricacies involved in unraveling the diverse relationships between values and consumer behavior and the need for more targeted investigations to comprehensively elucidate these intricate dynamics.

The analysis from Hypothesis 2 further, accentuate the salient role of Green Knowledge by unveiling its substantive mediating effect within the relationship between income and green purchase decisions. This mediating role serves as a poignant manifestation of the potential of environmental education to bridge the gap tied to income and bolster sustainable consumption behaviors. Remarkably aligned with the positive hypothesis that Green Knowledge mediates the relationship between life values, income, and consumers' green purchase decisions, the study's analysis also illuminated a statistically significant direct effect of income on green purchase decisions. This underscores the autonomous influence of income in shaping individuals' predilections towards sustainable purchases. This direct influence substantiates the notion that income can drive green purchase decisions, irrespective of the extent of Green Knowledge individuals possess. In essence, individuals with higher incomes have the financial means and resources to opt for environmentally responsible products, thereby making eco-conscious choices more accessible to them.

This pivotal interplay between income, Green Knowledge, and green purchase decisions further highlights the intermediary facet. This is encapsulated in the indirect effect, which delineates the mediated impact of income on green purchase decisions via the conduit of Green Knowledge. This underscored phenomenon indicates that income's influence on green purchase decisions is not solely direct but also operates through its effect on individuals' comprehension of environmental matters (Wang et al., 2021). This interplay underscores the potent role of knowledge in shaping individuals' consumptive behaviors. These discernible findings engender a multitude of implications that reverberate in the realms of sustainable consumerism and environmental education. The mediating effect of Green Knowledge accentuates the indispensable role that environmental education plays in guiding individuals' decisions regarding green purchases. Elevating the emphasis on environmental education and enhancing individuals' grasp of sustainability-related topics can equip them with the tools to make enlightened and ecologically conscientious choices (Yadav & Pathak, 2016).

Numerous studies have underscored the role of Green Knowledge in shaping individuals' attitudes and behaviors toward environmental concerns. These studies

collectively highlight a strong and positive correlation between individuals possessing a higher environmental knowledge and their propensity to hold more positive attitudes toward environmental issues. For instance, research conducted by Pihui Liu, Minmin Teng, and Chuanfeng Han has consistently shown that heightened environmental knowledge increases favorability towards environmental matters (Liu, Teng, & Han, 2020). This underscores the intrinsic connection between knowledge acquisition and attitude development in environmental awareness. This study's analysis, which explores the mediating effect of Green Knowledge between income and green purchase decisions, aligns with these observations. The mediation underscores the significance of knowledge as a bridge that can mitigate the influence of income disparities and promote sustainable consumer behaviors. The analysis results also reveal that the initial hypothesis was not fully supported. Specifically, Green Knowledge did not significantly mediate the relationship between Health and Activity and Green Purchase Decision.

One possible explanation for this finding is that there may not be a meaningful connection between an individual's Health and Activity and their level of Green Knowledge in the group of participants studied. Additionally, it is worth considering the measurement tools used in the study to assess Health and Activity, Green Knowledge, and Green Purchase Decision. If these measurement tools did not accurately capture the subtleties of these concepts, it could result in non-significant findings.

Furthermore, the characteristics of the participants in the study may have had an impact on the results.

Analysis from Hypothesis 3 identified correlations among Green Knowledge, life values, and income that shed light on the intricate interplay between environmental consciousness, values, socioeconomic factors, and sustainable consumption. The positive correlation found between Green Knowledge and concern for the environment underscores a significant link between knowledge levels and environmental values. This finding resonates with previous research emphasizing the connection between comprehension of environmental matters and pro-environmental attitudes and behaviors (Qureshi et al., 2022). It becomes evident that individuals with a deeper understanding of environmental subjects tend to prioritize ecological issues, translating to an increased likelihood of engaging in behaviors that contribute to environmental preservation.

