

**MASTER**  
ECONOMIC OF BUSINESS AND STRATEGY

# **A Study of Millennials and Generation Z in the Online Second Hand-Market**

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## A Study of Millennials and Generation Z in the Online Second Hand-Market

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Dissertation

Master in Economics of Business and Strategy

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Supervised by  
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## Resumo

O crescimento acelerado do mercado de segunda mão online reflete mudanças no comportamento do consumidor, impulsionadas tanto por pressões econômicas quanto pela crescente conscientização ambiental. Plataformas como Vinted, Depop e eBay tornaram-se centrais nesse processo, especialmente entre as gerações mais jovens. Embora Millennials e a Geração Z sejam frequentemente retratados como grupos consumidores atentos à sustentabilidade com a Geração Z amplamente associada a valores ecológicos, há escassez de evidências empíricas que examinem, de facto, os fatores que influenciam comportamentos ambientalmente conscientes nesse contexto digital.

O presente estudo procura analisar em que medida a identidade geracional constitui um determinante relevante da consciência ambiental, bem como avaliar se fatores individuais e percetivos oferecem uma capacidade explicativa superior. Para esse efeito, foi adotada uma abordagem quantitativa, recorrendo à estimação de modelos de regressão linear múltipla. A análise empírica baseou-se em 59 respostas obtidas através de um questionário online, das quais 54 foram consideradas válidas após o processo de tratamento e validação dos dados. Para a estimação dos modelos de regressão, foram utilizadas 41 observações completas, resultantes da aplicação do método de eliminação por omissão (listwise deletion) aos casos com valores em falta. A amostra é composta por utilizadores de plataformas digitais de comércio de artigos em segunda mão, sendo consideradas como variáveis explicativas a geração, a idade, o género, o nível de escolaridade, os valores associados ao consumo ético, o comportamento de poupança, a frequência de compra de artigos em segunda mão, o interesse por produtos vintage e a perceção da transparência ambiental das plataformas.

Contrariando suposições amplamente difundidas, os resultados indicam que nem geração, idade, género ou valores declarados de consumo ético foram preditores significativos da consciência ambiental. Em vez disso, três fatores se destacaram como estatisticamente relevantes: 1- o interesse por moda e estética vintage, 2- a perceção de que as plataformas comunicam com clareza seu impacto ambiental e 3- níveis mais altos de escolaridade, especialmente ensino superior.

Os resultados sugerem que o comportamento sustentável está menos relacionado à identidade demográfica e mais vinculado a valores pessoais, exposição à informação e engajamento cognitivo. O estudo contribui para a literatura sobre sustentabilidade e comportamento do consumidor ao desafiar estereótipos geracionais e destacar o papel da motivação estética, do design comunicacional das plataformas e da educação formal. Implicações práticas para desenvolvedores de plataformas, profissionais de marketing e educadores são discutidas, bem como limitações do estudo e caminhos para pesquisas futuras.

**Palavras-chave:** Millennials; Geração Z; Mercado de segunda mão; Consciência ambiental; Interesse vintage; Sustentabilidade; Consumo ético; Transparência de plataformas.

## Abstract

The rapid growth of the online second-hand market reflects shifting consumer behavior in response to economic pressures and rising environmental awareness. Platforms such as Vinted, Depop, and eBay have become central to this transition, especially among younger generations. While Millennials and Generation Z are often portrayed as sustainability-oriented consumer groups, with Gen Z particularly associated with climate-conscious values, there is limited empirical evidence examining the actual drivers of environmentally conscious behavior in the second-hand digital marketplace.

This study investigates whether generational identity meaningfully predicts environmental consciousness, or whether other individual and perceptual factors offer better explanations. A quantitative approach was adopted, for this analysis, we used a multiple linear regression model based on 59 collected survey responses, of which 54 were retained after data cleaning and 41 complete cases were used in the regression analysis. Who regularly engage with online second-hand platforms. Considered variables generation, age, gender, education, ethical consumption values, saving behavior, purchase frequency, vintage interest, and perceived environmental transparency of platforms.

Contrary to common assumptions, the results indicate that neither generation, age, gender, nor ethical consumption significantly predicted environmental awareness. Instead, three key factors emerged as significant: 1- interest in vintage fashion and aesthetics, 2- the perception that platforms communicate their environmental impact clearly, and 3- higher levels of education, particularly at university level and above. These findings suggest that sustainable behavior is less a product of demographic identity and more a reflection of personal values, information exposure, and cognitive engagement.

This study contributes to the literature on sustainability and consumer behavior by challenging generational stereotypes and emphasizing the role of aesthetic motivation, platform design, and education. It offers practical implications for platform developers, marketers, and educators aiming to foster environmentally responsible consumption. Limitations and future research directions are also discussed.

**Keywords:** Millennials; Generation Z; Second-hand market; Environmental consciousness; Vintage interest; Platform transparency; Circular economy; Sustainable consumption.

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## **List of Abbreviations**

Adj.  $R^2$  – Adjusted R-squared

Df – Degrees of Freedom

Gen Z – Generation Z

GVIF – Generalized Variance Inflation Factor

NGO – Non-Governmental Organization

OLS – Ordinary Least Squares

PhD – Doctor of Philosophy

$R^2$  – Coefficient of Determination

VIF – Variance Inflation Factor

## **I. Introduction**

### **1.1 Background and Context of the Study**

The growing popularity of online second-hand markets reflects broader changes in consumer behaviour rather than simply representing a passing trend. Increasing concerns about environmental issues such as resource depletion, excessive waste generation, and climate change have encouraged consumers to reconsider traditional consumption patterns and explore alternatives that promote product reuse and longer product lifecycles. At the same time, advances in digital technology have transformed the way people buy and sell goods, contributing to the rapid growth of online resale platforms. Platforms such as Vinted, Depop, eBay, and Facebook Marketplace have become an increasingly common part of everyday shopping practices, offering consumers access to more affordable products while supporting more sustainable consumption choices (Statista, 2023).

The expansion of these platforms is closely connected to the principles of the circular economy, which aims to reduce waste and improve resource efficiency through practices such as reuse, repair, refurbishment, and recycling (Kirchherr et al., 2017). By enabling peer-to-peer exchanges and extending the useful life of products, online second-hand marketplaces challenge the traditional linear model of consumption based on purchasing, using, and discarding goods. As a result, second-hand consumption has gradually moved beyond its niche origins and become a widely accepted form of consumer behaviour across different market segments.

Among the consumer groups most frequently associated with this shift are Millennials, generally defined as individuals born between 1981 and 1996, and Generation Z, born between 1997 and 2012. These generations have attracted considerable attention from researchers, marketers, and industry professionals because of their perceived influence on emerging consumption patterns. Millennials are often described as pragmatic consumers who place considerable importance on value for money and economic efficiency, partly due to experiencing periods of economic instability and financial uncertainty during their transition into adulthood (Fernando et al., 2018; Dabija et al., 2019). In contrast, Generation Z is commonly portrayed as a generation that is

particularly aware of social and environmental issues and more inclined to support ethical consumption, climate action, and sustainable lifestyles (Mazanec & Harantová, 2023; McKinsey & Company, 2022).

Although these generational descriptions provide a useful framework for understanding consumer behaviour, their ability to explain sustainable consumption remains uncertain. A common assumption in both academic literature and public discourse is that Generation Z is inherently more environmentally conscious than Millennials and that this greater awareness explains their participation in second-hand markets. However, environmental consciousness and engagement with resale platforms are likely shaped by a wider range of influences, including educational background, personal values, ethical beliefs, financial considerations, product preferences, and access to sustainability-related information. Consequently, it remains unclear whether generational identity itself is a meaningful determinant of sustainable behaviour or whether individual characteristics offer a more accurate explanation of participation in online second-hand marketplaces.

## **1.2 Research Problem and Rationale**

Despite the continued growth of online second-hand markets and the increasing importance of sustainable consumption, there is still limited empirical evidence regarding the factors that motivate consumers to participate in these platforms. Much of the existing discussion relies on broad assumptions about generational differences, suggesting that Millennials are mainly motivated by economic considerations, whereas Generation Z is driven by environmental and ethical concerns. While these distinctions are frequently highlighted in marketing reports and public discussions, they have not always been examined through rigorous empirical analysis.

In addition, it remains uncertain whether generational identity is a reliable predictor of environmental consciousness and second-hand purchasing behaviour. Previous studies have identified several factors that may influence sustainable consumption, including educational attainment, ethical consumption values, saving motivations, product preferences, and perceptions of sustainability-related information (Solomon, 2018; Eisner, 2005; Gregson & Crewe, 2003; Michalowska et al., 2023; Palomo-Domínguez et al., 2023). Focusing exclusively on generational categories may therefore oversimplify consumer behaviour and overlook

variables that provide a more comprehensive explanation of sustainability-related attitudes and actions.

To address this issue, the present study examines whether generational membership significantly influences environmental consciousness and second-hand purchasing behaviour among users of online resale platforms while controlling for a range of demographic, educational, motivational, and attitudinal factors. Through a quantitative and multivariate approach, the study seeks to determine whether the commonly assumed differences between Millennials and Generation Z remain significant when alternative explanatory factors are considered simultaneously.

### **1.3 Research Objective and Questions**

The main objective of this dissertation is to identify the factors associated with environmental consciousness and second-hand purchasing behaviour among users of online resale platforms while assessing the extent to which generational identity contributes to these outcomes.

To achieve this objective, the study addresses the following research questions:

1. Does generational identity significantly influence environmental consciousness among users of online second-hand platforms?
2. Which demographic, educational, motivational, and attitudinal factors are associated with environmental consciousness?
3. To what extent do these factors influence the frequency of second-hand purchasing behaviour?
4. Are value-based, educational, and informational factors more important than demographic characteristics in explaining sustainability-related behaviour?

### **1.4 Research Design and Methodological Approach**

To answer these research questions, a quantitative research design was adopted. Primary data were collected through an online questionnaire distributed to users of digital second-hand marketplaces. The survey gathered information on environmental awareness, purchase frequency, demographic characteristics, educational attainment, ethical consumption values,

saving motivations, interest in vintage products, and perceptions of environmental information provided by online platforms.

The empirical analysis was conducted using two multiple linear regression models. The first model examined environmental consciousness as the dependent variable and assessed the influence of generation, age, gender, education, saving behaviour, ethical consumption, vintage interest, purchase frequency, and perceptions of platform environmental transparency. These variables were selected based on previous research examining sustainable consumption and second-hand purchasing behaviour (Solomon, 2018; Eisner, 2005; Dabija et al., 2018; Gregson & Crewe, 2003; Michalowska et al., 2023; Palomo-Domínguez et al., 2023).

The second model focused on second-hand purchase frequency as the dependent variable. In addition to the explanatory variables included in the first model, environmental consciousness was incorporated as an additional predictor to examine whether individuals with higher levels of environmental awareness engage more frequently in second-hand purchasing behaviour.

By analysing both environmental consciousness and purchase frequency as dependent variables, the study distinguishes between the factors associated with sustainability-related attitudes and those associated with actual consumer behaviour. This approach allows for a more comprehensive understanding of participation in online second-hand markets.

