Playing for the Planet: How Gamification Shapes Purchase Behavior and Brand Outcomes in Sustainable FMCG Retail

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Abstract

Sustainable consumption in FMCG retail is a major environmental and managerial challenge, because everyday consumer goods such as food or personal care items combine high household penetration with frequent purchase and disposal, leading to significant resource use and waste generation. Simultaneously, purchase decisions in this category are typically low-involvement and habit-driven, which limits the adoption of more sustainable alternatives.

This thesis examines whether gamification can shape sustainable purchase behavior and brand outcomes in FMCG retail. A quantitative experimental design was applied using an online survey. Participants were randomly exposed to individual gamification, social gamification, or a non-gamified control scenario within an online shopping context.

The results indicate that gamification positively impacts purchase intention, willingness to pay, and brand loyalty compared to a non-gamified scenario. No meaningful differences emerged between individual and social gamification designs. Mediation analyses indicate that these effects are explained by enjoyment and empowerment, demonstrating that gamification operates through psychological mechanisms rather than design formats.

Brand trust emerged as a more sensitive outcome. Gamification exerted negative direct effects on trust for some consumers. This relationship was strongly moderated by sustainability orientation. Digital affinity did not moderate any of the effects significantly.

Overall, the findings suggest that gamification can be effective for promoting sustainable consumer behavior in FMCG retail when it enhances enjoyment and empowerment and is implemented with simplicity, credibility, and segmentation in mind. Future research should test these effects in real retail environments and examine their persistence across time and product categories.

Keywords: Brand loyalty, Brand trust, Consumer decision-making, FMCG retail, Gamification, Purchase intention, Sustainable consumption, Willingness to pay

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Resumo

O consumo sustentável no retalho de bens de grande consumo constitui um desafio ambiental e de gestão, uma vez que os produtos apresentam elevada penetração nos lares e são adquiridos e descartados com frequência, gerando um uso significativo de recursos e resíduos. Ao mesmo tempo, as decisões de compra nesta categoria são geralmente de baixo envolvimento e orientadas por hábitos, o que dificulta a adoção de alternativas sustentáveis.

Esta tese analisa se a gamificação pode influenciar comportamentos de compra sustentáveis e resultados de marca no retalho de bens de grande consumo. Para esse efeito, foi aplicado um desenho experimental quantitativo através de um inquérito online, no qual os participantes foram expostos aleatoriamente a gamificação individual, gamificação social ou um cenário de controlo.

Os resultados demonstram que a gamificação aumenta a intenção de compra, a disposição para pagar e a fidelidade à marca, em comparação com um cenário não gamificado. Não se observaram diferenças entre os desenhos de gamificação individual e social. As análises de mediação indicam que estes efeitos são explicados pelo prazer e pelo empoderamento, sugerindo que a gamificação atua através de mecanismos psicológicos.

A confiança na marca revelou-se um resultado mais sensível. A gamificação produziu efeitos negativos diretos na confiança de alguns consumidores, sendo esta relação moderada pela orientação para a sustentabilidade. A afinidade digital não apresentou efeitos moderadores significativos.

Os resultados sugerem que a gamificação pode promover comportamentos de consumo sustentável no retalho quando reforça o prazer e o empoderamento e é implementada de forma credível.

Keywords: Lealdade à marca, Confiança na marca, Tomada de decisão do consumidor, Varejo de bens de consumo rápido (FMCG), Gamificação, Intenção de compra, Consumo sustentável, Disposição a pagar

Title: Jogando pelo planeta: como a gamificação molda o comportamento de compra e os resultados das marcas no retalho sustentável de bens de consumo rápido (FMCG)

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List of Abbreviations

FMCG	Fast-Moving Consumer Goods
WTP	Willingness to Pay
SDT	Self-Determination Theory
IMI	Intrinsic Motivation Theory

AI Disclaimer

This document has been reviewed using AI tools for linguistic refinement and clarity.

1. Introduction

1.1. Relevance of the Topic

Earth Overshoot Day in 2024 fell on August 1. From this date onward, the use of the Earth's natural resources surpassed what could be regenerated within the same year (Interreg Central Europe 2025). The increasingly early arrival of this date highlights how current patterns of production and consumption exceed planetary boundaries and contribute to long-term consequences such as climate change. This persistent overshoot therefore underscores the need for a fundamental transformation of how societies source, produce, and consume everyday goods. Companies play a pivotal role in this transformation, as their influence on value chains and consumer decisions surpasses what individual consumers alone can achieve (Delmas, Lyon and Maxwell 2019).

This need for transformation is especially evident in the fast-moving consumer goods (FMCG) industry. FMCG products are purchased, consumed, and then disposed of millions of times every day, resulting in substantial environmental impacts (Bocken, Harsch and Weissbrod 2022). Most of these impacts occur in the upstream and downstream stages of the value chain, captured as Scope 3 emissions. Scope 3 emissions refer to emissions that fall outside a company's direct control but are closely linked to its business activities through the sourcing, usage, and disposal of products (Schmidt, Nill and Scholz 2022). For major FMCG companies such as Procter & Gamble or Nestlé, scope 3 emissions account for more than 90 percent of their total corporate emissions (Procter & Gamble 2024, Nestlé 2024).

As a result, consumer behavior and everyday purchasing decisions become a crucial factor in shaping the industry's environmental footprint. However, consumer decisions in FMCG contexts are often shaped by habitual behavior and low involvement, which makes sustainable choices difficult to achieve (Terlau and Hirsch 2015). Consequently, FMCG companies face growing pressure from regulators and market competition to develop more effective and innovative methods for encouraging sustainable choices (Prashar 2022).

Against this backdrop, the question arises of how retailers can effectively promote more sustainable purchase decisions. Traditional information campaigns often prove insufficient in FMCG settings because cognitive capacity for processing sustainability information is limited (Vermeir and Verbeke 2006). As a result, consumers frequently fall back on familiar brands or promotional cues, and more sustainable alternatives are overlooked despite pro-environmental intentions (Gleim et al. 2013).

These limitations have increased the interest in tools that can more actively engage shoppers and support behavioral change in everyday retail environments. One promising approach is gamification, which applies game elements to capture attention and motivate consumers in unconventional ways (Deterding et al. 2011). However, research on gamification has largely focused on online environments, applications, and high-involvement contexts like education and healthcare, while evidence from FMCG settings remains limited (Hamari, Koivisto and Sarsa 2014).

This raises the question of whether gamification can shape more sustainable consumer behavior in FMCG settings, which design approaches are effective and through which psychological mechanisms and consumer characteristics these effects emerge.

1.2. Research Objective

Building on the relevance of the topic and the research gap identified above, this thesis is guided by the following central research question:

RQ1: How does gamification design influence purchase behavior and brand outcomes in sustainable FMCG retail?

With the aim of answering the main research question, three further sub-research questions are formulated that operationalize RQ1 more precisely:

RQ2: How do enjoyment and perceived empowerment mediate the effects of gamification on purchase behavior and brand outcomes?

RQ3: How do consumer characteristics moderate the effects of gamification on purchase behavior and brand outcomes?

RQ4: What does effective gamification look like for retailers seeking to promote sustainable consumer behavior?

The aim of this study is to answer the research questions and derive relevant contributions for academic literature and managerial practice. The work pursues three central objectives. First, it addresses the research gap by empirically examining how different gamification designs influence purchase behavior and brand outcomes in the context of sustainable FMCG retail. Second, it analyses the underlying mechanisms by incorporating psychological mediators and moderating consumer characteristics in order to explain how and for whom gamification exerts its effects. Third, it develops actionable recommendations for FMCG retailers on how

gamification can be used and designed effectively to foster more sustainable behavior and strengthening brand value.

1.3. Thesis Structure

With the research objective in mind, this thesis is divided into six chapters. The following section outlines the structure of the thesis and selected research methods, showing how each chapter contributes to answering the research questions derived in section 1.2.

Chapter 1 highlights the ecological and managerial relevance of sustainable consumption decisions in the FMCG sector and introduces gamification as a promising yet partially underexplored digital intervention within this context. Based on this, the research questions that form the guiding framework of the study are formulated.

Chapter 2 develops the theoretical foundation of the thesis based on a comprehensive literature review. First, the specifics of consumer behavior in FMCG retail are explained, including market and category characteristics and the attitude–behavior gap in the context of sustainability. Next, key concepts of gamification are defined, the underlying psychological mechanisms are introduced, and different gamification designs are discussed. The two domains are then linked to explain why gamification may influence sustainability decisions in FMCG retail. Building on this, the outcome variables of the study are introduced. This is followed by the mediators through which gamification may exert its effects, and the consumer characteristics that act as potential moderating factors. Finally, the hypotheses and the conceptual model derived from literature are presented.

Chapter 3 presents the methodological approach used to empirically test the conceptual model. This study applies a quantitative, experimental research design that allows for the systematic comparison of different gamification designs in an FMCG setting. This design is appropriate because it enables controlled variation of gamification elements and allows for causal inference. The chapter details the data collection process, the structure of the questionnaire, the operationalization of all variables, and the statistical procedures used to test the hypotheses.

Chapter 4 presents the empirical results. After data preparation and reliability testing, the descriptive statistics are reported, followed by the findings of the hypothesis testing. These results form the basis for the subsequent discussion.

Chapter 5 discusses the results in relation to the theoretical concepts described in Chapter 2 and answers the research questions formulated in Chapter 1.2. The findings are interpreted and

theoretical as well as practical implications are derived. The chapter also outlines limitations of the study and identifies opportunities for future research.

Chapter 6 concludes the thesis by summarizing the key findings. It provides an integrative assessment of the potential of gamification to foster sustainable consumer behavior in FMCG retail.

Building on this research design, the following chapter develops the theoretical foundation of the thesis by reviewing relevant literature.

2. Literature Review

Chapter 2 synthesizes the relevant literature on sustainable consumer behavior in FMCG retail and on gamification. By integrating these two research streams, the chapter establishes the theoretical foundation for the study, develops the conceptual model and explains the key variables. Finally, the hypotheses and conceptual model that guide the empirical analysis are derived.

2.1. Consumer Behavior in Sustainable FMCG Retail

To address the main research question, this chapter introduces the characteristics of the FMCG retail market and its categories. It examines behavioral drivers and barriers and situates these dynamics within the broader sustainability context. The goal is to clarify why purchase decisions in this industry are environmentally consequential and psychologically complex, thereby providing the basis for assessing how gamification may influence these behaviors.

This thesis focuses exclusively on drugstore products within the FMCG sector. These categories, such as personal care and household items, combine high purchase frequency with substantial environmental impacts as already stated in chapter 1.1. In the course of this dissertation, therefore, only those product categories that are typically found in a retailer's drugstore range will be considered. Highly involved categories or non-retail contexts will not be explored in order to ensure that the thesis remains within scope.

2.1.1. Market Context and Category Characteristics

The term “retail” encompasses all activities involving the sale of goods or services to end consumers for personal use (Peterson and Balasubramanian 2002, Levy and Weitz 1996). As the interface between production and consumption, retailers have substantial influence on consumer decision-making through assortment decisions, pricing strategies, and the

configuration of physical and digital customer touchpoints (Jones, Hillier and Comfort 2011, European Brands Association 2019). Retail transactions today occur through various channels, including physical stores such as supermarkets, drugstores, or specialty shops; digital platforms like e-commerce websites and retailer apps, and, increasingly, omnichannel environments that combine physical and digital shopping experiences (Verhoef, Kannan and Inman 2015). The retail sector's assortment covers a wide range of goods and services, including apparel, consumer electronics, groceries, pharmaceuticals or personal care, and after-sales advisory services.

Within this broader retail context, fast-moving consumer goods represent a category characterized by intense competition, high purchase frequency and pronounced price sensitivity (Oramana, Azabagaoglua and Inana 2011). These market conditions are further reinforced by promotional dynamics and inflationary pressures, which heighten consumers' focus on price and convenience. As a result, Dibb et al. (2006) and Terlau and Hirsch (2015) argue that the nature of FMCG shopping leads consumers to rely on heuristics such as brand familiarity, price cues, and shelf visibility, rather than detailed evaluation of product attributes.

From a sustainability perspective, FMCG products present a particular challenge. Although individual items are small and inexpensive, their cumulative environmental impact is substantial. This is especially evident in categories such as personal care and household products, where single-use packaging contributes to high consumer-related Scope 3 emissions (Bockena, Harscha and Weissbrodc 2022). In response to growing consumer awareness and demand for more responsible products (Rausch, Baier and Wening 2021), retailers and manufacturers have expanded the availability of sustainable alternatives, including biodegradable or refillable packaging, formulations with reduced chemical content, and vegan options (Vieira, Agnihotri and Dhal 2023). However, despite this increased market presence, these alternatives continue to face barriers to widespread adoption (Vermeir and Verbeke 2006).

Retailers occupy a strategic position when it comes to influencing sustainable decisions, as they determine which items are made visible and attractive at the point of sale or online (Luceri and Latusi 2025). However, as already described in chapter 1.1 the low consumer involvement for FMCG products often limits the effectiveness of conventional sustainability communication, such as eco-labels and icon claims. Prior research shows that the habitual nature of supermarket shopping reduces consumer attention to sustainability labels and therefore only slightly influences their purchase decisions (Cook, et al. 2023).

All these characteristics make the FMCG drugstore sector an important area for new behavior change mechanisms. They provide an ideal setting for testing motivational tools, such as gamification, that aim to interrupt the decision-making processes and promote more sustainable product choices.

