

MINISTRY OF EDUCATION AND TRAINING  
NATIONAL ECONOMICS UNIVERSITY



**NGUYEN DINH SON**

**CONSUMER BEHAVIORAL INTENTION IN  
THE CIRCULAR ECONOMY: A STUDY OF  
SMARTPHONES IN VIETNAM**

**PHD DISSERTATION  
IN BUSINESS ADMINISTRATION**

**HANOI – 06/2026**

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*Supervisor:* Assoc. Prof. Dr. **NGUYEN DINH TOAN**

**HANOI – 06/2026**

# DECLARATION

*I confirm that I have read and understood the University's policy on plagiarism. I further declare, on my honor, that this PhD dissertation is my own work and complies with the regulations on good academic practice.*

*Hanoi, June 1st, 2026*

**PhD Candidate**

*(Signed)*

**Nguyen Dinh Son**

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## LIST OF ABBREVIATIONS

CFA	Confirmatory Factor Analysis
CE	Circular economy
CP	Consumer preference
DCE	Discrete choice experiment
EA	Environmental awareness
EC	Environmental concern
EFA	Exploratory Factor Analysis
MAP	Minimum Average Partial
ML	Maximum Likelihood
NAM	Norm Activation Model
PA	Principal Axis/Iterated Principal Axis
PI	Purchase intention
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
SI	Social influence
TAM	Technology Acceptance Model
TCCM	Theory, Context, Characteristics, and Method
TCT	Trust Commitment Theory
TPB	Theory of Planned Behavior
TRS	Trust in refurbished smartphones
TRSR	Trust in refurbished smartphones retailer
VBN	Value Belief Norm





## CHAPTER 1: INTRODUCTION TO THE RESEARCH

### 1.1. Rationale for the research

The electronic waste market has expanded significantly in recent years, reaching \$58.1 billion in 2025 and projected to increase to \$62.96 billion in 2026, reflecting a compound annual growth rate (CAGR) of 8.4%. This growth is driven by the rising volume of discarded electronic devices, limited formal recycling infrastructure, increasing environmental awareness, demand for valuable material recovery, and rapid technological obsolescence (Company, January 2026). The market is expected to maintain this upward trend, reaching approximately \$85.9 billion by 2030, with a projected CAGR of 8.1% over the forecast period (Company, January 2026). Moreover, despite their technological and economic benefits, smartphones are increasingly recognized as a major contributor to global electronic waste, primarily due to their widespread adoption and rapid replacement cycles (Choudhary *et al.*, 2025; Gadipelli, 2025; Quinto *et al.*, 2025). In Vietnam, electronic waste (e-waste) is becoming an increasingly significant environmental issue, driven by the rapid growth in the consumption of electronic devices and ongoing technological advancements (*Vietnam Electronic Waste Market Report and Forecast 2025-2034*, Jul 29, 2025). The market is projected to expand at a compound annual growth rate (CAGR) of 3.20% during 2025 to 2034, reflecting the rising volume of discarded equipment (*Vietnam Electronic Waste Market Report and Forecast 2025-2034*, Jul 29, 2025). This trend is largely attributed to shorter product lifecycles, declining costs of electronic goods, and consumers' tendency to replace rather than repair devices. Notably, consumer electronics and telecommunications devices, including smartphones, constitute a major share of e-waste due to their widespread use and frequent replacement, thereby contributing substantially to the overall increase in e-waste generation in Vietnam over 2025–2034 (*Vietnam Electronic Waste Market Report and Forecast 2025-2034*, Jul 29, 2025). Therefore, examining the use and replacement patterns of telecommunications devices, including smartphones, is an important approach to mitigating electronic waste, given their substantial and growing contribution to global and Vietnamese e-waste generation.

One potential approach to mitigating e-waste is to understand how consumers adopt environmentally responsible intentions and behaviors (Gadipelli, 2025; Yুদ্ধie and Kasmó, 2025; Pongén *et al.*, 2026). Therefore, research focusing on consumer decision-making is essential to addressing the e-waste challenge.

Given that smartphones represent a key case of short product lifespans, which contribute significantly to electronic waste, the circular economy provides a relevant framework for addressing this issue (Choudhary *et al.*, 2025; Zoka and Korez Vide, 2025; Rittershaus *et al.*, 2026). In Vietnam, this approach is not only theoretical but is increasingly positioned as a national development strategy. According to (UNDP, December 17, 2025), the country is facing rapidly rising material consumption, leading to growing pressures from waste generation, environmental pollution, and resource inefficiency. In response, the circular economy is promoted as a systemic solution to retain resource value, reduce emissions, and strengthen economic resilience (UNDP, December 17, 2025). Notably, sectors such as electronics are identified as key areas for transformation, as they still largely operate under linear models and generate significant landfill waste (UNDP, December 17, 2025). Within this strategic direction, telecommunications devices, including smartphones, represent a critical intervention point due to their widespread use and rapid replacement cycles (UNDP, December 17, 2025). The 10R framework provides a practical pathway to operationalize circular economy principles in this sector. Strategies such as Refuse, Rethink, and Reduce can limit unnecessary upgrades, while Reuse, Repair, Refurbish, and Remanufacture help extend device lifespans (Malooly and Daphne, November 9, 2023). Although Recycle and Recover remain important, upstream strategies are more effective in reducing overall e-waste generation (Malooly and Daphne, November 9, 2023). Therefore, aligning smartphone consumption and lifecycle management with circular economy principles, as advocated in Vietnam's sustainability agenda, represents a crucial step toward reducing e-waste and advancing long-term resource efficiency.

In this context, the circular economy is widely recognized as a critical framework for reshaping production and consumption practices, with a focus on extending product value over time through strategies such as refurbishment (Prabhu N and Majhi, 2023). Refurbishment is particularly suitable for smartphones, as it enables used devices to be restored and reintroduced into the consumer market with relatively limited technical intervention compared with remanufacturing, while retaining most of their original functional value (Prabhu N and Majhi, 2023). By extending the operational lifespan of smartphones, refurbishment directly reduces electronic waste generation. It lowers demand for newly extracted raw materials, thereby alleviating environmental pressures associated with resource-intensive production processes (Oraee *et al.*, 2024).

Recent circular economy research has examined consumer acceptance of reused, recycled, remanufactured, and refurbished products, with environmental awareness,

environmental concern, perceived value, perceived risk, and social influence commonly identified as antecedents of sustainable consumption intention (Parajuly *et al.*, 2020; Bigliardi, Filippelli and Quinto, 2022; Vidal-Ayuso, Akhmedova and Jaca, 2023). However, refurbished smartphones represent a distinct and more uncertain consumption context because consumers may recognize the environmental value of product life extension while still questioning product reliability, prior use, warranty conditions, and seller credibility (Agostini *et al.*, 2021; Sharifi and Shokouhyar, 2021; Alyahya *et al.*, 2023). This creates a first gap regarding whether environmental awareness, environmental concern, and social influence directly explain consumer preferences and purchase intentions in this specific product category.

A second gap concerns the conceptualization and role of trust. Trust theory defines trustworthiness in terms of ability, integrity, and benevolence, while e-commerce research shows that trust becomes critical when consumers face uncertainty and information asymmetry in transactions (Mayer, Davis and Schoorman, 1995; McKnight, Choudhury and Kacmar, 2002; Pavlou, 2003). In refurbished product markets, consumers evaluate both the product and the seller, suggesting that trust should be distinguished into trust in the refurbished product and trust in the retailer (Agostini *et al.*, 2021; Bigliardi, Filippelli and Quinto, 2022; Alyahya *et al.*, 2023). Prior studies often examine environmental factors, perceived value, perceived risk, and trust as separate antecedents of purchase intention in green or circular consumption, offering limited explanation for why consumers with similar environmental awareness or concern may respond differently to refurbished smartphones (Chen and Chang, 2013; Bigliardi, Filippelli and Quinto, 2022; Vidal-Ayuso, Akhmedova and Jaca, 2023). Building on the view that trust reduces uncertainty and perceived risk, this thesis examines whether trust in the product and trust in the retailer moderate the effects of environmental and social drivers on consumer preference and purchase intention.

A third gap concerns the contextual relevance of emerging markets. Consumer adoption of refurbished smartphones in emerging markets is theoretically important because environmental motives, price considerations, rapid technology diffusion, and uncertainty toward reuse and refurbishment channels may coexist in the same market environment (Parajuly *et al.*, 2020; Uriarte-Ruiz, 2022; Vidal-Ayuso, Akhmedova and Jaca, 2023). Vietnam provides a suitable context for examining how environmental and trust-related factors jointly shape circular consumption behavior under market uncertainty. To address these gaps, this thesis examines the direct effects of environmental awareness, environmental concern, social influence, and consumer preference on purchase intention

toward refurbished smartphones, and further investigates whether trust in the refurbished product and trust in the retailer moderate these relationships. Consumer preference is defined as consumers' relative preference for refurbished smartphones compared with conventional alternatives, rather than a general attitude toward purchasing.

In addition, this study examines consumer purchase intention for refurbished smartphones as a circular-economy product in Vietnam. In studies on green and sustainable purchase intention, demographic variables are commonly included as controls to ensure that differences in consumer background do not confound the effects of the main constructs. Sun, Li and Wang (2022) controlled for gender, age, education, and household income when testing green purchase intention, and their hierarchical regression results showed that only age and household income significantly influenced green purchase intention. Rahimah *et al.* (2018) also modeled the green product purchase experience alongside gender, income, age, and education as control variables, as these variables have been found to influence purchase intention in previous studies. Lavuri *et al.* (2023) found that age and gender were controlling factors for sustainable purchase intention, whereas education, occupation, and income level were not. These findings indicate that gender, demographic characteristics, and education may not consistently affect purchase intention, but they remain methodologically important in explaining it.

For refurbished smartphones in Vietnam, these controls are especially relevant because the product combines sustainability with technology-based consumption. Existing Vietnamese evidence indicates that income, as a control variable, was positively associated with the intention to purchase green apparel among young Vietnamese consumers. Gender also requires control because Felix *et al.* (2022) showed that self-reported gender significantly influenced how consumers evaluated environmentally friendly products, with the effect mediated by perceived masculinity and product effectiveness. Education should also be controlled for because prior studies include it in purchase intention models, even though its effect is often non-significant. Therefore, this study includes gender, demographic characteristics, and level of education completed as control variables to provide a cleaner estimation of consumer purchase intention toward refurbished smartphones in Vietnam.

## **1.2. Research objectives**

This thesis examines consumer purchase intention for refurbished smartphones in Vietnam within the context of the circular economy. The study seeks to provide a clearer

understanding of the factors that shape consumers' awareness, evaluation, and willingness to adopt refurbished smartphones as a sustainable alternative to new devices.

Specifically, the study focuses on the following objectives:

- To identify the key factors that contribute to consumers' awareness and perceptions of refurbished smartphones in Vietnam.
- To examine how environmental considerations and social influences affect consumers' purchase intention toward refurbished smartphones.
- To explore the role of trust, particularly trust in sellers and trust in product quality, in influencing purchase intention.
- To analyze how consumer preferences are formed and how they contribute to purchase intention toward refurbished smartphones.
- To examine whether consumers' purchase intention toward refurbished smartphones in Vietnam differs across gender groups, location groups, and completed education levels.
- To examine whether the structural relationships among environmental awareness, environmental concern, social influence, consumer preference, and purchase intention toward refurbished smartphones differ between male and female consumers in Vietnam.

Based on these findings, the thesis aims to propose managerial implications to enhance the adoption of refurbished smartphones and promote sustainable consumption in Vietnam.

### **1.3. Research questions**

Based on the above objectives, the thesis addresses the following research questions:

- How do environmental awareness, environmental concern, and social influence shape consumer preference toward refurbished smartphones in Vietnam?
- To what extent do environmental awareness, environmental concern, and social influence contribute to the development of purchase intention through consumer preference?
- How do trust in refurbished smartphone retailers and trust in refurbished smartphones moderate the relationships between environmental awareness (EA), environmental concern, social influence, and consumer preference?
- How is consumer preference formed, and how does it influence purchase intention toward refurbished smartphones?

- How do consumers evaluate refurbished smartphones under conditions of uncertainty and information asymmetry, particularly regarding product quality and retailer reliability?
- Does consumers' purchase intention toward refurbished smartphones in Vietnam differ significantly across gender groups, location groups, and completed education levels?
- Do the structural relationships among environmental awareness, environmental concern, social influence, consumer preference, and purchase intention toward refurbished smartphones differ between male and female consumers in Vietnam?

## **1.4. Research scope**

### ***1.4.1. Content scope***

The present research investigates consumer behavior toward refurbished smartphones within the broader transition toward a circular economy in Vietnam. The thesis seeks to provide a more comprehensive understanding of how environmental, psychological, and social factors jointly influence consumer decision-making in the refurbished smartphone market. In particular, the study examines how psychoenvironmental dimensions, including environmental awareness and environmental concern, together with social influence, contribute to the formation of consumer preferences and purchase intentions toward refurbished smartphones. By doing so, the research aims to clarify the extent to which pro-environmental perceptions and social pressures encourage consumers to consider refurbished products as viable and sustainable alternatives to new devices.

In addition, the thesis explores the moderating role of trust-related constructs, specifically trust in the seller and trust in the refurbished product, in shaping the relationships between psychoenvironmental conditions, social influence, and behavioral outcomes. The study further investigates the mediating role of consumer preference as an underlying mechanism through which environmental and social factors are translated into purchase intentions. Beyond these relationships, the research also evaluates how consumers perceive product value and quality under conditions of information asymmetry that commonly characterize refurbishment processes, where uncertainty regarding product reliability, warranty, and performance remains significant. Finally, the thesis analyses variations across consumer groups, with particular attention to gender based differences in the development of consumer preferences and purchase intentions toward refurbished smartphones.



#### ***1.4.2. Spatial and temporal scope***

The thesis is situated within the Vietnamese market. This context represents an emerging economy shaped by collectivist cultural orientations that may influence environmentally responsible consumption behavior.

The research was conducted over 2 months. Primary data collection took place between May and July 2025, capturing consumer perceptions and behavioral intentions towards refurbished smartphones within the contemporary market environment.

#### **1.5. Research method**

This study adopts a quantitative research approach to examine consumer purchase intention toward refurbished smartphones within the context of the circular economy. A structured survey was employed to collect primary data, as it enables measurement of latent constructs such as environmental awareness, social influence, trust, consumer preferences, and purchase intention.

Data were collected through a structured questionnaire administered to consumers in Vietnam with experience with or interest in refurbished smartphones. The questionnaire was developed based on established scales and included multiple items for each construct, measured using a five-point Likert scale. The survey was administered online to ensure accessibility and a broader reach. After data collection, responses were screened to remove incomplete or invalid entries before analysis.

For data processing and analysis, SPSS software was utilized. Initially, reliability analysis using Cronbach's Alpha was conducted to assess the internal consistency of the measurement scales. This was followed by confirmatory factor analysis (CFA) to validate the measurement model and assess construct validity.

Subsequently, multiple regression analysis was applied to test the direct effects of environmental factors, social influences, and trust on consumer preferences and purchase intention. Mediation analysis was conducted to evaluate the role of consumer preferences in linking independent variables to purchase intention. In addition, a moderation analysis was performed to assess how trust in sellers and in refurbished smartphones influences the strength of these relationships.

By applying these statistical techniques, the study ensures a systematic and rigorous examination of the factors influencing purchase intention for refurbished smartphones while maintaining clarity in both data collection and processing procedures.



## **1.6. Structure of the dissertation**

The thesis is structured into five chapters with the following specific content:

- Chapter 1: Introduction to the research
- Chapter 2: Theoretical foundations and literature review
- Chapter 3: Research methods
- Chapter 4: Results of research
- Chapter 5: Discussion and Implications

## CHAPTER 2: THEORETICAL FOUNDATIONS AND LITERATURE REVIEW

### 2.1. Literature review

This study focuses on circular consumption intention and consumer behavior regarding electronic waste (e-waste), with particular emphasis on refurbished smartphones, to maintain conceptual precision and avoid excessive generalization. Circular economy research often spans multiple industries and consumption domains, which can dilute analytical clarity if not properly bounded. Narrowing the scope to smartphone-related e-waste enables a more focused examination of consumer responses within technology markets (Borthakur and Govind, 2017; Forti *et al.*, 2020). This context is especially relevant given the rapid growth of e-waste and the increasing importance of extending product lifecycles (Forti *et al.*, 2020).

A systematic literature review is adopted to synthesize prior research and identify patterns within this focused domain. Rather than relying on descriptive summaries, the review adopts an analytical approach that integrates theoretical perspectives, empirical findings, and methodological trends across studies (Snyder, 2019). This approach is particularly suitable for interdisciplinary topics such as circular consumption, where research is distributed across marketing, sustainability, and information systems literature (Geissdoerfer *et al.*, 2017).

To structure the analysis, this study employs the Theory–Context–Characteristics–Method (TCCM) framework, developed by Paul and Criado (2020). The TCCM framework enables a systematic classification of prior studies along four dimensions. The theory dimension identifies the conceptual foundations used to explain circular consumption intention, including value-based and norm-based perspectives that are commonly applied in sustainability research (Confente, Scarpi and Russo, 2020). The context dimension is critical in distinguishing studies conducted in general sustainability settings from those specifically addressing e-waste and refurbished smartphones, thereby highlighting contextual gaps (Geissdoerfer *et al.*, 2017). The characteristics dimension examines how key constructs such as perceived value, trust, perceived risk, and environmental concern are operationalized and how they are related within empirical models (Wang *et al.*, 2013; Borrello *et al.*, 2020). The method dimension evaluates research designs and analytical techniques, supporting the identification of dominant methodological approaches and potential limitations (Hiebl, 2023).

In parallel, the study applies the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline to ensure transparency and rigor in the literature

selection process. PRISMA provides a structured procedure consisting of identification, screening, eligibility assessment, and inclusion, which helps reduce selection bias and improve reproducibility (Page *et al.*, 2021). This is particularly important in emerging research areas, where inconsistent selection procedures may lead to fragmented findings (Hiebl, 2023).

The literature search was conducted across multiple international databases to capture interdisciplinary research related to circular consumption, e-waste management, and consumer behavior in technology markets. This strategy reflects the field's fragmented nature, in which relevant studies are distributed across different academic disciplines (Geissdoerfer *et al.*, 2017). Keywords were developed based on core constructs such as circular economy, refurbished smartphones, and sustainable consumption, and were combined using Boolean operators to ensure both breadth and relevance of search results (Snyder, 2019).