The purpose of this study is explanatory rather than predictive or causal. The analysis seeks to identify factors associated with environmental awareness and second-hand purchasing behaviour. Consequently, the findings should be interpreted as correlational relationships rather than evidence of causation.

## **1.5 Contribution of the Study**

This dissertation contributes to the literature on sustainability, consumer behaviour, and the circular economy in several ways. First, it provides empirical evidence regarding the widely held assumption that Generation Z demonstrates higher levels of environmental consciousness than Millennials. Although this assumption is frequently discussed in both academic and professional contexts, empirical evidence within the specific setting of online second-hand consumption remains relatively limited.

Second, the study broadens existing research by examining a wider range of explanatory factors. Rather than concentrating solely on demographic characteristics, the analysis incorporates educational, motivational, behavioural, and informational variables that may offer a more complete understanding of sustainability-related attitudes and behaviours.

Third, the findings provide practical insights for platform developers, marketers, educators, and policymakers seeking to encourage more sustainable consumption practices. A better understanding of the factors associated with environmental awareness and participation in second-hand markets may support the development of more effective communication strategies, educational initiatives, and platform features that encourage circular consumption.

More broadly, this study contributes to ongoing discussions within sustainability and generational research by questioning the assumption that age-based categories are reliable predictors of environmentally responsible behaviour. The findings suggest that sustainability-related attitudes and behaviours may be more strongly influenced by individual values, educational experiences, and perceptions of sustainability-related information than by generational membership alone.

By bringing together perspectives from consumer behaviour, sustainability studies, and circular economy research, this dissertation offers a more nuanced understanding of the factors that shape participation in online second-hand markets and highlights the importance of looking beyond generational labels when explaining sustainable consumption in digital environments. Unlike much of the existing literature, this study simultaneously evaluates demographic, educational, motivational, behavioural, and informational predictors within a unified empirical framework, allowing their relative explanatory power to be compared directly.

## **1.6 Organisation of the Research**

This dissertation is structured into five chapters, each addressing a specific stage of the research process. Chapter 1 introduces the study by presenting the research topic, its relevance within the contemporary sustainability and consumption landscape, and the research problem that motivates the investigation. It also outlines the study's objectives and research questions.

Chapter 2 provides a review of the relevant literature on second-hand consumption, sustainable consumer behaviour, and generational cohort theory. The chapter critically examines existing research, identifies key theoretical perspectives, and highlights gaps in the literature that justify the present study and support the development of the conceptual framework and research hypotheses.

Chapter 3 describes the methodological approach adopted in the research. It details the research design, sampling strategy, data collection procedures, variable measurement, hypothesis formulation, and the statistical methods employed to analyze the data.

Chapter 4 presents the empirical results and discusses the findings in light of the theoretical framework and previous studies. The chapter includes descriptive statistics, regression analyses, diagnostic assessments, and an interpretation of the results.

Finally, Chapter 5 concludes the dissertation by summarizing the main findings, discussing their theoretical and practical implications, acknowledging the study's limitations, and suggesting avenues for future research.

## **II Literature Review**

### **2.1 Introduction**

The rapid growth of online second-hand marketplaces has attracted increasing attention from researchers interested in sustainable consumption and changing consumer behaviour. As concerns about environmental sustainability continue to intensify, second-hand consumption has emerged as a practice that aligns with broader efforts to reduce waste, extend product lifecycles, and promote more responsible patterns of consumption. At the same time, the expansion of digital platforms has made buying and selling pre-owned goods more accessible, contributing to the mainstream adoption of second-hand markets.

Despite this growing interest, there is still no clear consensus regarding the factors that encourage consumers to participate in these markets. While some studies emphasise the importance of environmental concerns and sustainability values, others suggest that economic benefits, personal preferences, and lifestyle considerations play a more significant role. Similarly, researchers continue to debate whether environmentally responsible behaviour is primarily

shaped by demographic characteristics, such as age and generational membership, or by individual attitudes, values, and motivations.

To address these issues, this chapter reviews the literature through the lens of three key debates. The first debate examines whether second-hand consumption is mainly driven by sustainability concerns or by personal and economic motivations. The second explores competing explanations for environmental consciousness, focusing on the relative importance of demographic and attitudinal factors. The third considers the extent to which generational differences influence sustainable consumption behaviour. The chapter concludes by identifying the research gap that motivates the present study and outlining the conceptual framework that guides the empirical analysis.

## **2.2 Debate 1: Is Second-Hand Consumption Driven by Sustainability or Self-Interest?**

Second-hand consumption is often viewed as an important component of sustainable consumption because it encourages the reuse of products and reduces the need for new production. Within the framework of the circular economy, extending the lifespan of products is considered a key strategy for reducing waste and improving resource efficiency (Kirchherr et al., 2017). From this perspective, consumers who purchase second-hand goods contribute to environmental sustainability by supporting practices that minimise unnecessary consumption and promote product recirculation.

A considerable body of research supports this view, suggesting that environmental concerns motivate many consumers to engage in second-hand purchasing. Individuals who are aware of environmental challenges may perceive second-hand consumption as a practical way to reduce their environmental impact while maintaining access to desired products. As sustainability becomes increasingly integrated into public discourse, second-hand markets have also gained visibility as environmentally responsible alternatives to conventional retail channels.

However, not all researchers agree that sustainability is the primary driver of second-hand consumption. Several studies indicate that consumers frequently participate in second-hand markets for reasons that are largely unrelated to environmental concerns. Economic

considerations, particularly the opportunity to save money, consistently emerge as one of the most important motivations for purchasing pre-owned goods (Guiot & Roux, 2010). For many consumers, second-hand products provide access to desired items at lower prices, making them an attractive option regardless of environmental considerations.

From a Consumer Culture Theory perspective, consumption practices also serve as mechanisms through which individuals construct and communicate identity (Arnould & Thompson, 2005). Second-hand purchasing may therefore reflect more than economic or environmental considerations. Consumers may engage with resale markets because these platforms allow them to express authenticity, individuality, and lifestyle preferences through unique or vintage products. This perspective suggests that symbolic and cultural motivations can coexist with sustainability-related objectives in shaping second-hand consumption behaviour.

However, even when consumers express strong environmental values, these attitudes do not always translate into actual purchasing behaviour. Carrington, Neville, and Whitwell (2010) argue that a persistent gap often exists between ethical intentions and realised consumption choices. Factors such as convenience, affordability, product availability, and situational constraints may prevent environmentally conscious consumers from consistently acting in accordance with their stated values. This distinction highlights the importance of analysing both environmental awareness and actual purchasing behaviour as separate, though related, outcomes.

### **2.3 Debate 2: What Explains Environmental Consciousness?**

A second area of debate concerns the factors that shape environmental consciousness and environmentally responsible behaviour. Early research frequently focused on demographic characteristics, arguing that variables such as age, gender, income, and education influence how individuals perceive environmental issues and respond to sustainability challenges (Eisner, 2005). According to this perspective, certain demographic groups are more likely than others to adopt environmentally conscious attitudes and behaviours.

Although demographic factors continue to receive attention in the literature, their explanatory power has increasingly been questioned. Many researchers argue that demographic characteristics alone provide only a limited understanding of environmental behaviour.

Individuals belonging to the same demographic group often display considerable variation in their attitudes and actions, suggesting that other factors may be more influential.

This argument is further supported by the Theory of Planned Behavior (Ajzen, 1991), which posits that individual behaviour is shaped by attitudes, subjective norms, and perceived behavioural control. Within this framework, pro-environmental behaviour is more likely to occur when individuals develop positive attitudes towards sustainable practices, perceive social support for such actions, and believe they possess the ability and resources necessary to engage in them. Consequently, environmental consciousness can be understood not merely as a function of demographic characteristics, but as the outcome of underlying psychological and attitudinal processes that influence decision-making and behavioural intentions. The theory therefore supports the argument that attitudinal and psychological factors may provide stronger explanations for environmental consciousness than demographic characteristics alone.

Ethical consumption has emerged as a particularly important concept within this discussion. Consumers who consider the social and environmental consequences of their purchasing decisions are often more willing to support sustainable products and practices. Ethical concerns may therefore influence both environmental awareness and actual purchasing behaviour.

Education has also been identified as a relevant factor. Higher levels of education may increase awareness of environmental issues by providing individuals with greater access to information and a deeper understanding of the consequences of consumption choices. Consequently, education is frequently associated with stronger environmental attitudes and greater support for sustainable practices.

Another factor that has gained prominence in recent years is access to sustainability-related information. Online platforms increasingly communicate the environmental benefits of second-hand consumption through sustainability messages, environmental impact indicators, and educational content. Research suggests that exposure to such information can influence consumer perceptions and strengthen environmental awareness (Palomo-Domínguez et al., 2023).

Although numerous factors have been linked to environmental consciousness, there is still no agreement regarding which factors are most influential. This lack of consensus highlights the

need for studies that examine multiple explanatory variables simultaneously in order to better understand the **drivers of environmentally responsible behaviour**.

## **2.4 Debate 3: Does Generation Matter?**

The role of generational identity in shaping consumer behaviour has become one of the most widely discussed topics in contemporary marketing and sustainability research. Generational cohort theory suggests that individuals who grow up during similar historical and social circumstances develop shared experiences that influence their attitudes, values, and behaviours throughout life (Mannheim, 1952).

Within the context of sustainability, Generation Z is often portrayed as particularly environmentally conscious and socially aware. Growing up during a period characterised by increased public attention to climate change, environmental activism, and digital connectivity, members of Generation Z are frequently described as consumers who prioritise sustainability and ethical consumption. Industry reports and market analyses commonly suggest that this generation is more likely to support environmentally responsible brands and adopt sustainable lifestyles (McKinsey & Company, 2022).

Millennials are also frequently associated with sustainability-related behaviours, although they are often characterised differently. Existing research suggests that Millennials tend to balance environmental concerns with practical considerations such as affordability and value for money. As a result, second-hand consumption may appeal to this generation for both economic and sustainability-related reasons.

Despite these commonly accepted assumptions, empirical findings remain inconsistent. Some studies report meaningful differences between generations in terms of environmental attitudes and sustainable consumption practices. Other studies, however, find that generational effects become weaker or disappear altogether when factors such as education, income, lifestyle, and personal values are taken into account (Dabija et al., 2019).

These contrasting findings raise important questions regarding the actual significance of generational identity. It is possible that differences commonly attributed to generations are, in reality, the result of broader social, educational, or cultural influences that affect individuals

across age groups. Consequently, it remains unclear whether generation itself is a meaningful predictor of environmental consciousness and second-hand purchasing behaviour or whether other individual characteristics provide a more convincing explanation.

## **2.5 Research Gap**

The literature reviewed in this chapter reveals several important observations. First, participation in second-hand markets appears to be motivated by a combination of environmental, economic, and personal factors. While sustainability concerns play an important role for some consumers, financial savings and product-related preferences also influence purchasing decisions.

Second, environmental consciousness is associated with a range of potential determinants, including education, ethical values, and access to sustainability-related information. However, existing research does not provide a clear understanding of the relative importance of these factors.