2.1.2. Consumer Behavior and the Attitude–Behavior Gap

As outlined in the previous section, even as the availability of sustainable product alternatives and consumer demand for them has expanded, actual purchase adoption remains limited. This discrepancy between pro-environmental attitudes and actual purchasing behavior is widely referred to as the "Attitude–Behavior Gap" (Vermeir and Verbeke 2006, Johnstone and Tan 2015).

Empirical studies consistently show that although a large proportion of consumers claim to care about environmental issues, their actual purchase often fails to reflect these stated values (Gleim, et al. 2013, Carrigan and Attalla 2001). This contradiction is particularly present in low-involvement settings, where decisions are made quickly and not with conscious deliberation. Gleim et al. (2013) argue that this context favors routine-based behavior and diminishes the influence of ethical intentions.

Multiple explanations for the Attitude–Behavior Gap have been advanced in literature. Bray, Johns, and Kilburn (2011) identify information overload and confusion due to the proliferation of sustainability labels as major cognitive barriers. Similarly, Gupta and Ogden (2009) emphasize the role of consumer skepticism, especially toward corporate sustainability claims, which they associate with the phenomenon of "greenwashing." In addition to informational and trust-related barriers, economic considerations persist. While many consumers express a willingness to pay more for ethical products, actual price sensitivity often overrides these intentions in reality (Auger and Devinney 2007).

Habits are another decisive factor, particularly in the FMCG domain. Terlau and Hirsch (2015) underscore that repeated behavior and convenience shape patterns that structurally disadvantage sustainable options. In this view, even consumers with high environmental concern often revert to familiar routines unless specific interventions disrupt the status quo.

The literature diverges on how best to address this behavioral inconsistency. Vermeir and Verbeke (2006) advocate for strategies that enhance consumer knowledge and self-efficacy, suggesting that more informed and confident consumers are more likely to act sustainably. In contrast, Carrington, Neville, and Whitwell (2014) argue that individual interventions are

insufficient and call for structural measures such as "choice editing," where retailers curate assortments in ways that make sustainable options more accessible by default. Gupta and Ogden's (2009) findings reinforce this structural perspective by demonstrating that trust in institutional frameworks plays a critical role in enabling behavioral change.

Together, these studies suggest that breaking the Attitude–Behavior Gap requires a combination of trust-building, simplification, and intrinsic-oriented strategies.

2.2. Gamification

As described in Chapter 2.1, the retail industry is faced with the challenge of disrupting routine purchasing patterns and involving consumers more actively in sustainable decision-making processes. One of the methods that has recently gained prominence with further developments in digitalization is gamification (Hamari, Koivisto and Sarsa 2014). The following chapter defines the concept of gamification, explains the psychological foundations and outlines central design mechanisms.

2.2.1. Concept and Definition of Gamification

Gamification is commonly defined as "the use of game design elements in non-game contexts" (Deterding et al. 2011). That means selected elements of a game, such as points, badges, leaderboards, or progress indicators, are transferred to other application areas in order to influence user motivation and behavior (Hamari, Koivisto and Sarsa 2014).

It is important to distinguish gamification from both digital games and traditional loyalty programs (Koivisto and Hamari 2014). Digital games are complete systems developed exclusively for entertainment purposes (Salen and Zimmerman 2004, Deterding, et al. 2011), while gamification only uses certain elements to increase user engagement in a functional context. Gamification also differs from loyalty programs, which primarily rely on extrinsic, monetary incentives such as discounts or coupons. In contrast, gamification aims to promote intrinsic motivation through enjoyment, challenge, and the experience of progress (Hofacker, et al. 2016).

While Deterding et al. (2011) laid the conceptual foundation for gamification, later researchers shifted the focus from design elements to user experience. Huotari and Hamari (2012) defined gamification as "enhancing a service with gameful experiences to support the user's overall value creation," emphasizing experiential value rather than structural features. Similarly, Zichermann and Cunningham (2011) and Werbach and Hunter (2020) described how progress

loops and feedback mechanisms can control user behavior. However, these more management-oriented approaches have been criticized for neglecting psychological mechanisms of user engagement (Koivisto and Hamari 2014).

Therefore, gamification in current research is viewed as a motivational approach to fulfill basic psychological needs of competence, autonomy, and social relatedness (Hamari, Koivisto and Sarsa 2014, Xi and Hamari 2020). This perspective explicitly links gamification to established behavioral theories, including Self-Determination Theory (Deci and Ryan 2000) and Social Comparison Theory (Festinger 1954), which will be further explained in the following chapter.

2.2.2. Psychological Foundations of Gamification

To assess the effects of gamification, it is essential to understand the psychological theories through which gamification can influence motivation and decision-making. As outlined in Chapter 2.2.1, prior research primarily links gamification to two theoretical frameworks: Self-Determination Theory and Social Comparison Theory**.**

Self-Determination Theory explains why individuals engage voluntarily and persistently in certain behaviors. The theory posits that sustained motivation arises when three basic psychological needs are fulfilled: autonomy**,** referring to the feeling of acting out of free choice; competence**,** referring to the perception of effectiveness and progress; and relatedness**,** referring to a sense of social connection. The theory further distinguishes between intrinsic motivation, where behavior is driven by enjoyment or personal meaning, and extrinsic motivation, where behavior is driven by external incentives such as rewards or discounts. According to Self-Determination Theory, long-term behavioral change is most likely when intrinsic or autonomously regulated motivation is activated (Deci and Ryan 2000).

In contrast, Social Comparison Theory explains motivation as a result of comparisons with others. Individuals evaluate their own behavior and performance relative to peers, which can occur through upward comparison with better-performing others or downward comparison with worse-performing others. While social comparison can increase motivation and engagement, prior literature also cautions that excessive comparison may lead to frustration or reduced intrinsic motivation, particularly when competitive pressure becomes salient (Festinger 1954).

Together, these theories provide the psychological foundation for understanding which motivational constructs can be activated by gamification and how different design approaches may trigger motivational mechanisms.

2.2.3. Gamification Design: Individual vs. Social Elements

After defining gamification and understanding how it works, it is important to address different design elements in gamification systems. Gamification design refers to the targeted selection and combination of game elements to produce certain psychological responses (Hamari, Koivisto and Sarsa 2014, Werbach and Hunter 2020). Prior literature commonly distinguishes between individual and social design types (Koivisto and Hamari 2019).

Individual gamification elements include points, progress bars, levels, and badges. These elements emphasize personal achievement and primarily target intrinsic motivation. They are therefore closely related to the user's individual feeling of achievement and self-efficacy (Sailer, et al. 2017).

Social gamification elements, such as leaderboards, challenges, or community features like comments and likes, instead, activate mechanisms of recognition and the need for social belonging (Zhang and Fang 2021). By making individual performance visible to others, these elements encourage engagement through interaction and comparison.

From a psychological perspective, individual gamification therefore corresponds to Self-Determination Theory by fulfilling intrinsic needs for autonomy and competence (Deci and Ryan 2000). On the other hand, social gamification is based on Social Comparison Theory, according to which interactions with peers increases motivation (Koivisto and Hamari 2014, Festinger 1954). Several studies confirm the motivational power of both approaches but emphasize that their effectiveness depends on context and goal orientation. For example, research in the fields of education and fitness tracking shows that individual elements better promote perceived competence and long-term engagement (Tondello, et al. 2016, Sailer, et al. 2017). In contrast, studies on energy-saving and environmental campaigns show that social elements contribute more effectively to increasing participation through comparison with peers and social recognition (Mulcahy, et al. 2021).

In the field of marketing and e-commerce, the findings are mixed. While Hofacker et al. (2016) and Xi and Hamari (2020) show that gamified brand communities can increase engagement and loyalty through both individual performance and social collaboration, other studies warn that excessive competition can reduce intrinsic motivation and even prevent participation (Hanus and Fox 2015). Thus, the relative strength of individual versus social design remains controversial and will be further explored within this thesis.

2.3. Linking Gamification to Sustainable Consumer Behavior

After stating in Chapter 2.1 why consumer behavior in FMCG retail is shaped by habits and difficult to shift toward more sustainable outcomes, this chapter links these insights with the gamification mechanisms introduced in Chapter 2.2. It presents key psychological mediators and consumer characteristics that may shape the relationship between gamification and sustainable purchase behavior and brand outcomes. By explaining these concepts and summarizing their application in prior research, this chapter provides the theoretical foundation for the proposed conceptual model and hypotheses.

2.3.1. Psychological Mediators: Enjoyment and Perceived Empowerment

In behavioral research, psychological mediators are variables that describe the relationship between an independent variable and a dependent outcome. They describe the underlying process through which an effect unfolds (Baron and Kennedy 1986). In consumer and marketing science, mediators help to understand how and why certain interventions, such as gamification, influence behavioral responses, including purchasing behavior and brand outcomes.

The role of mediators is especially important in the context of sustainable consumption. As discussed in chapter 2.1.2, simply providing sustainable alternatives often does not lead to actual behavioral change (Vermeir and Verbeke 2006). Identifying mediating mechanisms therefore helps to explain how interventions can overcome habitual purchasing patterns.

The selection of mediators in the areas of gamification and sustainable retail is based on established motivational models from the literature. One key approach is the Self-Determination Theory from chapter 2.2.2, which distinguishes between intrinsic and extrinsic motivations as fundamental drivers of human behavior (Deci and Ryan 2000). SDT assumes that a sustainable commitment to environmentally friendly behavior results when consumers experience both joy and empowerment through their decisions. This is a dynamic that is therefore already being actively used in gamification research (Hamari and Koivisto 2015).

Enjoyment as a Mediator (Hedonic-Intrinsic Path)

Enjoyment refers to the subjective experience of fun, playfulness, or inner satisfaction that can result from interactions. In gamification research, enjoyment acts as an important mediator that supports attention and more sustained engagement in digital environments (Hamari 2013). While earlier studies have examined this mechanism in general service contexts, growing

evidence suggests that enjoyment derived from playful retail experiences can encourage consumers to repeat sustainable behavior and increase brand engagement (Mekler, et al. 2017).

This pathway may be particularly important in low-involvement FMCG contexts. By introducing additional enjoyment, playful interventions might effectively capture consumers' attention and positively change purchasing patterns (Hassan and Habib 2022).

Perceived Empowerment as a Mediator (Purposeful-Autonomous Path)

Perceived Empowerment encompasses feelings of autonomy, competence, and control over one's choices. As a psychological mediator, empowerment is anchored in autonomous motivation, a core element of SDT (Deci and Ryan 2000). SDT posits that people internalize and persist in behaviors when they feel actions are self-endorsed and meaningful.

In gamification research, experiences of autonomy and empowerment have been shown to not only drive engagement but also foster more purposeful and goal-aligned decisions (Sailer, et al. 2017). This mechanism is particularly relevant for sustainable retail. While enjoyment may trigger initial engagement, empowerment can be crucial for sustaining behavior and internalizing pro-sustainability values.

The dual focus on enjoyment and perceived empowerment in this thesis reflects their complementary roles in bridging the gap between attitude and behavior in sustainable FMCG retail, as discussed in chapter 2.1.2. Enjoyment offers a hedonistic-intrinsic path to engagement and makes sustainable choices more attractive in low-involvement environments. Empowerment offers an autonomous pathway by aligning gamified interventions with consumers' deeper motivations for autonomy.

By integrating these mediators, this thesis can test not only whether gamification works in changing behavior, but also explore the why, by distinguishing whether enjoyment or perceived empowerment is more effective, or whether their combination is necessary for optimal effect.

2.3.2. Moderating Role of Consumer Characteristics

Moderators are variables that influence the strength or direction of the relationship between the independent and the dependent variables. This helps in understanding why individuals may respond differently to interventions (Aguinis et al. 2005). In the context of this thesis, it is essential to identify and test relevant moderators, as this provides insights into the consumer segments, for which gamification might be most effective for. This later helps to develop better

managerial implications (Hofacker, et al. 2016). In the explicit context of gamification and retail, the following two moderators will be of most significance, due to prior literature.

Digital Affinity reflects a consumer's familiarity, expertise, and enthusiasm for using digital technologies. Prior empirical studies have shown that consumers with high digital affinity are more willing to actively engage with digital platforms and respond more positively to gamified features (Koivisto and Hamari 2014, Hofacker et al. 2016).

Sustainability Orientation captures the extent to which a consumer's values and purchasing priorities are guided by environmental and ethical concerns. The literature shows that consumers with a strong sustainability orientation are more receptive to environmentally friendly appeals or loyalty programs that signal environmental benefits (Vermeir and Verbeke 2006, White, Habib and Hardisty 2019).

Additionally, other more general consumer characteristics can moderate how gamification design affects purchase behavior and brand outcomes. Research shows that for example, the importance of gamified features can vary with age (Park and Lee 2011). Gender and income may also shape attitudes towards engagement with digital gamification, though evidence remains mixed. In this study, these characteristics are therefore not conceptualized as central moderators but are included for descriptive purposes to enhance interpretability of the results and improve transparency regarding potential subgroup patterns (Hofacker et al. 2016; Venkatesh, Thong, & Xu 2012).

2.3.3. Purchase Behavior and Brand Outcomes as Outcome Variables

The effectiveness of gamification in sustainable retail is most meaningfully assessed by examining its impact on consumer behavior outcomes, which can be broadly categorized into purchase behavior and brand attributes (Ajzen 1991, Chaudhuri and Holbrook 2001, Vermeir and Verbeke 2006). For the purposes of this thesis, the focus is on four key constructs: purchase intention, willingness to pay, brand trust and brand loyalty. These variables were selected because they represent both immediate behavioral outcomes as well as long-term relational effects (Chaudhuri & Holbrook 2001, Vermeir & Verbeke 2006). The specific importance and definitions of each construct, along with the literature supporting their inclusion, are detailed in the following paragraphs.