Furthermore, the positive correlation between Green Knowledge and concern for others offers a compelling insight into the nexus between environmental awareness and social empathy. This insight suggests that individuals with a more comprehensive grasp of

environmental issues are inclined to consider the well-being of fellow human beings. Such alignment underscores the intrinsic interdependence between environmental sustainability and social responsibility. Hence, individuals with heightened Green Knowledge might be more likely to engage in pro-social actions that positively impact the environment and society (Jisana, 2014).

The study also reveals noteworthy associations between income and values. The unexpected negative correlation between income and concern for the environment challenges conventional assumptions, implying that individuals with higher incomes may exhibit lower levels of environmental concern. This finding raises intriguing questions about the complex influence of financial status on ecological awareness and behavior, suggesting potential trade-offs between lifestyle choices and environmental conservation. In this context, the outcomes could be shaped by the cultural context inherent to the participants. The majority of the sample comprises individuals from Portuguese and Mozambican backgrounds. Notably, the Portuguese demographic has been ascertained to possess comparatively lower levels of ecological awareness in contrast to other nationalities. This scarcity of cognizance concerning ecological domains may contribute substantively to the observed inverse correlation between income and concern for the environment.

Moreover, the cultural milieu of Mozambique, combined with its economic status, might accentuate this observed pattern. Given the nation's restricted fiscal resources, individuals have a proclivity to prioritize immediate economic exigencies over more prolonged ecological contemplations. This resonates with the empirical finding that individuals with augmented incomes tend to exhibit diminished levels of concern toward the environment. Similarly, the study's identification of negative correlations between income and concern for others, health and activity, and responsibility highlights potential trade-offs between higher income and the emphasis on interpersonal relationships, personal well-being, and individual accountability. This dynamic underscores the intricate interplay between economic factors and value systems. Another potential explanation is bounded rationality, a behavioral economics and cognitive psychology concept. It suggests that while humans aim to make rational decisions, they are limited by their cognitive capacity and the complexity of the decisions they face. In the context of green knowledge and behavior, individuals may have a limited capacity to process and integrate all the information they possess. This can lead to discrepancies between their knowledge and their actual

behaviors. They may prioritize other factors like convenience or price due to cognitive limitations (Sun, 2019).

These results can also be explained within this cultural and economic context. The emphasis on interpersonal relationships and personal well-being might be more prominent in societies where financial resources are limited. In such contexts, individuals might value social connections and their health more than those with higher disposable incomes, who may focus more on material pursuits. This cultural difference in value systems could contribute to the observed negative correlations.

On the other hand, the positive correlation between income and scientific understanding suggests that higher-income individuals may possess greater scientific knowledge or appreciation. This insight aligns with the notion that higher socioeconomic status increases access to educational resources, fostering scientific literacy and a deeper comprehension of environmental processes.

A recent body of research examining perceptions and behaviors related to COVID-19 has revealed that individuals possessing more precise information about the virus tend to be correlated with specific sociodemographic attributes. These attributes include advanced age, higher educational attainment, employment status, and an elevated monthly familial income (Ferdous et al., 2020).

According to research, consumer behavior is influenced by various factors, including cultural, social, personal, and psychological variables. One significant personal characteristic that impacts buying behavior is the individual's economic situation. Specifically, high levels of income and savings tend to result in the purchase of more expensive products. In contrast, lower levels of income and savings tend to lead to purchasing less expensive products. These findings suggest that a consumer's financial circumstances are a critical consideration for businesses looking to understand and target their customer base (Jisana, 2014).

However, it is essential to note that this hypothesis could only be partially supported due to several negative correlations, particularly the negative correlation between green knowledge and income. Individuals with lower incomes have limited access to formal education and may not have had the opportunity to acquire in-depth knowledge about environmental issues. In contrast, higher-income individuals may have had greater access to educational resources, which could explain their higher levels of green knowledge. Furthermore, higher-income individuals may prioritize other aspects of their lives, such as career advancement or material pursuits, over environmental concerns (Jisana, 2014).