Third, although generational differences are frequently discussed in both academic and professional contexts, empirical evidence remains inconclusive. While some studies suggest that younger generations are more environmentally conscious, others argue that individual attitudes and values are more important than generational membership in explaining sustainable behaviour.

A notable limitation of the existing literature is that many studies examine demographic and attitudinal explanations separately. Comparatively few studies investigate these factors simultaneously within the context of online second-hand marketplaces. Consequently, it remains uncertain whether generation continues to influence environmental consciousness and purchasing behaviour once educational attainment, ethical consumption values, platform transparency, saving motivations, and product preferences are considered together.

The present study seeks to address this gap by examining the relative contribution of demographic, educational, motivational, and attitudinal factors in explaining environmental awareness and second-hand purchasing behaviour among users of online resale platforms.

## 2.6 Conceptual Framework and Hypothesis Development

The debates discussed throughout this chapter provide the theoretical foundation for the conceptual framework adopted in this study. Drawing on previous research, the framework examines the influence of generation, education, ethical consumption, platform environmental information, vintage interest, saving motivation, and purchasing behaviour on environmental awareness and second-hand purchase frequency.

By incorporating both demographic and attitudinal variables within the same analytical framework, the study aims to evaluate their relative importance in explaining sustainable consumption behaviour. This approach allows for a more comprehensive assessment of whether generational membership remains a significant predictor once other relevant factors are considered. The hypotheses derived from this framework are presented in the following section.

## III. Methodology

### 3.1 Theoretical Framework

This study employs a quantitative, cross-sectional, and comparative research design to investigate differences in how Millennials and Generation Z engage with the online second-hand market. The cross-sectional method provides a snapshot of behaviors and attitudes at a single point in time, enabling a direct comparison between generational cohorts in terms of their motivations, consumption patterns, and sustainability orientations.

The research is theoretically grounded in three principal frameworks:

- **Consumer Behavior Theory** (Solomon, 2018), which explores the psychological and social factors influencing purchasing decisions.
- **Generational Cohort Theory** (Mannheim, 1952), which posits that individuals within the same generational cohort exhibit shared attitudes and behaviors shaped by historical and social experiences.
- **Circular Economy Model** (Kirchherr et al., 2017), which advocates sustainable consumption through reuse, recycling, and extended product lifecycles.

These frameworks collectively inform the conceptual foundation of the study, enabling a nuanced analysis of generational influences on second-hand consumption within digital environments.

### 3.2 Research Hypothesis

Grounded in theory and supported by existing empirical evidence, this study puts forward a set of focused hypotheses to examine the underlying drivers of environmental consciousness in the context of online second-hand consumption. Each hypothesis is based on prior literature and reflects key assumptions about how generational identity, consumer values, and behavioral tendencies influence sustainability-oriented attitudes and practices:

- **H1: Generation Z is expected to demonstrate significantly higher levels of environmental consciousness than Millennials**, reinforcing the idea that younger cohorts are more attuned to environmental and ethical concerns. Previous studies indicate that Generation Z is more inclined to engage in sustainable behaviors and hold companies accountable for their environmental impact (Tolegenov et al., 2024; Palomo-Domínguez et al., 2023).
- **H2: Ethical consumption is expected to serve as a robust and consistent predictor of environmental awareness**. Individuals who emphasize ethical values in their purchasing decisions are more likely to consider the environmental and social consequences of their consumption (Dabija et al., 2018; Testa et al., 2021).
- **H3: Education is hypothesized to play a central role**, with higher levels of academic attainment associated with greater environmental awareness. Education contributes to sustainability literacy, critical thinking, and exposure to environmental topics (Kirchherr et al., 2017; Solomon, 2018).
- **H4: Perceived environmental transparency of platforms is expected to influence environmental consciousness directly**. When platforms clearly communicate their sustainability efforts, consumers are more likely to act upon those values (Okeke et al., 2024; eBay Recommence Report, 2023).

- **H5: Frequency of second-hand purchases and a saving-oriented mindset are expected to positively correlate with environmental consciousness.** Frugality has been linked to sustainability, especially when guided by values rather than necessity (Young et al., 2010; Gregson & Crewe, 2003).

Together, these hypotheses aim to uncover not only generational contrasts but also the behavioral signals that reveal why some consumers are more committed to sustainability **than others**.

### **3.3 Population and Sampling Strategy**

This research targets individuals belonging to the Millennial (born between 1981 and 1996) and Generation Z (born between 1997 and 2012) cohorts who had engaged in at least one online second-hand purchase during the previous 12 months. Although one respondent was at the lower boundary of Generation Z, all participants fell within the predefined generational categories used in this study. To ensure the quality and relevance of the data, a purposive sampling strategy was employed. This non-probabilistic method allowed us to selectively recruit participants who met the study's criteria, thereby increasing the validity of comparisons drawn between generational groups.

The study collected 59 survey responses, which, while modest in size, provided rich insights into consumption patterns, environmental attitudes, and digital engagement. Efforts were made to capture diversity in gender identity, educational background, and platform usage frequency. Nonetheless, the relatively small sample size and the use of non-random sampling limit the generalizability of the findings. As such, the results are best interpreted as exploratory, offering valuable directional insights rather than population-wide generalizations.

### **3.4 Data Collection Tools and Procedures**

Data for this study were collected through a structured online questionnaire developed and administered using the Lime Survey platform. This tool was chosen for its flexibility, user privacy features, and ability to support structured, multi-section survey design.

The questionnaire was disseminated via social media networks and online communities dedicated to second-hand platforms, targeting participants with relevant and recent experience in the second-hand digital marketplace.

The survey instrument was designed to capture a range of information relevant to the study's objectives, including:

- Demographic characteristics: age, gender, and education level.
- Behavioral patterns: frequency of second-hand purchases, saving behavior, and interest in vintage products.
- Perception of platform transparency: particularly regarding the availability and visibility of environmental information on second-hand platforms.
- Attitudinal measures: including Likert-scale items assessing ethical consumption values and the degree of environmental consciousness.

The use of Lime Survey allowed for a streamlined distribution process and ensured consistent data collection across respondents. The survey also included eligibility checks to ensure participants had recent second-hand consumption experience.

## **IV. Variables and Measurement**

### **4.1 Descriptive Statistics**

To provide an initial understanding of the dataset, descriptive statistics were computed for all variables included in the empirical analysis. Examining these statistics allows for a clearer characterization of the sample and offers valuable context for interpreting the regression results presented later in this chapter.

The study initially collected 59 survey responses. After data cleaning and the exclusion of incomplete questionnaires, 54 valid responses remained for descriptive analysis. For the regression models, listwise deletion of missing observations resulted in a final analytical sample of 41 complete cases. Despite the reduction in sample size, the final set of complete observations

was considered adequate for the exploratory nature of the study and allowed for the estimation of the proposed regression models.

Table 1 presents the descriptive statistics for the variables included in the analysis. Specifically, the table reports the mean, standard deviation, minimum value, and maximum value for each variable, providing an overview of their distribution and variability within the sample. These statistics offer initial insights into the characteristics of the data and facilitate a preliminary understanding of the patterns observed in the subsequent empirical analysis.

**Table 1- Descriptive Statistics of Main Variables**

| <b>Variable</b>                    | <b>Mean</b> | <b>Standard Deviation</b> | <b>Minimum</b> | <b>Maximum</b> |
|------------------------------------|-------------|---------------------------|----------------|----------------|
| Environmental Awareness            | 4.13        | 0.63                      | 2.00           | 5.00           |
| Purchase Frequency                 | 2.94        | 1.17                      | 1.00           | 5.00           |
| Age (Years)                        | 26.54       | 9.02                      | 13.00          | 43.00          |
| Saving Motivation                  | 3.02        | 1.00                      | 1.00           | 5.00           |
| Vintage Interest                   | 4.20        | 0.90                      | 1.00           | 5.00           |
| Ethical Consumption                | 4.26        | 0.73                      | 2.00           | 5.00           |
| Platform Environmental Information | 4.19        | 0.78                      | 1.00           | 5.00           |

Source: own elaboration

The results indicate relatively high levels of environmental awareness among respondents ( $M = 4.13$ ,  $SD = 0.63$ ), suggesting that environmental considerations are generally important when making consumption decisions. Similarly, ethical consumption recorded a high average score ( $M = 4.26$ ,  $SD = 0.73$ ), indicating that sustainability-related values play a meaningful role in participants' purchasing attitudes.

Interest in vintage products was also relatively strong ( $M = 4.20$ ,  $SD = 0.90$ ), supporting the notion that aesthetic preferences and appreciation for unique or reused products are important

motivations within the second-hand marketplace. In addition, respondents reported positive perceptions of the environmental information provided by online resale platforms ( $M = 4.19$ ,  $SD = 0.78$ ), suggesting that sustainability-related communication is generally visible and valued by users.

In contrast, second-hand purchase frequency showed greater variability ( $M = 2.94$ ,  $SD = 1.17$ ), indicating that although respondents generally express favorable attitudes toward sustainability, these attitudes do not always translate into frequent purchasing behavior. Saving motivation displayed a more moderate average score ( $M = 3.02$ ,  $SD = 1.00$ ), suggesting that financial considerations remain relevant but are not the sole driver of participation in online second-hand markets.

Overall, the descriptive statistics reveal sufficient variation across the key constructs to support the subsequent regression analysis. The absence of extreme values and the relatively balanced distribution of responses provide an appropriate basis for further statistical examination of the factors influencing environmental awareness and second-hand purchasing behavior.

## **4.2 Regression Models and Formal Specification**

To investigate the factors associated with environmental consciousness and the frequency of second-hand purchases among users of online resale platforms, two multiple linear regression models were estimated using the Ordinary Least Squares (OLS) method. OLS is one of the most widely employed statistical techniques in empirical research due to its ability to assess the relationship between a dependent variable and multiple explanatory variables simultaneously. Originally formalized by Carl Friedrich Gauss (1809), the method remains a robust and widely accepted approach for examining associations between variables and evaluating the relative contribution of individual predictors.

The use of OLS was considered appropriate for the objectives of this study, as it enables the identification of statistically significant determinants of the outcomes under investigation while quantifying the direction and magnitude of their effects. Furthermore, the method facilitates the assessment of the proportion of variation in the dependent variable explained by the set of explanatory variables included in the model.

The general specification of a multiple linear regression model can be expressed as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \epsilon$$

where Y represents the dependent variable,  $\beta_0$  denotes the intercept,  $\beta_1$  to  $\beta_k$  correspond to the estimated coefficients associated with each explanatory variable,  $X_1$  to  $X_k$  represent the independent variables, and  $\epsilon$  captures the unexplained variation in the model.

Based on this framework, two regression models were estimated.