Purchase Intention describes the probability that a consumer will purchase a particular product or service in the future (Ajzen 1991, Dodds, Monroe and Grewal 1991). It represents the cognitive manifestation of a behavioral intention and shows how attitudes, perceived value, and

trust are translated into concrete tendencies to act. In research on sustainable consumption, purchase intention is often measured using self-reported Likert scale and is considered a valid proxy for actual purchasing behavior, as real purchases often cannot be observed (White, Habib and Hardisty 2019, Joshi and Rahman 2015).

Willingness to Pay (WTP) refers to the maximum price consumers are willing to pay for a product or certain characteristics such as quality, design, brand, or sustainability (Hanemann 1991, Dodds, Monroe and Grewal 1991). It reflects the perceived value of an offer and is often used in sustainability research to assess the willingness to pay a premium for environmentally or ethically responsible products (Gleim, et al. 2013, Griskevicius, Tybur and Van den Bergh 2010). Empirically, willingness to pay is usually measured by direct price inquiries, which are also used in this study, or by conjoint experiments in which decisions between alternatives with different prices and characteristics are compared (Auger and Devinney 2007, Breidert, Hahsler and Reutterer 2006).

Brand Trust refers to the confidence consumers place in a brand's reliability, honesty, and ability to fulfill its promises (Delgado-Ballester, Munuera-Alemán and Yagüe-Guillén 2003, Chaudhuri and Holbrook 2001). Trust is particularly important in sustainable retail, where consumers are often skeptical of the credibility of sustainability claims due to the prevalence of greenwashing (Delmas and Burbano 2011). High brand trust is associated with a greater willingness to try sustainable products, more positive word-of-mouth, and increased likelihood of repeat purchases (Chaudhuri and Holbrook 2001, Morgan and Hunt 1994). In empirical studies, brand trust is commonly measured using multi-item scales that assess confidence, dependability, and the perceived integrity of the brand (Delgado-Ballester, Munuera-Alemán and Yagüe-Guillén 2003).

Brand Loyalty captures the degree to which consumers consistently choose the same brand over competitors, reflecting both attitudinal commitment and behavioral repetition (Chaudhuri and Holbrook 2001, Oliver 1999). In the context of sustainable retail, fostering brand loyalty is critical for encouraging consumers to choose sustainable options not just once, but repeatedly, helping to close the attitude–behavior gap as described in Chapter 2.1.2 (Vermeir and Verbeke 2006). Measurement typically involves assessing repurchase intentions, willingness to recommend, and actual repeat behavior (Chaudhuri and Holbrook 2001).

Summarizing the insights from Chapters 2.1 to 2.3 illustrate that sustainable FMCG retail is driven by habitual consumer behavior, that gamification offers a promising mechanism to

disrupt these routines, and that its effectiveness depends on specific psychological mechanisms and consumer characteristics. The reviewed literature suggests that enjoyment and perceived empowerment act as central mediators, while digital affinity and sustainability orientation can serve as relevant moderators that shape consumers' responses to gamified interventions. At the same time, existing research highlights a gap regarding the influence of gamification on concrete behavioral and brand-related outcomes in sustainable FMCG retail contexts. These theoretical foundations culminate in the hypotheses presented in the table below.

Table 1: Overview Hypotheses

Research Questions	Hypotheses
RQ1: How does gamification design influence purchase behavior and brand outcomes in sustainable FMCG retail?	**H1a:** Gamification (individual or social) positively affects purchase behavior and brand outcomes compared to the non-gamified control condition. **H1b:** Social gamification results in stronger positive effects on purchase behavior and brand outcomes than individual gamification.
RQ2: How do enjoyment and perceived empowerment mediate the effects of gamification on purchase behavior and brand outcomes?	**H2a:** Enjoyment mediates the relationship between gamification design and consumer outcomes. **H2b:** Perceived empowerment mediates the relationship between gamification design and consumer outcomes.
RQ3: How do consumer characteristics moderate the effects of gamification on purchase behavior and brand outcomes?	**H3a:** Digital Affinity strengthens the positive effect of gamification on outcomes. **H3b:** Sustainability Orientation strengthens the positive effect of gamification on outcomes.
RQ4: What does effective gamification look like for retailers seeking to promote sustainable consumer behavior?	RQ4 is addressed through the interpretation of results from H1–H3.

2.4. Conceptual Model

Figure 1 presents the conceptual model derived from the hypotheses above. It provides the foundation for the subsequent data analysis used to address the research questions set out in this study.

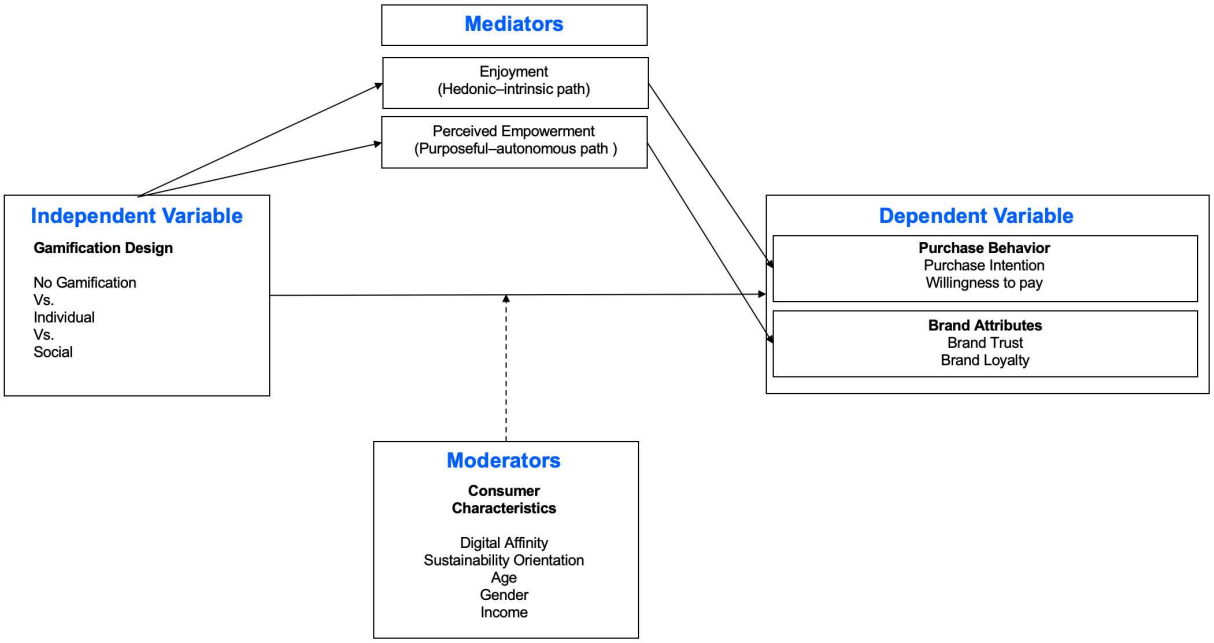

Figure 1: Conceptual Model

3. Methodology

Based on the theoretical foundations and hypotheses developed in the previous chapter, the next chapter outlines the methodological approach used to empirically test the proposed relationships. It describes the research design, the overall procedure of the experiment and the operationalization of the key constructs.

3.1. Research Design

The purpose of this study was to examine the effects of gamification on purchase behavior and brand outcomes in the sustainable FMCG retail context. A quantitative, experimental, between-subjects research design was applied, using an online survey administered with Qualtrics, which is a widely used academic survey tool (Carpenter et al. 2019). Three experimental conditions were tested: social gamification, individual gamification and a control condition.

3.2. Procedure

3.2.1. Data Collection

The scientific questionnaire method was chosen for the collection of quantitative data. This was carried out using a fully structured written questionnaire (Appendix 1), which is defined as a systematic and rule-based collection of self-reported information from various respondents (Döring and Bortz 2016, 398).

The questionnaire was developed based on the literature review in Chapter 2 and draws on established measurement instruments for gamification, consumer behavior, and sustainable retail contexts. The operationalization of all constructs is further detailed in Chapter 3.3. In addition, the key variables of the conceptual model introduced in Chapter 2.4 were incorporated into the design.

The quality criteria to be adhered for a quantitative study are objectivity, reliability, and validity (Baur and Blasius 2014, 425f). **Objectivity** is ensured by the standardized questionnaire and the uniform presentation of the experimental stimuli, as well as by the transparent documentation of data collection and processing. **Reliability** is confirmed by the empirical calculation of Cronbach's alpha for the measurement instruments used, suggesting that the measurements yield consistent results under similar conditions. The third criterion of **validity** is ensured by the adoption of validated scales from the literature.

Overall, the data collection methods meet the central quality criteria of quantitative research and thus represent a suitable instrument for answering the research questions.

3.2.2. Survey Design and Structure

The questionnaire can be described as fully structured and standardized due to the exclusive use of closed questions. It is an anonymous survey of individuals (Döring and Bortz 2016, 399f). The questionnaire was created electronically using Qualtrics. This tool makes it easier to send out the questionnaire via email, WhatsApp, and Social Media and simplifies the subsequent analysis due to the easy data transfer into SPSS (Couper 2011, 900f).

The questionnaire is divided into five sections.

The **first section** contains a short introductory text that introduces participants to the overarching topic of the survey. It also explains the scientific purpose, voluntary participation and anonymity, and approximate duration of the survey (approx. 5 min). Participants are then asked if they are over 18 and agree to participate.

In the **second section**, participants are introduced to a short scenario in which they are asked to imagine that they are on an online app searching for skincare products. They are then randomly assigned to one of the three experimental conditions and confronted with the corresponding manipulation. This is followed by a manipulation check to ensure that the participant correctly identified whether gamification elements were used in the scenario and, if so, what type of gamification was used. The following questions were asked "Did the app page you just saw include any game-like elements (such as badges, progress bars, or leaderboards)?" and "Which option best describes the extra module on the app page you just saw" (1:"no game-like elements", 2:"personal badges or levels", 3:"leaderboards or social ranking")

The **third section** covers the psychological mediators of the research model. Participants first rate their perceived enjoyment during interaction with the app situation presented. Items on perceived empowerment are then collected to measure the extent to which the scenario conveyed a feeling of autonomy and self-efficacy. The mediators are queried immediately after the manipulation, as their perception is closely linked to the direct experience with the stimulus. The aim is to find out in the later analysis how and why gamification influences consumer behavior and therefore helps to answer RQ2.

The **fourth section** collects the dependent variables of the model. To determine this, participants evaluate their purchase intentions, their willingness to pay, and their perceptions of brand trust and brand loyalty toward the product shown previously. The goal of this section is to determine whether and to what extent the scenario presented, influences subsequent consumer behavior, and it is therefore central to answering the main research question RQ1.

Before the **fifth section** begins, a brief attention check is integrated to ensure that only those participants who are following the survey attentively are included in the evaluation. The final section then collects data on the moderators Digital Affinity and Sustainability Orientation as well as other consumer characteristics (country, age, gender, income). All these variables serve to analyze for which target groups the influence of gamification is stronger. Enabling the research questions RQ3 and RQ4 to be answered and subsequent managerial recommendations to be derived. The consumer characteristic questions were placed at the end of the questionnaire with the intention of achieving a lower dropout rate. The demographic questions are also important for describing the sample. This ensures that the sample is comparable to other studies.

The survey ended with a short concluding text thanking participants for their participation and informing them that their response had been saved. The concluding text also included a brief

explanation of the actual purpose of the study and offered participants the opportunity to contact the researcher if they had any questions.

3.2.3. Execution of the survey and pretest procedure

Before the questionnaire was published, a pretest was conducted (N=9). The participants completed the entire questionnaire while the researcher accompanied and observed the test run. This was followed by a short qualitative feedback session in the form of a focus group, in which the participants evaluated both the comprehensibility of the questionnaire and the plausibility of the manipulations (Döring and Bortz 2016, 411). Based on the feedback received (Appendix 2), the content and language of the questionnaire were revised. In addition to that, the product category used in the mock-ups was adjusted. While a cleaning product was initially employed, a skincare product was used in the final survey to ensure sufficient salience of the experimental manipulation.

After completion of the pretest, the final survey was published as part of a passive recruitment process (Döring and Bortz 2016, 411). Data collection took place from 19.11.2025 to 30.11.2025. The survey was closed after a total of 203 participants had been reached.

3.3. Variable Measurement

After outlining the overall survey design, the following chapter details how each variable from the conceptual model was operationalized. All constructs were measured using validated scales from prior research and were adapted when necessary to fit the context of this study.

3.3.1. Independent Variable: Gamification Design

The independent variable in this study is gamification design, operationalized through three experimental conditions: a control condition without gamification, an individual gamification condition, and a social gamification condition. The manipulations were developed based on established gamification elements identified in chapter 2.2.3, particularly points, badges, and leaderboards (Hamari, Koivisto, and Sarsa 2014; Deterding et al. 2011). In the individual gamification condition, participants were presented with a personal eco-badge and a progress bar visualizing their individual contribution toward a sustainability goal. In the social gamification condition, the eco-badge was supplemented with an eco-leaderboard displaying participants' relative performance compared to other consumers, thereby emphasizing social comparison. Progress bars were included in both gamification conditions to provide continuous

feedback. All other visual and text elements of the stimulus were held constant across conditions to ensure comparability.