As mentioned in the text, the study sample consisted of individuals from Portuguese and Mozambican backgrounds. Cultural and economic factors specific to these regions may contribute to the observed negative correlation. For example, if the cultural emphasis in these regions is less on environmental awareness, individuals with higher incomes may not prioritize green knowledge.

Additionally, individuals' perceptions of their own green knowledge may differ based on their income levels, potentially influencing the correlation.

In conclusion, the interplay between Green Knowledge, life values, and income reveals intricate relationships between environmental consciousness and sustainable consumption. The correlations highlight the complex interdependencies between knowledge, values, socioeconomic factors, and behavior.

Limitations and Future Recommendations

The study's findings, while insightful, come with certain limitations that warrant recognition pertaining to the nature of the data, the survey, and the temporal scope.

Nature of the data. The sample composition, dominated by individuals from Portuguese and Mozambican backgrounds, might restrict the applicability of results to a broader demographic. This demographic bias could potentially obscure the nuanced cultural and economic variations present in other societies.

Another important limitation pertains to the influence of culture on the observed correlations between income, life values, green knowledge, and green purchase decisions. The study's scope might not fully encompass the distinct ecological sensitivities and environmental priorities in different cultural contexts, potentially confining the results to the specific cultures under investigation.

The present study relied exclusively on quantitative data for analysis purposes. However, future studies may benefit from incorporating mixed-methods or qualitative research methodologies to further explore the complex interplay between the variables under investigation. Such an approach could yield a more nuanced understanding of the subject matter and provide valuable insights for practitioners and scholars alike. Qualitative research methods can uncover the underlying motivations, cultural influences, and decision-making processes shaping participants' responses.

The survey. The measurement tools employed to assess life values were primarily designed to gauge these values within their original domains and do not incorporate environmental values inherent to the person. This might have led to underestimating the

direct associations between these values and green purchasing behavior, as the tools were not explicitly designed to measure this specific connection.

Another factor that should be considered is that the green purchase decision instrument used in the survey was self-made. While this instrument was developed with the intention of capturing specific aspects of green purchasing behavior, its effectiveness, and validity needed to be rigorously tested or validated against established measures. This can introduce a potential source of measurement bias or error in the study.

In addition, it would have been beneficial to utilize a more comprehensive measurement scale to gauge the participants' level of green knowledge. Such a scale could encompass a broader range of topics and intricacies related to environmental awareness, providing a more thorough assessment of participants' understanding of environmentally sustainable practices. This expanded approach to measuring green knowledge would offer a more nuanced and complete perspective on participants' familiarity with ecological concepts and their potential implications for consumer behavior.

Temporal scope. The study's data was collected only a single time point. The cross-sectional design presents a limitation in establishing causal relationships between variables. To gain deeper insights into the dynamics among life values, green knowledge, income, and green purchase decisions over time, adopting longitudinal research designs would be imperative to infer causality.

Moving forward, specific recommendations can serve as guiding principles for shaping future research endeavors. It is imperative that these recommendations not only address the limitations previously discussed but also take into account the novel insights derived from the data.

Firstly, although this research aimed to have a global sample, considering that it did not happen, broadening the study's horizon to encompass diverse cultural contexts beyond the confines of Portuguese and Mozambican backgrounds could significantly enrich our understanding. By doing so, the research can offer a more comprehensive and globally relevant perspective, shedding light on the intricate interplay between life values, income, green knowledge, and green purchase decisions across a broad spectrum of societies.

Furthermore, embarking on comparative studies across countries characterized by varying income levels and cultural nuances could generate valuable insights for businesses seeking to understand and cater to the needs and preferences of their target demographics. This cross-country exploration holds the promise of unraveling shared

patterns, divergences, and the cultural subtleties that intricately influence consumer behavior.

A longitudinal research design is recommended to further comprehend the dynamics at play. Such an approach can unveil the evolving relationships between life values, income, and green knowledge.