To capture contemporary developments, the review focuses on studies published between 2010 and 2025, a period marked by the rapid expansion of circular economy research and increasing attention to sustainability-oriented consumption practices (Agarwal *et al.*, 2025). Only peer-reviewed empirical studies directly examining consumer intention or behavior were included to ensure the validity of findings. After screening and eligibility, 50 studies were selected for in-depth analysis using the TCCM framework. This sample size is considered appropriate for an emerging yet focused research domain and allows for systematic comparison across theoretical and methodological approaches (Paul and Criado, 2020).

By combining the PRISMA as a transparent selection procedure with the TCCM framework as an analytical tool, this study ensures both methodological rigor and contextual relevance. This integrated approach provides a structured and reliable synthesis of literature on circular consumption intention and consumer behavior in the context of e-waste and refurbished smartphones, forming a solid foundation for subsequent model development.

### ***2.1.1. Theoretical perspectives on consumer behavioral intention in the circular economy***

Prior to conducting a comprehensive examination of each theoretical group outlined in the summary table below, it is essential to acknowledge that research on refurbished items and sustainable consumption has evolved through diverse theoretical frameworks, despite numerous intersections among them. Numerous studies focus on elucidating consumer behavior and acceptability, particularly through methods that examine

behavioral intention, trust systems, and risk perception. Moreover, some research situates the consumption of refurbished products within the broader framework of the circular economy or technological acceptance models.

Each theoretical framework highlights a distinct explanatory mechanism, encompassing the creation of purchasing intentions, the influence of information and quality signals, and the product's congruence with company strategy and sustainable value systems. This diversity indicates that the research field is not confined to a single theoretical framework but is expanding across multiple dimensions, reflecting the complexity of consumer behavior regarding refurbished products within the context of sustainable consumption.

Table 2. 1: Principal theoretical frameworks in the examination of customer behavior with circular economy items

Theory Group (primary stream)	Theoretical focus	References (No.)
<b>Theory of Planned Behavior (TPB)</b>	This study path emphasizes the analysis of behavioral intentions, with purchase intention recognized as the predominant variable, while elucidating the process of intention creation grounded in the theoretical framework of attitudes, subjective norms, and perceived behavioral control. Consequently, numerous studies have augmented the Theory of Planned Behavior by incorporating concepts pertinent to circular or sustainable consumption, alongside factors such as perceived risk, beliefs, social influence, and environmental concerns, to more comprehensively capture the nuances of refurbished and sustainable consumption.	(Khor and Hazen, 2017), (Güngördü Belbağ and Belbağ, 2025), (Sharifi and Shokouhyar, 2021), (Zhang and Luo, 2021), (Singhal, Tripathy and Jena, 2019), (Abbasi <i>et al.</i> , 2022), (Wang <i>et al.</i> , 2018a), (Bandara and Ariyaratne, 2024), (Parajuly <i>et al.</i> , 2020), (Harms and Linton, 2016), (Keong, Kumar and Abbasi, 2020), (Phantratanamongkol <i>et al.</i> , 2018), (Ibrahim <i>et al.</i> , 2025), (Bandara and Ariyaratne, 2024), (Ballerini <i>et al.</i> , 2025), (Fu <i>et al.</i> , 2024)
<b>Signaling–trust–perceived risk (information asymmetry) stream</b>	Research adopting this methodology arises from the issue of information asymmetry between vendors and consumers, hence highlighting the significance of product quality indicators. These indicators may encompass warranty policies, certifications, supplier reputes, or associated policy commitments. These qualities are believed to enhance trust, diminish perceived risk, and thus affect consumer intentions, decisions, or willingness to pay.	(Mugge, Jockin and Bocken, 2017), (Michaud and Llerena, 2011), (Abbey <i>et al.</i> , 2015b), (Barkhi <i>et al.</i> , 2024), (Khan, Tabish and Yu, 2025), (Agostini <i>et al.</i> , 2021), (Van Weelden, Mugge and Bakker, 2016),

		(Nasiri and Shokouhyar, 2021), (Hazen <i>et al.</i> , 2017), (Wang, 2021), (Mahmoodi and Heydari, 2021), (Sharifi & Shokouhyar, 2021), (Wang and Hazen, 2016), (Clemm <i>et al.</i> , 2025), (Harms and Linton, 2016)
<b>Circular economy / circular business models stream</b>	This study is grounded in the circular economy framework, in which customer approval is seen as essential to the proper functioning and advancement of circular business models. This group's efforts primarily focus on implementing circular practices, prolonging product lifecycles, and transitioning consumer behavior from conventional ownership models to service access within a circular ecosystem.	(Elzinga <i>et al.</i> , 2020), (Kerber, Fettermann and Bouzon, 2024), (Chun <i>et al.</i> , 2022), (Bączyk <i>et al.</i> , 2024), (Kerber, Fettermann and Bouzon, 2024), (Koide <i>et al.</i> , 2025)
<b>Technology Acceptance Model (TAM)</b>	This group examines refurbished things, especially technology items, through the lens of technology acceptance models. The analysis emphasizes not only customer acceptance of the product but also elucidates the mechanisms that shape acceptance behavior, integrating elements such as perceived risk and beliefs to more precisely represent the environment of refurbished products.	(Wallner <i>et al.</i> , 2024), (Wallner <i>et al.</i> , 2022), (Wallner, Magnier and Mugge, 2022), (Mugge <i>et al.</i> , 2018)
<b>Norm-Based Theories</b>	<p><b>Value–Belief–Norm (VBN) Theory</b> explains behavior as the outcome of a psychological chain that begins with individual values. These values shape beliefs about environmental consequences, which in turn influence a sense of moral obligation. When individuals feel personally responsible, they are more likely to engage in pro-social or environmentally responsible actions, such as choosing sustainable products.</p> <p><b>Norm Activation Model (NAM)</b> focuses more narrowly on how personal norms are triggered. It suggests that behavior arises when individuals become aware of the negative consequences of their actions and accept responsibility for them. This process activates an internal sense of duty, which then guides behavior in a more ethical or socially responsible direction.</p>	(Abbey <i>et al.</i> , 2015a), (Gaur <i>et al.</i> , 2015), (Hazen, Mollenkopf and Wang, 2017), (Lee and Kwak, 2020), (Hazen <i>et al.</i> , 2012), (Zhang, Wang and Gao, 2025), (Dong <i>et al.</i> , 2025), (Abdulla <i>et al.</i> , 2024), (Amaral and Spers, 2022)

*Source: Authors' own work*

### 2.1.2. Research contexts in circular economy consumer behavioral intention in the circular economy

Before engaging in the context-specific analysis of the studies included in the subsequent summary table, it is crucial to underscore that research on refurbished products spans diverse contexts, underscoring the variability and complexity of this domain. Divergences in product categories, distribution methods, and geographical reach establish heterogeneous research environments, thereby affecting the methodologies and analytical outcomes of each investigation. Refurbished smartphones are frequently selected as the primary focus of research due to their popularity and the substantial issues they raise regarding quality and reliability. In this setting, perceived risk and consumer trust are recognized as key determinants of acceptance and associated behavioral effects.

In addition to smartphones, other studies have broadened their focus to encompass various electronic devices and product categories within the circular consumer ecosystem, seeking to elucidate mechanisms underlying factors such as risk, perceived value, and trust in sustainable purchasing. The varied array of products enables research to focus on both the specifics of product categories and the identification of overarching trends in consumer behavior toward refurbished items. These studies concurrently highlight notable disparities across market environments, particularly in comparisons of online platforms, closed-loop circular economy systems, and alternative distribution strategies. The disparities illustrate that customer behavior towards refurbished products is significantly shaped by market structure and the operational dynamics of each distribution channel.

Research has been undertaken across diverse geographical regions worldwide, with Europe, North America, and Asia among the most thoroughly examined. Nonetheless, several studies lack a clear geographic context, underscoring the worldwide yet disparate nature of research on refurbished products. This geographically uneven distribution indicates that this area still has numerous gaps to address, especially in comparative analyses across markets and cultural contexts.

Table 2. 2: Contextual dimensions of consumer research on circular e-waste products

Context dimension	Context group	Brief description	References (No.)
Product domain	Refurbished smartphones	Core research context. Smartphones are highly personalized technology	(Mugge, Jockin and Bocken, 2017), (Güngördü Belbağ and Belbağ, 2025), (Sharifi and Shokouhyar, 2021), (Kerber, Fettermann and Bouzon, 2024), (Agostini <i>et</i>

		products, and quality risk and consumer trust play central roles in shaping acceptance and purchase outcomes.	<i>al.</i> , 2021), (Singhal, Tripathy and Jena, 2019), (Chun <i>et al.</i> , 2022), (Bandara and Ariyaratne, 2024), (Van Weelden, Mugge and Bakker, 2016), (Mugge <i>et al.</i> , 2018), (Nasiri and Shokouhyar, 2021), (Wang, 2021), (Sharifi and Shokouhyar, 2021), (Phantratanamongkol <i>et al.</i> , 2018), (Kerber, Fettermann and Bouzon, 2024), (Ibrahim <i>et al.</i> , 2025), (Bandara and Ariyaratne, 2024)
	<b>Other electronic products</b>	Electronic products beyond smartphones, commonly used to test risk–trust–value mechanisms in refurbished or remanufactured settings.	(Gaur <i>et al.</i> , 2015), (Khor and Hazen, 2017), (Hazen, Mollenkopf and Wang, 2017), (Wallner <i>et al.</i> , 2024), (Barkhi <i>et al.</i> , 2024), (Wallner, Magnier and Mugge, 2022), (Lee and Kwak, 2020), (Hazen <i>et al.</i> , 2012), (Bączyk <i>et al.</i> , 2024), (Parajuly <i>et al.</i> , 2020), (Dong <i>et al.</i> , 2025), (Hazen <i>et al.</i> , 2017), (Keong, Kumar and Abbasi, 2020), (Clemm <i>et al.</i> , 2025)
	<b>Remanufactured/circular products (general)</b>	Refurbished and circular products in general, with a strong emphasis on consumer acceptance and willingness to pay.	(Michaud and Llerena, 2011), (Abbey <i>et al.</i> , 2015b), (Wallner <i>et al.</i> , 2022), (Khan, Tabish and Yu, 2025), (Zhang and Luo, 2021), (Abbasi <i>et al.</i> , 2022), (Wang <i>et al.</i> , 2018a), (Zhang, Wang and Gao, 2025), (Mahmoodi and Heydari, 2021), (Harms and Linton, 2016), (Abdulla <i>et al.</i> , 2024), (Wang and Hazen, 2016), (Amaral and Spers, 2022), (Harms and Linton, 2016), (Koide <i>et al.</i> , 2025), (Ballerini <i>et al.</i> , 2025), (Fu <i>et al.</i> , 2024)
<b>Market/channel</b>	<b>Online platforms/e-commerce</b>	Digital market environments are characterized by high information asymmetry and a firm's reliance on	(Elzinga <i>et al.</i> , 2020), (Mugge, Jockin and Bocken, 2017), (Hazen, Mollenkopf and Wang, 2017), (Sharifi and Shokouhyar, 2021), (Wallner <i>et al.</i> , 2024), (Barkhi <i>et al.</i> , 2024),



		quality and trust-related signals.	(Wallner <i>et al.</i> , 2022), (Wallner, Magnier and Mugge, 2022), (Khan, Tabish and Yu, 2025), (Singhal, Tripathy and Jena, 2019), (Chun <i>et al.</i> , 2022), (Mugge <i>et al.</i> , 2018), (Zhang, Wang and Gao, 2025), (Nasiri and Shokouhyar, 2021), (Dong <i>et al.</i> , 2025), (Wang, 2021), (Abdulla <i>et al.</i> , 2024), (Phantratanamongkol <i>et al.</i> , 2018), (Ibrahim <i>et al.</i> , 2025), (Clemm <i>et al.</i> , 2025), (Amaral and Spers, 2022), (Bandara and Ariyaratne, 2024), (Koide <i>et al.</i> , 2025)
	<b>Circular systems / closed-loop settings</b>	System-level contexts that link demand-side consumer acceptance with supply-side circular design and operational decisions.	(Güngördü Belbağ and Belbağ, 2025), (Agostini <i>et al.</i> , 2021), (Abbasi <i>et al.</i> , 2022), (Wang <i>et al.</i> , 2018a), (Bandara and Ariyaratne, 2024), (Lee and Kwak, 2020), (Hazen <i>et al.</i> , 2012), (Bączyk <i>et al.</i> , 2024), (Parajuly <i>et al.</i> , 2020), (Hazen <i>et al.</i> , 2017), (Harms and Linton, 2016), (Sharifi and Shokouhyar, 2021), (Keong, Kumar and Abbasi, 2020), (Fu <i>et al.</i> , 2024)
<b>Geographic scope</b>	<b>Europe / North America</b>	Western contexts, primarily European countries and the United States.	(Elzinga <i>et al.</i> , 2020), (Mugge, Jockin and Bocken, 2017), (Abbey <i>et al.</i> , 2015a), (Gaur <i>et al.</i> , 2015), (Hazen, Mollenkopf and Wang, 2017), (Wallner <i>et al.</i> , 2022), (Hazen <i>et al.</i> , 2012), (Mugge <i>et al.</i> , 2018), (Zhang, Wang and Gao, 2025), (Parajuly <i>et al.</i> , 2020), (Hazen <i>et al.</i> , 2017), (Harms and Linton, 2016), (Phantratanamongkol <i>et al.</i> , 2018), (Harms and Linton, 2016), (Ballerini <i>et al.</i> , 2025)
	<b>Asia</b>	Asian contexts, including China, Malaysia, Japan, Korea, Taiwan, and India.	(Khor and Hazen, 2017), (Zhang and Luo, 2021), (Chun <i>et al.</i> , 2022), (Abbasi <i>et al.</i> , 2022), (Wang <i>et al.</i> , 2018a), (Lee and Kwak, 2020), (Hazen <i>et al.</i> , 2017),



			(Wang, 2021), (Keong, Kumar and Abbasi, 2020), (Phantratanamongkol <i>et al.</i> , 2018), (Wang and Hazen, 2016), (Clemm <i>et al.</i> , 2025)
	<b>Others</b>	Studies in which the geographic context is not explicitly specified.	(Michaud and Llerena, 2011), (Abbey <i>et al.</i> , 2015b), (Güngördü Belbağ and Belbağ, 2025), (Sharifi and Shokouhyar, 2021), (Wallner <i>et al.</i> , 2024), (Barkhi <i>et al.</i> , 2024), (Wallner, Magnier and Mugge, 2022), (Khan, Tabish and Yu, 2025), (Kerber, Fettermann and Bouzon, 2024), (Agostini <i>et al.</i> , 2021), (Bandara and Ariyaratne, 2024), (Van Weelden, Mugge and Bakker, 2016), (Bączyk <i>et al.</i> , 2024), (Nasiri and Shokouhyar, 2021), (Dong <i>et al.</i> , 2025), (Mahmoodi and Heydari, 2021), (Sharifi and Shokouhyar, 2021), (Abdulla <i>et al.</i> , 2024), (Kerber, Fettermann and Bouzon, 2024), (Ibrahim <i>et al.</i> , 2025), (Amaral and Spers, 2022), (Bandara and Ariyaratne, 2024), (Koide <i>et al.</i> , 2025), (Fu <i>et al.</i> , 2024)

*Source: Authors' own work*

### **2.1.3. Key characteristics of circular economy consumer behavioral intention in the circular economy**

Prior to conducting a systematic analysis of the variable groups and their functions within the study model illustrated in the table below, it is evident that contemporary studies examine consumer behavior regarding refurbished products through a notably extensive and varied array of variables. Numerous studies focus on outcome variables such as purchase intention, consumer choice, or willingness to pay, while also elucidating value-creating elements, mediating mechanisms, and the psychological and behavioral underpinnings that influence decision-making. Moreover, fundamental mechanisms such as perceived danger and trust, along with signaling factors designed to alleviate information asymmetry, are often considered essential for elucidating consumer acceptance levels. Multiple studies underscore the importance of moderating factors and

boundary conditions, demonstrating that customer behavior toward refurbished products is highly context-dependent and varies markedly across consumer segments and market contexts.