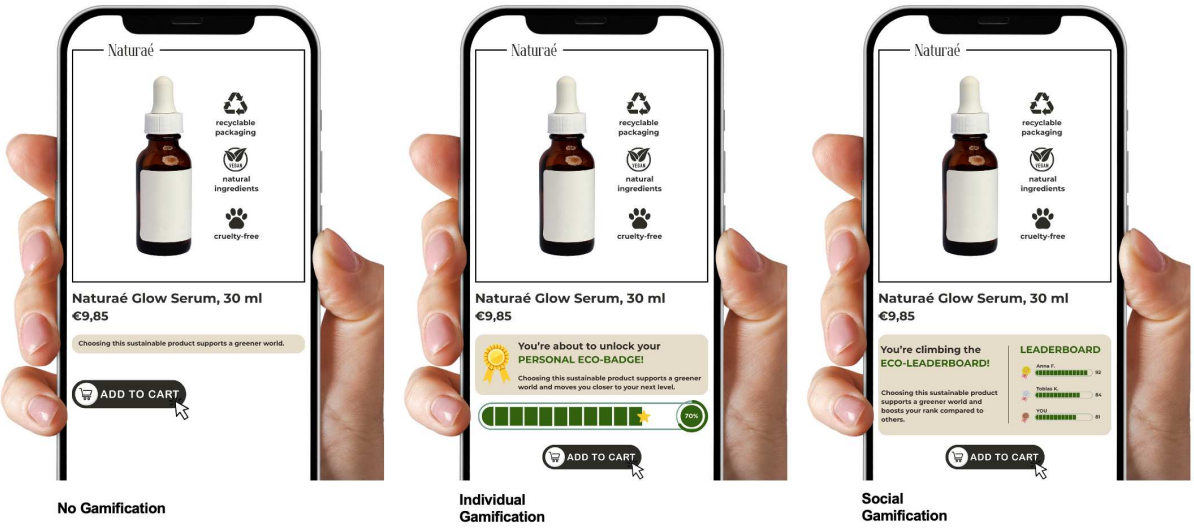

Figure 2: Overview Manipulations

3.3.2. Mediators: Enjoyment & Empowerment

Enjoyment was measured using an adapted version of the Interest/Enjoyment subscale of the Intrinsic Motivation Inventory (IMI). This scale was developed within the framework of Self-Determination Theory to measure motivation in experimental contexts (Ryan, Mims and Koestner 1983). The scale is considered a key indicator of intrinsic motivation, as it measures the extent to which an activity is experienced as enjoyable and entertaining.

In this study, participants rated their experience of the app situation presented on a seven-point Likert scale. Example items include “Interacting with this app page was enjoyable” and “I found this experience fun.”.

Perceived Empowerment was measured using an adapted version of the Perceived Choice subscale of the IMI, also based on the SDT. This scale reflects the degree to which individuals experience autonomy and control while engaging in an activity (Ryan, Mims and Koestner 1983).

This survey used four adapted items on a seven-point Likert scale. Examples of statements include “This app made me feel in control of my sustainable choices.” and “The app gave me autonomy to act on my values.”

3.3.3. Dependent Variables

As already explained in Chapter 2.3.3, this study focuses on the four most relevant purchase behavior and brand attribute outcome variables for the given research context. All dependent variables were measured using four items on a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree).

Purchase Intention was operationalized using the scale developed by Dodds, Monroe, and Grewal (1991), which measures willingness to purchase a product. An example item is: “I would consider buying this product”.

Willingness to Pay was measured using items that capture the willingness to pay a premium for a sustainable product. The items are based on price-value and WTP measures from Dodds, Monroe, and Grewal (1991) and Auger and Devinney (2007). An example item is: “I would be willing to pay a higher price for this product compared to a conventional alternative.”.

Brand Trust was measured using the validated scale developed by Delgado-Ballester, Munuera-Alemán, and Yagüe-Guillén (2003). Examples of statements include “I trust this brand” and “This brand is reliable.”.

Brand Loyalty was measured using items that reflect repurchase and recommendation intentions, based on scales from Chaudhuri and Holbrook (2001) and Zeithaml, Berry, and Parasuraman (1996). Example items are “I would buy this brand again in the future” and “I would recommend this brand to friends.”.

3.3.4. Moderators & Control Variables

As stated in Chapter 2.3.2, this study focuses primarily on the consumer characteristics digital affinity and sustainability orientation, as well as the typical demographics country, age, gender, income.

Digital Affinity was measured with four items capturing participants comfort, interest, and confidence in using digital technologies for example “I enjoy exploring new digital tools and apps” and “I consider myself comfortable using technology.”. The items were adapted from prior work on technology readiness and consumer IT use (Parasuraman 2000).

Sustainability Orientation was assessed with four items reflecting the importance of environmental and ethical considerations to a person for example “I feel personally responsible for contributing to sustainability.” and “Environmental issues are important to me.”. These were

adapted from established pro-environmental and ethical consumption scales (Vermeir & Verbeke 2006, White, Habib & Hardisty 2019).

Furthermore, based on previous literature, demographic information such as age (Li, et al. 2013) gender, origin and income were collected as control variables.

4. Results

After understanding the measurement of each variable, the following chapter presents the results of the quantitative survey.

4.1. Data Preparation and Scale Reliability

A total of 203 responses were collected. Several exclusion criteria were applied. Participants who had not provided a declaration of consent, had not passed the attention check, or had not completed the survey were removed. In addition, duplicate entries, identifiable test runs and participants failing the manipulation check (i.e., incorrectly identifying the presence or type of gamification) were excluded. After applying these criteria, the final data set consisted of N = 181 observations. This procedure ensured that only participants who correctly perceived the experimental manipulation were retained for the analysis.

Following data cleaning, all variables were labeled and prepared in SPSS. Mean indices were computed for all multi-item constructs. None of the scales contained reversed items, so no reverse coding was required. To assess internal consistency, as described in Chapter 3.2.1, Cronbach's Alpha was calculated for each construct. All eight multi-item scales demonstrated high internal consistency**,** with α-values exceeding the commonly accepted threshold of .70 (Bortz and Döring 2016). According to Taber (2018), values above .90 indicate very high internal consistency, which supports the robustness of the scales used in this study, but also suggests that some items may be partially redundant. Table 2 provides an overview of the reliability statistics for all constructs included in the analysis.

Table 2: Reliability Statistics

Construct	Items	Cronbach's Alpha	N
Enjoyment	4	0.974	181
Empowerment	4	0.962	181
Purchase Intention	4	0.977	181
Willingness to Pay	4	0.968	181
Brand Trust	4	0.963	181
Brand Loyalty	4	0.968	181
Digital Affinity	4	0.918	181
Sustainability Orientation	4	0.951	181

4.2. Participants and Descriptive Statistics

After applying the data cleaning criteria described in Section 4.1, a total of 181 responses remained for the analysis. Participants were randomly assigned to the control condition (n = 59), individual gamification (n = 61), or social gamification (n = 61). Participants ages ranged from 18 to 56 years**,** with an average age of 27 years (SD = 7.93), indicating a relatively young respondent group. The gender distribution was fairly balanced, with a slight majority identifying as female (60.2%**,** n = 109), followed by male participants (39.2%**,** n = 71). One participant selected "prefer not to say." Participants represented a diverse set of countries, although the sample was largely European. The largest group came from Germany (61.9%, n = 112), followed by Portugal (19.3%, n = 35) and Austria (9.4%, n = 17). Smaller shares were from Norway (n = 5), the Netherlands (n = 3), Poland (n = 3), Belgium (n = 2), and several single-respondent countries. This distribution likely reflects the use of a convenience sampling approach within the researcher's personal and academic networks, as the researcher is originally from Germany and currently studying in Portugal. Participants reported a wide range of monthly net income levels. The largest group indicated earnings between €1,000 and €1,999 (35.9%, n = 65), followed by those earning less than €1,000 (27.6%, n = 50). Further income brackets included €2,000–€2,999 (13.3%, n = 24), €3,000–€3,999 (12.2%, n = 22), and €4,000–€4,999 (6.1%, n = 11). A small share (2.2%, n = 4) reported earning €5,000 or more, and five respondents preferred not to state their income.

To assess the success of random assignment, a series of randomization checks was conducted. One-way ANOVAs revealed no significant differences between experimental conditions with respect to age (p = .412) and digital affinity (p = .632). Chi-square tests further indicated no significant associations between condition and gender (p = .333) or income (p = .081). However, sustainability orientation differed significantly across conditions (p < .001). This

variable was therefore explicitly included as a moderator in subsequent analyses to account for this imbalance. Please see appendix 3 for further details.

Table 3 presents the descriptive statistics. All means exceed the scale midpoint of 4, which indicates generally positive responses across all constructs.

Table 3: Descriptive Statistics

	N	Min	Max	Mean	Std. Dev
enjoyment_mean	181	1.00	7	5.0953	1.6740
empowerment_mean	181	1.00	7	5.3080	1.5774
PI_mean	181	1.00	7	5.2169	1.3923
WTP_mean	181	1.00	7	4.7390	1.3976
BT_mean	181	1.00	7	5.0041	1.1216
BL_mean	181	1.00	7	4.7431	1.3156
DA_mean	181	1.00	7	5.6989	1.0103
SO_mean	181	1.75	7	5.2500	1.0891

Table 4 shows the Pearson correlation coefficients between all variables included in the model.

Table 4: Bivariate Correlations

	1	2	3	4	5	6	7	8
1 enjoyment_mean	1	.901**	.835**	.825**	.327**	.809**	0.073	.448**
2 empowerment_mean	.901**	1	.865**	.844**	.325**	.836**	0.006	.366**
3 PI_mean	.835**	.865**	1	.850**	.460**	.882**	0.031	.367**
4 WTP_mean	.825**	.844**	.850**	1	.362**	.893**	0.049	.479**
5 BT_mean	.237**	.325**	.460**	.362**	1	.458**	0.089	-0.005
6 BL_mean	.809**	.836**	.882**	.893**	.458**	1	0.056	.406**
7 DA_mean	0.073	0.006	0.031	0.049	0.089	0.056	1	0.058
8 SO_mean	.448**	.366**	.367**	.479**	-0.005	.406**	0.058	1

The correlations between enjoyment and empowerment and the majority of the outcome variables were high (approximately r = .81-.90), indicating that these variables are closely associated. In contrast, the correlations with brand trust were lower, showing that this construct is related but not strongly aligned with the other outcomes. Digital affinity displayed only minimal correlations with the psychological and behavioral variables. These intercorrelations do not pose multicollinearity concerns, as each PROCESS model included only one mediator and one outcome at a time.

4.3. Hypothesis Testing

To test **H1a and H1b** (Appendix 4), which examine the effects of gamification on purchase behavior and brand outcomes, a series of one-way ANOVA analyses were conducted. Each ANOVA tested the influence of the experimental condition on one of the four dependent variables: purchase intention, willingness to pay, brand trust, and brand loyalty. Post-hoc tests

with Bonferroni correction were then used to determine which conditions differed from each other. All analyses were based on the three-level condition variable: 1 = control, 2 = individual gamification, 3 = social gamification.

The ANOVA analyses revealed significant main effects for purchase intention, willingness to pay, and brand loyalty ($p < .001$). Effect sizes were large, with η^2 values ranging from .436 to .528.

Table 5: One-Way ANOVA Results for Gamification Effects (H1a)

Outcome	F (2, 178)	p-value	η^2 (Effect Size)
PI	68.85	< .001	0.436
WTP	99.59	<.001	0.528
BT	0.22	0.806	0.002
BL	71.34	<.001	0.445

For all three outcomes, both gamification conditions showed significantly higher mean scores than the control condition. Social gamification also showed slightly higher means than individual gamification, but these differences were not statistically significant. Post-hoc results are summarized in Table 6 below.

Table 6: Bonferroni Post-Hoc Comparisons between Gamification Conditions (H1b)

Outcome	Comparison	Mean Difference	p-value	Interpretation
PI	Individual vs Control	+1.86	< .001	Individual > Control
	Social vs Control	+2.04	< .001	Social > Control
	Social vs Individual	+0.18	1	no difference
WTP	Individual vs Control	+2.11	< .001	Individual > Control
	Social vs Control	+2.21	< .001	Social > Control
	Social vs Individual	+0.11	1	no difference
BT	Individual vs Control	-0.04	1	no difference
	Social vs Control	+0.09	1	no difference
	Social vs Individual	+0.13	1	no difference
BL	Individual vs Control	+1.79	< .001	Individual > Control
	Social vs Control	+1.93	< .001	Social > Control
	Social vs Individual	+0.14	1	no difference

In contrast, the ANOVA for brand trust showed no significant effect of condition ($p = .806$) and all Bonferroni comparisons were non-significant.

These findings indicate that H1a is supported for three outcome variables**,** demonstrating that gamification, regardless of whether it is individual or social, positively influences purchase intention, willingness to pay, and brand loyalty compared to the control condition. H1b is not supported**,** as social gamification did not outperform individual gamification in any of the outcomes.

For brand trust**,** the ANOVA revealed no significant effect of the experimental condition, and all post-hoc comparisons were non-significant. Consequently, neither H1a nor H1b is supported for brand trust.

As a result, H1a is partially confirmed overall, whereas H1b is not supported.

To test **H2a and H2b**, separate mediation analyses were performed for each of the four dependent variables using the PROCESS model 4 according to Hayes (2022). The same experimental condition as described above served as the independent variable. The mediators were enjoyment (H2a) and perceived empowerment (H2b) from Chapter 2.3.1. For each analysis, 5,000 bootstrap samples were used, and bias-corrected confidence intervals were calculated.