**Model 1** examines environmental consciousness as the dependent variable:

$$\begin{aligned} \text{Environmental\_Consciousness} = & \beta_0 + \beta_1(\text{Age}) + \beta_2(\text{Gender}) + \beta_3(\text{Generation}) + \\ & \beta_4(\text{Education}) + \beta_5(\text{Purchase Frequency}) + \beta_6(\text{Saving Behaviour}) + \beta_7(\text{Vintage Interest}) + \\ & \beta_8(\text{Ethical Consumption}) + \beta_9(\text{Platform Environmental Information}) + \epsilon \end{aligned}$$

**Model 2** examines purchase frequency as the dependent variable:

$$\begin{aligned} \text{Purchase\_Frequency} = & \beta_0 + \beta_1(\text{Age}) + \beta_2(\text{Gender}) + \beta_3(\text{Generation}) + \beta_4(\text{Education}) + \\ & \beta_5(\text{Saving Behaviour}) + \beta_6(\text{Vintage Interest}) + \beta_7(\text{Ethical Consumption}) + \beta_8(\text{Platform} \\ & \text{Environmental Information}) + \beta_9(\text{Environmental Consciousness}) + \epsilon \end{aligned}$$

In both models, age and gender were included as control variables, while the remaining predictors were selected based on the theoretical framework and hypotheses developed from the literature review. The estimated coefficients provide insights into the extent to which each variable is associated with environmental consciousness and second-hand purchasing behaviour, after controlling for the influence of the other factors included in the analysis. Equation 1 specifies environmental consciousness as the dependent variable, modeled in relation to demographic, motivational, and informational factors. Equation 2 illustrates the second model, where purchase frequency was explained by the same predictors, including environmental consciousness as an additional independent variable. These models allow for assessing the individual effect of each predictor variable while controlling for the others, providing a multifaceted understanding of sustainability-related attitudes and behaviors.

### 4.3 Description and Operationalization of Variables

The selection and operationalization of variables were grounded in prior literature on sustainability, consumer behavior, and generational studies. The variables used in both models are described below.

- Environmental Consciousness (dependent in Model 1; independent in Model 2):

Measured through a composite index derived from several Likert-scale items. These items capture participants' concern, awareness, and engagement with environmental issues, particularly in relation to consumption decisions.

- Second-Hand Purchase Frequency (dependent in Model 2; independent in Model 1):

Measured on a 5-point scale, this variable indicates how frequently participants buy second-hand products. It serves as an indicator of behavior aligned with circular consumption.

- Age: A continuous variable representing participants' age in years. It allows for the examination of how sustainability attitudes and behaviors may vary across the life span.
- Gender: A categorical variable used to explore gender-based differences in environmental consciousness and second-hand shopping behavior
- Generation: A categorical variable distinguishing between Millennials and Generation Z, enabling analysis of cohort-specific patterns.
- Education Level: An ordinal variable ranging from secondary education to doctoral degree. It is assumed that higher educational attainment is associated with greater critical thinking and environmental literacy.
- Saving Behavior: Measured on a 5-point scale, these variables captures participants' self-reported financial saving habits, which may be conceptually related to intentional and conscious decision-making.
- Vintage Interest: Measured using Likert-scale items reflecting aesthetic or nostalgic motivations for second-hand product use.
- Ethical Consumption: Assessed through Likert-scale items capturing participants' values related to sustainability, fairness, and social responsibility in purchasing decisions.

- Perceived Environmental Information on Platforms: A Likert-based measure assessing participants' perceptions of environmental messaging, transparency, and information availability on second-hand digital platforms.

#### **4.4 Statistical Procedures and Assumption Testing**

The R software environment (R Core Team, 2024) was used to perform all statistical analyses. The broom and stargazer packages facilitated the organization, presentation, and interpretation of regression results in tabular form.

The analysis began with descriptive statistics to summarize key demographic, behavioral, and attitudinal characteristics of the sample. This provided a contextual basis for interpreting the regression findings.

Before interpreting the models, key assumptions of linear regression were tested:

- Residuals were examined for normality using histograms and the Shapiro-Wilk test.
- Linearity and homoscedasticity were assessed through scatterplots and residual diagnostics.
- Multicollinearity was checked using the Variance Inflation Factor (VIF)

Particular attention was given to the potential multicollinearity between age and generation, which is conceptually and statistically related. While both were initially included to capture distinct theoretical constructs age as a life-stage variable and generation as a socio-cultural category VIF diagnostics were used to assess whether their joint inclusion compromised model stability. If necessary, alternative models excluding one of the two were explored.

A potential limitation of the regression models concerns endogeneity and reverse causality. For example, environmental awareness may influence second-hand purchase frequency, while frequent participation in second-hand markets may also strengthen environmental awareness. Given the cross-sectional nature of the data, the analysis cannot establish causal relationships. Therefore, the estimated coefficients should be interpreted as associations rather than causal effects. Future research using longitudinal data or experimental methods could better address these issues.

## 4.5 Regression Results and Interpretation

The regression results presented in **Table 2** offer critical empirical insights that challenge conventional wisdom in sustainability and generational behavior research. Contrary to widespread assumptions, generational identity specifically belonging to Generation Z as opposed to the Millennial cohort was not a statistically significant predictor of environmental consciousness. This finding calls into question dominant narratives that portray Generation Z as inherently more environmentally engaged than previous generations. The absence of a generational effect, despite strong theoretical expectations (see H1), suggests that demographic labels alone are insufficient to explain variations in sustainability-related attitudes.

Instead, other factors particularly vintage motivation and the importance attributed to platform environmental information emerge as significant and consistent drivers of environmental awareness. Ethical consumption also plays an important role, but more prominently in predicting purchase frequency rather than awareness itself.

**Table 2- Regression Models: Environmental Awareness and Purchase Frequency**

| Variables                   | Environmental Awareness<br>(Model 1) | Purchase Frequency (Model<br>2) |
|-----------------------------|--------------------------------------|---------------------------------|
| Generation                  | -0.007 (0.174)                       | 0.413 (0.699)                   |
| Age                         | -0.0002 (0.011)                      | -0.015 (0.046)                  |
| Gender                      | 0.126 (0.113)                        | -0.345 (0.461)                  |
| education.L                 | -0.009 (0.181)                       | -0.746 (0.720)                  |
| education.Q                 | 0.297** (0.133)                      | -0.764 (0.564)                  |
| education.C                 | -0.091 (0.088)                       | 0.250 (0.362)                   |
| purchase_frequency          | -0.009 (0.046)                       |                                 |
| saving_motivation           | -0.053 (0.049)                       | -0.038 (0.202)                  |
| vintage_motivation          | 0.411*** (0.128)                     | -0.502 (0.596)                  |
| ethical_consumption         | 0.102 (0.166)                        | 1.401** (0.623)                 |
| platform_environmental_info | 0.313*** (0.094)                     | 0.241 (0.446)                   |
| environmental_awareness     |                                      | -0.150 (0.751)                  |

|                               |                |                 |
|-------------------------------|----------------|-----------------|
| Constant                      | 1.153 (22.776) | 28.392 (92.069) |
| Observations                  | 41             | 41              |
| R <sup>2</sup>                | 0.764          | 0.258           |
| Adjusted R <sup>2</sup>       | 0.674          | -0.024          |
| Residual Std. Error (df = 29) | 0.295          | 1.195           |
| F Statistic (df = 11; 29)     | 8.519***       | 0.915           |

Source : own elaboration

OLS estimates reported. Standard errors shown in parentheses. Generation is coded as 1 = Generation Z and 0 = Millennials. Education was modeled using polynomial contrasts. Model 1 uses Environmental Awareness as the dependent variable. Model 2 uses Purchase Frequency as the dependent variable. The analytical sample includes 41 complete observations after listwise deletion of missing values.

Where:

- Statistical significance is denoted by asterisks as follows:

\*\*\*  $p < 0.01$ , indicating high significance

\*\*  $p < 0.05$ , indicating significance

\* $p < 0.10$ , indicating marginal significance

- Values inside parentheses are standard errors of the estimated coefficients.

Model 1 explains a substantial proportion of variance in environmental awareness ( $R^2 = 0.764$ ), and several predictors are statistically significant particularly vintage motivation, education (quadratic), and platform-provided environmental information.

Model 2, predicting purchase frequency, exhibits weaker explanatory power ( $R^2 = 0.258$ ; adjusted  $R^2 < 0$ ), and no variables are significant at the 1% level, though ethical consumption

achieves significance at the 5% level. The negative adjusted  $R^2$  suggests overfitting or multicollinearity in the extended model.

Diagnostic statistics (residual standard error) and a low F-statistic in Model 2 further indicate the model may not be appropriate in its current form, while Model 1 presents robust statistical validity.

Similarly, other commonly cited sociodemographic and behavioral variables **age, gender, saving behavior, purchase frequency**, and even **self-reported ethical consumption values** were not found to significantly influence environmental consciousness in this context. While some of these factors have shown relevance in previous studies, their lack of significance here highlights the **limitations of relying on general attitudes or demographic profiles as proxies for sustainable behavior** in the digital second-hand marketplace.

Instead, the model identified **three statistically significant predictors**, each with conceptual depth and practical relevance:

- **Vintage motivation** emerged as the strongest positive predictor ( $\beta = 0.411, p < 0.01$ ), underscoring the powerful link between **aesthetic orientation and environmental concern**. This suggests that individuals attracted to vintage products may be practicing sustainability not necessarily through environmental ideology, but via an appreciation for uniqueness, nostalgia, and reuse key principles of the circular economy. What may appear as a stylistic choice thus functions as a **gateway to environmentally conscious behavior**, particularly among younger digital consumers.
- **Perceived platform environmental transparency** also had a significant positive association with environmental awareness ( $\beta = 0.313, p < 0.01$ ). Respondents who viewed platforms such as Vinted or Depop as credible and informative regarding their environmental efforts reported **higher levels of environmental consciousness**. This finding affirms the role of **information architecture and communication design** in shaping sustainable attitudes, and it emphasizes that platform-mediated perceptions can be just as influential as personal values in fostering pro-environmental behavior.

- **Education**, operationalized through a quadratic contrast, showed a curvilinear but significant relationship ( $\beta = 0.297, p < 0.05$ ), indicating that **intermediate to higher levels of education** are associated with greater environmental awareness. This effect may reflect the cumulative impact of **sustainability literacy, critical thinking, and academic exposure to environmental issues**, reinforcing the broader claim that sustainable behavior is partly a cognitive and informational construct.

**Table 3- Analysis of Variance Inflation Factors (VIF)**

| Variable                      | GVIF  | Df | GVIF <sup>1/(2×Df)</sup> |
|-------------------------------|-------|----|--------------------------|
| Age                           | 4.154 | 1  | 2.038                    |
| Gender                        | 1.484 | 1  | 1.218                    |
| Generation                    | 3.541 | 1  | 1.882                    |
| Education                     | 2.907 | 3  | 1.195                    |
| Purchase frequency            | 1.345 | 1  | 1.160                    |
| Saving behavior               | 1.099 | 1  | 1.048                    |
| Vintage interest              | 2.484 | 1  | 1.576                    |
| Ethical consumption           | 2.996 | 1  | 1.731                    |
| Environmental info (platform) | 1.429 | 1  | 1.196                    |

Source: own elaboration

Importantly, **Table 3**, which reports the Variance Inflation Factors (VIF), confirmed that multicollinearity among the independent variables was not a concern. All GVIF<sup>1/(2×Df)</sup> values were well below the critical threshold, validating the robustness and interpretability of the regression coefficients.