Moreover, a dual-level examination of micro and macro factors is encouraged to increase the depth of analysis. Integrating insights from individual consumer behavior with macro-level influences, such as policy frameworks, economic trends, and global sustainability initiatives, would offer a more holistic understanding of the intricate relationships studied.

Also, future studies could consider introducing the "Perceived Product Eco-friendliness" variable into the research framework, offering a reinvigorated perspective distinct from the variables already under investigation. They can provide deeper insights into how consumers' perceptions of product sustainability interact with their life values, income, green knowledge, and purchase decisions.

This variable investigates how participants evaluate and interpret product attributes regarding environmental impact. Understanding how these evaluations align with or deviate from participants' intrinsic life values, level of green knowledge, and socioeconomic status can offer a comprehensive overview of the underlying mechanisms that guide sustainable consumer behavior. It can also reveal how these perceptual evaluations might mediate or moderate the relationships between the studied variables, potentially illuminating whether and how participants' perceptions of eco-friendliness play a pivotal role in shaping their purchasing decisions.

Lastly, applying advanced statistical techniques, such as structural equation modeling, can discover interactions and mediation effects within the studied variables. These sophisticated techniques can illuminate complex relationships, providing a deeper understanding of the interconnected influences on consumer behavior.

Conclusion

The present research objective was to empirically develop and evaluate an integrative model that clarifies the connection between Green Purchase Decision, Income, and Life Values with Green Knowledge. Our investigation revealed a direct and positive correlation between consumers' green purchase decisions and their life values (H1). Additionally, we assessed the role of Green Knowledge as a mediator (H2) in the relationship between Income, Life Values, and Green Purchase Decision, and our findings

demonstrated a significant linkage. Moreover, we ascertained that Green Knowledge was positively associated with both Life Values and Green Purchase Decision, but there was no discernible correlation between Green Knowledge and Income (H3).

Notwithstanding the confirmation of our hypothesis, it would be premature to assert that these findings hold across all populations, given that the sample was largely composed of individuals from Portugal and Mozambique.

Nevertheless, despite these constraints, the data collected still provided an understanding of the variables. The data indicated that Green Purchase Decision positively correlates with Green Knowledge, an essential factor in the consumer's decision process. It highlights the potential for market-driven sustainability as consumers' demand for environmentally friendly products and services increases as they become more knowledgeable about environmental issues. This, in turn, can incentivize businesses to adopt more sustainable practices and offer a more comprehensive range of green alternatives, thus fostering a favorable supply and demand cycle for sustainable goods.

Encountering with the literature, the positive correlations between green purchase decisions and various environmental life values provide valuable insights into the factors influencing sustainable consumer behavior. Individuals who prioritize environmental concerns and demonstrate concern for others are more likely to translate those values into their purchasing decisions, actively seeking environmentally friendly products or services.

These findings have important implications for both businesses and policymakers. Businesses can tailor their marketing strategies and product offerings to align with the values of environmentally conscious consumers, catering to their demand for sustainable products. Policymakers can design initiatives and campaigns that raise awareness about consumption's environmental and social impacts, fostering a broader shift toward more sustainable consumer behavior. The study findings suggest that higher levels of green knowledge are correlated with higher levels of environmental life values (concern for the environment, concern for others, health and activity, responsibility, and scientific understanding) and green purchase decisions, bringing helpful knowledge in understanding what the key aspects play a role in influencing the individual's environmental decisions.

The mediating effect of Green Knowledge emphasizes the significance of environmental awareness in encouraging eco-friendly purchases. By enhancing individuals' understanding of sustainability-related matters through environmental education, they

can make more informed and responsible choices. Acknowledging this role can inform the development of targeted interventions to improve environmental knowledge across varying income levels. While the study did reveal some unfavorable connections between income and green knowledge, it nonetheless underscores the vital influence that income has on promoting sustainable consumption habits. Financial means are a crucial factor in fostering eco-conscious choices, and it is imperative to address any gaps in knowledge or income-related barriers that may hinder an all-encompassing shift toward sustainable consumer behavior.