In the first step, all models showed a clear, highly significant effect of the condition on enjoyment (a-path), confirming that the gamification conditions led to a substantial increase in perceived enjoyment compared to the control group.

For purchase intention, willingness to pay, and brand loyalty, enjoyment significantly predicted each outcome (b-path), while the direct effect of the condition became non-significant. The indirect effects were significant, and the confidence intervals excluded zero. This pattern indicates full mediation, supporting H2a for these three variables.

A different pattern emerged for brand trust. Although the indirect effect via enjoyment was significant, the direct effect of the condition remained significantly negative. This indicates partial mediation, meaning that enjoyment transmits part of the positive effect, but a separate negative direct effect persists.

Table 7: Mediation Analysis Results for Enjoyment (H2a)

Outcome	a-path	b-path	Direct effect	Indirect effect	Bootstrap CI	Mediation
PI	1.5299*	0.7338*	–0.1074 (n.s.)	1.1227*	[.9007, 1.3651]	full
WTP	1.5299*	0.6506*	0.1051 (n.s.)	0.9953*	[.7833, 1.2421]	full
BT	1.5299*	0.3213*	–0.4458 (p = .0027)	0.4916*	[.2272, .7557]	partial
BL	1.5299*	0.6444*	–0.0231 (n.s.)	0.9859*	[.7694, 1.2337]	full

In a second step, it was examined whether perceived empowerment mediates the relationship between gamification and the outcome variables. Analogous to the enjoyment analyses, all models showed a clear, highly significant effect of the experimental condition on

empowerment, confirming that the gamification conditions significantly increased perceived empowerment compared to the control group.

For purchase intention, willingness to pay, and brand loyalty, the pattern was almost identical to that for enjoyment. Empowerment predicted all three outcome variables highly significantly, while the direct effect of the condition was no longer significant in each case. In all cases, the indirect effects were significant, and the bootstrap confidence intervals did not include the value 0, indicating full mediation.

Partial mediation was again evident for brand trust. The indirect effect via empowerment was significantly positive, while the direct effect of the condition on brand trust remained negative. This negative direct effect was stronger in the empowerment model than in the enjoyment model, suggesting the presence of an additional negative mechanism not captured by empowerment.

Table 8: Mediation Analysis Results for Empowerment (H2b)

Outcome	a-path	b-path	Direct effect	Indirect effect	Bootstrap CI	Mediation
PI	1.3805*	0.7925*	−0.0788 (n.s.)	1.0941*	[.8921, 1.3046]	full
WTP	1.3805*	0.6955*	0.1402 (n.s.)	0.9602*	[.7550, 1.1860]	full
BT	1.3805*	0.4382*	−0.5592*	0.6049*	[.3517, .8912]	partial
BL	1.3805*	0.6969*	−0.0231 (n.s.)	0.9622*	[.7840, 1.1669]	full

Overall, both mediators show a consistent pattern: full mediation is present for purchase intention, willingness to pay, and brand loyalty, while partial mediation occurs in both cases for brand trust. This supports both H2a and H2b, with the caveat that mediation for brand trust is only partial.

For **H3a and H3b,** it was examined whether digital affinity and sustainability orientation moderate the relationship between gamification and the four outcome variables. To test this separate moderation analyses were conducted for each dependent variable using the PROCESS model 1 (Hayes 2022). The experimental condition served as the predictor, digital affinity/sustainability orientation as the moderator, and purchase intention, willingness to pay, brand trust, and brand loyalty as the outcome variables.

No significant interaction effect between gamification design and digital affinity was found for purchase intention (p = .0875). However, the conditional effects indicate that the positive effect of gamification conditions increases numerically with higher digital affinity.

There was also no significant interaction effect for willingness to pay (p = .1644); neither the moderator nor the interaction term contributed substantially to the additional variance explained. Accordingly, there is no evidence of moderation of the relationship between gamification and willingness to pay.

No moderating effect was found for brand trust either (p = .2836); the effects of gamification design remained largely constant regardless of the level of digital affinity.

For brand loyalty, a similar pattern emerged as for purchase intention. The interaction term was not significant (p = .0853), but the conditional effects showed a slight numerical increase in the gamification effect at higher values of digital affinity.

In summary, the analyses do not provide statistically reliable evidence of moderation by digital affinity in any of the four models. Although purchase intention and brand loyalty show consistent trends toward stronger gamification effects with higher digital affinity, these remain below the significance threshold. No moderating effects could be identified for willingness to pay and brand trust.

Table 9: Moderation Analysis Results for Digital Affinity (H3a)

Outcome	Interaction Term	p-value
PI	F = 2.95	p = .0875
WTP	F = 1.95	p = .1644
BT	F = 1.16	p = .2836
BL	F = 2.99	p = .0853

No significant interaction effect between condition and the other moderator sustainability orientation was found for purchase intention (p = .1071). The conditional effects for low, medium, and high levels of the moderator differed only slightly, indicating that gamification increases purchase intention to a similar extent across all sustainability levels. This pattern is consistent with the previously reported results for digital affinity.

There was also no significant interaction term for willingness to pay (p = .4538); neither the moderator itself nor the interaction contributed substantially to the additional variance explained. Thus, there is no evidence that sustainability orientation moderates the relationship between gamification and willingness to pay.

For brand loyalty, the interaction effect approached some significance ($p = .0924$) but did not fall below the usual threshold of $p < .05$. However, the conditional effects increase systematically with increasing sustainability orientation. Formally, therefore, no significant moderation can be identified, but the trend, similar to that for digital affinity, suggests that consumers with a stronger sustainability orientation respond more strongly to gamification in terms of brand loyalty.

For brand trust, however, the picture was different. The interaction term was highly significant ($p < .001$) and identified sustainability orientation as a strong moderator. The conditional effects illustrate a clear change in direction: with low sustainability orientation (SO = 4.00), gamification significantly reduces brand trust (effect = - 0.64, $p < .001$), with no significant effect at medium levels (SO = 5.25) (Effect = 0.05, $p = .600$), and significantly increasing brand trust at high levels of sustainability orientation (SO = 6.50) (Effect = 0.75, $p < .001$). This pattern differs fundamentally from the results for digital affinity, where there was no moderating effect on brand trust. While digital affinity does not influence the relationship between gamification and brand trust, sustainability orientation changes this relationship very significantly to the point of reversing the direction of the effect from negative to neutral to positive, depending on the sustainability profile of consumers.

Table 10: Moderation Analysis Results for Sustainability Orientation (H3b)

Outcome	Interaction Term	p-value
PI	F = 2.62	p = .1071
WTP	F = 0.56	p = .4538
BT	F = 2.86	p = .0924
BL	F = 34.94	p < .001

Collectively, the results show no significant moderation by digital affinity, meaning H3a is not supported. For sustainability orientation, only weak or non-significant trends emerged for purchase intention, willingness to pay, and brand loyalty, but a strong moderation effect appeared for brand trust. Since this moderation is limited to one outcome variable, H3b receives only partial support**.**

Finally, an overview of the results of all hypotheses can be find below.

Table 11: Summary of Hypothesis Testing Results Across Outcome Variables

Hypotheses	PI	WTP	BT	BL
H1a: Gamification (individual or social) positively affects purchase behavior and brand outcomes compared to the non-gamified control condition.	✓	✓	X	✓
H1b: Social gamification results in stronger positive effects on purchase behavior and brand outcomes than individual gamification.	X	X	X	X
H2a: Enjoyment mediates the relationship between gamification design and consumer outcomes.	✓	✓	X	✓
H2b: Perceived empowerment mediates the relationship between gamification design and consumer outcomes.	✓	✓	X	✓
H3a: Digital Affinity strengthens the positive effect of gamification on outcomes.	X	X	X	X
H3b: Sustainability Orientation strengthens the positive effect of gamification on outcomes.	X	X	✓	X

5. Discussion

The following chapter integrates the theoretical foundations outlined in Chapter 2 with the empirical results presented in Chapter 4. The research questions are answered and implications for the literature and practice are developed.

5.1. Interpretation of Key Results

The aim of this study was to investigate the effects of gamification design on purchase behavior and brand outcomes in the sustainable FMCG retail context.

From this broader context three sub-research question arose. The first question was:

RQ2: How do enjoyment and perceived empowerment mediate the effects of gamification on purchase behavior and brand outcomes?

As argued in Chapter 2.3.1, gamification was expected to influence consumer behavior through two motivational pathways: a hedonistic-intrinsic pathway via enjoyment and a purposeful-autonomous pathway via perceived empowerment. Previous research has shown that enjoyment is an important mediator for the use of digital services (Hamari, Koivisto and Sarsa 2014, Hamari 2013) and that the feeling of autonomy and competence is central to the internalization of desired behaviors (Mekler et al. 2017).

The empirical findings combined with the literature provide a clear answer to RQ2 and strongly support this dual-path view. Both enjoyment and perceived empowerment fully mediated the effects of gamification on purchase intention, willingness to pay, and brand loyalty. As outlined in Chapter 2.3.3, these outcomes are central for evaluating sustainable consumer behavior (Chaudhuri and Holbrook 2001, Vermeir and Verbeke 2006, Ajzen 1991). The results therefore empirically confirm the mechanism proposed in Chapter 2.3.1. Gamification does not primarily change behavior through its structural elements, in contrast to the argument proposed by Carrington, Neville, and Whitwell (2014) from Chapter 2.1.2, but through the subjective

experiences of fun and control that these elements create. Therefore, it can be assumed that the more psychological needs of Self-Determination Theory are met in a gamification intervention, the more likely it is to foster intrinsically motivated engagement and sustained positive consumer responses.

These results are consistent with prior studies showing that playful features in retail and service contexts increase enjoyment, which then drives behavioral intentions (Huotari and Hamari 2012). By demonstrating that enjoyment and empowerment mediate not only engagement but concrete purchase-related outcomes, this study extends the observation by Hamari and Koivisto (2014) that previous gamification research rarely linked these mechanisms directly to purchase behavior.

A more nuanced picture emerges for brand trust. As discussed in Chapter 2.3.3, trust is especially fragile in sustainability contexts due to skepticism and concerns about greenwashing (Delmas and Burbano 2011, Gupta and Ogden 2009). The results of this study are consistent with this concern. Although enjoyment and empowerment generated significant positive indirect effects on brand trust, the direct effect of gamification on trust remained significantly negative. In other words, the gamified experience was enjoyable and empowering, but for some consumers it simultaneously weakened trust in the brand.

This finding partly contradicts more optimistic accounts in the gamification and brand community literature, which suggest that gameful interactions generally strengthen brand relationships and loyalty (Hofacker, et al. 2016, Xi and Hamari 2020).

In this sense, the present study suggests that gamification in sustainable retail can be a double-edged sword: it supports motivation and behavior through enjoyment and empowerment but may also trigger credibility concerns that directly harm brand trust**.**

After looking at the mediators the next sub-research question focuses on the moderators:

RQ3: How do consumer characteristics moderate the effects of gamification on purchase behavior and brand outcomes?

Chapter 2.3.2 proposed that the effects of gamification should depend on consumer characteristics, in particular digital affinity and sustainability orientation. Based on research showing that digitally experienced users are more willing to engage with interactive platforms and gameful interfaces (Koivisto and Hamari 2014, Hofacker, et al. 2016), H3a expected stronger effects of gamification for consumers with higher digital affinity. At the same time, Chapter 2.1.2 and 2.3.2 highlighted that sustainability orientation shapes how consumers

interpret environmental messages and respond better to pro-environmental interventions (White, Habib and Hardisty 2019), leading to H3b.

The results of this study provide a differentiated answer to RQ3. Digital affinity did not significantly moderate any of the relationships between gamification and the four outcome variables. This contradicts earlier expectations that technology readiness is a key boundary condition for gamification effectiveness (Koivisto and Hamari 2014). One plausible explanation, consistent with more recent work summarized in Chapter 2.2.2 (Koivisto and Hamari 2019) is that simple, intuitive gamification designs can be processed easily even by users with only moderate digital skills. In such cases, digital affinity becomes less decisive, and the psychological mechanisms of enjoyment and empowerment operate similarly across consumer segments. This finding may also be partly related to the composition of the sample described in Chapter 4.2, which consisted predominantly of younger consumers with generally high levels of digital affinity as well as the experimental design, which relied on mock-up interventions and therefore did not permit actual interaction with the gamified features. The small numerical trends towards stronger effects at higher digital affinity for purchase intention and brand loyalty may still indicate some relevance of technology enthusiasm, but overall, the findings suggest that simple and well-designed gamification in FMCG retail can be broadly accessible and does not primarily depend on digital expertise.

In contrast, sustainability orientation emerged as a meaningful moderator for brand trust, thereby providing a clear and substantive answer to RQ3. The results reveal a distinct pattern: for consumers with low sustainability orientation, gamification significantly reduced brand trust; for consumers with medium orientation, the net effect was neutral; and for consumers with high sustainability orientation, gamification significantly increased brand trust. This interaction closely reflects theoretical arguments that consumers with strong pro-environmental values respond more positively to sustainability-oriented interventions due to higher value congruence and moral identification (Vermeir and Verbeke 2006, White, Habib and Hardisty 2019). Conversely, consumers with lower sustainability orientation may interpret gamified sustainability messaging as inauthentic, which can reduce sustainable behavioral responses and, in extreme cases, negatively affect brand reputation (Gupta and Ogden 2009, Delmas and Burbano 2011).