In contrast to the explanatory strength of the environmental consciousness model ( $R^2 = 0.764$ ; Adjusted  $R^2 = 0.674$ ), the second regression model where **second-hand purchase frequency** was the dependent variable was considerably weaker. Only **ethical consumption** reached

statistical significance ( $\beta = 1.401, p < 0.05$ ), suggesting that individuals who endorse ethical values are somewhat more likely to engage in frequent second-hand purchasing. However, the overall model fit was poor (Adjusted  $R^2 = -0.024$ ), and the **F-statistic was not significant**, indicating that this model failed to capture the primary drivers of purchase behavior.

This divergence in model performance reveals a **conceptual and behavioral asymmetry**: while **environmental consciousness** is shaped by deeper cognitive and value-based factors such as aesthetic motivation, platform perception, and educational background the **frequency of sustainable consumption** appears to be driven by **more pragmatic, possibly contextual variables** that were not included in the present analysis (e.g., product availability, pricing, or habit strength).

Overall, these findings challenge the assumption that **demographics or self-reported values alone can explain sustainable behavior**. Instead, they point toward the importance of **individual-level meaning-making processes, perceived informational clarity, and experiential motivations**, all of which operate independently of age or generational cohort. For researchers and practitioners alike, this suggests a paradigm shift: to promote sustainability effectively, strategies should move beyond identity-based targeting and instead focus on **value alignment, platform communication design, and educational interventions** that transcend demographic boundaries.

#### 4.6 Structural Model Estimates and Hypotheses Testing

The structural model was estimated to evaluate the relationships between selected predictors and the dependent variables **Environmental Awareness** (Model 1) and **Purchase Frequency** (Model 2). The results reveal differentiated patterns between the two models, highlighting distinct drivers of environmental consciousness and second-hand purchasing behavior.

**Table 4- Hypothesis Testing Results for Environmental Awareness and Purchase Frequency**

| Hypothesis | Relationship                                            | Environmental Awareness (Model 1) $\beta$ | p-value | Result        | Purchase Frequency (Model 2) $\beta$ | p-value | Result        |
|------------|---------------------------------------------------------|-------------------------------------------|---------|---------------|--------------------------------------|---------|---------------|
| H1         | Generation → Dependent Variable                         | -0.007                                    | 0.968   | Not Supported | 0.413                                | 0.559   | Not Supported |
| H2         | Ethical Consumption → Dependent Variable                | 0.102                                     | 0.543   | Not Supported | 1.401                                | 0.033   | Supported     |
| H3         | Education → Dependent Variable                          | 0.297                                     | 0.033   | Supported     | -0.764                               | 0.185   | Not Supported |
| H4         | Platform Environmental Information → Dependent Variable | 0.313                                     | 0.002   | Supported     | 0.241                                | 0.592   | Not Supported |
| H5a        | Purchase Frequency →                                    | -0.009                                    | 0.846   | Not Supported | —                                    | —       | —             |

| Hypothesis | Relationship                                 | Environmental Awareness (Model 1) $\beta$ | p-value | Result        | Purchase Frequency (Model 2) $\beta$ | p-value | Result        |
|------------|----------------------------------------------|-------------------------------------------|---------|---------------|--------------------------------------|---------|---------------|
|            | Environmental Awareness                      |                                           |         |               |                                      |         |               |
| H5b        | Saving Motivation → Dependent Variable       | -0.053                                    | 0.288   | Not Supported | -0.038                               | 0.852   | Not Supported |
| H6         | Vintage Interest → Dependent Variable        | 0.411                                     | 0.003   | Supported     | -0.502                               | 0.406   | Not Supported |
| H7         | Environmental Awareness → Purchase Frequency | —                                         | —       | —             | -0.150                               | 0.843   | Not Supported |

### Control Variables

| Variable | Environmental Awareness<br>(Model 1) $\beta$ | p-value | Purchase Frequency<br>(Model 2) $\beta$ | p-value |
|----------|----------------------------------------------|---------|-----------------------------------------|---------|
| Age      | -0.0002                                      | 0.986   | -0.015                                  | 0.747   |
| Gender   | 0.126                                        | 0.273   | -0.345                                  | 0.460   |

Source: own elaboration.

### Drivers of Environmental Awareness (Model 1)

The findings of Model 1 reveal that only a subset of the explanatory variables exhibited a statistically significant relationship with environmental awareness. Specifically, Vintage Interest ( $\beta = 0.411$ ,  $p = 0.003$ ), Platform Environmental Information ( $\beta = 0.313$ ,  $p = 0.002$ ), and Education ( $\beta = 0.297$ ,  $p = 0.033$ ) emerged as significant positive predictors, providing support for hypotheses H6, H4, and H3, respectively.

These results indicate that respondents who demonstrate a stronger interest in vintage products perceive online resale platforms as environmentally transparent, and possess higher levels of education tend to report greater environmental awareness. Among the significant predictors, Vintage Interest displayed the largest coefficient, suggesting that motivations associated with authenticity, uniqueness, and product reuse may be closely linked to environmentally conscious attitudes. This finding aligns with the notion that sustainable consumption is not solely driven by environmental concerns but may also be reinforced by lifestyle preferences and symbolic forms of consumption.

In contrast, Ethical Consumption ( $\beta = 0.102$ ,  $p = 0.543$ ), Generation ( $\beta = -0.007$ ,  $p = 0.968$ ), Purchase Frequency ( $\beta = -0.009$ ,  $p = 0.846$ ), and Saving Motivation ( $\beta = -0.053$ ,  $p = 0.288$ ) did not achieve statistical significance. Consequently, hypotheses H2, H1, and H5 were not supported. Likewise, the control variables Age ( $\beta = -0.0002$ ,  $p = 0.986$ ) and Gender ( $\beta = 0.126$ ,  $p = 0.273$ ) were not significantly associated with environmental awareness.

Overall, the evidence suggests that environmental awareness is more strongly associated with educational, informational, and attitudinal factors than with demographic characteristics. Perceptions of platform transparency and individual motivations appear to play a more substantial role in shaping environmental consciousness than generational membership alone.

### **Drivers of Purchase Frequency (Model 2)**

Model 2 examined the factors associated with the frequency of second-hand purchases. The results indicate that Ethical Consumption ( $\beta = 1.401$ ,  $p = 0.033$ ) was the only predictor that reached conventional levels of statistical significance, providing support for H2 in the context of purchasing behaviour.

This finding highlights the importance of ethical and sustainability-oriented values in explaining actual participation in second-hand markets. Individuals who place greater emphasis on responsible consumption practices appear more likely to engage regularly in second-hand purchasing, suggesting that ethical considerations may be translated into tangible consumption behaviour.

By contrast, Vintage Interest ( $\beta = -0.502$ ,  $p = 0.406$ ), Platform Environmental Information ( $\beta = 0.241$ ,  $p = 0.592$ ), Education ( $\beta = -0.764$ ,  $p = 0.185$ ), Generation ( $\beta = 0.413$ ,  $p = 0.559$ ), Saving Motivation ( $\beta = -0.038$ ,  $p = 0.852$ ), and Environmental Awareness ( $\beta = -0.150$ ,  $p = 0.843$ ) did not exhibit statistically significant effects. Similarly, neither Age ( $\beta = -0.015$ ,  $p = 0.747$ ) nor Gender ( $\beta = -0.345$ ,  $p = 0.460$ ) appeared to influence purchase frequency.

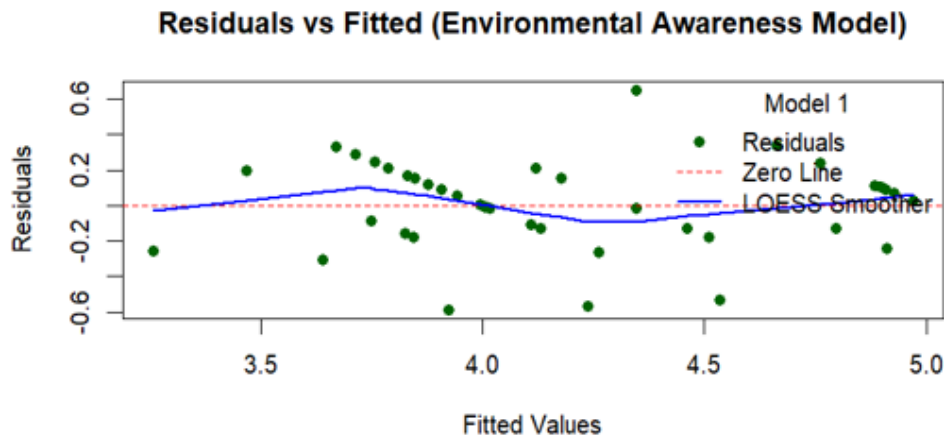
Taken together, the findings suggest that regular participation in second-hand consumption is driven primarily by ethical consumption values rather than by demographic attributes or perceptions of platform sustainability. Moreover, the absence of a significant relationship between environmental awareness and purchase frequency may indicate that environmentally conscious attitudes do not necessarily translate into more frequent second-hand purchasing behaviour, reflecting the well-documented attitude-behaviour gap identified in previous consumer research.

Having examined the regression results, the following section evaluates the extent to which the assumptions underlying the regression models were satisfied through a detailed assessment of the residual diagnostics.

## 4.7 Residual Diagnostics

To assess the adequacy of the linear regression assumptions, residuals versus fitted plots were examined for both the **frequency** and **environmental awareness** models (Figures 1 and 2, respectively).

Figure 1- Environmental Awareness Model



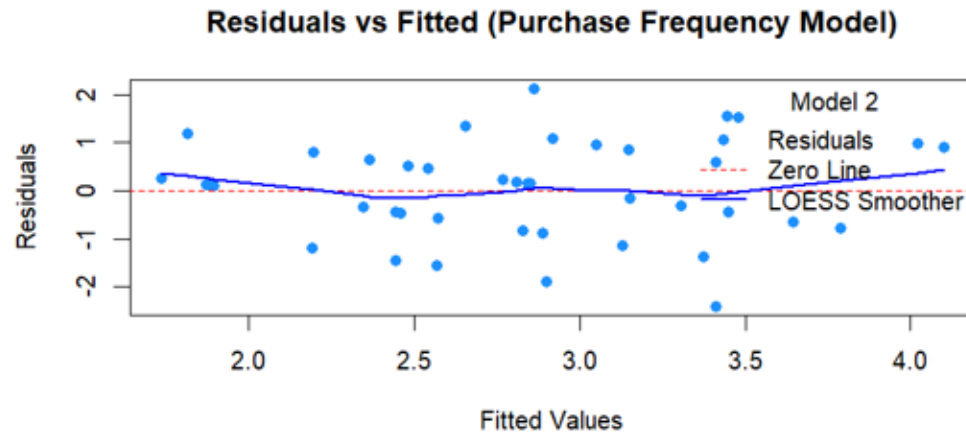
Source: own elaboration

The residual distribution for the environmental consciousness model is markedly more consistent with linear regression assumptions. Residuals are symmetrically distributed around zero, and the LOESS line is relatively flat, indicating a **well-specified linear relationship** between predictors and the dependent variable. The absence of heteroscedasticity implies homogeneity of variance, which enhances the reliability of hypothesis testing within this model.