Table 2. 3: Key variables and constructs in consumer research on circular products

Characteristic group	Key variables/constructs	Role in the research model	References (No.)
Outcome variables	Purchase intention	Core dependent variable reflecting consumers' propensity to accept and purchase refurbished products.	(Khor and Hazen, 2017), (Güngördü Belbağ and Belbağ, 2025), (Sharifi and Shokouhyar, 2021), (Zhang and Luo, 2021), (Chun <i>et al.</i> , 2022), (Abbasi <i>et al.</i> , 2022), (Wang <i>et al.</i> , 2018a), (Bandara and Ariyaratne, 2024), (Zhang, Wang and Gao, 2025), (Wang, 2021), (Harms and Linton, 2016), (Keong, Kumar and Abbasi, 2020), (Kerber, Fettermann and Bouzon, 2024), (Bandara and Ariyaratne, 2024), (Ballerini <i>et al.</i> , 2025), (Fu <i>et al.</i> , 2024)
	Consumer choice	Behavioral or choice-based outcome examined in experimental or simulated decision contexts.	(Elzinga <i>et al.</i> , 2020), (Michaud and Llerena, 2011), (Abbey <i>et al.</i> , 2015b), (Abbey <i>et al.</i> , 2015a), (Van Weelden, Mugge and Bakker, 2016), (Parajuly <i>et al.</i> , 2020), (Dong <i>et al.</i> , 2025), (Mahmoodi and Heydari, 2021), (Sharifi and Shokouhyar, 2021), (Phantratanamongkol <i>et al.</i> , 2018), (Ibrahim <i>et al.</i> , 2025)
	Willingness to pay	Economic outcome variable capturing consumers' willingness to pay for refurbished products.	(Michaud and Llerena, 2011), (Barkhi <i>et al.</i> , 2024), (Khan, Tabish and Yu, 2025), (Van Weelden, Mugge and Bakker, 2016), (Dong <i>et al.</i> , 2025), (Mahmoodi and Heydari, 2021), (Sharifi and Shokouhyar, 2021), (Phantratanamongkol <i>et</i>

			<i>al.</i> , 2018), (Ibrahim <i>et al.</i> , 2025), (Harms and Linton, 2016), (Fu <i>et al.</i> , 2024)
Value-based drivers	Perceived value	Primary motivational driver, typically exerting direct or indirect effects on intention and willingness to pay.	(Mugge, Jockin and Bocken, 2017), (Gaur <i>et al.</i> , 2015), (Barkhi <i>et al.</i> , 2024), (Agostini <i>et al.</i> , 2021), (Zhang and Luo, 2021), (Van Weelden, Mugge and Bakker, 2016), (Hazen <i>et al.</i> , 2012), (Dong <i>et al.</i> , 2025), (Mahmoodi and Heydari, 2021), (Sharifi and Shokouhyar, 2021), (Ballerini <i>et al.</i> , 2025)
	Economic benefit/price advantage	Perceived economic gains are often evaluated relative to new products.	(Michaud and Llerena, 2011), (Gaur <i>et al.</i> , 2015), (Khan, Tabish and Yu, 2025), (Hazen <i>et al.</i> , 2012), (Dong <i>et al.</i> , 2025), (Mahmoodi and Heydari, 2021), (Sharifi and Shokouhyar, 2021), (Phantratanamongkol <i>et al.</i> , 2018), (Ibrahim <i>et al.</i> , 2025)
	Environmental value/sustainability value	Environment-related value perceptions linked to circular and sustainable consumption.	(Elzinga <i>et al.</i> , 2020), (Sharifi and Shokouhyar, 2021), (Zhang and Luo, 2021), (Wang <i>et al.</i> , 2018a), (Van Weelden, Mugge and Bakker, 2016), (Kerber, Fettermann and Bouzon, 2024), (Ballerini <i>et al.</i> , 2025)
Core mechanisms	Perceived risk (quality, performance, privacy)	Inhibiting mechanism that exerts direct adverse or moderating effects within the model.	(Mugge, Jockin and Bocken, 2017), (Barkhi <i>et al.</i> , 2024), (Khan, Tabish and Yu, 2025), (Kerber, Fettermann and Bouzon, 2024), (Agostini <i>et al.</i> , 2021), (Nasiri and Shokouhyar, 2021), (Hazen <i>et al.</i> , 2017), (Abdulla <i>et al.</i> , 2024), (Wang and Hazen, 2016), (Amaral and Spers, 2022), (Fu <i>et al.</i> , 2024)
	Trust (seller, platform, product)	Central mediating mechanism that	(Hazen, Mollenkopf and Wang, 2017), (Wallner

		reduces perceived risk and enhances intention and willingness to pay.	<i>et al.</i> , 2024), (Singhal, Tripathy and Jena, 2019), (Abbasi <i>et al.</i> , 2022), (Bandara and Ariyaratne, 2024), (Lee and Kwak, 2020), (Bączyk <i>et al.</i> , 2024), (Mugge <i>et al.</i> , 2018), (Harms and Linton, 2016), (Kerber, Fettermann and Bouzon, 2024), (Bandara and Ariyaratne, 2024)
Signaling variables	Warranty/certification	Quality-related signals that mitigate information asymmetry in refurbished product markets.	(Mugge, Jockin and Bocken, 2017), (Van Weelden, Mugge and Bakker, 2016), (Lee and Kwak, 2020), (Mahmoodi and Heydari, 2021), (Harms and Linton, 2016)
	Seller reputation/platform credibility	Trust-related signals that are particularly salient in online and platform-based contexts.	(Hazen, Mollenkopf and Wang, 2017), (Singhal, Tripathy and Jena, 2019), (Abbasi <i>et al.</i> , 2022), (Bączyk <i>et al.</i> , 2024), (Mugge <i>et al.</i> , 2018), (Hazen <i>et al.</i> , 2017), (Harms and Linton, 2016), (Wang and Hazen, 2016)
Behavioral and psychological factors	Attitude	Core TPB component with a direct influence on behavioral intention.	(Khor and Hazen, 2017), (Güngördü Belbağ and Belbağ, 2025), (Chun <i>et al.</i> , 2022), (Zhang, Wang and Gao, 2025), (Wang, 2021), (Keong, Kumar and Abbasi, 2020), (Ballerini <i>et al.</i> , 2025)
	Social norms / social influence	Normative pressure often operates as a moderating or contextual factor.	(Khor and Hazen, 2017), (Sharifi and Shokouhyar, 2021), (Chun <i>et al.</i> , 2022), (Wang <i>et al.</i> , 2018a), (Zhang, Wang and Gao, 2025), (Keong, Kumar and Abbasi, 2020), (Clemm <i>et al.</i> , 2025)
	Environmental concern	A boundary condition that strengthens the effect of environmental value on outcome variables.	(Zhang and Luo, 2021), (Wang <i>et al.</i> , 2018a), (Keong, Kumar and Abbasi, 2020), (Ballerini

			<i>et al.</i> , 2025), (Fu <i>et al.</i> , 2024)
<b>Moderators/boundary conditions</b>	<b>Consumer experience</b>	Moderates the relationships between perceived risk, trust, and behavioral intention.	(Wallner, Magnier and Mugge, 2022), (Hazen <i>et al.</i> , 2012), (Zhang, Wang and Gao, 2025), (Wang, 2021), (Harms and Linton, 2016)
	<b>Price sensitivity</b>	Moderates the impact of value perceptions on willingness to pay and intention.	(Khan, Tabish and Yu, 2025), (Hazen <i>et al.</i> , 2012), (Dong <i>et al.</i> , 2025), (Mahmoodi and Heydari, 2021), (Sharifi and Shokouhyar, 2021)
	<b>Product condition/grading</b>	Boundary condition influencing trust formation and perceived risk.	(Kerber, Fettermann and Bouzon, 2024), (Lee and Kwak, 2020), (Nasiri and Shokouhyar, 2021), (Abdulla <i>et al.</i> , 2024), (Harms and Linton, 2016)

*Source: Authors' own work*

#### **2.1.4. Research methods in circular economy consumer behavioral intention in the circular economy**

Prior to conducting a comprehensive review of the research methodologies and analytical approaches outlined in Table 4, it is evident that investigations into consumer behavior regarding circular-economy items predominantly use quantitative methods. Most research includes cross-sectional surveys alongside online questionnaires, facilitating extensive data collection and the evaluation of models about consumer attitudes, perceived value, and purchasing intentions. Furthermore, several studies employ empirical and choice methodologies to elucidate decision-making processes, willingness to pay, and customer reactions to various types of product information.

Statistical techniques such as regression, confirmatory factor analysis, and structural equation modeling are widely used in data analysis to examine interactions among variables, including mediating and moderating effects. Moreover, investigations utilizing multi-method designs or literature reviews are essential for enhancing the dependability of study findings and broadening theoretical insights into consumer behavior regarding circular products.

Table 2. 4: Approaches to studying consumer behavior and analysis in the context of circular products

Characteristic group	Key methods/techniques	Role in the research	References (No.)
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<b>Quantitative survey methods</b>	<b>Cross-sectional survey</b>	Dominant empirical approach for testing models of attitudes, perceived value, and purchase intention.	(Mugge, Jockin and Bocken, 2017), (Gaur <i>et al.</i> , 2015), (Khor and Hazen, 2017), (Güngördü Belbağ and Belbağ, 2025), (Sharifi and Shokouhyar, 2021), (Barkhi <i>et al.</i> , 2024), (Agostini <i>et al.</i> , 2021), (Zhang and Luo, 2021), (Chun <i>et al.</i> , 2022), (Abbasi <i>et al.</i> , 2022), (Wang <i>et al.</i> , 2018a), (Bandara and Ariyaratne, 2024), (Hazen <i>et al.</i> , 2012), (Zhang, Wang and Gao, 2025), (Wang, 2021), (Harms and Linton, 2016), (Keong, Kumar and Abbasi, 2020), (Kerber, Fettermann and Bouzon, 2024), (Bandara and Ariyaratne, 2024), (Ballerini <i>et al.</i> , 2025), (Fu <i>et al.</i> , 2024)
	<b>Online questionnaire</b>	Primary data collection instrument, well-suited to the refurbished product context.	(Mugge, Jockin and Bocken, 2017), (Gaur <i>et al.</i> , 2015), (Khor and Hazen, 2017), (Güngördü Belbağ and Belbağ, 2025), (Sharifi and Shokouhyar, 2021), (Barkhi <i>et al.</i> , 2024), (Khan, Tabish and Yu, 2025), (Zhang and Luo, 2021), (Chun <i>et al.</i> , 2022), (Abbasi <i>et al.</i> , 2022), (Wang <i>et al.</i> , 2018a), (Bandara and Ariyaratne, 2024), (Hazen <i>et al.</i> , 2012), (Zhang, Wang and Gao, 2025), (Wang, 2021), (Harms and Linton, 2016), (Keong, Kumar and Abbasi, 2020),

			(Kerber, Fettermann and Bouzon, 2024), (Bandara and Ariyaratne, 2024), (Ballerini <i>et al.</i> , 2025), (Fu <i>et al.</i> , 2024)
<b>Experimental methods</b>	<b>Scenario-based experiment</b>	Measures consumer choice, willingness to pay, and responses to signals such as price, warranty, and eco-labels.	(Elzinga <i>et al.</i> , 2020), (Michaud and Llerena, 2011), (Abbey <i>et al.</i> , 2015b), (Abbey <i>et al.</i> , 2015a), (Van Weelden, Mugge and Bakker, 2016), (Parajuly <i>et al.</i> , 2020), (Dong <i>et al.</i> , 2025), (Mahmoodi and Heydari, 2021), (Sharifi and Shokouhyar, 2021), (Phantratanamongkol <i>et al.</i> , 2018), (Ibrahim <i>et al.</i> , 2025), (Harms and Linton, 2016)
	<b>Between-subjects design</b>	Enables control of independent variables and reduces cognitive and demand biases.	(Elzinga <i>et al.</i> , 2020), (Michaud and Llerena, 2011), (Abbey <i>et al.</i> , 2015b), (Abbey <i>et al.</i> , 2015a), (Van Weelden, Mugge and Bakker, 2016), (Parajuly <i>et al.</i> , 2020), (Dong <i>et al.</i> , 2025), (Mahmoodi and Heydari, 2021), (Sharifi and Shokouhyar, 2021), (Phantratanamongkol <i>et al.</i> , 2018), (Ibrahim <i>et al.</i> , 2025)
<b>Choice-based methods</b>	<b>Discrete Choice Experiment (DCE)</b>	Examines choice behavior and trade-offs among product attributes.	(Michaud and Llerena, 2011), (Van Weelden, Mugge and Bakker, 2016), (Dong <i>et al.</i> , 2025), (Mahmoodi and Heydari, 2021), (Sharifi and Shokouhyar, 2021), (Phantratanamongkol <i>et al.</i> , 2018), (Ibrahim <i>et al.</i> , 2025)
	<b>Willingness-to-pay elicitation</b>	Captures perceived economic value	(Michaud and Llerena, 2011),

		associated with refurbished products.	(Barkhi <i>et al.</i> , 2024), (Khan, Tabish and Yu, 2025), (Van Weelden, Mugge and Bakker, 2016), (Dong <i>et al.</i> , 2025), (Mahmoodi and Heydari, 2021), (Sharifi and Shokouhyar, 2021), (Phantratanamongkol <i>et al.</i> , 2018), (Ibrahim <i>et al.</i> , 2025), (Harms and Linton, 2016), (Fu <i>et al.</i> , 2024)
<b>Statistical and analytical techniques</b>	<b>Regression analysis</b>	Tests direct relationships among key variables.	(Michaud and Llerena, 2011), (Gaur <i>et al.</i> , 2015), (Barkhi <i>et al.</i> , 2024), (Khan, Tabish and Yu, 2025), (Agostini <i>et al.</i> , 2021), (Hazen <i>et al.</i> , 2012), (Dong <i>et al.</i> , 2025), (Mahmoodi and Heydari, 2021), (Sharifi and Shokouhyar, 2021), (Phantratanamongkol <i>et al.</i> , 2018), (Ibrahim <i>et al.</i> , 2025)
	<b>Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM)</b>	Examines structural relationships, including mediating and moderating effects.	(Mugge, Jockin and Bocken, 2017), (Gaur <i>et al.</i> , 2015), (Khor and Hazen, 2017), (Güngördü Belbağ and Belbağ, 2025), (Sharifi and Shokouhyar, 2021), (Zhang and Luo, 2021), (Chun <i>et al.</i> , 2022), (Abbasi <i>et al.</i> , 2022), (Wang <i>et al.</i> , 2018a), (Bandara and Ariyaratne, 2024), (Hazen <i>et al.</i> , 2012), (Zhang, Wang and Gao, 2025), (Wang, 2021), (Harms and Linton, 2016), (Keong, Kumar and Abbasi, 2020), (Kerber, Fettermann and Bouzon, 2024), (Bandara and



			Ariyaratne, 2024), (Ballerini <i>et al.</i> , 2025), (Fu <i>et al.</i> , 2024)
	<b>Mediation/moderation analysis</b>	Investigates trust–risk–value mechanisms and boundary conditions.	(Wallner, Magnier and Mugge, 2022), (Khan, Tabish and Yu, 2025), (Zhang and Luo, 2021), (Wang <i>et al.</i> , 2018a), (Hazen <i>et al.</i> , 2012), (Zhang, Wang and Gao, 2025), (Dong <i>et al.</i> , 2025), (Wang, 2021), (Mahmoodi and Heydari, 2021), (Sharifi and Shokouhyar, 2021), (Harms and Linton, 2016), (Ballerini <i>et al.</i> , 2025), (Fu <i>et al.</i> , 2024)
<b>Multi-method designs</b>	<b>Multi-study design</b>	Enhances robustness and generalizability of findings across methods and samples.	(Van Weelden, Mugge and Bakker, 2016), (Dong <i>et al.</i> , 2025), (Mahmoodi and Heydari, 2021), (Sharifi and Shokouhyar, 2021), (Phantratanamongkol <i>et al.</i> , 2018), (Ibrahim <i>et al.</i> , 2025)
<b>Review and conceptual methods</b>	<b>Systematic/narrative review</b>	Synthesizes theoretical perspectives, empirical patterns, and research gaps.	(Hazen, Mollenkopf and Wang, 2017), (Wallner <i>et al.</i> , 2024), (Kerber, Fettermann and Bouzon, 2024), (Singhal, Tripathy and Jena, 2019), (Lee and Kwak, 2020), (Bączyk <i>et al.</i> , 2024), (Mugge <i>et al.</i> , 2018), (Nasiri and Shokouhyar, 2021), (Hazen <i>et al.</i> , 2017), (Abdulla <i>et al.</i> , 2024), (Wang and Hazen, 2016), (Amaral and Spers, 2022)

*Source: Authors' own work*

### **2.1.5. Research gaps**

The circular economy (CE) has emerged as a central paradigm for addressing sustainability challenges, guided by the 10R framework, which includes a hierarchy of strategies from Refuse, Rethink, and Reduce to Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, and Recover (Potting *et al.*, 2017; Malooly and Daphne, November 9, 2023). These are further grouped into three overarching objectives—ensuring the effective use of materials, extending product and component lifespans, and enabling smarter product use and manufacturing (Morseletto, 2020). Among the specific strategies, refurbishment is widely recognized as one of the most impactful circular solutions. Refurbishment extends product lifespan, reduces the need for virgin raw materials, saves energy, and lowers emissions, thereby playing a crucial role in advancing the CE (MacArthur, 2013; Prabhu N and Majhi, 2023; Oraee *et al.*, 2024). Despite its environmental and economic significance, refurbishment adoption ultimately hinges on consumer acceptance—yet consumer perspectives have received insufficient scholarly attention (Van Weelden, Mugge and Bakker, 2016; Nasiri and Shokouhyar, 2021). Understanding consumer behavior toward refurbished products, particularly smartphones, therefore represents a critical research challenge.

Although refurbished smartphones offer clear advantages such as greater affordability and lower environmental impact (Chen and Chen, 2019; Zheng, Wang and Park, 2024), many consumers remain hesitant to purchase them (Hutchins and Tindall, 2021). A key barrier is the lack of transparency in the refurbishment process: sellers often provide limited or vague information, leaving consumers uncertain about product quality and reliability (Schweiger and Strauss, 2023; Ballerini *et al.*, 2025). In the absence of trustworthy information, consumers develop doubts about product functionality and performance (Cikrt *et al.*, 2007; Shi, Liu and Srinivasan, 2022). Addressing these informational and perceptual gaps is vital to strengthening purchase intentions and encouraging sustainable consumption of refurbished devices (Sharifi and Shokouhyar, 2021; Alyahya *et al.*, 2023; Bölen, Çelik and Kılıç, 2025; Zhang, Wang and Gao, 2025).

Recent circular economy research has increasingly examined consumer acceptance of reused, recycled, remanufactured, and refurbished products. Within this stream, environmental awareness, environmental concern, perceived value, perceived risk, and social influence have been identified as relevant antecedents of sustainable consumption intention (Parajuly *et al.*, 2020; Bigliardi, Filippelli and Quinto, 2022; Vidal-Ayuso, Akhmedova and Jaca, 2023). However, refurbished smartphones constitute a more

uncertain consumption context than many conventional green products because consumers may value the environmental benefits of product life extension while still expressing concerns about technical reliability, prior use, warranty conditions, and seller credibility (Agostini *et al.*, 2021; Sharifi and Shokouhyar, 2021; Bigliardi, Filippelli and Quinto, 2022; Alyahya *et al.*, 2023). Therefore, the first gap concerns whether environmental awareness, environmental concern, and social influence directly explain consumer preference and purchase intention in this specific product category.

A second gap concerns the conceptualization of trust. Foundational trust theory defines trustworthiness in terms of beliefs about ability, integrity, and benevolence (Mayer, Davis and Schoorman, 1995), while e-commerce research emphasizes the importance of trust when consumers face uncertainty and information asymmetry in transactions with sellers (McKnight, Choudhury and Kacmar, 2002; Pavlou, 2003). The literature on refurbished products also indicates that consumers evaluate refurbished offerings at two levels: the refurbished product itself and the retailer or seller that provides it (Agostini *et al.*, 2021; Bigliardi, Filippelli and Quinto, 2022; Alyahya *et al.*, 2023). In this context, trust in the refurbished product concerns perceived reliability, functionality, and durability, whereas trust in the retailer concerns competence, honesty, transparency, warranty commitment, and after-sales responsibility (Mayer, Davis and Schoorman, 1995; McKnight, Choudhury and Kacmar, 2002; Pavlou, 2003; Agostini *et al.*, 2021). This study therefore distinguishes between trust in the refurbished product and trust in the retailer.