For purchase intention, willingness to pay, and brand loyalty**,** sustainability orientation did not significantly moderate the effects of gamification, although there was a descriptive trend toward stronger effects at higher sustainability orientation, especially for brand loyalty. This partially

confirms the expectation from Chapter 2.3.2 that value alignment enhances responsiveness to sustainable interventions, but it also indicates that the primary behavioral effects of gamification are largely driven by universal motivational mechanisms rather than by specific consumer characteristics.

Bringing together the results on mediation and moderation allows for an integrated answer to the leading research question:

RQ1: How does gamification design influence purchase behavior and brand outcomes in sustainable FMCG retail?

Overall, the findings indicate that gamification positively influences purchase behavior and brand outcomes in sustainable FMCG retail, but that these effects are driven less by specific design formats and more by the psychological experiences' gamification creates. Both individual and social gamification significantly increased purchase intention, willingness to pay, and brand loyalty compared to the non-gamified control condition, while no significant differences emerged between the two design types. This finding partially contrasts with the literature reviewed in Chapter 2.2.2. While prior research suggested that social elements may generate stronger effects through social comparison and recognition (Mulcahy, et al. 2021) and individual elements may support competence and mastery (Sailer, et al. 2017), the present results indicate that design differentiation plays a subordinate role in low-involvement FMCG contexts. Instead, as predicted by Self-Determination Theory (Deci and Ryan 2000) and empirical work on gamification's motivational mechanisms (Hamari, Koivisto and Sarsa 2014), the presence of gamification itself activates core psychological experiences of enjoyment and empowerment**,** which then shape behavioral outcomes.

These findings directly confirm the proposition by Hamari & Koivisto (2014) that gamification can positively influence user attitudes, while also addressing the research gap they identified, namely, the lack of studies linking gamification to concrete purchase behavior in the context of FMCG. By demonstrating effects on purchase intention and willingness to pay in a FMCG setting, this study extends prior work that had primarily investigated engagement or platform usage (Xi and Hamari 2020, Hofacker, et al. 2016). It further aligns with literature on habitual consumer behavior (Gleim, et al. 2013), as gamification appears to interrupt routine choices by adding hedonic and autonomy-related cues that make the interaction more salient than usual low-involvement decisions.

For brand loyalty, the strong positive effects of gamification also mirror earlier findings that gameful environments foster repeated engagement and attitudinal commitment (Chaudhuri and Holbrook 2001).

However, brand trust presents a more complex and theoretically meaningful exception. As discussed in Chapter 2.1.2 and supported by sustainability literature (Gupta and Ogden 2009) (Delmas and Burbano 2011, White, Habib and Hardisty 2019) consumers often approach sustainability communication with skepticism due to concerns about greenwashing. The present study confirms this concern. The direct effect of gamification on brand trust was negative, indicating that some consumers perceive gamified sustainability messaging as manipulative or commercially motivated. Moreover, this study uniquely shows that this negative direct effect is not uniform but depends strongly on sustainability orientation. As demonstrated in Chapter 2.3.2, consumers with high pro-environmental values interpret sustainability-related interventions as value-consistent, while low-orientation consumers may perceive them as strategically motivated. The results align closely with value-congruence arguments (Vermeir and Verbeke 2006, White, Habib and Hardisty 2019) and show that gamification can either strengthen or damage brand trust depending on the consumer segment, revealing a boundary condition overlooked in prior gamification research.

Overall, the answer to RQ1 is therefore partially affirmative. Gamification influences purchase behavior and brand outcomes, consistent with the motivational pathways described in the literature, but its effect on trust is asymmetric and sensitive to consumers' underlying sustainability values. Importantly, this study provides evidence that the motivational mechanisms (enjoyment and empowerment) are more decisive than the type of gamification design itself, adding nuance to previous theoretical debates and offering an important conceptual refinement for research in sustainable retail.

5.2. Theoretical Implications

This study contributes several theoretical insights to gamification research in sustainable FMCG retail.

First, the results show that the effects of gamification are driven primarily by motivational mechanisms, not by the specific design type. This confirms the SDT-based assumptions outlined in Chapter 2.3.1, namely that enjoyment and perceived empowerment function as central pathways through which gamification influences consumer behavior (Deci and Ryan 2000). The full mediation effects for purchase intention, willingness to pay and brand loyalty

extend existing literature by demonstrating that these psychological mechanisms translate into actual purchase-related outcomes**,** addressing the research gap identified by Hamari and Koivisto (2014).

Second, the absence of significant differences between individual and social gamification challenges prior findings emphasizing stronger effects from social comparison dynamics (Festinger 1954, Zhang & Fang 2021). In low-involvement FMCG contexts, the study suggests that structural design differences matter less than the motivational experiences they trigger.

Third, the results highlight brand trust as a critical boundary condition. This aligns with sustainability literature emphasizing heightened skepticism toward marketing interventions (Gupta & Ogden 2009, Delmas & Burbano 2011) and contrasts with more positive statements in gamification research (Hofacker, et al. 2016). The findings therefore offer a more differentiated theoretical perspective on the risks and benefits of gamification in ethical consumption contexts.

Fourth, the study challenges assumptions about digital affinity as a moderator. Contrary to technology acceptance models (Koivisto & Hamari 2014, Venkatesh et al. 2012), digital affinity did not significantly shape consumer responses, suggesting that simple gamification formats may be effective across different user segments.

Finally, the strong moderating effect of sustainability orientation for brand trust supports value-congruence theories (White, Habib and Hardisty 2019, Vermeir and Verbeke 2006). The finding that gamification can reduce trust for low-orientation consumers but enhance it for high-orientation consumers extends gamification theory by identifying value alignment as a decisive boundary condition.

5.3. Practical Implications

The findings of this study also provide several actionable implications for retailers and offer a clear answer to the final sub-research question:

RQ4: What does effective gamification design look like for retailers seeking to promote sustainable consumer behavior?

First, the results show that enjoyment and empowerment are the central drivers of gamification effectiveness. Retailers should prioritize game elements that foster intrinsic motivation trough the three psychological needs of the SDT rather than focusing on complex mechanics. In practice, retailers can support autonomy by for example allowing consumers to freely

participate in sustainability challenges or options to turn gamified features on or off. Competence can be fostered through progress indicators, such as eco-scores, refill tracking, or cumulative impact feedback showing avoided emissions or packaging waste. Relatedness may be addressed through light social cues, such as showing how many shoppers have chosen a sustainable option, without introducing too much competitive pressure.

Second, the absence of differences between gamification designs indicates that design complexity is not a prerequisite for effectiveness in FMCG retail. In low-involvement contexts characterized by habitual decision-making, simple, individualized and attention-catching elements are sufficient to disrupt routines (Gleim, et al. 2013). Retailers can therefore focus on solutions such as personal sustainability dashboards, refill reminders, or personalized product suggestions based on previous eco-friendly purchases, rather than investing in resource-intensive leaderboards or social competitions.

Third, the findings underline that gamification does not work uniformly for all consumers**,** particularly with regard to brand trust. The effect of gamification on trust for some segments highlights the importance of segmentation and personalization**,** especially in digital and omnichannel environments where retailers have access to rich consumer data. Retailers should leverage behavioral data to tailor gamified interventions to different sustainability orientations. For value-aligned consumers, sustainability-focused missions, impact tracking, or educational content can reinforce identification and trust. For less sustainability-oriented consumers, gamification should be framed around convenience, savings, or product quality rather than moral appeals, thereby avoiding skepticism.

Fourth, given the sensitivity of trust in this contexts, credibility must be actively safeguarded. Retailers should link gamified elements to verifiable outcomes, such as third-party certifications, transparent product data, or externally validated sustainability claims. Overly playful visuals or exaggerated rewards should be avoided, as they risk reinforcing perceptions of greenwashing (Gupta and Ogden 2009). Consistency across channels is equally critical. As highlighted earlier in the thesis, omnichannel retail environments require that sustainability messaging and gamified features remain aligned across apps, websites, and physical stores to maintain credibility.

Fifth, the absence of moderation by digital affinity suggests that simple gamification designs are accessible even to users with limited technological expertise (contrary to Koivisto & Hamari 2014). Retailers should prioritize ease of use and intuitive interaction patterns**,** such as simple

animations. This makes gamification scalable across broad consumer segments and supports its application in diverse FMCG shopper populations.

Finally, retailers may consider combining intrinsic and extrinsic motivation strategically over time. Gamification can serve as an initial intervention to disrupt habits and increase engagement through enjoyment and empowerment. Once consumers are activated, external incentives such as loyalty points, discounts, or exclusive offers, as stated in Chapter 2.2.1, can be layered on top to reinforce behavior. This staged approach allows retailers to benefit from intrinsic motivation while leveraging traditional loyalty mechanisms to scale long-term impact.

5.4. Limitations and Future Research

Despite its valuable contributions, this study is subject to several limitations that inform directions for future research. The data was collected through a convenience sample, resulting in an overrepresentation of young, digitally experienced participants from Germany and Portugal. This limits the generalizability of the findings, particularly given cultural and demographic differences in shopping behavior. Future studies should therefore rely on more heterogeneous and cross-cultural samples.

The experimental design used static mock-ups of gamification elements, meaning that participants did not interact with real-time feedback, social features, or progress mechanisms. As a result, the findings capture attitudinal responses rather than the dynamic engagement processes typically observed in gamification research. In addition, the study relied exclusively on self-reported intentions within a hypothetical shopping scenario. Given the well-documented attitude–behavior gap in sustainability contexts (Vermeir and Verbeke 2006), actual behavioral responses may differ from the stated intentions observed here. Furthermore, as both mediating variables and outcome measures were collected via self-reports within the same survey context, common method variance may have inflated some of the estimated mediation effects.

Another limitation concerns the use of a fictional brand. While this avoided bias from prior brand associations, it may have influenced the observed trust effects, which could behave differently for well-known brands with established reputations. Moreover, the study focused only on two moderators, although consumer reactions to gamification are likely shaped by additional factors such as product involvement, environmental knowledge or price sensitivity.

These limitations open several areas for future research. Field experiments in real retail environments should examine whether the motivational pathways identified here translate into actual purchases. Longitudinal designs are needed to assess whether gamification effects on

loyalty and engagement persist over time. Future studies may also decompose gamification into individual elements to determine which components drive behavioral change in sustainable FMCG contexts and which ones reduces trust. Expanding the moderator set, testing further product categories such as sustainable fashion, and examining hybrid models that combine gamification with loyalty programs to give stronger incentives represent additional promising directions.

6. Conclusion

Finally, it can be said that sustainable consumption in FMCG retail remains a central environmental and managerial challenge because everyday purchase decisions are frequent, low-involvement, and strongly habit driven. This thesis examined whether gamification could influence purchase behavior and brand outcomes in a sustainable FMCG context, and through which psychological mechanisms and consumer characteristics these effects occur.

Overall, the findings indicate that gamification can strengthen consumer responses in commercially relevant ways. Compared to a non-gamified experience, gamified scenarios increased purchase intention, willingness to pay, and brand loyalty. The specific design format played a limited role. This suggests that in low-involvement FMCG contexts, the presence of gameful elements is more important than the distinction between personal and social designs.

The results further show that gamification operates primarily through the psychological experiences it creates. Enjoyment and empowerment emerged as the central mechanisms explaining its effects. Gamification appears to be effective when it makes sustainable choices feel engaging, fun, and self-directed, which is particularly relevant in FMCG environments where consumers have limited attention and often rely on heuristics rather than deliberate evaluation.

Brand trust emerged as a more sensitive outcome. Although enjoyment and empowerment contributed positively, gamification also triggered negative effects for certain consumers, reflecting skepticism toward sustainability-related marketing and concerns about greenwashing. This highlights that motivational benefits do not automatically translate into increased credibility.

Taken together, the findings suggest that gamification can be a valuable tool for promoting sustainable purchase decisions in FMCG retail, but only if it is applied carefully. Simple, autonomy-supporting elements such as progress feedback or badges appear sufficient to

generate behavioral and loyalty effects without requiring complex social mechanics. However, because trust responses depend on consumers' underlying sustainability values, one-size-fits-all implementations are risky. Gamified sustainability interventions should therefore also be designed with credibility, transparency, and segmentation in mind.