Although a few moderate outliers (notably cases 1, 5, and 34) are evident, their influence does not appear to skew the regression line significantly, nor do they violate assumptions of normality or linearity to a meaningful extent. Additionally, Q-Q plots confirmed that the residuals follow

an approximately normal distribution, further justifying the use of parametric tests and supporting the robustness of Model 1.

Figure 2- Purchase Frequency Model



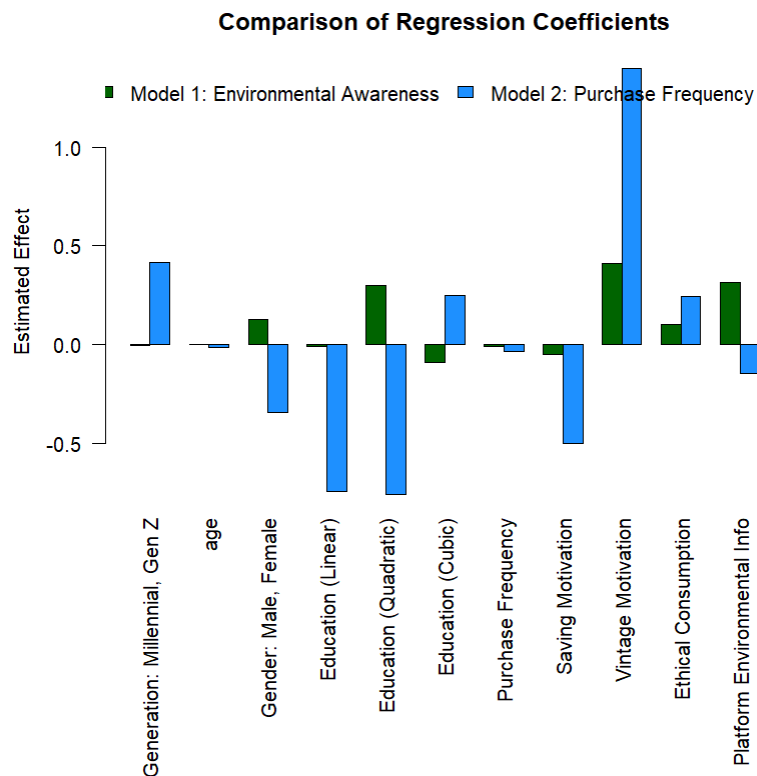
Source: own elaboration

The residuals appear generally scattered around the zero line, which is broadly consistent with the assumption of linearity. However, the slight curvature of the LOESS smoothing line suggests potential non-linearity. Additionally, there is some indication of heteroscedasticity, as the variance of residuals appears to increase with higher fitted values. Several data points (notably cases 6, 8, and 9) deviate markedly from the horizontal axis, indicating the presence of potential outliers that may exert disproportionate influence on model estimates. Taking together, these patterns indicate that **Model 2 may be mispecified**, either due to omitted variable bias or inadequate modeling of non-linear effects. The relatively low adjusted  $R^2$  and non-significant F-statistic further support this interpretation, highlighting a **limited explanatory capacity** for this model in its current form.

### 4.7.1 Comparison of Regression Models and Diagnostic Evaluation

Figure 3 presents a side-by-side comparison of the standardized regression coefficients for two linear models. Model 1, representing a basic specification, and Model 2, encompassing an extended specification with additional predictors and polynomial terms. The divergence in coefficient magnitudes and directions between the models reflects how model specification can shape the understanding of variable relationships within the data.

Figure 3- Comparison of Regression Coefficients



Source : own elaboration

Notably, in Model 2, the variables education.L (linear term) and education.Q (quadratic term) exert statistically significant and negative effects on the outcome, whereas in Model 1 their influence is marginal or negligible. This suggests that educational attainment does not follow a simple linear relationship with the dependent variable, but rather exhibits a curvilinear association, implying that certain education levels (e.g., tertiary) may correlate with stronger

environmental attitudes, while others (e.g., secondary or postgraduate) may not yield a consistent pattern.

Additionally, motivation which in this context refers to factors such as vintage interest or value-based drivers emerges with a much stronger positive coefficient in Model 2 than in Model 1. This enhancement suggests that the inclusion of interaction terms or better operationalization of motivation in the extended model enables a more accurate capture of its influence on sustainability-related behavior.

Variables such as gender, purchase frequency, and perceived environmental information on platforms display attenuated or modest negative effects in Model 2. These shifts might indicate that once motivational and educational factors are properly accounted for, the explanatory power of demographic variables diminishes. Furthermore, the generation variable fails to reach statistical significance in either model, reinforcing the study's broader conclusion that generational identity alone is an insufficient predictor of environmental consciousness or second-hand purchasing behavior.

Importantly, the comparison of these models illustrates the value of iterative model development. Model 2's improved ability to differentiate significantly from nonsignificant variables underscores that simplistic specifications may obscure key relationships, particularly when latent constructs such as value orientation or cognitive engagement are inadequately modeled. This has theoretical implications, as it challenges identity-based frameworks like Generational Cohort Theory and favors models emphasizing behavioral and attitudinal complexity.

The comparative strength of Model 1 reflected in its higher  $R^2$  value (0.764) and statistically significant predictors suggests that environmental awareness is better explained by **attitudinal and cognitive variables** than by demographic traits. Specifically, **vintage interest**, **platform environmental transparency**, and **education (quadratic)** emerged as the most consistent and conceptually coherent predictors.

The residual diagnostics and model comparison collectively underscore the importance of **model refinement and diagnostic rigor** in behavioral research. Poor model fit and assumption

violations, as seen in the Purchase Frequency model, reveal the limitations of relying solely on demographic or frequency-based indicators to explain pro-environmental behaviors.

From a practical standpoint, these findings indicate that **sustainability strategies should not be demographically targeted** (e.g., based on age or generation) but should instead be **value-aligned** and **cognitively engaging**. Platforms and policymakers seeking to promote circular consumption should prioritize transparent sustainability communication, educational content, and personalization based on users' motivations rather than identity markers.

#### 4.7.2 Robustness Checks

To assess the stability of the findings, alternative model specifications were estimated through the sequential inclusion of explanatory variables. The direction and significance of the key predictors, particularly Vintage Interest and Platform Environmental Information, remained stable across specifications. Furthermore, VIF diagnostics indicated no evidence of problematic multicollinearity. These results provide additional confidence that the principal findings are not driven by a particular model specification.

## **V. Conclusion**

### **5.1 Overview of the Study**

This research aimed to explore the determinants of environmental consciousness among users of online second-hand platforms, with a specific focus on potential generational differences between Millennials and Generation Z. Motivated by widespread claims that Generation Z is more sustainability-driven than older cohorts, the study sought to empirically test whether generational identity or other attitudinal and behavioral factors best predicts environmentally conscious behavior in the context of second-hand digital consumption.

Grounded in the frameworks of Consumer Behavior Theory, Generational Cohort Theory, and the Circular Economy model, the study employed a quantitative, cross-sectional design and utilized a multiple linear regression model to assess the predictive power of variables such as generation, age, gender, education, second-hand purchase frequency, saving behavior, ethical consumption, vintage interest, and perceived platform transparency.

Instead, three predictors emerged as both statistically significant and conceptually meaningful:

#### **1. Vintage Interest**

Participants who reported a strong interest in vintage items often associated with nostalgia, uniqueness, and personal style also scored significantly higher on measures of environmental consciousness. This finding suggests that what might appear to be a stylistic or aesthetic preference is also deeply intertwined with sustainable values. Vintage fashion represents a rejection of fast fashion, promoting reuse, authenticity, and longevity key pillars of the circular economy (Gregson & Crewe, 2003; ThredUp, 2023). In this sense, aesthetic motivations may act as an important behavioral gateway to sustainability, especially among younger users.

#### **2. Perceived Environmental Transparency of Platforms**

Another strong predictor was how participants perceived the environmental communication and transparency of the platforms they used. Users who believed that platforms like Vinted or Depop clearly conveyed their sustainability efforts were more likely to report higher levels of environmental consciousness. This insight emphasizes the power of platform design, interface

messaging, and brand values. Clear communication about environmental benefits, reuse statistics, and carbon savings may reinforce user beliefs and shape sustainable behavior (eBay Recommerce Report, 2023; Okeke et al., 2024).

### **3. Education (Quadratic Relationship)**

Educational attainment also showed a statistically significant curvilinear effect. Participants with intermediate to high levels of education were more environmentally conscious, aligning with research that links higher education to critical thinking, ethical reasoning, and sustainability literacy (Solomon, 2018; Kirchherr et al., 2017). This reinforces the idea that sustainability is not simply a behavior, but also a mindset one that is cultivated over time through exposure to environmental issues, social discourse, and academic content.

These findings suggest that sustainable behavior in the second-hand digital market is not primarily driven by demographic identity, but rather by individual values, perception of platform communication, and educational exposure.

## **5.2 Theoretical Contributions**

This study contributes to ongoing debates in sustainability and consumer behavior literature by:

- Questioning the validity of generational stereotyping in explaining pro-environmental behavior and demonstrating that such labels may lack predictive power in digital consumption contexts.
- Emphasizing the importance of value-driven and perception-based models over identity-based frameworks for understanding sustainable behavior.
- Providing empirical support for the role of aesthetic orientation (vintage interest) as a behavioral expression of sustainability thus broadening traditional conceptualizations of environmental motivation.

Moreover, the findings align with Circular Economy principles, confirming that attitudes and platform design can shape the extent to which consumers meaningfully engage in reuse and extended product lifecycles.

### 5.3 Practical Implications

The results of this study have several important implications for practitioners, especially those operating in second-hand platform design, marketing, and sustainability advocacy:

- Generational segmentation should be reconsidered as a primary strategy for sustainability-related marketing. Instead, companies should focus on shared values and interests, such as authenticity, vintage appreciation, and conscious reuse.
- Platform transparency is crucial. Consumers respond positively to visible, credible environmental information. Enhancing communication strategies such as showing carbon savings, reuse impact, or eco-labels may increase user engagement and awareness.
- Education remains a long-term enabler of environmental consciousness. Businesses, NGOs, and policymakers should consider partnerships with educational institutions or integrate educational tools into digital platforms to encourage critical thinking and sustainable decision-making.

### 5.4 Limitations of the Study

Despite its valuable insights, the study has several limitations that must be acknowledged:

- The use of purposive sampling and a relatively small sample size ( $n=59$ ) limits the generalizability of the results. Future studies with larger, randomized samples are needed to strengthen external validity.
- The cross-sectional design captures behavior and attitudes at a single point in time. Longitudinal research could provide deeper insights into how environmental attitudes evolve over time, especially as social and technological conditions change.
- All data were self-reported, which may introduce response bias, particularly on topics related to sustainability where social desirability can influence answers.
- While the study included attitudinal and behavioral variables, it did not account for cultural or psychological factors such as environmental identity, social influence, or emotional connection to sustainability.