A third gap relates to the role of trust as a boundary condition. Prior studies have often examined environmental factors, perceived value, perceived risk, and trust as separate antecedents of purchase intention in green or circular consumption contexts (Chen and Chang, 2013; Bigliardi, Filippelli and Quinto, 2022; Vidal-Ayuso, Akhmedova and Jaca, 2023). However, this approach offers limited explanation for why consumers with similar levels of environmental awareness or concern may form different preferences regarding refurbished smartphones. Prior research suggests that trust can reduce perceived uncertainty and risk in consumer decision-making, thereby supporting the formation of purchase intention under conditions of exchange uncertainty (Pavlou, 2003; Chen and Chang, 2013; Alyahya *et al.*, 2023). Building on this logic, this thesis examines whether trust in the refurbished product and trust in the retailer moderate the relationships between environmental and social drivers, consumer preference, and purchase intention.

A fourth gap concerns the contextual relevance of emerging markets. Consumer adoption of refurbished smartphones in emerging markets is theoretically relevant because

environmental motives, price considerations, rapid technology diffusion, and uncertainty toward reuse and refurbishment channels may coexist in the same market environment (Parajuly *et al.*, 2020; Uriarte-Ruiz, 2022; Vidal-Ayuso, Akhmedova and Jaca, 2023). Vietnam provides a suitable context for examining these relationships because consumer acceptance of refurbished smartphones may depend not only on environmental concern and social influence, but also on perceptions of product quality, warranty credibility, and retailer trustworthiness. This context enables the thesis to assess how environmental and trust-related factors jointly shape circular consumption behavior under market uncertainty.

To address these gaps, this thesis examines the direct effects of environmental awareness, environmental concern, social influence, and consumer preference on purchase intention toward refurbished smartphones. It further investigates whether trust in the refurbished product and trust in the retailer moderate these relationships. Consumer preference is defined as consumers' relative preference for refurbished smartphones compared with conventional alternatives, rather than a general attitude toward purchasing. This definition helps separate preference from attitude and purchase intention.

Moreover, Prior studies have controlled for gender, demographic characteristics, and education in green and sustainable purchase intention models, but their findings remain inconsistent. Sun, Li and Wang (2022) found that only age and household income significantly influenced green purchase intention after controlling for gender, age, and education. Lavuri *et al.* (2023) reported that age and gender controlled for sustainable purchase intention, whereas education, occupation, and income level did not. Nguyen, Nguyen and Nguyen (2019) found that income was positively related to green apparel purchase intention in Vietnam. Chakraborty and Dash (2023) found that gender and household size were significantly related to purchase intention, whereas age, income, and qualification were not. These mixed results show that the role of demographic controls cannot be assumed across product categories and national contexts. Thus, it concerns the absence of evidence on these control variables in the specific context of refurbished smartphones in Vietnam. The reviewed studies examine green products, sustainable products, green apparel, natural food products, and environmentally friendly packaging, but they do not directly examine refurbished smartphones as a circular economy product. Nguyen, Nguyen and Nguyen (2019) studied green apparel purchase intention among young Vietnamese consumers, not refurbished smartphones. Trinh, Tran and Adomako (2025) examined sustainable consumption behavior among young Vietnamese consumers, not purchase intention toward refurbished smartphones. This study addresses that gap by

testing purchase intention toward refurbished smartphones in Vietnam while controlling for gender and demographic characteristics.

## **2.2. Theoretical foundations**

### **2.2.1. Circular Economy**

In the context of contemporary sustainability transitions, the Circular Economy (CE) has evolved beyond a narrow focus on waste management to become a systemic economic framework that prioritizes redesigning production and consumption processes to prevent pollution and waste at the source. According to a recent report by Malooly and Daphne (November 9, 2023), CE models have the potential to address up to 70 percent of global greenhouse gas emissions through improved resource efficiency and reduced reliance on virgin materials. Moving away from linear economic structures requires the strategic application of the R hierarchy, which aims to preserve material value within economic cycles for as long as possible.

The 10R hierarchy, grounded in the foundational work of (Potting *et al.*, 2017; Reike, Vermeulen and Witjes, 2018), categorizes circular strategies by environmental priority and the length of resource loops. The most beneficial strategies are associated with the shortest loops, including R0 Refuse, R1 Rethink, and R2 Reduce. These approaches emphasize smarter production and consumption practices that prevent waste generation before products enter the market. For instance, substituting scarce or environmentally harmful materials with more abundant alternatives, such as sodium chloride in battery production, illustrates a refusal strategy that minimizes ecological impact at the design stage (Malooly and Daphne, November 9, 2023).

Once products are already in circulation, mid-level strategies focus on extending product lifespans through approaches ranging from R3 Reuse to R7 Repurpose. Practices such as R4 Repair, R5 Refurbish, and R6 Remanufacture play a significant role in restoring product functionality while conserving substantial amounts of energy and chemical inputs compared with manufacturing new goods. Macarthur and Heading (2019) reported that remanufacturing processes can reduce energy use by up to 80 percent and chemical consumption by up to 92 percent. In addition, R7 Repurpose introduces opportunities for creative value recovery by transforming discarded components into products with entirely new functions.

Strategies associated with longer loops, such as R8 Recycle and R9 Recover, are positioned at the lower end of the priority scale. Although recycling enables the recovery of raw materials, it often requires considerable energy inputs and may result in material

quality degradation, commonly referred to as downcycling. Energy recovery through waste incineration or anaerobic digestion is generally considered a final option for managing residual waste streams that cannot be reused or recycled (Potting *et al.*, 2017; Reike, Vermeulen and Witjes, 2018). To effectively implement circular pathways, firms are encouraged to integrate analytical tools, such as Life Cycle Assessment, and to develop robust reverse logistics systems to ensure sustainability across the entire value chain.

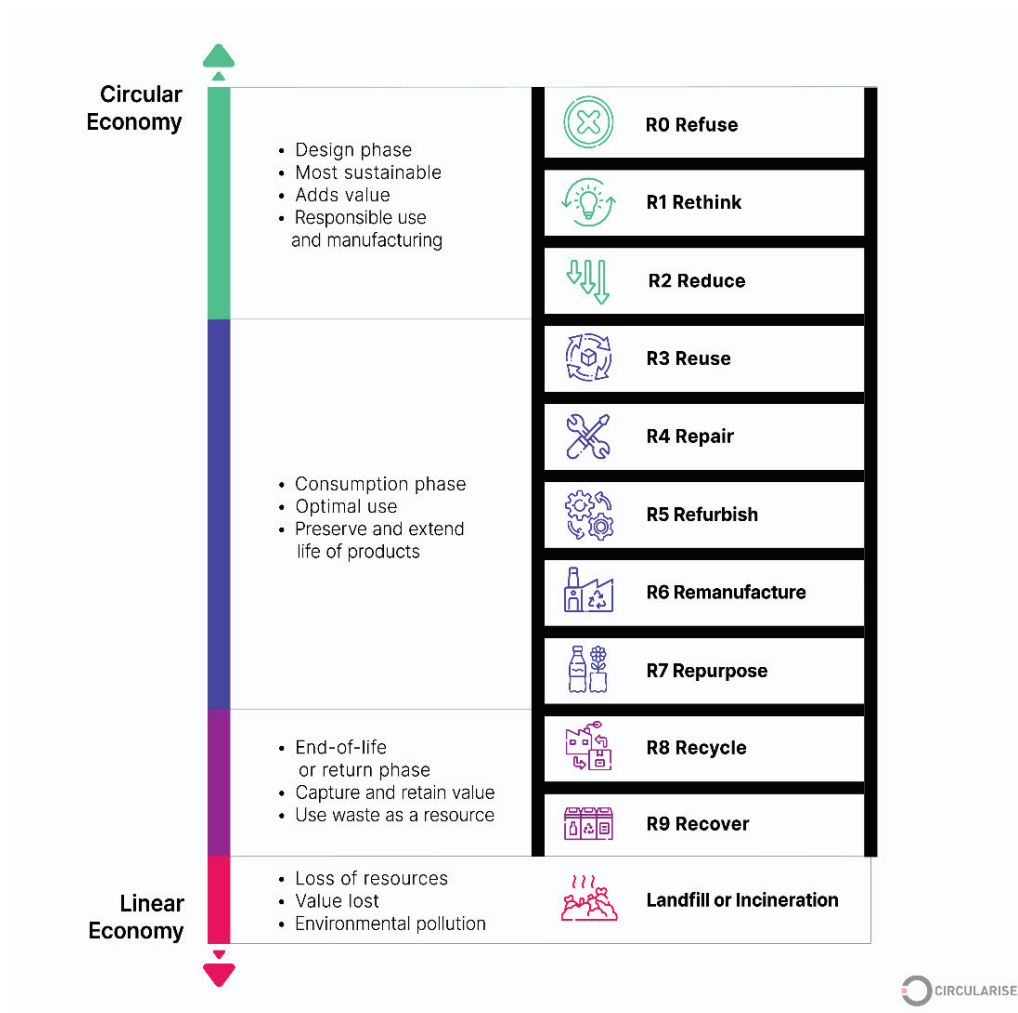


Figure 2. 1: The 10R Hierarchy of Circular Economy Strategies and Resource Value Retention

*Source: (Malooly and Daphne, November 9, 2023)*

The 10R model serves as both a technical analysis framework and a representation of participants' responsibilities in the economic system, encompassing customers, manufacturers, and market entities such as retailers and waste management firms. These actors engage in various phases of the product life cycle and can employ diverse techniques to preserve the value of resources within the economy (Reike, Vermeulen and Witjes, 2018). The 10R model offers a comprehensive framework for understanding and implementing circular economy strategies in practice.



- **Refuse:** This method entails abstaining from utilizing superfluous products or services, hence averting resource consumption from the inception of the product lifecycle.
- **Rethink:** It represents a high-priority circular strategy that emphasizes optimizing product utilization intensity through changes in business models or consumption practices, rather than focusing solely on modifications to the product's physical structure.
- **Reduce:** It emphasizes minimizing resource and energy consumption in manufacturing and consumption processes.
- **Reuse:** It denotes the utilization of a product or component without substantial alterations to its structure or function. This is a fundamental approach in the circular economy, as it prolongs the product's lifecycle and diminishes the necessity for new manufacturing.
- **Repair:** It is a method for restoring damaged objects to prolong their usability. In a conventional linear economy, numerous products are disposed of soon after minor damage.
- **Refurbish:** It denotes the procedure of renovating or enhancing obsolete products to reinstate its functionality and quality. During refurbishing, certain components may be substituted or enhanced to augment product performance.
- **Remanufacture:** It is the process of recreating a product by repurposing components from a previously used product. During this procedure, functional components are examined, sanitized, and reassembled to produce a new product of comparable quality to the original.
- **Repurpose:** It is a strategy that involves altering a product or component's intended application. The product is no longer used for its intended purpose but can still serve an alternative purpose.
- **Recycle:** Recycling is the process of recovering materials from waste and reusing them in production. This is the predominant strategy in contemporary waste management practices.
- **Recover:** Recovery refers to the extraction of energy from garbage, typically via incineration to generate power or heat. When materials are no longer reusable or recyclable, energy recovery is regarded as an alternative to landfill disposal.

### ***2.2.2. Consumer roles in the circular economy***

The 10 Value Retention Options (10R) model, proposed by Reike, Vermeulen and Witjes (2018), highlights that circular economy strategies encompass not only technical decisions regarding products and materials but also the cyclical interactions among stakeholders in the value chain, including consumers, manufacturers, and market participants such as retailers, collectors, and waste management entities. These tactics are executed at various stages of the product lifecycle, resulting in multifaceted interactions, including consumer-to-consumer, consumer-to-business, and business-to-business, which generate value flows within the circular economy (Reike, Vermeulen and Witjes, 2018).

In the loops adjacent to the product's utilization phase, consumers are pivotal in initiating or halting value retention cycles. Decisions about product rejection, shelf-life extension, or resale post-use can drive product transfer dynamics among customers or between consumers and enterprises. Reike, Vermeulen and Witjes (2018) assert that several reuse activities occur in consumer-to-consumer transactions, in which products are exchanged directly through secondary market platforms. In this scenario, market participants, including shops and intermediaries, function as facilitators, ensuring that items remain in circulation within the system rather than being discarded as waste.

This connection is especially significant when associated with the Refurbish method. Although refurbishment is generally conducted by the manufacturer or specialized technical units, the refurbishment cycle requires coordination among three stakeholder groups. Initially, consumers must return utilized products via recall systems or exchange initiatives. Subsequently, the producer or technical firm examines, rectifies, and enhances the product to reinstate its functionality. Ultimately, market participants, including merchants and distribution platforms, reintroduce the restored products, thereby establishing a new consumption cycle. Refurbishment serves as an intermediary value loop linking consumer behavior with the technical capabilities of enterprises and the market's distribution system (Reike, Vermeulen and Witjes, 2018).

The crucial point is that this cycle is not linear but cyclical, contingent on the degree of consumer acceptance of the refurbished products. If consumers lack trust in the quality of refurbished products or are reluctant to participate in recall procedures, refurbishment techniques will struggle to achieve widespread effectiveness. This indicates that customers serve as both end users and catalysts for value flow in a circular economy, whilst producers and market participants fulfill supportive and coordinating functions within the technological and commercial loops.

Consequently, the effectiveness of a circular economy relies on the establishment of reciprocal interactions among these three categories of stakeholders. Consumers supply used products and demand refurbished items, producers offer the technological capability to preserve product value, and market participants facilitate the movement of products within the economic system. This cooperation creates closed value cycles, enhancing product lifecycles and alleviating demand on natural resources (Reike, Vermeulen and Witjes, 2018).



### 2.2.3. Consumers' purchase intention

Within consumer behavior research, purchase intention (PI) has been widely conceptualized as a psychological readiness that reflects an individual's willingness or plan to engage in a specific purchasing action within a defined time frame (Abbasi *et al.*, 2022). Rather than functioning as a simple attitudinal expression, PI represents a transitional cognitive state through which evaluative processes begin to take behavioral form. In the classical Theory of Planned Behavior, intention emerges from the combined influence of attitude toward the behavior, perceived social expectations, and the individual's assessment of control over performing the action. Ajzen's framework thus positions intention as a proximal determinant of behavior, linking internal judgment to observable marketplace outcomes (Ajzen, 1991).

More recent studies have attempted to extend this explanatory logic by incorporating contextual and experiential dimensions. Drawing on the Stimulus Organism Response perspective, Güngördü Belbağ and Belbağ (2025) and Shah *et al.* (2021) demonstrate that digitally mediated environmental cues operate as external stimuli that shape consumers' internal psychological states before manifesting in behavioral responses such as purchase intention. This shift reflects a broader recognition that decision-making increasingly unfolds within technologically structured environments where information exposure, interface design, and interactive features continuously influence perception formation.

The digitalization of commerce has also transformed the drivers of intention formation. Earlier research tended to emphasize economic evaluation and product attributes. However, Saima and Khan (2020) show that relational trust mechanisms have become more central in online settings, where uncertainty about product authenticity and transaction reliability remains salient. Similarly, Wang *et al.* (2022) highlighted that social interaction embedded within digital platforms can significantly shape consumers' motivational orientation. In contexts such as social commerce and live-streaming commerce, purchase intention is often constructed through parasocial engagement. Emotional proximity to influencers, combined with perceived authenticity and immediacy of communication, can intensify value perception and increase the likelihood of impulsive intention formation. Under such circumstances, consumers may respond less to utilitarian product information and more to socially mediated cues that signal belonging or urgency.

Alongside these relational dynamics, sustainability concerns have emerged as another influential dimension shaping contemporary purchase intention. Fu *et al.* (2025) stated that perceived sustainability and brand transparency are direct antecedents of intention to

purchase environmentally responsible products. This development reflects a growing integration of ethical evaluation into consumption choices

Taken together, these perspectives indicate that PI should be understood as a dynamic construct formed at the intersection of cognition, interaction, and contextual influence. It signals a readiness to act, yet remains continuously shaped by symbolic meaning and evolving consumer expectations.

#### **2.2.4. Refurbished smartphone**

Refurbished smartphones are positioned within the 10R framework as a value retention strategy aligned with Refurbish (R5), situated between reuse and remanufacture (Reike, Vermeulen and Witjes, 2018; Malooly and Daphne, November 9, 2023). This approach involves technical interventions such as inspection, repair, and component replacement to restore device functionality, enabling smartphones to be reintroduced to the market with improved performance and reliability (Alyahya *et al.*, 2023; Bandara and Ariyaratne, 2024; Barkhi *et al.*, 2024). As a result, refurbishment extends product lifespans while preserving substantial functional and economic value.

In contrast, Reuse (R3) refers to the direct transfer of products between users without significant modification, typically through second-hand markets (Reike, Vermeulen and Witjes, 2018; Malooly and Daphne, November 9, 2023). While reuse also prolongs the use phase, it relies on the product's existing condition and does not involve systematic quality improvement (Zink *et al.*, 2014; Prabhu N and Majhi, 2023).

The key difference lies in the level of intervention. Reuse maintains the product in its current state, whereas refurbishment enhances and standardizes its performance (Zink *et al.*, 2014; Prabhu N and Majhi, 2023). Consequently, refurbished smartphones tend to offer greater reliability and lower perceived risk, making them more widely acceptable and effective in supporting circular economy objectives (Mugge, Jockin and Bocken, 2017; Alyahya *et al.*, 2023; Bandara and Ariyaratne, 2024).

### **2.3. Research model and hypotheses**

#### **2.3.1. Theoretical framework**

Numerous theoretical frameworks have been employed to elucidate consumer motives and decision-making processes in the examination of sustainable consumer behavior and the circular economy. VBN, NAM, and TPB are regarded as significant theoretical frameworks that elucidate the impact of environmental values, ethical norms, and perceived evaluations on consumer behavior (Schwartz, 1977; Ajzen, 1991; Stern,

2000). Nevertheless, when contextualized within the consumption of refurbished products, particularly refurbished cellphones, these theoretical frameworks inadequately elucidate decision-making amid product-quality uncertainties and information asymmetries. This work develops an enhanced model, derived from the Theory of Planned Behavior (TPB), that incorporates environmental motives and trust systems in the context of circular consumption.