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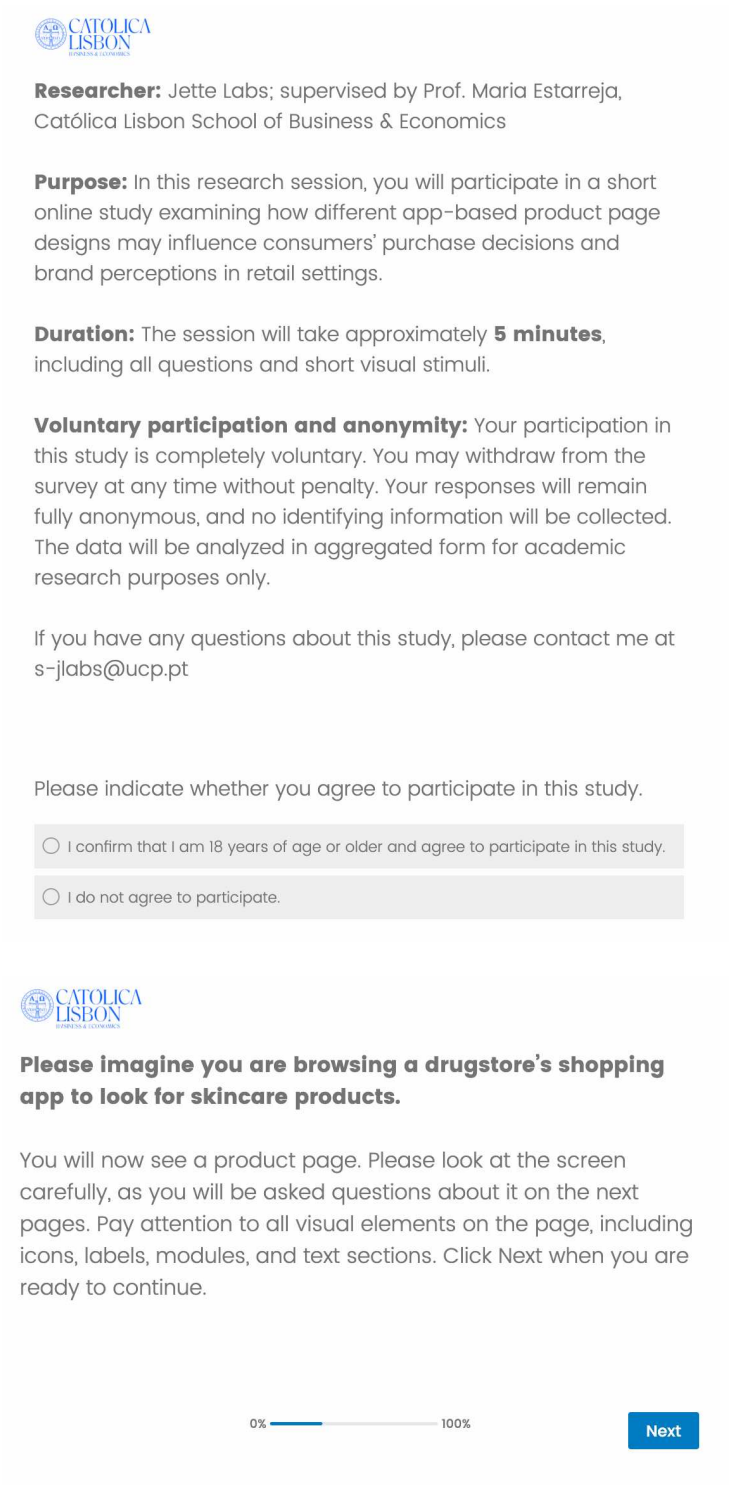
Appendix

Appendix 1: Questionnaire



CATÓLICA LISBON

Researcher: Jette Labs; supervised by Prof. Maria Estarreja, Católica Lisbon School of Business & Economics

Purpose: In this research session, you will participate in a short online study examining how different app-based product page designs may influence consumers' purchase decisions and brand perceptions in retail settings.

Duration: The session will take approximately **5 minutes**, including all questions and short visual stimuli.

Voluntary participation and anonymity: Your participation in this study is completely voluntary. You may withdraw from the survey at any time without penalty. Your responses will remain fully anonymous, and no identifying information will be collected. The data will be analyzed in aggregated form for academic research purposes only.

If you have any questions about this study, please contact me at s-jlabs@ucp.pt

Please indicate whether you agree to participate in this study.

- ○ I confirm that I am 18 years of age or older and agree to participate in this study.
- ○ I do not agree to participate.

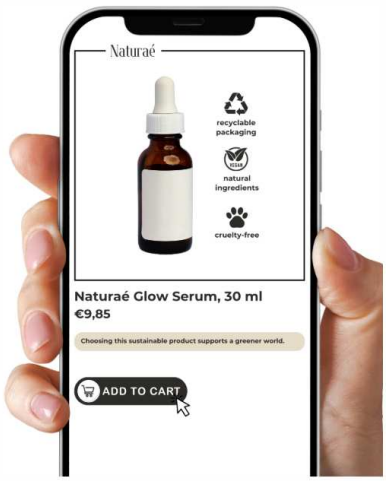
CATÓLICA LISBON

Please imagine you are browsing a drugstore's shopping app to look for skincare products.

You will now see a product page. Please look at the screen carefully, as you will be asked questions about it on the next pages. Pay attention to all visual elements on the page, including icons, labels, modules, and text sections. Click Next when you are ready to continue.

0% 100%

Next



I have viewed the product page carefully.

- ○ Yes
- ○ No

0% 100%

Next

Did the app page you just saw include any game-like elements (such as badges, progress bars, or leaderboards)?

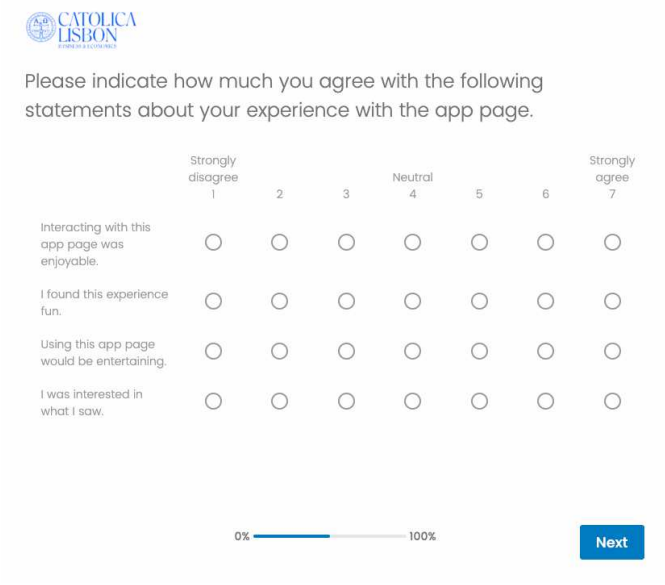
- ○ Yes
- ○ No

Which option best describes the extra module on the app page you just saw?

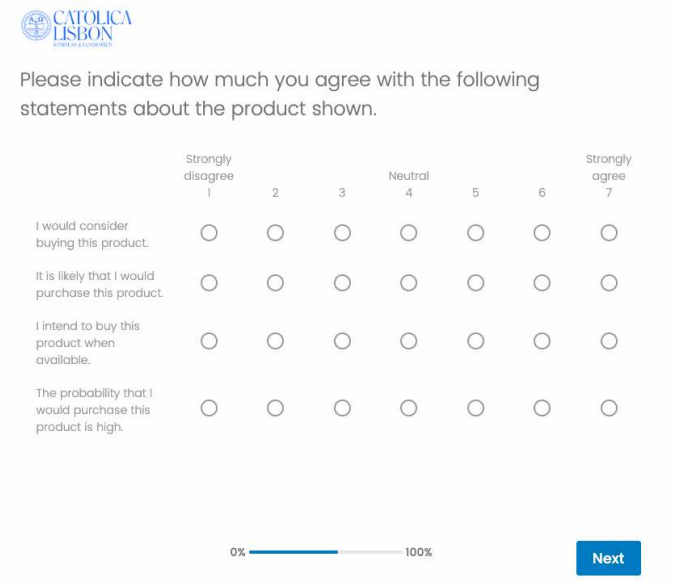
- ○ No game-like elements (normal shopping cart)
- ○ Personal badges or levels (individual progress)
- ○ Leaderboard or social ranking (social comparison)

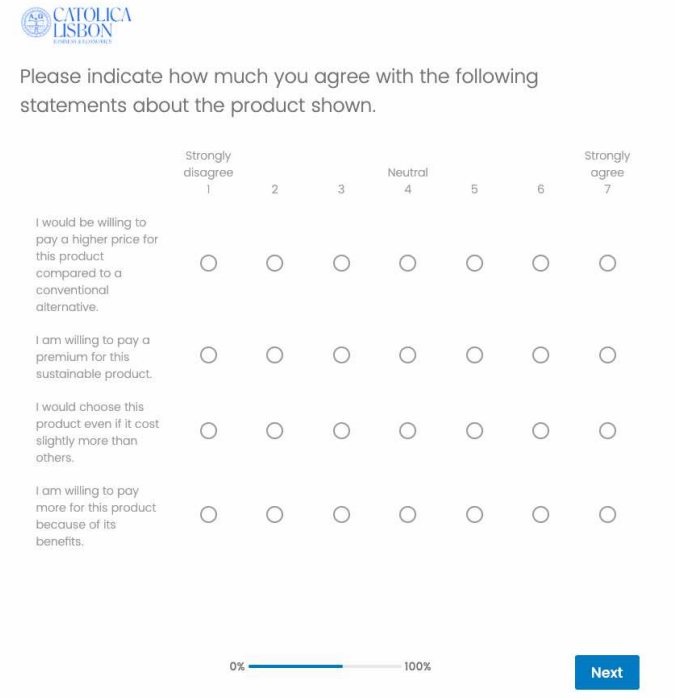
0% 100%

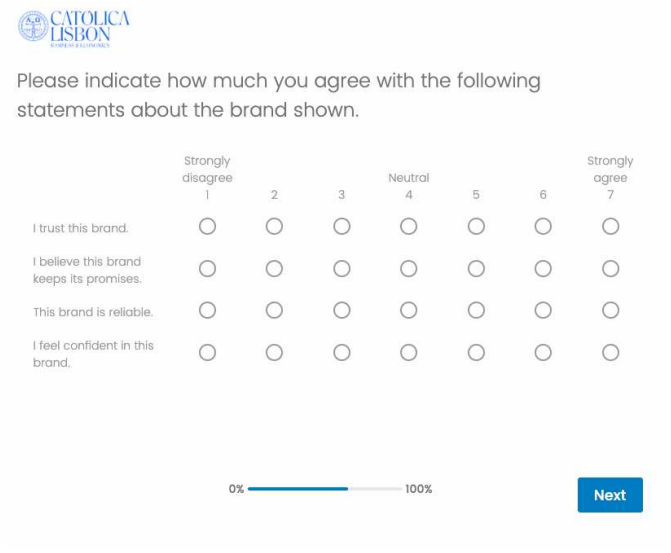
Next

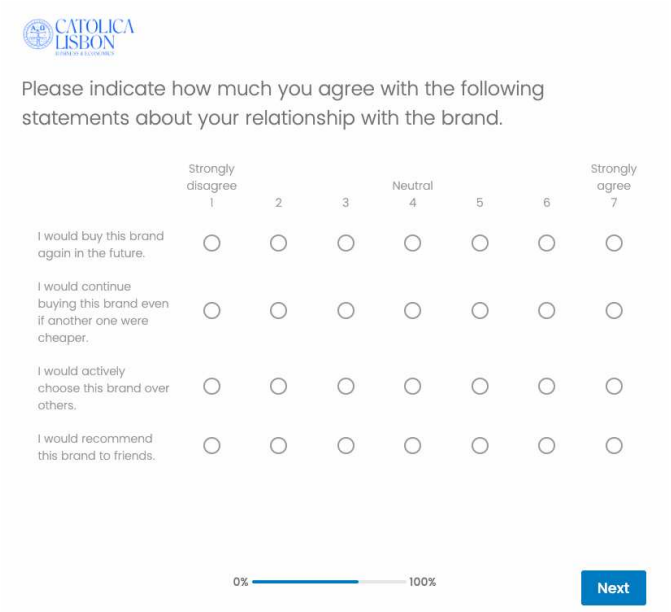

CATOLICA LISBON
Please indicate how much you agree with the following statements about your experience with the app page.
Strongly disagree 1
2
3
Neutral 4
5
6
Strongly agree 7
Interacting with this app page was enjoyable.
I found this experience fun.
Using this app page would be entertaining.
I was interested in what I saw.
0%
100%
Next

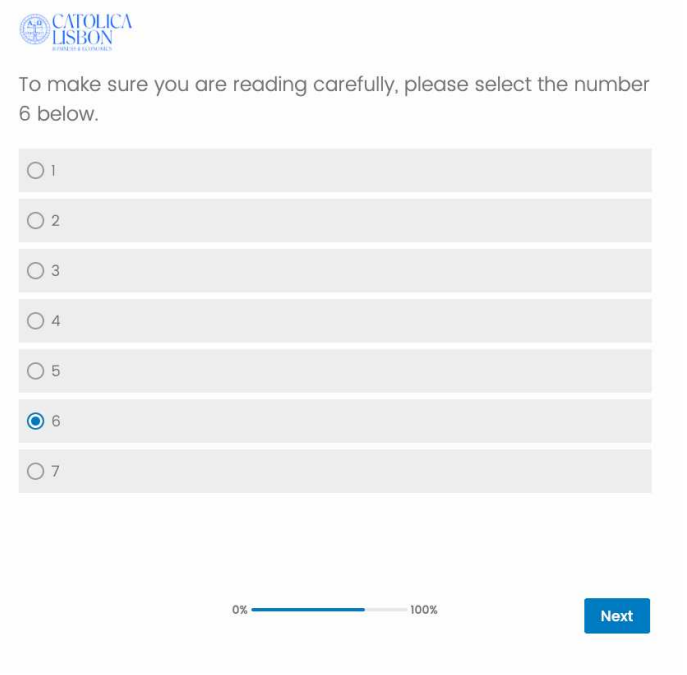

CATOLICA LISBON
Please indicate how much you agree with the following statements about your experience with the app page.
Strongly disagree 1
2
3
Neutral 4
5
6
Strongly agree 7
This app made me feel in control of my sustainable choices.
The feature helped me make purposeful shopping decisions.
I felt capable of contributing to sustainability with this product.
The app gave me autonomy to act on my values.
0%
100%
Next