- Because the data are cross-sectional, the direction of the observed relationships cannot be established with certainty. Future longitudinal studies would be better suited to examining causal relationships between environmental awareness and second-hand purchasing behaviour.

## 5.5 Suggestions for Future Research

To build upon the findings of this study, several future research directions are recommended:

- Qualitative research (e.g., interviews, focus groups) could help explore the deeper motivations and personal narratives behind second-hand consumption.
- Comparative studies between different platforms (e.g., Vinted vs. Depop vs. eBay) could help identify platform-specific influences on environmental awareness.
- Cross-cultural studies would help determine whether these findings hold across different national or regional contexts, especially in markets where sustainability norms vary.
- Research into algorithmic influence (e.g., how platform recommendations shape consumer behavior) could further illuminate the intersection of digital design and sustainability.

## 5.6 Final Remarks

In conclusion, this study has shown that sustainable behavior in online second-hand markets is not determined by who people are in terms of generation, but by how they think, what they value, and how they engage with the platforms they use. Environmental consciousness emerges not as a generational trait, but as the result of cognitive, aesthetic, and informational factors that cut across demographic boundaries.

As the circular economy becomes more embedded in daily life, understanding these drivers becomes essential for businesses, educators, and policymakers seeking to promote responsible consumption. This research offers a modest but meaningful contribution to that understanding and invites a broader, more inclusive conversation about what it truly means to act sustainably in the digital age.

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## **Annexes**

### **Annex 1 - Questionnaire Survey**

#### Section 1: Demographic Information

1. Have you purchased any second-hand products through online platforms within the last 12 months?  
☐ Yes  
☐ No
  
2. How old are you?  
\_\_\_\_ years
  
3. To which generational cohort do you belong?  
☐ Millennial (born between 1981 and 1996)  
☐ Generation Z (born between 1997 and 2012)
  
4. What is your gender?  
☐ Female  
☐ Male
  
5. What is the highest level of education you have completed?  
☐ Secondary school  
☐ Bachelor's degree  
☐ Master's degree  
☐ Doctorate (PhD or equivalent)
  
6. Which of the following best describes your current employment status?  
☐ Student  
☐ Employed full-time  
☐ Employed part-time  
☐ Self-employed  
☐ Unemployed

## Section 2: Consumer Motivations

For the following statements, please indicate your level of agreement using a five-point Likert scale where:

1 = Strongly Disagree and 5 = Strongly Agree.

| Statement                                                                                          | 1 | 2 | 3 | 4 | 5 |
|----------------------------------------------------------------------------------------------------|---|---|---|---|---|
| I purchase second-hand products online primarily to save money.                                    |   |   |   |   |   |
| I am motivated to buy second-hand items to reduce environmental impact.                            |   |   |   |   |   |
| Ethical and sustainable consumption is an important factor in my second-hand shopping decisions.   |   |   |   |   |   |
| I enjoy purchasing unique or vintage items through second-hand platforms.                          |   |   |   |   |   |
| I am concerned about overconsumption and the waste generated by the fashion and retail industries. |   |   |   |   |   |

Open-Ended Question:

- Please explain your primary motivation for engaging in online second-hand shopping.

## Section 3: Digital Engagement Patterns

8. Which of the following online platforms do you primarily use for purchasing second-hand products?

- ☐ Vinted
- ☐ Depop
- ☐ Poshmark
- ☐ eBay
- ☐ Facebook Marketplace
- ☐ Other : \_\_\_\_\_

9. How frequently do you make online second-hand purchases?

- ☐ Rarely (1–2 times per year)
- ☐ Occasionally (3–5 times per year)
- ☐ Regularly (more than 5 times per year)
- ☐ Monthly
- ☐ Weekly or more

10. How do you usually discover second-hand items online? (Select all that apply)

- ☐ Browsing marketplace applications
- ☐ Recommendations from friends/family
- ☐ Social media platforms (e.g., Instagram, TikTok)
- ☐ Influencer promotions or endorsements
- ☐ Promotional emails or newsletters
- ☐ Other (please specify): \_\_\_\_\_

11. Please rate the importance of the following platform features when engaging in online second-hand shopping:  
(1 = Not Important, 5 = Very Important)

| Feature                                                         | 1 | 2 | 3 | 4 | 5 |
|-----------------------------------------------------------------|---|---|---|---|---|
| Ease of navigation and user-friendliness                        |   |   |   |   |   |
| Secure and reliable payment options                             |   |   |   |   |   |
| Availability of customer reviews and feedback                   |   |   |   |   |   |
| Community and social interaction features                       |   |   |   |   |   |
| Clear information about environmental impact and sustainability |   |   |   |   |   |

#### Section 4: Participation in the Circular Economy

12. How frequently do you engage in the following activities?  
(1 = Never, 5 = Very Often)

| Activity                                           | 1 | 2 | 3 | 4 | 5 |
|----------------------------------------------------|---|---|---|---|---|
| Selling used items through second-hand platforms   |   |   |   |   |   |
| Donating used items instead of discarding them     |   |   |   |   |   |
| Purchasing refurbished or recycled products        |   |   |   |   |   |
| Borrowing or sharing second-hand items with others |   |   |   |   |   |

Open-Ended Question:

- How do you believe your personal habits contribute to waste reduction through second-hand consumption?

#### Section 5: Generational Values and Perceptions

13. In your opinion, is your generational cohort (Millennials or Generation Z) more environmentally conscious than previous generations?

☐ Yes

☐ No

☐ Unsure

14. How do your generation's values, such as sustainability, ethics, and affordability, influence your consumption behavior compared to other generations?

15. Do you observe any notable differences between Millennials and Generation Z in their approach to second-hand shopping? Please describe.

#### Section 6 – Environmental Consciousness

16. Please indicate your level of agreement with the following statements.

*(Scale: 1 = Strongly Disagree, 5 = Strongly Agree)*

| Statement                                                   | 1 =<br>Strongly<br>Disagree | 2 | 3 =<br>Neutral | 4 | 5 =<br>Strongly<br>Agree |
|-------------------------------------------------------------|-----------------------------|---|----------------|---|--------------------------|
| I consider environmental impact in my purchasing decisions. |                             |   |                |   |                          |

| Statement                                                            | 1 =<br>Strongly<br>Disagree | 2 | 3 =<br>Neutral | 4 | 5 =<br>Strongly<br>Agree |
|----------------------------------------------------------------------|-----------------------------|---|----------------|---|--------------------------|
| I avoid buying from companies that harm the environment.             |                             |   |                |   |                          |
| I am willing to pay more for sustainable products.                   |                             |   |                |   |                          |
| I believe my consumer choices have a real impact on the environment. |                             |   |                |   |                          |
| I research sustainable practices before buying.                      |                             |   |                |   |                          |

|                                                              |                             |   |                |   |                          |
|--------------------------------------------------------------|-----------------------------|---|----------------|---|--------------------------|
| Statement                                                    | 1 =<br>Strongly<br>Disagree | 2 | 3 =<br>Neutral | 4 | 5 =<br>Strongly<br>Agree |
| Environmental concerns<br>influence my overall<br>lifestyle. |                             |   |                |   |                          |

#### Section 7: Future Outlook and Suggestions

17. What improvements would you recommend for enhancing online second-hand shopping platforms?

18. What factors would encourage you to increase your engagement with online second-hand shopping in the future?

## Annex 2- Complete R Script – Regression Models for Environmental Awareness and Purchase Frequency

```
5 # Install necessary packages
6 install.packages("dplyr")
7 install.packages("ggplot2")
8 install.packages("car")
9 install.packages("broom")
10 install.packages("stargazer")
11 install.packages("readxl")
12 install.packages("effectsize")
13 # Load required libraries
14 library(dplyr)
15 library(ggplot2)
16 library(car)
17 library(broom)
18 library(stargazer)
19 library(readxl)
20 # Load the dataset
21
22 data <- read_excel("C:/Users/Novais Ferreira/Downloads/survey_data2025.xlsx")
23
24 data <- data %>%
25   rename(
26     age = idade,
27     gender = genero,
28     generation = geracao,
29     education = educacao,
30     saving_motivation = poupanca,
31     vintage_motivation = vintage,
32     ethical_consumption = consumo_etico,
33     platform_environmental_info = info_ambiental_plataforma,
34     environmental_awareness = consciencia_ambiental,
35     purchase_frequency = frequencia_compra
36   )
37
38 # Translate education levels
39 data$education <- dplyr::recode(data$education,
40                                "Secundário" = "Secondary",
41                                "Licenciatura" = "Bachelor",
42                                "Mestrado" = "Master",
43                                "Doutoramento" = "PhD")
44
45 # Convert categorical variables
46 data$gender <- as.factor(data$gender)
47 data$generation <- as.factor(data$generation)
48 data$education <- ordered(data$education, levels = c("Secondary", "Bachelor", "Master", "PhD"))
49
50 # OPTIONAL: Handle missing data (drop NAs for model vars)
51 data_model <- data %>%
52   select(age, gender, generation, education,
53          saving_motivation, vintage_motivation,
54          ethical_consumption, platform_environmental_info,
55          environmental_awareness, purchase_frequency) %>%
56   na.omit()
57
58 # MODEL 1: ENVIRONMENTAL AWARENESS
59
60 model1 <- lm(environmental_awareness ~ generation + age + gender + education +
61              purchase_frequency + saving_motivation + vintage_motivation +
62              ethical_consumption + platform_environmental_info, data = data_model)
63 summary(model1)
64 vif(model1)
65
66 cat("Model 1: Environmental Awareness as Dependent Variable\\n")
67 summary(model1)
68 vif(model1)
```

```

71 # MODEL 2: PURCHASE FREQUENCY
72
73 model2 <- lm(purchase_frequency ~ generation + age + gender + education +
74             saving_motivation + vintage_motivation + ethical_consumption +
75             platform_environmental_info + environmental_awareness, data = data_model)
76
77 cat("Model 2: Purchase Frequency as Dependent Variable\\n")
78 summary(model2)
79 vif(model2)
80
81
82 model2 <- lm(purchase_frequency ~ generation + age + gender + education +
83             saving_motivation + vintage_motivation + ethical_consumption +
84             platform_environmental_info + environmental_awareness, data = data_model)
85
86
87 # Standardized effect sizes
88 if (!require(parameters)) install.packages("parameters")
89 library(parameters)
90 model1_impact <- model_parameters(model1, standardize = "refit", ci = 0.95)
91 model2_impact <- model_parameters(model2, standardize = "refit", ci = 0.95)
92 print(model1_impact)
93 print(model2_impact)
94
95 #. EXPORT MODELS TO TEXT
96 stargazer(model1, model2, type = "text",
97           title = "Regression Models: Environmental Awareness & Purchase Frequency",
98           column.labels = c("Model 1", "Model 2"))
99 # Residual plots
100 plot(model1, which = 1)
101 plot(model2, which = 1)
102
103
104 # Combine coefficients into a matrix
105 coefs_matrix <- rbind(coef1, coef2)
106
107 #. EXPORT MODELS TO TEXT
108 stargazer(model1, model2, type = "text",
109           title = "Regression Models: Environmental Awareness & Purchase Frequency",
110           column.labels = c("Model 1", "Model 2"))
111 # Residual plots
112 plot(model1, which = 1)
113 plot(model2, which = 1)
114
115
116 # Combine coefficients into a matrix
117 coefs_matrix <- rbind(coef1, coef2)
118
119 # Set plotting parameters to avoid label and legend cutoff
120 par(mar = c(10, 5, 4, 2)) # Increase bottom margin for axis labels
121
122 # Create barplot
123 barplot(coefs_matrix,
124         beside = TRUE,
125         col = c("darkgreen", "dodgerblue"),
126         names.arg = variables,
127         las = 2, # Rotate variable labels for readability
128         main = "Comparison of Regression Coefficients",
129         ylab = "Estimated Effect")
130
131 # Add legend with better positioning
132 legend("top", inset = 0.01, bty = "n",
133       legend = c("Model 1: Environmental Awareness",
134                 "Model 2: Purchase Frequency"),
135       fill = c("darkgreen", "dodgerblue"),
136       horiz = TRUE, cex = 0.8)