The Value Belief Norm (VBN) posits that ecologically sustainable conduct arises from a causal sequence linking personal values to environmental beliefs and individual norms, ultimately fostering motivation for social action (Stern *et al.*, 1999; Stern, 2000). This theory highlights the significance of inner motivation and moral duty in fostering sustainable conduct, transcending mere cost-benefit analysis (Schwartz, 1973; Schwartz, 1977). In the realm of purchasing refurbished products, factors such as environmental knowledge and care reflect environmental values and ideas, contributing to the development of circular consumption incentives. Nonetheless, VBN primarily elucidates behavior related to personal norms and has not delineated how these motives are translated into specific product assessments in a competitive market.

Likewise, the Norm Activation Model (NAM) underscores the significance of perceived repercussions and personal responsibility in shaping ethical standards and conduct for the benefit of the community (Schwartz, 1977). In sustainable consumption, when consumers recognize the adverse effects of conventional consumption practices and feel accountable for mitigating them, they are inclined to develop an ethical commitment to adopt ecologically sustainable consumption (Han *et al.*, 2019; Liobikienė *et al.*, 2020). Nonetheless, NAM predominantly explains behavioral reasons through the lens of ethical obligation, neglecting to adequately account for market-oriented cognitive factors, such as perceived risk, quality indicators, and trust in retailers, which are especially pertinent to the consumption of refurbished products.

The TPB offers a more comprehensive analytical framework by integrating cognitive evaluation, social norms, and behavioral control to elucidate behavioral goals (Ajzen, 1991). TPB has been widely used in sustainable consumption research, encompassing purchasing behaviors related to green products, recycling, and resource conservation (Joshi and Rahman, 2016; Zheng, Qiu and Morrison, 2023). Recent research indicates that the impact of TPB components can fluctuate considerably based on the informational context and the degree of product uncertainty. In high-risk quality scenarios, self-assessment and personal conviction may outweigh social normative pressure (Wang *et al.*, 2018a). This

indicates that the Theory of Planned Behavior needs to be expanded to incorporate specific product evaluation mechanisms and contextual factors related to trust.

Building on these theoretical foundations, the present work advances the Theory of Planned Behavior in three primary ways. The study combines customer preference for refurbished cellphones as an intermediary evaluation stage between socio-environmental reasons and purchase intentions, rather than directly analyzing overall views toward sustainable consumption. This indicates that customers may have a favorable disposition toward the circular economy but have not yet developed a distinct preference for refurbished products over new offerings.

Secondly, the study incorporates the belief mechanism as a vital moderating variable in the conversion of sustainability incentives into consumer behavior. In a cyclical market, buyers assess environmental advantages while also facing ambiguity about product quality and the reliability of the refurbishment process. This corresponds with Trust–Commitment Theory (TCT), which asserts that trust is essential for establishing long-term trade relationships and reducing opportunistic behavior in situations of incomplete knowledge (Morgan and Hunt, 1994; Fischer, 2013; Agarwal *et al.*, 2025). Differentiating between trust in refurbished products and trust in refurbished retailers clarifies how various market signals influence customer decision-making.

The study expands the TPB to encompass cooperative consumption within the circular economy, emphasizing that consumer behavior extends beyond mere transactions to encompass active engagement in the product lifecycle value-generation process. The co-creation viewpoint underscores that the degree of consumer involvement is largely contingent upon the quality of the relationship and the trust established in the firm (Hollebeek, Srivastava and Chen, 2019). Consequently, incorporating trust elements into the consumer behavior model enhances the understanding of the acceptance of refurbished products in the actual market.

Overall, this study contributes to TPB development by integrating environmental drivers from VBN and NAM with trust mechanisms from TCT, thereby building a consumer behavior model better suited to the context of refurbished product consumption. This extension helps explain how sustainability values are translated into specific product evaluations and purchase intentions under conditions of quality uncertainty.

### **2.3.2. Research hypotheses**

#### **2.3.2.1. Environmental Awareness and Concern**

Environmental awareness refers to consumers' cognitive recognition and understanding of environmental issues related to consumption activities. It is not an immediate condition but develops through an ongoing process of personal experience, observation, and engagement with environmental information. Through these experiences, individuals acquire knowledge of environmental issues and form a clearer perspective on the interaction between human activities and the natural environment (Renn, 2011; Hannibal, Liu and Vedlitz, 2016). In this study, environmental awareness is specifically understood as the extent to which consumers recognize the environmental consequences of smartphone production, use, disposal, and replacement. Thus, the concept mainly captures the cognitive dimension of knowing and recognizing environmental problems, rather than emotional concern, personal responsibility, or behavioral readiness. Enhanced environmental awareness can inform decisions that support long-term environmental health and sustainable consumption (Hopwood, Mellor and O'Brien, 2005).

Prior research has shown that environmental awareness is associated with behaviors that support sustainable development. Consumers with higher environmental awareness tend to consider resource conservation and the selection of eco-friendly products when making purchasing decisions (Wang *et al.*, 2016). In the consumer domain, empirical studies also show that environmental knowledge predicts green consumer behavior, including the purchase of eco-friendly products and support for sustainable consumption practices (Junaedi, 2012; Gandhi, 2021; Ogiemwonyi, 2024). These findings suggest that environmental awareness provides a cognitive basis for evaluating whether a product is consistent with environmental sustainability.

Within the circular economy framework, product refurbishment is an effective strategy for reducing environmental costs associated with new manufacturing, resource extraction, and waste management. Huysman *et al.* argue that extending product lifecycles through refurbishment can reduce environmental impacts compared with manufacturing wholly new products (Huysman *et al.*, 2015). Therefore, when consumers understand the environmental benefits of refurbishment, they may perceive refurbished smartphones as a practical way to reduce electronic waste, resource use, and the ecological burden of frequent product replacement. This recognition can provide a basis for more favorable consumer preference toward refurbished smartphones.

Environmental concern, by contrast, goes beyond awareness by reflecting the depth of an individual's feelings, attitudes, and evaluations regarding environmental problems. This concept denotes the degree to which citizens recognize environmental issues, support initiatives to mitigate them, and are prepared to contribute to improving environmental conditions (Faver and Muñoz, 2013). Prior definitions also associate environmental concern with personal accountability in addressing environmental problems, thereby distinguishing it from mere awareness (Dunlap and Jones, 2002; Hu, Parsa and Self, 2010). Accordingly, while environmental awareness emphasizes cognitive recognition, environmental concern captures the affective and evaluative response to environmental issues.

A number of studies have confirmed the influence of environmental concern on green consumer behavior. Consumers with stronger environmental concern generally exhibit more favorable attitudes toward eco-friendly products and a greater willingness to adjust their purchase behavior to be more sustainable (Pagiaslis and Krontalis, 2014; Kautish and Dash, 2017; Kautish and Sharma, 2020). Recent studies in consumer electronics further indicate that environmental concern is positively associated with the intention to purchase refurbished electronic products, which are perceived as alternatives that can reduce negative environmental impacts (Herziger and Shmueli, 2024; Wallner *et al.*, 2024). In the context of the circular economy, environmental concern can also shape attitudes toward circular products and enhance consumer acceptance and purchase intentions (Sharma and Foropon, 2019; Testa *et al.*, 2022; Pandey and Yadav, 2023).

The Value–Belief–Norm framework provides a theoretical basis for explaining how environmental awareness and environmental concern influence sustainable consumption. The VBN framework posits that pro-environmental behavior arises from the interaction among individual values, ecological beliefs, and moral obligations, which together influence behavioral decision-making (Lee, Kim and Roh, 2023). The framework is conceptually grounded in the Norm Activation Model, which emphasizes the role of personal moral norms in motivating socially and environmentally responsible behavior (Majeed, Kim and Kim, 2023). NAM suggests that individuals are more likely to engage in pro-environmental actions when they recognize the negative consequences of environmental degradation and perceive personal responsibility for environmental protection (Jhawar, Kumar and Israel, 2024; Wasaya, Prentice and Hsiao, 2024; Liao, 2025). In this process, awareness of consequences represents the cognitive starting point, while responsibility and personal norms explain the subsequent moral mechanism (Han, 2015). The VBN framework extends this logic by incorporating broader value orientations



and ecological worldviews into the explanation of sustainable behavior (Choi, Jang and Kandampully, 2015).

In the context of refurbished smartphones, this theoretical perspective suggests that consumers who recognize the environmental consequences of smartphone consumption may evaluate refurbished products more favorably because they extend the products' lifecycle value and reduce waste. Environmental awareness helps consumers understand the environmental benefits of refurbishment, whereas environmental concern reflects the extent to which they care about these benefits and consider them important. Since refurbished smartphones can be evaluated not only in terms of functionality but also in terms of their ethical and environmental implications, both environmental awareness and environmental concern are expected to influence consumer preference (Stern, 2000). Therefore, the following hypotheses are proposed:

*H1: Environmental awareness is positively associated with consumer preference in the context of refurbished smartphones.*

*H2: Environmental concern is positively associated with consumer preference in the context of refurbished smartphones.*

#### *2.3.2.2. Social Influence on Consumer Preference*

Social influence refers to the perceived pressure or encouragement individuals receive from important others within their social environment when forming evaluations and making consumption-related decisions (Henningsen *et al.*, 2003; Saima and Khan, 2020; Cho and Chan, 2021). Sociopsychological research indicates that individuals do not make decisions independently; instead, they often monitor, compare, and respond to the actions of other members within their social group (Cruwys, Bevelander and Hermans, 2015). When social norms are overtly articulated and subtly coercive, people often modify their decisions to align with the group's dominant behavior, even if those decisions do not fully originate in their original personal assessment (Venkatesh and Brown, 2001).

In scholarly discourse, social influence is typically classified into two primary types: normative influence and informational impact. Normative influence signifies the necessity to preserve social cohesion and approval within the community. In this instance, individuals modify their behavior not solely to evade adverse reactions, but rather to validate their inclusion and sustain significant social connections (Hassebrock, 2000). Adhering to group norms reinforces social identity and fosters a sense of connectedness, particularly in groups characterized by high interaction and distinctly defined shared ideals.

Conversely, informational influence concerns the need for precision in assessment and decision-making. In circumstances characterized by limited information or significant uncertainty, individuals often seek and depend on information from others seen as knowledgeable or reliable. Acquiring new information from the social environment may lead to changes in attitudes or behaviors, even without direct social coercion (Henningsson *et al.*, 2003). Thus, normative influence highlights social drive, whereas informational influence underscores cognitive motivation.

Within the realm of refurbished smartphone consumption, these two types of social influence coexist and can concurrently affect customer preferences and decisions. Normative impact emerges from the aspiration to integrate into a social group where the utilization of refurbished products is deemed conventional or broadly endorsed. When customers see that friends, coworkers, or social network members regularly use refurbished smartphones, they perceive this behavior as a prevailing standard, thereby increasing the likelihood of making similar choices (O'REILLY III and Caldwell, 1985). Recognizing group behavior diminishes individual feelings of difference and reinforces social connections through collective consumption patterns.

Information influence is essential in this context as buyers seek assistance in assessing the quality, reliability, and usability of refurbished smartphones. Due to the inherent ambiguity around the condition and performance of refurbished products, consumers frequently seek the experiences and reviews of others prior to establishing preferences or making judgments (O'REILLY III and Caldwell, 1985; Cho and Chan, 2021). In this setting, social networks serve as an auxiliary source of information that helps individuals reduce perceived risk and bolster their confidence in their decisions.

The Theory of Planned Behavior (TPB) provides a useful theoretical framework for understanding how social influence shapes the formation of consumer preferences and purchase intentions. According to TPB, individual behavior is primarily predicted by behavioral intention, which is shaped by three key determinants: attitude toward the behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). Within this framework, behavioral intention reflects the extent to which an individual is willing to perform a particular action, while the three determinants collectively explain the psychological and social processes underlying decision-making.

Among these components, subjective norms are particularly relevant for understanding the role of social influence in consumer behavior. Subjective norms refer to an individual's perception of social expectations, approval, or pressure from important



reference groups, such as family members, friends, colleagues, or broader social communities, regarding whether a specific behavior should be performed (Ajzen, 1991). This concept suggests that consumers consider the opinions and expectations of significant others when evaluating products and forming behavioral intentions. In the context of refurbished smartphones, subjective norms may shape perceptions of the acceptability and desirability of purchasing refurbished devices.

Within the framework of a circular economy, numerous studies have demonstrated a favorable association between subjective norms and the adoption of circular products, such as refurbished and remanufactured items. Empirical research indicates that when consumers observe others endorsing or using refurbished products, they are inclined to form more favorable opinions and exhibit a greater willingness to select them (Bigliardi, Filippelli and Quinto, 2022; Gaur, Pandey and Hungund, 2024). Comparable findings have been reported in studies on remanufactured items, in which subjective standards influence consumer acceptance within the framework of sustainable consumption (Pisitsankkhakarn and Vassanadumrongdee, 2020; Alam *et al.*, 2024).

Social influence can generate a contagion effect, or “herd effect,” in which individuals adopt a behavior or product after seeing many others engage in similar actions. In some instances, product popularity may be perceived as an indicator of social endorsement, prompting customers to adhere not solely due to technical characteristics, but also out of a compulsion to align with prevailing trends (Corneo and Jeanne, 1997; Oyedele and Goenner, 2021). Recent research indicates that this effect is especially significant in emerging markets or contentious product categories, where consumers largely depend on the actions of the majority to mitigate uncertainty (Myers and Sar, 2013; Anning-Dorson and Tackie, 2025).

In the TPB, social influence, through subjective norms, affects behavior by shaping individuals’ perceptions and interpretations of others’ attitudes and actions. Regular exposure to favorable perspectives or behaviors about refurbished products on social networks might shape consumer attitudes and preferences (Xu, Ye and Liu, 2022; Mohammadrezaei, Meredith and McNamara, 2023). Concurrently, information disseminated within the group helps elucidate perceived advantages and mitigate perceived risks, thereby facilitating the assessment and preference development process (Choi, 2023; Märtns, Westmattelmann and Schewe, 2023).

Based on the theoretical justifications and empirical evidence presented, social impact is expected to significantly shape customer preferences for refurbished cellphones.

When customers are motivated by the aspiration for social integration and bolstered by information from social networks, they are inclined to evaluate these items more favorably and prioritize them within a circular economy framework. Consequently, the study posits the subsequent hypothesis:

*H3: Social influence is positively associated with consumer preference in the context of refurbished smartphones.*

#### *2.3.2.3. Consumer Preference on Purchase Intention*

In consumer behavior research, consumer preference can be understood as the relative priority that consumers assign to one product option over competing alternatives after comparing relevant attributes, choice conditions, and perceived value (Tversky, Slovic and Kahneman, 1990; Hsee, 1996; Huber, Ariely and Fischer, 2002). This conceptualization differs from attitude toward behavior in the Theory of Planned Behavior, which refers to an individual's favorable or unfavorable evaluation of performing a specific behavior (Ajzen, 1991; Ajzen, 2006). Preference, by contrast, is more closely related to how consumers compare alternatives and express a choice tendency through ranking, selection, rating, or matching processes (Hsee, 1996; Huber, Ariely and Fischer, 2002). Accordingly, in this study, consumer preference is conceptualized as a product-level comparative orientation, indicating the extent to which consumers prioritize refurbished smartphones over competing smartphone options after considering functional, economic, and environmental attributes.

This distinction is particularly important in sustainable consumption because consumers may evaluate sustainable purchasing positively in general, but such an attitude does not necessarily mean that they will prioritize a specific sustainable product option when it is compared with other available alternatives (Ajzen, 1991; Hsee, 1996; Ajzen, 2006). In the context of refurbished smartphones, consumers evaluate not only the product's functional advantages but also the alignment of the product option with their personal values, such as reducing negative environmental impact through smartphone selection (Mehraj and Qureshi, 2022). Thus, consumer preference in this study does not simply describe a favorable evaluation of buying refurbished smartphones. Rather, it reflects whether refurbished smartphones become a preferred option when consumers compare them with new smartphones or other alternatives, based on usability, reliability, price-value, sustainability, and perceived product benefits.

From a psychological standpoint, preference is not merely a transient positive emotion or a general favorable attitude. It represents a relatively stable cognitive readiness

that emerges when consumers perceive that a product's attributes align with their personal needs, expectations, and standards (Srivastava, Gupta and Rana, 2023). In this sense, preference involves an internal comparison between product alternatives and the consumer's evaluative criteria. As this perceived fit strengthens, consumers are more likely to develop a clearer priority for one alternative over others and to show greater consistency in their purchase-related decisions (Hsee, 1996; Huber, Ariely and Fischer, 2002; Srivastava, Gupta and Rana, 2023). This psychological stability may increase the likelihood that favorable product perceptions are converted into purchase intention, particularly in contexts that require careful product evaluation (Mehraj and Qureshi, 2022).

Prior research indicates that consumer choice is shaped by the ongoing evaluation of the relationship between the consumer's self-image and the product's features, including both functional and symbolic dimensions (Srivastava, Gupta and Rana, 2023). For refurbished smartphones, preference may develop when consumers perceive that the product can satisfy important criteria such as usability, reliability, affordability, and sustainability. However, this does not make preference identical to attitude toward purchasing behavior. Attitude captures whether consumers evaluate the act of buying refurbished smartphones positively or negatively, whereas preference captures whether refurbished smartphones are prioritized over other smartphone options after consumers compare relevant product attributes (Ajzen, 1991; Hsee, 1996; Ajzen, 2006). In this situation, preference serves as a psychological mechanism that guides consumers toward a particular product alternative, even when the actual purchase is not immediate (Mehraj and Qureshi, 2022).

This conceptual distinction is especially relevant for refurbished smartphones because this product category often requires consumers to compare several product-related trade-offs, including usability, reliability, price value, warranty, perceived risk, environmental benefits, and differences from new models (Mehraj and Qureshi, 2022; Srivastava, Gupta and Rana, 2023). Consumer preference for refurbished smartphones therefore signifies that consumers accept the product's core attributes and regard refurbished phones as a viable option within their purchase consideration set (Mehraj and Qureshi, 2022). From this perspective, preference functions as an indicator of product acceptance and choice priority, which may strengthen purchase intention during the final decision-making phase (Srivastava, Gupta and Rana, 2023).