According to this study, the proposed model appears to have a high level of accuracy. Nonetheless, more research is required to assess the impact of income. An optimal method would be to establish both an experimental and control groups with differing income levels. Additionally, it would be advantageous to incorporate cultures that prioritize humanistic and environmental aspects, which exhibit a broader range of income levels and are more environmentally aware. This would represent an improvement from the primary cultures evaluated, which possess limited financial resources and low levels of environmental consciousness.

This research contributes valuable insights to the evolving discourse on sustainable consumer behavior. The connections unearthed between Green Purchase Decision, Income, Life Values, and Green Knowledge offer a multifaceted lens through which to understand and promote environmentally conscious choices. As we strive for a more sustainable future, these findings encourage us to harness the power of values, knowledge, and strategic interventions in shaping a greener, more responsible consumption landscape.

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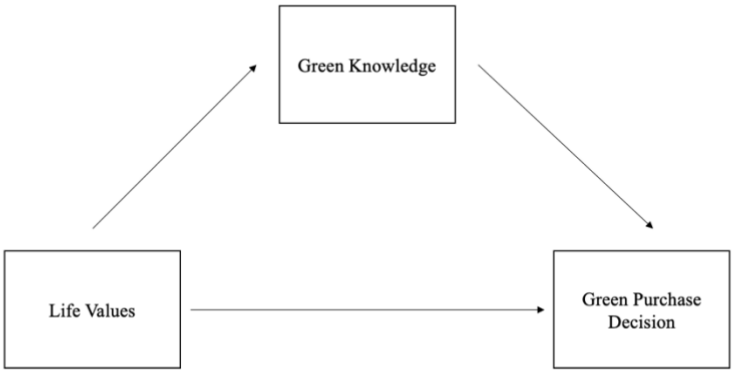
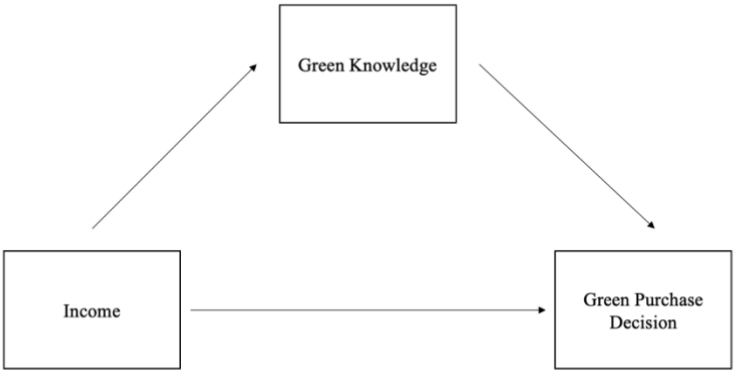
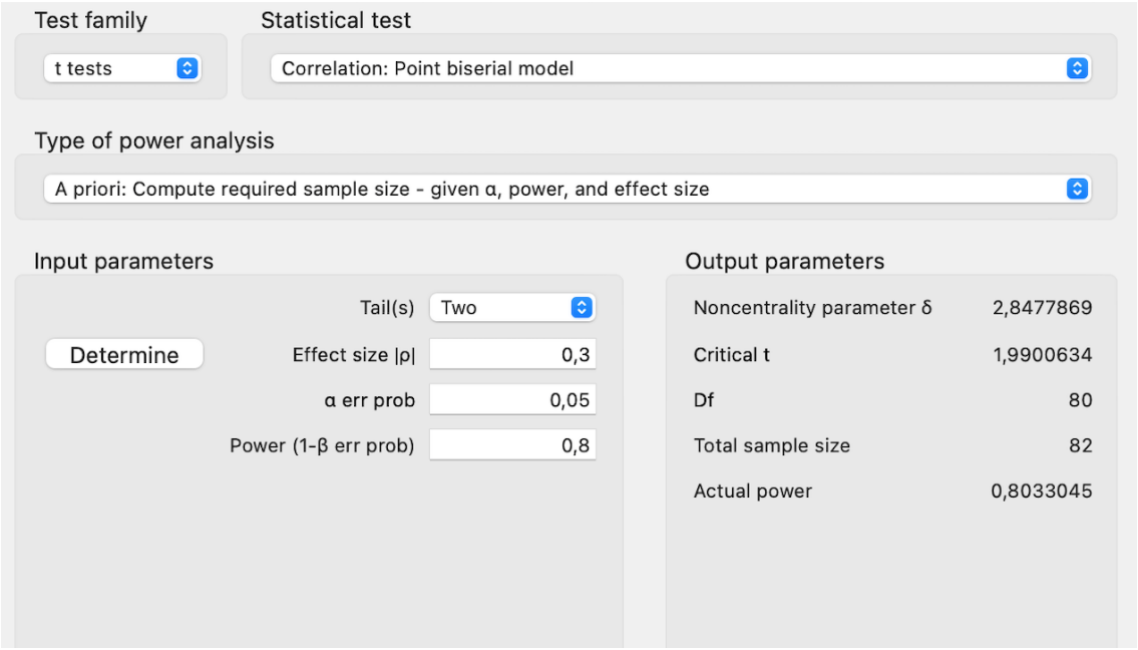
Appendix