```

```

128 # Plot: Comparison of Regression Coefficients with clearer legend and labels
129 coef1 <- coef(model1)[-1] # Remove intercept
130 coef2 <- coef(model2)[-1] # Remove intercept
131 variables <- names(coef1)
132
133 par(mfrow = c(2, 1), mar = c(5, 5, 4, 2)) # 2 rows, 1 column layout
134
135 # Model 1
136 plot(model1$fitted.values, model1$residuals,
137      xlab = "Fitted Values", ylab = "Residuals",
138      main = "Residuals vs Fitted (Environmental Awareness Model)",
139      pch = 19, col = "darkgreen")
140 abline(h = 0, col = "red", lty = 2)
141 lines(lowess(model1$fitted.values, model1$residuals), col = "blue", lwd = 2)
142 legend("topright",
143      title = "Model 1",
144      legend = c("Residuals", "Zero Line", "LOESS Smoother"),
145      col = c("darkgreen", "red", "blue"),
146      pch = c(19, NA, NA),
147      lty = c(NA, 2, 1),
148      lwd = c(NA, 1, 2),
149      bty = "n")
150
151 # Model 2
152 plot(model2$fitted.values, model2$residuals,
153      xlab = "Fitted Values", ylab = "Residuals",
154      main = "Residuals vs Fitted (Purchase Frequency Model)",
155      pch = 19, col = "dodgerblue")
156 abline(h = 0, col = "red", lty = 2)
157 lines(lowess(model2$fitted.values, model2$residuals), col = "blue", lwd = 2)
158 legend("topright",
159      title = "Model 2",
160      legend = c("Residuals", "Zero Line", "LOESS Smoother"),
161      col = c("dodgerblue", "red", "blue"),
162      pch = c(19, NA, NA),
163      lty = c(NA, 2, 1),
164      lwd = c(NA, 1, 2),
165

```

```

165         lwd = c(NA, 1, 2),
166         bty = "n")
167
168
169 # Extract coefficients without intercept
170 coef1 <- coef(model1)[-1]
171 coef2 <- coef(model2)[-1]
172 variables <- names(coef1)
173
174 # Create barplot data
175 coefs_matrix <- rbind(coef1, coef2)
176
177 # Plot with space for labels
178 par(mar = c(10, 5, 4, 2))
179 barplot(coefs_matrix,
180         beside = TRUE,
181         col = c("darkgreen", "dodgerblue"),
182         names.arg = variables,
183         las = 2, # rotate labels
184         main = "Comparison of Regression Coefficients",
185         ylab = "Estimated Effect")
186
187 # Add legend
188 legend("top",
189       legend = c("Model 1: Environmental Awareness",
190                 "Model 2: Purchase Frequency"),
191       fill = c("darkgreen", "dodgerblue"),
192       horiz = TRUE,
193       bty = "n")
194

```

## Annex 3- Excel Data Survey

|    | A     | B        | C       | D             | E                         | F                     | G                      | H        | I                 | J        | K |
|----|-------|----------|---------|---------------|---------------------------|-----------------------|------------------------|----------|-------------------|----------|---|
| 1  | idade | genero   | vintage | consumo_etico | info_ambiental_plataforma | consciencia_ambiental | geracao                | educacao | frequencia_compra | poupanca |   |
| 2  | 1996  | Masculin | 5       | 5             | 4                         | 5                     | Millenniz Licenciatura |          | 3                 | 3        |   |
| 3  | 1996  | Masculin | 5       | 5             | 5                         | 4                     | Millenniz Licenciatura |          | 5                 | 5        |   |
| 4  | 2000  | Feminino | 4       | 4             | 3                         | 3.666666667           | Millenniz Licenciatura |          | 4                 | 2        |   |
| 5  | 2004  | Feminino | 5       | 5             | 4                         | 4.333333333           | Geraçao ; Secundário   |          | 3                 | 2        |   |
| 6  | 2006  | Feminino | 5       | 4             | 4                         | 3.666666667           | Geraçao ; Licenciatura |          | 2                 | 1        |   |
| 7  | 1983  | Masculin | 5       | 5             | 4                         | 4.333333333           | Doutoramento           |          | 2                 | 3        |   |
| 8  | 1987  | Feminino | 4       | 4             | 4                         | 3.666666667           | Millenniz Mestrado     |          | 1                 | 3        |   |
| 9  | 2007  | Masculin | 2       | 2             | 4                         | 2                     | Secundário             |          | 4                 | 3        |   |
| 10 | 2008  | Masculin | 2       | 2             | 4                         | 3.666666667           | Secundário             |          | 3                 | 4        |   |
| 11 | 2010  | Feminino | 5       | 5             | 5                         | 4.666666667           | Geraçao ; Secundário   |          | 4                 | 3        |   |
| 12 | 1996  | Masculin | 5       | 5             | 5                         | 4.666666667           | Millenniz Mestrado     |          | 1                 | 3        |   |
| 13 | 1999  | Feminino | 4       | 4             | 5                         | 4.333333333           | Millenniz Mestrado     |          | 5                 | 3        |   |
| 14 | 2010  | Masculin | 1       | 4             | 4                         | 2.666666667           | Geraçao Z              |          | 4                 | 2        |   |
| 15 | 1999  | Feminino | 4       | 4             | 4                         | 4                     | Geraçao ; Licenciatura |          | 2                 | 4        |   |
| 16 | 1985  | Masculin | 4       | 4             | 4                         | 4                     | Millenniz Mestrado     |          | 2                 | 2        |   |
| 17 | 1989  | Feminino | 4       | 4             | 4                         | 4                     | Millenniz Doutoramento |          | 2                 | 5        |   |
| 18 | 2003  | Masculin | 4       | 4             | 4                         | 4                     | Geraçao ; Licenciatura |          | 3                 | 4        |   |
| 19 | 1995  | Feminino | 4       | 4             | 4                         | 4                     | Millenniz Mestrado     |          | 3                 | 2        |   |
| 20 | 2000  | Feminino | 4       | 4             | 4                         | 4                     | Licenciatura           |          | 3                 | 1        |   |
| 21 | 2001  | Feminino | 5       | 4             | 5                         | 4.333333333           | Geraçao ; Mestrado     |          | 2                 | 4        |   |
| 22 | 1997  | Masculin | 4       | 5             | 4                         | 4                     | Geraçao ; Mestrado     |          | 3                 | 4        |   |
| 23 | 2006  | Masculin | 4       | 4             | 4                         | 4.333333333           | Geraçao ; Secundário   |          | 2                 | 4        |   |
| 24 | 1990  | Feminino | 4       | 4             | 4                         | 4                     | Millenniz Doutoramento |          | 2                 | 4        |   |
| 25 | 1987  | Masculin | 4       | 4             | 4                         | 4                     | Millenniz Mestrado     |          | 3                 | 2        |   |
| 26 | 2003  | Feminino | 4       | 4             | 4                         | 4                     | Geraçao ; Mestrado     |          | 3                 | 3        |   |
| 27 | 2002  | Feminino | 4       | 4             | 4                         | 4                     | Geraçao ; Licenciatura |          | 4                 | 2        |   |
| 28 | 1995  | Masculin | 4       | 4             | 4                         | 4                     | Millenniz Mestrado     |          | 2                 | 4        |   |
| 29 | 2004  | Feminino | 4       | 4             | 4                         | 4                     | Geraçao ; Licenciatura |          | 3                 | 3        |   |
| 30 | 1997  | Masculin | 5       | 5             | 5                         | 4.666666667           | Mestrado               |          | 3                 | 3        |   |
| 31 | 1989  | Masculin | 3       | 4             | 4                         | 3.666666667           | Millenniz Doutoramento |          | 1                 | 2        |   |
| 32 | 2012  | Masculin | 2       | 2             | 2                         | 3.333333333           |                        |          | 3                 | 3        |   |
| 33 | 2007  | Masculin | 4       | 4             | 4                         | 4                     | Geraçao ; Licenciatura |          | 2                 | 3        |   |
| 34 | 1982  | Masculin | 4       | 4             | 4                         | 4.333333333           | Secundário             |          | 1                 | 4        |   |
| 35 | 1985  | Masculin | 4       | 4             | 5                         | 4                     | Millenniz Licenciatura |          | 5                 | 3        |   |
| 36 | 1983  | Masculin | 5       | 4             | 5                         | 4                     | Mestrado               |          | 5                 | 4        |   |
| 37 | 2006  | Masculin | 5       | 5             | 4                         | 4.333333333           | Geraçao ; Mestrado     |          | 4                 | 3        |   |
| 38 | 2008  | Masculin | 4       | 4             | 4                         | 4                     | Geraçao ; Mestrado     |          | 3                 | 2        |   |
| 39 | 2000  | Feminino | 4       | 4             | 5                         | 4                     | Geraçao ; Mestrado     |          | 1                 | 4        |   |
| 40 | 1996  | Masculin | 4       | 4             | 3                         | 3.666666667           | Millenniz Licenciatura |          | 3                 | 4        |   |
| 41 | 2008  | Masculin | 4       | 4             | 1                         | 1                     | Mestrado               | Mestrado | 3                 | 3        |   |
| 42 | 2008  | Masculin | 4       | 4             | 1                         | 4                     | Mestrado               |          | 3                 | 3        |   |
| 43 | 2010  | Feminino | 3       | 4             | 4                         | 3                     | Geraçao ; Licenciatura |          | 2                 | 4        |   |
| 44 | 1987  | Masculin | 4       | 4             | 3                         | 3.333333333           | Millenniz Mestrado     |          | 3                 | 3        |   |
| 45 | 1994  | Masculin | 5       | 4             | 4                         | 4                     | Millenniz Licenciatura |          | 1                 | 3        |   |
| 46 | 2003  | Masculin | 4       | 5             | 4                         | 3.333333333           | Geraçao ; Licenciatura |          | 5                 | 3        |   |