Moreover, recent studies highlight that eco-oriented value systems can clarify and direct consumer preferences. When preferences are formed based on environmental values,

consumers are more likely to prioritize alternatives consistent with a sustainable lifestyle and environmental responsibility (Alam *et al.*, 2025a). In this framework, preference serves as a guiding mechanism that helps consumers distinguish and prioritize sustainable product options. It does not simply express a positive attitude toward purchasing behavior; rather, it reflects a comparative tendency to select refurbished smartphones as more desirable than competing options (Ajzen, 1991; Hsee, 1996; Ajzen, 2006). Consequently, in studies concerning refurbished smartphones, consumer preference emerges as a significant determinant of sustainable purchasing choices because it clarifies which product alternative consumers are more likely to prioritize when moving toward purchase intention (Mehraj and Qureshi, 2022; Alam *et al.*, 2025a). In light of the aforementioned arguments, the study posits the subsequent hypothesis:

*H4: Consumer preference has a positive influence on consumers' purchase intention toward refurbished smartphones.*

#### *2.3.2.4. Retailer Trust as a Moderating Factor*

Environmental knowledge refers to consumers' understanding of environmental problems, their causes, consequences, and possible solutions in consumption. Prior research shows that environmental knowledge helps consumers connect environmental issues with specific behaviors and encourages more responsible consumption choices, including waste reduction, resource conservation, and support for circular practices (Zsóka *et al.*, 2013; Joshi and Rahman, 2015; Yue *et al.*, 2020). In the context of refurbished smartphones, this knowledge enables consumers to recognize refurbishment as a sustainable option because it extends product life cycles and reduces electronic waste.

However, refurbished smartphones are also associated with higher perceived uncertainty than new products. Studies on remanufactured and refurbished products indicate that consumers often consider quality consistency, prior usage, product performance, warranty, and post-purchase reliability before accepting such products (Abbey *et al.*, 2015b; Wang *et al.*, 2018b; Bigliardi, Filippelli and Quinto, 2022). For smartphones, these concerns are particularly relevant because consumers cannot fully observe battery condition, component replacement, repair history, or testing transparency before purchase. Therefore, environmental knowledge can support favorable evaluations of refurbished smartphones, but its effect is expected to be stronger when the retail context provides sufficient trust.

In this study, retailer trust refers to consumers' belief that the refurbished smartphone retailer or retail channel under consideration is competent, honest, and reliable in

inspecting devices, disclosing product conditions, honoring warranty commitments, and providing after-sales support. This definition follows relationship marketing theory, which conceptualizes trust as confidence in an exchange partner's reliability and integrity (Morgan and Hunt, 1994), and online shopping research, which shows that trust reduces uncertainty when consumers cannot directly verify product quality before purchase (Gefen, Karahanna and Straub, 2003; Mou *et al.*, 2020). The term "retailer" refers specifically to sellers of refurbished smartphones, including formal stores, certified sellers, and platform-based retail channels. Thus, this study does not assume that all retailers are equally trusted; rather, retailer trust is treated as a consumer-level perception of the specific retailer or retail channel under evaluation.

On this basis, retailer trust is expected to strengthen the relationship between environmental knowledge and consumer preference. Environmental knowledge helps consumers understand the sustainability value of refurbishment, while retailer trust provides assurance that the product is technically reliable and that the seller will fulfill quality, warranty, and service commitments. Thus, the study proposes:

*H5a: Trust in the refurbished smartphone retailer positively moderates the effect of environmental awareness on consumer preference for refurbished smartphones.*

A similar logic applies to environmental concern. Environmental concern reflects consumers' care for environmental protection and their sense of responsibility for reducing environmental harm through consumption choices (Yue *et al.*, 2020). However, research on green consumption shows that environmental concern does not always translate into purchase behavior when consumers face perceived risk, inconvenience, price sensitivity, or uncertainty about product performance (Joshi and Rahman, 2015; Wiederhold and Martinez, 2018; Bigliardi, Filippelli and Quinto, 2022). In refurbished smartphone purchases, retailer trust can reduce this hesitation by making the environmentally preferred option appear both sustainable and practically acceptable. Therefore, the effect of environmental concern on consumer preference is expected to be stronger when trust in the retailer under consideration is high. Thus, the study proposes:

*H5b: Trust in the refurbished smartphone retailer positively moderates the effect of environmental concern on consumer preference for refurbished smartphones.*

Retailer trust can also condition the effect of social influence. According to the Theory of Planned Behavior, subjective norms reflect perceived social pressure from significant others and reference groups (Ajzen, 1991). In consumer markets, social influence also operates through recommendations, online reviews, and electronic word of

mouth. Research shows that eWOM affects purchase intention partly through perceived credibility, usefulness, and trust in information sources (Ismagilova *et al.*, 2020). In the context of refurbished smartphones, recommendations from family, friends, colleagues, or online reviewers become more actionable when consumers also trust the retailer that provides the product. When retailer trust is low, social recommendations may be insufficient because concerns about seller credibility and product reliability remain unresolved. Therefore, retailer trust is expected to strengthen the relationship between social influence and consumer preference. Thus, the study proposes:

*H5c: Trust in the refurbished smartphone retailer positively moderates the effect of social influence on consumer preference for refurbished smartphones.*

Overall, retailer trust is included as a moderating variable because refurbished smartphones represent a sustainable but risk-sensitive consumption option. The revised conceptualization clarifies that retailer trust refers to trust in the specific refurbished smartphone retailer or retail channel under consideration, rather than a general assumption that all retailers are trusted equally. It also specifies that consumers' trust concerns the retailer's competence, honesty, reliability, product quality assurance, warranty fulfillment, and after-sales support.

#### *2.3.2.5. Product Trust as a Moderating Factor*

Consumer confidence in the quality of refurbished smartphones is often influenced by personal trust in environmental considerations. Research indicates that when customers perceive refurbished products as meeting performance and durability standards, they often integrate this perception with environmental considerations to influence their purchasing behavior towards enhanced sustainability (McQueen *et al.*, 2022). The purchasing decision not only embodies functional factors but also signifies a personal commitment to mitigating adverse environmental effects by prolonging the product's longevity (Herziger and Shmueli, 2024; Senali *et al.*, 2024).

Confidence in product quality is essential for mitigating perceived risk, particularly for used or refurbished items, which can entail significant ambiguity concerning their usage history and long-term dependability (Herziger and Shmueli, 2024; Senali *et al.*, 2024). Within the Trust–Commitment Theory (TCT), the Commitment–Trust hypothesis asserts that enduring relationships between customers and businesses depend on two fundamental elements, namely trust and commitment, with trust reducing perceived risk and providing the foundation for long-term consumer engagement (Kumar, Jain and Sharma, 2025; Anwar, 2026; Khan *et al.*, 2026). As confidence increases, consumers are more likely to



perceive the value of refurbished phones favorably, thereby increasing the likelihood that environmental awareness translates into intentions to select ecologically responsible products (McQueen *et al.*, 2022). Confidence in quality establishes a “cognitive anchor point,” connecting abstract environmental values with concrete consumer advantages in purchase decisions (Herziger and Shmueli, 2024).

Previous research indicates that product quality affects consumers’ interpretation and use of their environmental knowledge in decision-making, from a sustainable consumer behavior perspective (McQueen *et al.*, 2022). When consumers regard refurbished phones as possessing dependable quality, they are more inclined to view them as an appropriate choice to fulfill their environmental consciousness without considerably compromising functionality or user experience (Senali *et al.*, 2024). This indicates that confidence in product quality not only directly influences product assessment but also moderates the relationship between environmental awareness and behavioral consequences concerning sustainable consumption. The study posits that trust in refurbished cellphones will enhance the influence of environmental awareness on customer preferences and purchasing intentions.

*H6a: Trust in the refurbished smartphone positively moderates the effect of environmental awareness on consumer preference.*

In addition to environmental knowledge, environmental concern indicates the degree to which consumers perceive environmental issues as significant and pertinent to their individual consumption practices. Nonetheless, with refurbished products, this apprehension is not invariably sufficient to prompt a purchase if consumers harbor uncertainties about the product’s quality and reliability (Understanding the factors affecting customers’ behavior when purchasing used products, 2023). Numerous studies suggest that once trust in a product is established, customers are inclined to perceive the purchase of refurbished phones as a pragmatic response to environmental issues rather than solely a symbolic stance (Senali *et al.*, 2024).

Confidence in the product instills a sense of security in customers about its quality and usefulness, thereby facilitating alignment between environmental principles and personal accountability in consumption (Senali *et al.*, 2024). Selecting a refurbished phone is not merely an environmentally conscious choice; it is also a pragmatic decision appropriate for everyday use. Research on sustainable consumer behavior indicates that a trust in quality is frequently a prerequisite for environmental concerns to influence product preference and specific purchasing intentions, particularly in markets characterized by

elevated perceived risk levels (Understanding the factors affecting consumers' behavior when purchasing refurbished products, 2023; Herzallah et al., 2025). Consequently, the study formulates the subsequent hypotheses:

*H6b: Trust in the refurbished smartphone itself positively moderates the effect of environmental concern on consumer preference.*

In addition to personal values, social influence is a significant factor in the purchasing decision-making process, particularly for products that entail considerable risk and novelty, such as refurbished phones. (Wang *et al.*, 2013) demonstrate that product quality can influence consumer reactions to others' expectations and views. When a product is regarded as reliable, consumers are more inclined to heed and appreciate recommendations from friends, colleagues, or reference groups (Wang *et al.*, 2013).

In the realm of refurbished phones, confidence in product quality can amplify the influence of social norms, as perspectives from the social milieu are now situated within a favorable assessment framework for the reliability and practicality of the decision (Herziger and Shmueli, 2024). When consumers perceive that a product sufficiently meets their usage needs, endorsements from peers or the community are perceived as low-risk and serve as a reinforcing source of information for their decision (Wang *et al.*, 2013). This indicates that confidence in the product can mediate the relationship between social impact and behavioral outcomes regarding refurbished phones. In light of the aforementioned argument, the study posits:

*H6c: Trust in the refurbished smartphone itself positively moderates the effect of environmental concern on consumer preference.*

In conclusion, trust in the quality of refurbished smartphones is a crucial factor that enables environmental and social influences to emerge as stronger preferences and purchase intentions.

#### *2.3.2.6. Control variables and demographic differences in purchase intention*

Rather than positioning gender, location, and completed education level as primary explanatory constructs, this study uses them as control variables. Prior research has shown that demographic characteristics, including gender, education, income, and age, may be associated with consumers' green and sustainable purchase intention. However, the empirical evidence remains inconsistent across contexts, as some studies found significant demographic effects, whereas others reported weak, indirect, or context-dependent roles of demographic variables (Chekima *et al.*, 2016; Rahimah *et al.*, 2018; Sreen, Purbey and



Sadarangani, 2018; Nguyen, Nguyen and Nguyen, 2019; Sun, Li and Wang, 2022; Meet, Kundu and Ahluwalia, 2024). Therefore, the present study does not assume a fixed positive or negative direction for these demographic variables. Instead, it examines whether consumers' purchase intention toward refurbished smartphones in Vietnam differs significantly across demographic groups.

In the Vietnamese context, evidence from green consumption research suggests that consumers' background conditions may affect purchase intention and therefore should be considered when examining sustainable product adoption. Nguyen, Nguyen and Nguyen (2019) included income as a control variable and found it to be positively associated with green apparel purchase intention, indicating that economic capacity may influence consumers' willingness to purchase sustainable products. Building on this logic, the present study treats demographic characteristics not only as control variables but also as potential sources of group differences in purchase intention toward refurbished smartphones. Accordingly, differences in purchase intention are further examined across selected demographic groups to assess whether consumers' background characteristics meaningfully distinguish their intention to purchase refurbished smartphones.

Gender is included as a control variable because prior studies report mixed findings. Rahimah *et al.* (2018) found that men were more inclined to purchase green products than women. Felix *et al.* (2022) found that the positive influence of perceived masculinity on perceived product effectiveness held for male but not female consumers. Sreen, Purbey and Sadarangani (2018) also indicated that green purchase intention may vary across gender and individual behavioral characteristics. However, Sun, Li and Wang (2022) found that only age and household income had significant effects among the demographic variables tested. These mixed findings suggest that gender should not be treated as a central explanatory construct in the present model. Nevertheless, gender may still reflect meaningful heterogeneity in consumers' purchase intention toward refurbished smartphones. Therefore, the following hypothesis is proposed:

*H7: Consumers' purchase intention toward refurbished smartphones in Vietnam differs significantly across gender groups.*

Location is also included as a control variable because consumers from different geographic areas may differ in their access to retail infrastructure, delivery services, online product information, and exposure to refurbished or second-hand electronics. Prior research shows that e-shopping behavior varies geographically and is shaped by both physical and virtual accessibility, such as offline retail facilities, transport infrastructure,

broadband access, and delivery points (Shao, Derudder and Witlox, 2022). In the context of refurbished smartphones, consumers' evaluations are influenced by product information, perceived quality, perceived risk, perceived benefits, warranty conditions, and customer-group differences (Mugge, Jockin and Bocken, 2017; Nasiri and Shokouhyar, 2021)). In Vietnam, location may therefore capture differences in market access, retail infrastructure, consumer exposure to refurbished smartphones, and familiarity with renewed or second-hand consumer electronics. Therefore, the following hypothesis is proposed:

*H8: Consumers' purchase intention toward refurbished smartphones in Vietnam differs significantly across location groups.*

Completed education level is included as a control variable because prior studies frequently control for education or qualification, but the empirical evidence is inconsistent. Sun, Li and Wang (2022) included education as a control variable in the green purchase intention model. Rahimah *et al.* (2018) included education as a demographic control in a green product purchase intention model. Chekima *et al.* (2016) also examined the role of demographic characteristics, including education, in green purchasing intention. However, Lavuri *et al.* (2023) found that education did not control for sustainable purchase intention, and Chakraborty and Dash (2023) found that qualification was not significantly related to purchase intention. In the context of refurbished smartphones, education may shape consumers' ability to evaluate product information, warranty conditions, environmental claims, perceived product value, and risks associated with refurbished products. However, because prior findings are inconsistent, this study does not assume a directional effect of education. Instead, it examines whether purchase intention varies across levels of completed education. Therefore, the following hypothesis is proposed:

*H9: Consumers' purchase intention toward refurbished smartphones in Vietnam differs significantly across completed education levels.*

#### *2.3.2.7. Gender-based multi-group differences*

Although gender is treated as a demographic control variable in this study, it may also serve as a meaningful segmentation variable in explaining how consumers form purchase intention toward refurbished smartphones. Recent studies on green and sustainable consumption have suggested that male and female consumers may differ not only in their purchase intentions but also in how psychological and social factors translate into product preferences and behavioral intentions. For example, Islam, Thomas and Albishri (2024) found that women were more responsive to social influence in the

formation of sustainability consciousness and green purchase intention, while Olfat (2025) showed that the direct and mediated relationships between green attitudes and green purchase intention differed between male and female consumers. In addition, socio-demographic variables, including gender, education, and income, have been shown to influence green purchase intention in sustainable product contexts (Meet, Kundu and Ahluwalia, 2024). In the context of refurbished smartphones, consumers' evaluations may also depend on perceived value, perceived risk, product information, and satisfaction dimensions, which can vary across consumer segments (Nasiri and Shokouhyar, 2021).

Accordingly, this study further examines whether the proposed structural relationships operate differently between male and female consumers. This analysis is conceptually distinct from testing whether the mean level of purchase intention differs by gender. Instead, it focuses on whether the pathways linking environmental awareness, environmental concern, social influence, consumer preference, and purchase intention vary across gender groups. Therefore, the following hypothesis is proposed:

*H10: The structural relationships among environmental awareness, environmental concern, social influence, consumer preference, and purchase intention toward refurbished smartphones differ significantly between male and female consumers in Vietnam.*

### **2.3.3. Research model**

Based on the theoretical arguments and empirical evidence discussed earlier, this study proposes an integrated research model to explain consumer preferences and purchase intentions for refurbished smartphones in Vietnam. The model combines environmental, social, and trust-related perspectives to capture the decision-making process in a high-perceived-risk and circular-economy context.

In the model, environmental awareness, environmental concern, and social influence are proposed as key antecedents of consumer preference. Consumer preference is then positioned as a direct predictor of purchase intention, reflecting the role of favorable product evaluation in shaping consumers' readiness to buy refurbished smartphones.

The model also includes retailer trust and product trust as moderating variables. Retailer trust is expected to strengthen the effects of environmental and social factors on consumer preference by reducing perceived uncertainty in the transaction process. Product trust is expected to reinforce consumers' confidence in the quality, reliability, and usability of refurbished smartphones.

In addition, gender and demographic characteristics are included as control variables to assess whether the main relationships in the research model remain significant after accounting for differences across consumer groups. Figure 2.2 presents the proposed research model, in which solid lines indicate direct effects and dashed lines indicate moderating effects.