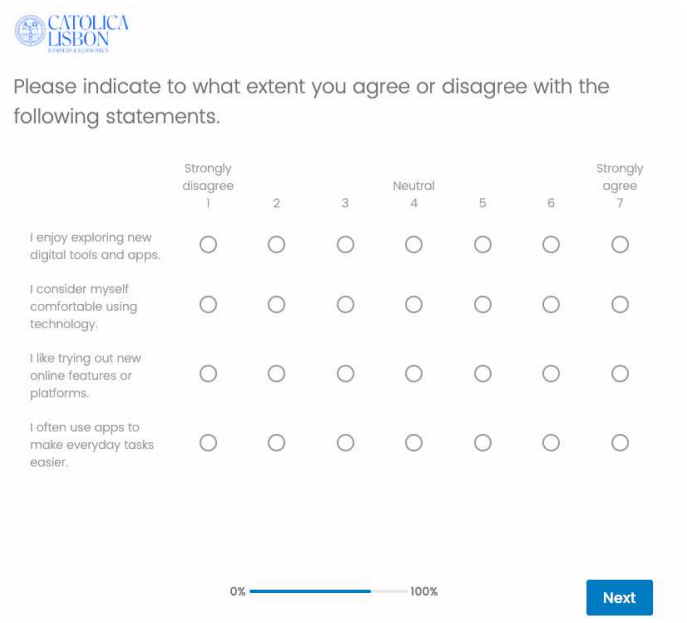

CATOLICA LISBON
Please indicate how much you agree with the following statements about the product shown.
Strongly disagree 1
2
3
Neutral 4
5
6
Strongly agree 7
I would consider buying this product.
It is likely that I would purchase this product.
I intend to buy this product when available.
The probability that I would purchase this product is high.
0%
100%
Next

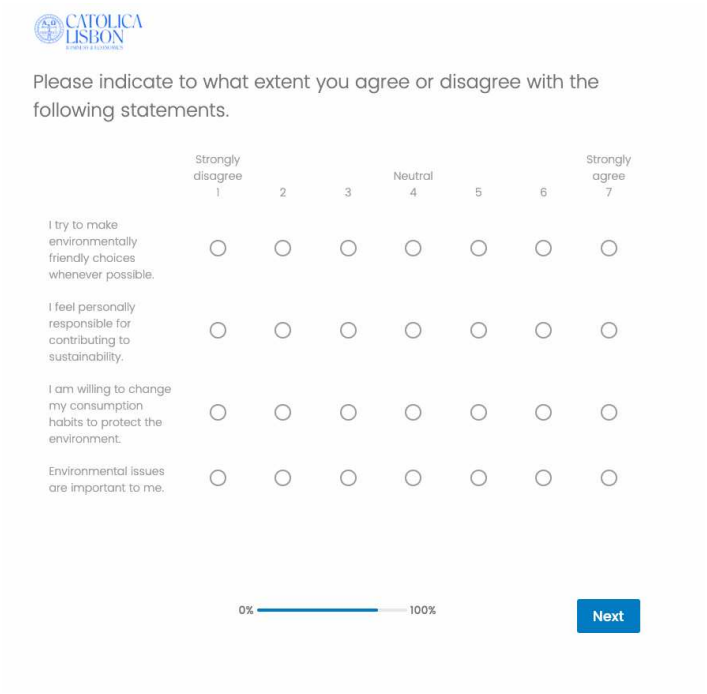

CATOLICA LISBON
Please indicate how much you agree with the following statements about the product shown.
Strongly disagree 1
2
3
Neutral 4
5
6
Strongly agree 7
I would be willing to pay a higher price for this product compared to a conventional alternative.
I am willing to pay a premium for this sustainable product.
I would choose this product even if it cost slightly more than others.
I am willing to pay more for this product because of its benefits.
0%
100%
Next

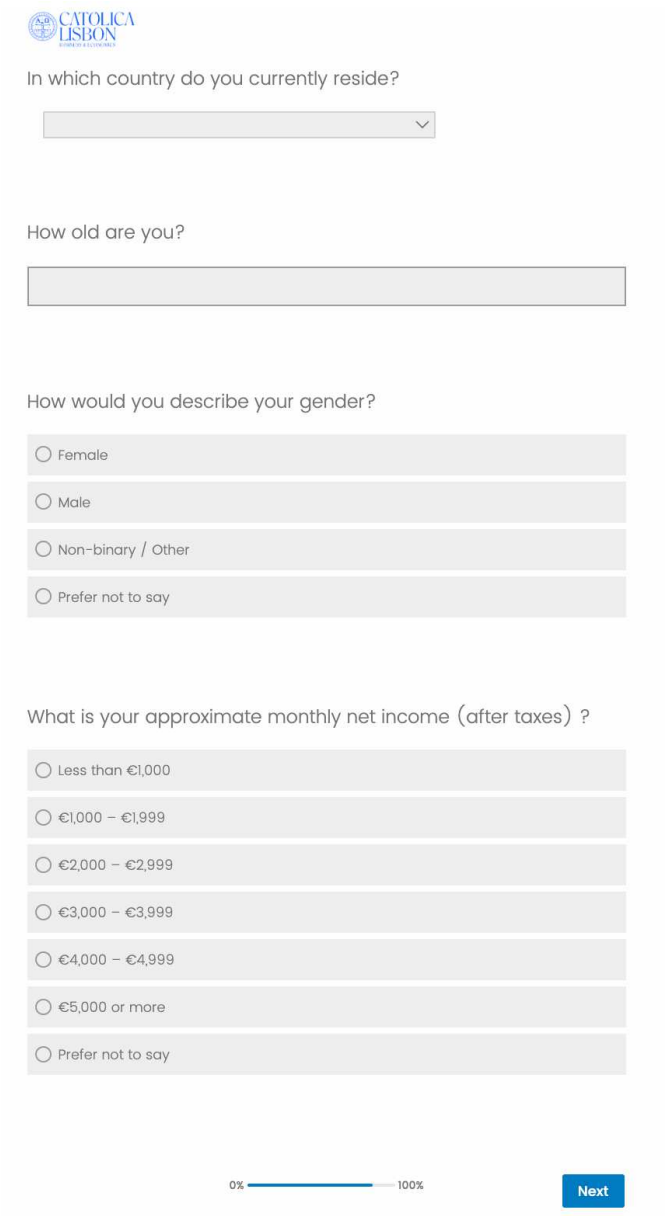

CATOLICA LISBON
Please indicate how much you agree with the following statements about the brand shown.
Strongly disagree 1
2
3
Neutral 4
5
6
Strongly agree 7
I trust this brand.
I believe this brand keeps its promises.
This brand is reliable.
I feel confident in this brand.
0%
100%
Next


CATOLICA LISBON
Please indicate how much you agree with the following statements about your relationship with the brand.
Strongly disagree 1
2
3
Neutral 4
5
6
Strongly agree 7
I would buy this brand again in the future.
I would continue buying this brand even if another one were cheaper.
I would actively choose this brand over others.
I would recommend this brand to friends.
0%
100%
Next


CATOLICA LISBON
To make sure you are reading carefully, please select the number 6 below.
1
2
3
4
5
6
7
0%
100%
Next


CATOLICA LISBON
Please indicate to what extent you agree or disagree with the following statements.
Strongly disagree 1
2
3
Neutral 4
5
6
Strongly agree 7
I enjoy exploring new digital tools and apps.
I consider myself comfortable using technology.
I like trying out new online features or platforms.
I often use apps to make everyday tasks easier.
0%
100%
Next


CATOLICA LISBON
Please indicate to what extent you agree or disagree with the following statements.
Strongly disagree 1
2
3
Neutral 4
5
6
Strongly agree 7
I try to make environmentally friendly choices whenever possible.
I feel personally responsible for contributing to sustainability.
I am willing to change my consumption habits to protect the environment.
Environmental issues are important to me.
0%
100%
Next


CATÓLICA LISBON
In which country do you currently reside?
How old are you?
How would you describe your gender?
Female
Male
Non-binary / Other
Prefer not to say
What is your approximate monthly net income (after taxes) ?
Less than €1,000
€1,000 – €1,999
€2,000 – €2,999
€3,000 – €3,999
€4,000 – €4,999
€5,000 or more
Prefer not to say
0%
100%
Next


CATÓLICA LISBON
Thank you very much for participating in this study.
Your responses have been recorded.
This research examines how different types of gamification elements—such as social or individual features—may influence consumers' purchase behavior and brand attitudes in sustainable retail contexts.
If you have any questions, feel free to contact me at: s-jlabs@ucp.pt
0%
100%

Appendix 2: Pre-Test Feedback from Focus Group

Participant Number	Manipulation	Comments for Improvement
1	control	Increase font size, add progress bar, hard to answer questions about enjoyment, because there where no "exciting" elements
2	individual	Add Católica logo, improve final thank-you sentence, bold the numbers, I am not sure if for the type of product a badge is strong enough to actually change my behavior
3	social	Change the button to "Next" instead of an arrow, ask a question "What do you think this study was about", the leaderbaord and points require me to purchase all my products online and dont really purchase them
4	control	Add Católica logo, add a back button so people can review the mockup, improve the final sentence, explain in the end what the study was about, add your email in the end for questions
5	individual	Rephrase "autonomy to act on my values" or adjust the order of items, clarify before the mediator items that these questions are about the participant's feelings, not the images anymore (confusing)
6	social	Add a progress bar, add icons to the mockups to make it look more "game-like", change maybe from cleaning products to a little more high-involvement product
7	control	make 5 min participation time bold, 4 items per question feels quite long, make only one question per page, because most people will answer on a phone and then more then one questions seems quite long
8	individual	match the wording on the mock-up and the manipulation check question, easier to understand, for example headline mock-Up: LEADERBOARD and then ask in manipulation check, did you see a LEADERBOARD?
9	social	highlight or bold the word LEADERBOARD so it is more visible

Appendix 3: Population Statistics

Table 12: Descriptive Statistics for Age

	N	Min	Max	Mean	Std. Dev
Age	181	18	56	27.182	7.926
Valid N	181				

Table 13: Frequency Table for Gender

	N	%
Female	109	60.2
Male	71	39.2
Prefer not to	1	0.6
Total	181	100

Table 14: Frequency Table for Nationality

	N	%
Germany	112	61.9
Portugal	35	19.3
Austria	17	9.4
Norway	5	2.8
Netherlands	3	1.7
Poland	3	1.7
Belgium	2	1.1
Azerbaijan	1	0.6
Denmark	1	0.6
France	1	0.6
Japan	1	0.6
Total	181	100

Table 15: Frequency Table for Income

	N	%
€1.000-€1.999	65	35.9
Less than €1.000	50	27.6
€2.000-€2.999	24	13.3
€3.000-€3.999	22	12.2
€4.000-€4.999	11	6.1
Prefer not so say	5	2.8
€5.000 or more	4	2.2
Total	181	100

Table 16: Randomization Check Across Experimental Conditions

Variable	Test	Test Statistic	df	p-value
Age	One-way ANOVA	$F = 0.89$	(2, 178)	0.412
DA	One-way ANOVA	$F = 0.46$	(2, 178)	0.632
SO	One-way ANOVA	$F = 14.81$	(2, 178)	< .001
Gender	Chi-square	$\chi^2 = 4.58$	4	0.333
Income	Chi-square	$\chi^2 = 19.34$	12	0.081

Appendix 4: Hypothesis Testing H1a and H1b

Table 17: Mean and Standard Deviation Overview

	1 Control		2 Individual		3 Social	
Outcome	Mean	SD	Mean	SD	Mean	SD
PI	3.90	1.10	5.76	1.15	5.94	0.89
WTP	3.28	1.03	5.39	0.98	5.50	0.89
BT	4.99	1.48	4.95	0.97	5.08	0.84
BL	3.49	0.93	5.28	1.07	5.42	0.95

Table 18: Levene-Test

Outcome	Levene Stat.	Sig.
PI	1.72	0.18
WTP	0.62	0.54
BT	7.62	<.001
BL	0.95	0.39

Appendix 5: Hypothesis Testing H2a and H2b

Table 19: Mediation Summary (Enjoyment, H2a)

Outcome	a-path	b-path	Direct effect	Indirect effect	Bootstrap CI	Mediation
PI	1.5299*	0.7338*	–0.1074 (n.s.)	1.1227*	[.9007, 1.3651]	full
WTP	1.5299*	0.6506*	0.1051 (n.s.)	0.9953*	[.7833, 1.2421]	full
BT	1.5299*	0.3213*	–0.4458 (p = .0027)	0.4916*	[.2272, .7557]	partial
BL	1.5299*	0.6444*	–0.0231 (n.s.)	0.9859*	[.7694, 1.2337]	full

Table 20: Mediation Summary (Empowerment, H2b)

Outcome	a-path	b-path	Direct effect	Indirect effect	Bootstrap CI	Mediation
PI	1.3805*	0.7925*	–0.0788 (n.s.)	1.0941*	[.8921, 1.3046]	full
WTP	1.3805*	0.6955*	0.1402 (n.s.)	0.9602*	[.7550, 1.1860]	full
BT	1.3805*	0.4382*	–0.5592*	0.6049*	[.3517, .8912]	partial
BL	1.3805*	0.6969*	–0.0231 (n.s.)	0.9622*	[.7840, 1.1669]	full

Appendix 6: Hypothesis Testing H3a and H3b

Table 21: Moderation Summary (Digital Affinity, H3a)

Outcome	Interaction Term	p-value
PI	F = 2.95	p = .0875
WTP	F = 1.95	p = .1644
BT	F = 1.16	p = .2836
BL	F = 2.99	p = .0853

Table 22: Moderation Summary (Sustainability Orientation, H3b)

Outcome	Interaction Term	p-value
PI	F = 2.62	p = .1071
WTP	F = 0.56	p = .4538
BT	F = 2.86	p = .0924
BL	F = 34.94	p < .001