Appendix *1.* Conceptual Framework





Appendix 2. *G*Power*



Appendix 3. Table Demographics

Characteristics	Category	Values
Gender	Feminine	156 (41.5%)
	Masculine	187 (49.7%)
	Other	1 (0.3%)
Age	18 - 76	*M* = 34.49; *SD* = 13.085
Nationality	Portuguese	270 (71.8%)
	Mozambican	15 (4%)
	Brazilian	5 (1.3%)
	Indian	4 (1.1%)
	Canadian	2 (0.5%)
	French	2 (0.5%)
	Italian	2 (0.5%)
	Moroccan	1 (0.3%)
	German	1 (0.3%)
	Dutch	1 (0.3%)
	Ukrainian	1 (0.3%)
	Japanese	1 (0.3%)
	Angolan	1 (0.3%)
	Cape Verdean	1 (0.3%)
Education Level	Elementary School	6 (1.6%)
	High school	57 (15.2%)
	Technical/Professional course	28 (7.4%)
	Bachelor's Degree	101 (26.9%)
	Master's Degree	140 (37.2%)
	PhD	7 (1.9%)
Residence	Aveiro	2 (0.5%)
	Braga	5 (1.3%)
	Castelo Branco	1 (0.3%)
	Coimbra	4 (1.1%)
	Faro	5 (1.3%)
	Leiria	11 (2.9%)
	Lisbon	186 (49.5%)
	Portalegre	1 (0.3%)
	Porto	12 (3.2%)
	Santarém	3 (0.8%)
	Setúbal	34 (9%)
	Vila Real	1 (0.3%)
	Viseu	3 (0.8%)
	Madeira	7 (1.9%)
	Azores	4 (1.1%)
	Outside of Portugal	37 (9.8%)
Income	Less than 1000€	86 (22.9%)
	Between 1000€ and 1300€	52 (13.8%)
	Between 1300€ and 1600€	30 (8%)

	Between 1600€ and 1900€	26 (6.9%)
	Between 1900€ and 2200€	19 (5.1%)
	Between 2200€ and 2500€	26 (6.9%)
	Between 2500€ and 2800€	9 (2.4%)
	Between 2800€ and 3100€	7 (1.9%)
	Between 3100€ and 3400€	7 (1.9%)
	Between 3400€ and 3700€	6 (1.6%)
	Between 3700€ and 4000€	6 (1.6%)
	More than 4000€	37 (9,8%)