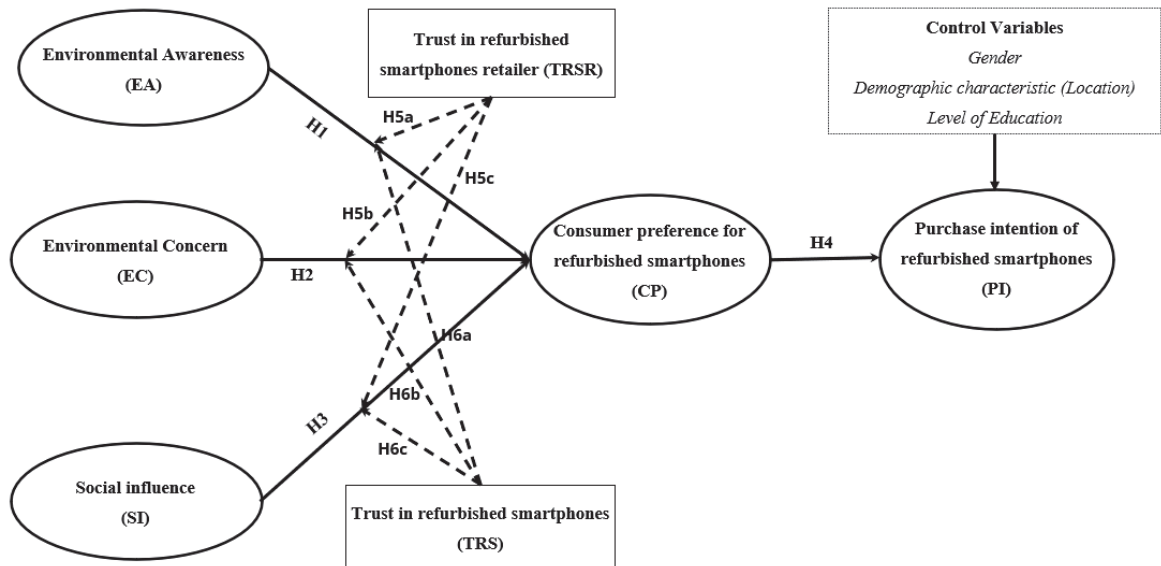


Figure 2. 2: Proposed research model

*Source: Authors' own work*

## **SUMMARY OF CHAPTER 2**

Chapter 2 outlines the theoretical foundations and reviews prior research relevant to sustainable consumption in the context of refurbished smartphones. Drawing on perspectives from value theory, norm-based approaches, and intention-driven behavioral models, the chapter examines how individual perceptions, environmental concern, and social influence shape consumer evaluations and decision processes. The review of existing studies further highlights unresolved issues in understanding the interplay between psychoenvironmental factors, trust structures, and consumer behavior within circular economy settings.

Building on this theoretical and empirical synthesis, the chapter advances a conceptual research model and formulates hypotheses concerning the effects of environmental awareness, environmental concern, and social influence on consumer preferences for refurbished smartphones. Particular attention is given to the role of trust in both sellers and products as mechanisms that can reduce perceived uncertainty in situations characterised by information asymmetry. Within this framework, consumer preference is positioned as a key mediating process through which cognitive appraisals, value orientations, and socially embedded motivations are translated into purchase intentions.

## CHAPTER 3: RESEARCH METHODS

### 3.1. Research context

The circular economy in Vietnam is still in a formative stage, yet its relevance has grown significantly as concerns over resource depletion and waste generation continue to intensify. At the global level, circular practices remain limited, accounting for only 6.9-7 percent of total economic activity, indicating that most production and consumption systems are still governed by linear patterns (UNDP, December 17, 2025). Within this broader context, Vietnam faces increasing pressure to shift toward more resource-efficient models as economic expansion continues to rely heavily on material extraction and consumption (Nguyen *et al.*, 2025).

In recent decades, the scale of material use in Vietnam has expanded rapidly, accompanied by rising demand for energy, infrastructure, and industrial inputs (UNDP, December 17, 2025). This trajectory has contributed to a steady increase in waste generation, particularly in sectors such as plastics, textiles, electronics, and beverages, which together represent a substantial share of landfill volume and remain largely dependent on linear production systems (UNDP, December 17, 2025). The growth of these sectors has strengthened economic performance, yet it has also intensified environmental pressures, particularly in waste management and pollution control (Nguyen, 2025; Sang and Anh, 2025). In this respect, electronic waste, including discarded consumer devices, has become an increasingly visible challenge due to the short lifecycle of technology products and the limited recovery of valuable materials (Hajalilou, Parvini and Majidi, 2026).

The transition toward a circular economy is therefore closely associated with improving resource efficiency and extending product lifecycles. Projections suggest that adopting circular practices could reduce municipal waste by approximately 30 to 34 percent, while greenhouse gas emissions may decline by 40 to 70 percent over the long term (UNDP, December 17, 2025). Beyond environmental outcomes, these changes are expected to support job creation and strengthen economic resilience, particularly in sectors with high material intensity.

Sectoral dynamics further illustrate the potential of circular approaches. Agriculture remains a major contributor to the national economy, accounting for about 11.6 percent of GDP and 26 percent of employment, with annual production reaching 100 to 105 million tons (UNDP, December 17, 2025). At the same time, the energy sector contributes roughly 4 percent of GDP and employs close to 4 million workers (UNDP, December 17, 2025).

These figures highlight the scale at which resource efficiency improvements could generate both economic and environmental benefits (Khatun, Narayan and Wijerathna, 2025). In parallel, industries associated with consumer goods, including electronics, continue to play a central role in shaping waste streams, particularly through the accumulation of e-waste linked to rapid technological turnover (UNDP, December 17, 2025).

Evidence from local pilot initiatives provides further insight into the feasibility of circular implementation. In the case of Hue, circular economy interventions have been designed across multiple sectors, with projections indicating a potential increase of 4.5 percent in regional GDP and a 2 percent rise in employment by 2030 (UNDP, December 17, 2025). Over a longer horizon, these initiatives are expected to contribute to a reduction of greenhouse gas emissions by more than 40 percent (UNDP, December 17, 2025). Such outcomes suggest that a system-oriented approach, combining policy coordination with sector-specific actions, can facilitate measurable progress toward circular development.

Taken together, the current state of the circular economy in Vietnam reflects a combination of structural constraints and emerging opportunities. While circular practices remain limited in scale, the increasing pressure from waste generation, particularly e-waste, and the need for improved resource efficiency continue to drive interest in alternative production and consumption models. This evolving context provides an important foundation for examining circular consumption intention and consumer behavior in technology-related markets.

The market for refurbished and second-hand smartphones in Vietnam has shown clear signs of growth, driven primarily by economic considerations and changing consumer preferences. Refurbished devices are typically priced 15 to 50 percent lower than new products, allowing consumers to save substantially. In some cases, the price difference can reach several hundred US dollars, making higher-end models more accessible to a broader group of buyers (Vietnam Smartphone Market, February, 2026). This pricing advantage has influenced purchasing behavior, particularly among consumers who are more cost-sensitive (Arantes and Barbosa Costa, 2025; Mouloudj *et al.*, 2026). Instead of prioritizing new devices, many buyers are willing to consider used or certified pre-owned smartphones that still deliver comparable functionality (Vietnam Smartphone Market, February, 2026). This tendency is especially evident among individuals seeking access to premium features at a reduced price point. The expansion of this segment has also been supported by the increasing presence of organized retailers and digital marketplaces. These actors provide additional services, such as warranties, quality checks, and after-sales support, which help



address concerns about product reliability (Vietnam Smartphone Market, February, 2026). In addition, trade-in programs offered by smartphone brands and retailers have contributed to the circulation of used devices. By allowing customers to exchange old products for discounts on new purchases, these programs create a steady supply of devices for refurbishment and resale (Vietnam Smartphone Market, February, 2026).

Overall, the growing interest in refurbished smartphones reflects a combination of price sensitivity, improved service support, and changing consumption preferences. This trend is expected to continue, particularly among first-time users and students seeking more affordable options in the smartphone market.

Moreover, The Vietnamese smartphone market is anticipated to reach around US\$6.71 billion in 2024 and expand to US\$11.50 billion by 2030, with a substantial compound annual growth rate (Vietnam Smartphone Market by Size, share, growth and Forecast 2030., n.d.). This expansion is propelled by a youthful demographic, enhanced technological accessibility, and the vigorous advancement of digital infrastructure. Smartphones have become essential tools for engaging in the digital economy, encompassing electronic payments, e-commerce, and remote education and employment. Nonetheless, the Vietnamese market displays the unique traits of a developing economy, in which buyers emphasize value and cost-efficiency rather than the latest technology.

In this scenario, refurbished smartphones are increasingly appealing to a range of customer demographics. Refurbished smartphones, priced 15% to 50% lower than new items, enable consumers to acquire premium models at a reasonable expense (Vietnam Smartphone Market by Size, share, growth and Forecast 2030., n.d.). This choice not only saves students, young workers, and middle-income groups money but also enhances access to technology, thereby mitigating digital inequality. The emergence of e-commerce platforms and professional retailers has notably altered consumer perceptions of refurbished products, since warranties, quality control, and after-sales service are becoming more standardized.

In addition to economic incentives, environmental consciousness is becoming increasingly significant in consumer behavior, particularly among youth and well-educated individuals. Purchasing refurbished smartphones is perceived as both a financially prudent choice and a demonstration of environmental stewardship and personal ethics (Sharifi and Shokouhyar, 2021). Amid the escalating global e-waste issue, selecting refurbished equipment enables consumers to recognize their role in mitigating the environmental impacts of technological use. The transition from environmental knowledge to purchasing



behavior is not automatic; it is influenced by various mediating factors, with perceived trust and risk being pivotal.

Taken together, the research context of this thesis emerges at the intersection of three closely connected developments in Vietnam. The first is the gradual policy and market shift toward a circular economy in response to rising pressure from resource depletion, waste generation, and environmental degradation. The second is the growing significance of e-waste, particularly from consumer electronics, as shorter product lifecycles continue to intensify disposal challenges. The third is the growing presence of refurbished smartphones as a practical market response to affordability concerns and changing consumption patterns. Viewed together, these trends indicate that refurbished smartphones are not merely a low-cost alternative within the electronics market. They also represent a relevant form of circular consumption, enabling consumers to extend product lifecycles while balancing financial and environmental considerations.

### **3.2. Research process**

The research model is designed to examine consumer behavioral intention in the circular economy, with a specific focus on refurbished smartphones in Vietnam, a representative case of e-waste-related consumption. This focus reflects the growing importance of consumer decision-making in addressing environmental challenges posed by short product lifecycles and rising volumes of e-waste. Rather than approaching circular economy adoption solely from a production or policy perspective, the model centers on consumer behavior, recognizing that the effectiveness of circular economy practices ultimately depends on individuals' willingness to adopt alternative consumption patterns.

The first stage of the research process establishes the conceptual foundation through a structured review of literature on circular economy, e-waste, and consumer behavior in sustainable consumption contexts. In this stage, refurbished smartphones are positioned as a practical manifestation of circular economy principles, where product lifecycles are extended through reuse and refurbishment. The literature review identifies key determinants of consumer intention, including environmental awareness, environmental concern, social influence, perceived value, and trust-related factors. These constructs are not treated in isolation but are considered as part of a broader decision-making process in which consumers evaluate both functional benefits and environmental implications when engaging with refurbished products.

Building on this foundation, the second stage develops the conceptual framework and associated hypotheses. The model assumes that consumer behavior in the circular economy

is shaped by the interaction between environmental motivations and product-related perceptions. In particular, consumer intention toward refurbished smartphones is conceptualized as the central dependent variable, reflecting an individual's readiness to adopt circular consumption practices. At the same time, trust is incorporated as a critical moderating factor, capturing confidence in both refurbished products and the retailers offering them. This inclusion reflects the persistent uncertainty surrounding second-life electronic devices, where perceived risk may influence how consumers interpret product quality and reliability in the context of e-waste reduction.

The third stage involves empirical data collection using a quantitative survey designed to capture consumer perceptions in Vietnam. This stage aims to bridge the gap between theoretical assumptions and real-world decision-making by examining how individuals respond to refurbished smartphones in practice. The survey focuses on measuring consumer intentions and attitudes that may influence consumer behavior, including perceptions of value, environmental impact, and trust. By situating these perceptions within the context of the circular economy and e-waste, the study seeks to understand how abstract sustainability concepts are translated into concrete consumption choices.

In the fourth stage, the collected data are analyzed using structural modeling techniques to test the proposed relationships. This analysis evaluates both the measurement properties of the constructs and the structural links between variables. Particular attention is given to the role of trust in shaping the strength of relationships between environmental and product-related factors and consumer intention. Through this process, the study provides empirical evidence that consumer behavior in the circular economy is influenced by multiple interacting dimensions rather than a single dominant factor.

The final stage focuses on interpreting the findings in relation to the broader objectives of circular economy development. The results are examined in terms of their implications for reducing e-waste and promoting more sustainable consumption patterns in the smartphone market. By linking consumer intention to the extension of product lifecycles through refurbished smartphones, the study highlights the role of individual behavior in supporting circular economy outcomes. This stage also considers how insights from consumer behavior can inform strategies for increasing the adoption of refurbished products in Vietnam, particularly in a market characterized by price sensitivity and evolving environmental awareness.

Taken together, the research model reflects a coherent progression from theoretical grounding to empirical validation, with a consistent emphasis on the relationship between circular economy principles, e-waste challenges, and consumer behavior. By focusing on consumer intention toward refurbished smartphones, the study contributes to a more context-specific understanding of how circular consumption can be realized in a developing economy. At the same time, it provides a framework for examining how individual decision-making can support broader efforts to improve resource efficiency and reduce the environmental impact of electronic consumption.

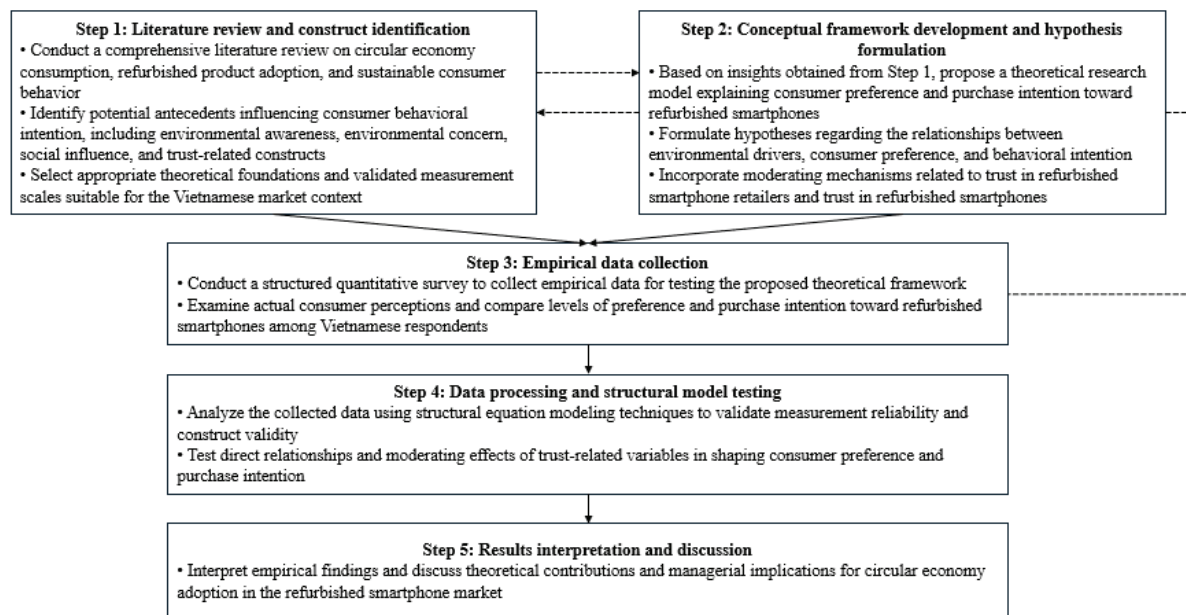


Figure 3. 1: The Research Process of the Study

*Source: Authors' own work*

### 3.3. Questionnaire Development

The development and validation of the measurement instrument in this study followed a five-step process designed to ensure that the questionnaire was both conceptually accurate and linguistically appropriate for Vietnamese respondents. Because the study examines consumer intention and behavior in the context of the circular economy, with a particular focus on refurbished smartphones, careful attention was required to ensure that each item conveyed the intended meaning clearly in Vietnamese. This was especially important because several constructs used in the study, such as environmental concern, trust, and perceived risk, are conceptually abstract and may be interpreted differently when translated from English into the respondents' mother tongue.

#### *Step 1: Translation into Vietnamese*

In the first step, the measurement items were translated from English into Vietnamese in order to make them suitable for the local research context. The purpose of this stage was not simply to translate the wording from one language to another, but to ensure that each item's content could be understood naturally by Vietnamese respondents, while remaining consistent with the original construct definitions. Since the study concerns refurbished smartphones and consumer behavior in a circular-economy setting, some expressions drawn from the international literature may sound overly technical or unfamiliar if translated too literally. For that reason, the translation process emphasized clarity, contextual relevance, and conceptual equivalence.

Particular care was taken with terms related to circular economy, e-waste, product reuse, and trust in refurbished products. These concepts are common in academic discussions, yet they are not always expressed in everyday Vietnamese in a stable or widely recognized form. As a result, the translation aimed to preserve the theoretical meaning of each item while adjusting the wording to ensure respondents could interpret the questions without confusion. The intention was to make the questionnaire accessible to individuals with experience with refurbished smartphones or who had previously sought information about such products, regardless of whether they were familiar with the academic terminology used in the study.

### ***Step 2: Back translation and comparison***

After the Vietnamese version was prepared, an independent bilingual expert conducted a back-translation from Vietnamese into English. This step served as an additional quality check of the translated instrument. The back-translated version was then carefully compared with the original English questionnaire to identify any discrepancies, semantic shifts, or unintended changes in meaning. Through this comparison, the study sought to reduce the risk that an item might appear linguistically correct in Vietnamese while no longer reflecting the same construct as intended in the original version.

### ***Step 3: Expert review***

Once the translation and back-translation processes were completed, the questionnaire was reviewed by academic experts in Marketing and Business Management. Their role was to examine whether the items adequately represented the intended constructs and whether the wording was sufficiently clear, precise, and unambiguous. This expert review was necessary because a questionnaire may appear linguistically acceptable while still failing to capture a construct's conceptual boundaries with sufficient precision.

In this study, the expert review focused on whether the items were appropriate for investigating consumer intention and behavior toward refurbished smartphones within the broader framework of the circular economy. The experts also considered whether the Vietnamese wording reflected the realities of the local market. This point was especially relevant because respondents in Vietnam may understand used, renewed, and refurbished smartphones in slightly different ways. The review process, therefore, helped ensure that the questionnaire referred specifically to the intended product category and that respondents would not answer based on an incorrect interpretation of the product concept.

#### ***Step 4: Pilot survey***

Following the expert review, a pilot survey was conducted with 30 Vietnamese respondents who shared characteristics similar to those of the target population. These participants were selected because they were relevant to the case under investigation. In practical terms, this means they had prior experience with refurbished smartphones, had considered purchasing them, or had shown genuine interest in this product category. Their familiarity with the case made them well-suited to assess whether the questionnaire could be understood in a realistic consumption setting rather than only at an abstract level.

During the pilot stage, respondents were invited not only to complete the questionnaire but also to comment on the clarity, comprehensibility, and overall coherence of the instrument. Attention was given to whether the questions sounded natural in Vietnamese, whether any terms appeared too academic or unfamiliar, and whether respondents could distinguish clearly between related ideas such as environmental concern, product value, trust, and purchase intention. The pilot group also reflected a degree of balance across male and female participants so that feedback would not be shaped too narrowly by one demographic perspective. The aim here was not to create a statistically representative sample at this stage, but to obtain informed reactions from respondents whose profiles resembled those of the eventual survey participants.

Based on feedback collected during the pilot survey, several items were slightly rephrased to improve clarity and reduce potential misunderstandings. These revisions were carefully and selectively made. The purpose was not to alter the constructs themselves, but to make sure that the Vietnamese wording conveyed the intended meaning more directly and naturally. In this sense, the editing process was central to the adaptation of the questionnaire. It ensured that the final instrument would speak to respondents in their

native language in a way that was both intelligible and conceptually faithful to the original measurement framework.

#### ***Step 5: Pilot analysis and finalization of the questionnaire***

After the pilot survey, the questionnaire underwent preliminary analysis. Although their statistical contribution was weaker at the pilot stage, they captured important aspects of the constructs and broadened the conceptual scope of the measurement instrument.

This decision reflects an important principle in measurement development. Scale refinement should not rely solely on statistical thresholds, particularly in studies of complex attitudes and perceptions related to consumer behavior in the circular economy. In the case of refurbished smartphones, respondents may vary in how they interpret trust, environmental concern, or product-related uncertainty, especially when such topics are still emerging in the Vietnamese market. For that reason, the retention of certain items was considered appropriate, provided they remained theoretically meaningful and did not undermine the overall reliability and validity of the scale set.

Subsequent assessments showed that the measurement instrument as a whole remained satisfactory. The results supported finalizing the questionnaire for formal data collection, indicating that the set of items was adequate for examining consumer intention and behavior toward refurbished smartphones in Vietnam. By the end of this process, the questionnaire had not only been translated and tested, but also refined to match the local linguistic context and the specific research focus on circular economy practices and e-waste-related consumption.

Taken together, the five-step process presented in Figure 3.2 demonstrates that the measurement instrument was developed through a careful combination of translation, validation, respondent feedback, and pilot analysis. Each stage contributed to making the questionnaire more suitable for Vietnamese respondents and more closely aligned with the study's conceptual framework. This was particularly necessary because the research does not examine general consumption, but a more specific form of consumer behavior linked to refurbished smartphones and the circular economy.

By refining the questionnaire through translation checks, expert review, and a pilot survey with relevant participants, the study increased the likelihood that respondents would understand each item as intended. This enhances data quality and provides a more reliable basis for later analysis of consumer behavioral intention in the Vietnamese smartphone market.



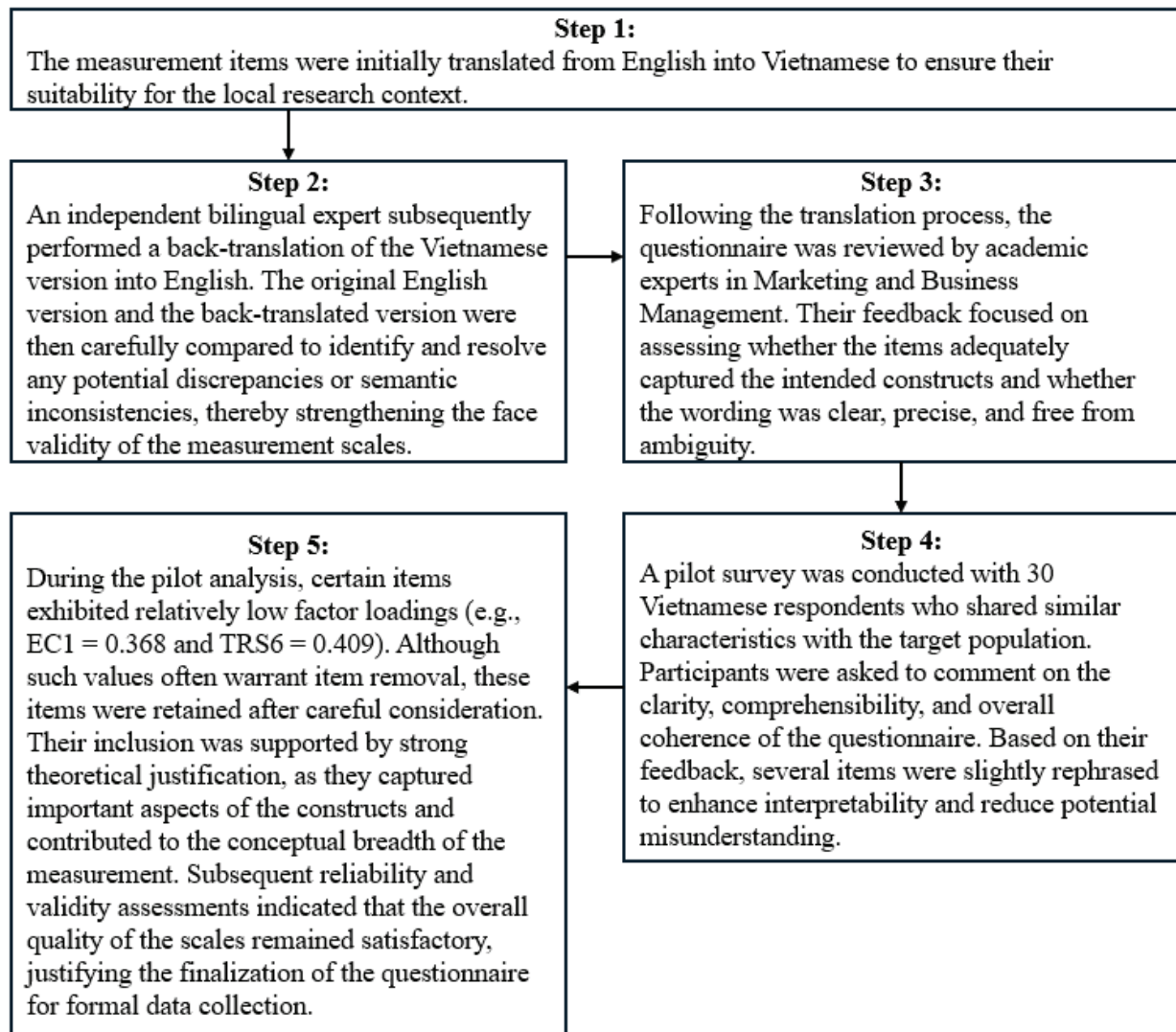


Figure 3. 2: Measurement Development and Validation Process

*Source: Authors' own work*

### 3.4. Measurement scales

This study employed a five-point Likert scale to quantify respondents' perceptions, ranging from strongly disagree to strongly agree. The selection of a five-point scale is widely supported in consumer behavior research because it provides an appropriate balance between measurement sensitivity and respondent cognitive effort. Specifically, this format allows participants to express varying degrees of agreement without causing confusion or response fatigue, which is particularly important when investigating complex constructs such as environmental awareness, trust, and purchase intention. Moreover, prior studies have demonstrated that five-point Likert scales are sufficient to capture attitudinal variance while maintaining reliability and interpretability in behavioral research contexts.

The measurement scales used in this study were not newly developed from scratch but were adapted from prior studies that have been rigorously validated in the literature. These original scales have been widely applied in research areas such as consumer behavior, sustainable consumption, and circular economy practices, thereby ensuring a high level of theoretical grounding and construct validity. By adopting established scales, this study benefits from previously confirmed psychometric properties, including internal consistency, convergent validity, and discriminant validity. This approach also enhances the comparability of findings with existing studies, allowing for stronger theoretical integration and discussion.

However, adopting existing scales without contextual adaptation may lead to measurement bias, especially when applied in a different cultural or industrial setting. Therefore, in this research, all measurement items were carefully reviewed and modified in wording to better reflect the specific context of refurbished smartphone consumption in Vietnam. For example, items originally referring to organic food or information systems were rephrased to align with the characteristics of refurbished smartphones. This adaptation process ensured that respondents could clearly understand each item while preserving the original conceptual meaning of the constructs.

Importantly, the modification of scale wording was not conducted arbitrarily. The revised items underwent a preliminary qualitative validation process through interviews with representatives of the target population, as described in the question development stage. These interviews aimed to assess the clarity, relevance, and interpretability of the measurement items in the local context. Feedback from participants indicated that the adjusted wording was appropriate, easy to understand, and closely aligned with their real experiences and perceptions. This process provides initial evidence of content validity and supports the reliability of the adapted scales.

As a result, this study adopts a hybrid measurement approach that combines theoretical robustness with contextual flexibility. The use of validated scales ensures conceptual consistency, while the careful adaptation and pre-testing process enhances their applicability to the Vietnamese market and the refurbished smartphone industry. Consequently, the measurement framework is expected to effectively capture consumers' cognitive, affective, and behavioral dimensions related to sustainable smartphone consumption within the circular economy.

Table 3. 1: Measurement items



Constructs	Items	Source
Environmental awareness	I consider the potential environmental impact of my actions when making my decisions.	(Shah <i>et al.</i> , 2021)
	I would like to describe myself as environmentally responsible.	
	I am worried about wasting and destroying the Earth's resources.	
	Even if I feel inconvenient, I would like to take more environmentally friendly actions.	
Environmental concern	I am very concerned about the environment.	(Paul, Modi and Patel, 2016)
	I would be willing to reduce my consumption to help protect the environment.	
	Major political change is necessary to protect the natural environment.	
	Major social changes are necessary to protect the natural environment.	
	Anti-pollution laws should be enforced more strongly.	
Social influence	It is important what my friends or colleagues think about me purchasing a refurbished smartphone.	(Li, 2013)
	I often identify with people by choosing to purchase a refurbished smartphone.	
	I like to know that purchasing a refurbished smartphone makes a good impression on my friends or colleagues.	
	I purchase a refurbished smartphone based on the expectations of my friends and colleagues.	

	I feel a sense of belonging with my friends and colleagues by purchasing a refurbished smartphone.	
	When I purchase a refurbished smartphone, I often consult other people for useful information to help choose the alternative that best fits my needs.	
	When I purchase a refurbished smartphone, I often ask my friends for useful information to solve problems.	
	When I purchase a refurbished smartphone, I frequently gather information from friends or colleagues.	
Consumer preference	I like using refurbished smartphones.	(Lu and Lin, 2002)
	I am favorable toward using refurbished smartphones.	
	It is beneficial to use refurbished smartphones.	
	It is wise to use refurbished smartphones.	
	Overall, my attitude toward using refurbished smartphones is positive.	
Trust in refurbished smartphones	I trust that refurbished smartphones are high-quality.	(Duong <i>et al.</i> , 2024)
	Refurbished smartphones are reliable.	
	I trust that refurbished smartphones are safe.	
	I trust that refurbished smartphones are fully traceable back to their origin.	
	I trust that refurbished smartphones are truthful.	

	I trust that refurbished smartphones still retain the core quality and value of the original product.	
Trust in refurbished smartphones retailer	I trust in refurbished smartphone retailers.	
	I rely on refurbished smartphone retailers.	
	These are honest refurbished smartphone retailers.	
	The refurbished smartphone retailer is very concerned about my welfare.	
Purchase intention	I plan to purchase a refurbished smartphone in my next smartphone purchase.	(Pisitsankkhakarn and Vassanadumrongdee, 2020)
	I plan to recommend my peers to purchase refurbished smartphones in their next smartphone purchase.	
	I plan to ask for a refurbished smartphone in my next smartphone purchase.	

To empirically examine the proposed relationships, the key constructs in the research model were operationalized using multi-item measurement scales adapted from prior validated studies. These scales were carefully reviewed and refined to ensure conceptual consistency and contextual relevance to the consumption of refurbished smartphones in Vietnam. Each construct was measured through a set of observed indicators designed to capture consumers' cognitive evaluations, affective responses, and socially influenced behavioral tendencies. The following section presents the operational definitions and measurement approaches adopted for each construct in the study.

Environmental awareness is measured using four observed variables that reflect individuals' understanding of environmental and ecological issues. These observed variables are inherited and adapted from the scale proposed by Shah *et al.* (2021), which has been validated and used in studies on consumer intentions related to technology and sustainable consumption. The construct captures the extent to which individuals consciously consider the environmental consequences of their actions, including their awareness of resource depletion, environmental degradation, and the importance of environmentally responsible behavior (Strilchuk, Kravchuk and Dovgan, 2025). In the

context of this study, environmental awareness plays a foundational role in shaping consumers' cognitive evaluations of refurbished smartphones, as such products are often positioned as environmentally friendly alternatives within the circular economy. By adapting this scale, the study ensures that respondents' level of environmental understanding is accurately captured while maintaining consistency with prior empirical research.

The level of environmental concern is measured by five observed variables that reflect individual sensitivity and concern about environmental degradation. This scale is derived from the study by Paul, Modi and Patel (2016), which has been widely used in studies of consumer behavior and environmentally oriented attitudes. Unlike environmental awareness, which focuses on cognitive understanding, environmental concern reflects the affective dimension, including feelings of worry, responsibility, and urgency toward environmental issues (Schwegler and Petty, 2025; Selvanathan *et al.*, 2025; Peñasco and Grossman, 2026). This distinction is important because individuals may be aware of environmental problems without necessarily feeling personally concerned or motivated to act (Selvanathan *et al.*, 2025). In this study, environmental concern is expected to influence behavioral tendencies more directly, as emotionally engaged consumers are more likely to support sustainable consumption practices such as purchasing refurbished smartphones.

Social influence is measured through eight observed variables that reflect the extent to which individuals and reference groups influence consumer perceptions and behavior. These observed variables are inherited from the scale proposed by Li (2013) and have been used in consumer behavior studies. The construct captures both normative influence, in which individuals conform to others' expectations, and informational influence, in which individuals seek advice or information from their social network. In the Vietnamese context, where collective values and social relationships play a significant role in decision-making, social influence is particularly relevant. The adapted items ensure that the construct reflects real-life consumption scenarios, such as consulting friends before making a purchase or considering how one's choices are perceived by others.

Consumer preference for refurbished smartphones is measured using five observed variables that reflect consumers' evaluations of product quality, reliability, and usability. This scale is derived from the research of Lu and Lin (2002) and has been applied in studies evaluating technology products. The construct reflects the extent to which consumers perceive refurbished smartphones as beneficial, wise, and favorable compared to

alternatives. It represents an overall attitudinal evaluation that integrates both cognitive and affective responses. In this study, consumer preference serves as a key mediating factor between external influences, such as environmental factors and social influence, and the eventual behavioral intention to purchase refurbished smartphones.

Trust is considered a multidimensional concept, comprising two distinct components. The first component is trust in the product, measured by six observed variables reflecting consumer confidence in the quality and performance of refurbished smartphones. The second component is trust in the retailer, including four observed variables focusing on the level of confidence in the product supply and distribution process. Both groups of observed variables are inherited from the scale proposed by Duong *et al.* (2024) and are adapted in content and wording to suit the context of refurbished smartphone research in Vietnam.

Purchase intention was measured through three observed variables to reflect the level of consumer readiness to engage in future purchasing behavior. These observed variables were inherited from the scale proposed by Pisitsankkhakarn and Vassanadumrongdee (2020), which had been used in studies of consumer intentions toward environmentally friendly products.

### **3.5. Data Collection and Sample**

The Vietnam smartphone market has been experiencing a noticeable shift in recent years, particularly in major urban areas, where market saturation is increasingly evident. Cities such as Hanoi, Ho Chi Minh City, and Da Nang have reached a stage where smartphone ownership is already widespread, meaning that most consumers are no longer entering the market for the first time (Vietnam Smartphone Market, By Region, Competition, Forecast & Opportunities, 2020-2030F, July 2025). Instead, their behavior is shaped by replacement needs, upgrade considerations, and a growing openness to alternative consumption options.

This context provides a strong rationale for selecting these three cities as the primary sampling locations. When a market becomes saturated, consumers' decision-making processes tend to change. Rather than focusing solely on acquiring new products, individuals begin to evaluate different options based on value, sustainability, and long-term benefits. Refurbished smartphones naturally become more relevant under these conditions, as they offer a balance between affordability and functionality while also aligning with environmental considerations. As a result, consumers in these urban areas are more likely to have both the experience and the awareness needed to form clear opinions about such products.

Another important aspect concerns the characteristics of the populations in these cities. Urban consumers in Hanoi, Ho Chi Minh City, and Da Nang are generally more exposed to technological developments and market trends (Vietnam Smartphone Market, By Region, Competition, Forecast & Opportunities, 2020-2030F, July 2025). Their access to information, combined with higher levels of education and income, tends to shape more informed and reflective consumption behavior. This is particularly important for a study that examines constructs such as environmental awareness, concern for sustainability, trust, and social influence. These factors are less likely to be meaningfully expressed in contexts where consumers have limited exposure to such issues.

Choosing these cities also enhances the quality of the collected data. Respondents with prior smartphone experience are better positioned to realistically evaluate the idea of refurbished products. They can compare performance, assess risks, and reflect on their own purchasing habits. In contrast, collecting data from areas with lower smartphone penetration may yield more speculative responses, weakening the reliability of the findings. At the same time, including Hanoi, Ho Chi Minh City, and Da Nang helps capture variation across different parts of Vietnam. Each city represents a distinct regional context, allowing the study to avoid excessive concentration in a single area while maintaining a focus on urban consumers. This balance makes the findings more meaningful within the scope of the research.

Moreover, determining an appropriate sample size is important for ensuring that empirical findings are both reliable and meaningful. In this study, the required number of observations is first estimated using Cochran's formula, a widely recognized approach in social science research when the population is large (Cochran, 1977). The formula is expressed as:

$$n = \frac{Z^2 \cdot p(1 - p)}{e^2}$$

In this expression,  $n$  refers to the minimum sample size needed,  $Z$  represents the  $z$  value associated with the chosen confidence level,  $p$  is the estimated proportion of the population that exhibits the characteristic of interest, and  $e$  indicates the acceptable level of sampling error. For the purpose of this study, the confidence level is set at 95 percent, corresponding to a  $z$  value of 1.96. The margin of error is fixed at 5 percent, which is commonly considered acceptable in behavioral research. Because the true population proportion is not known in advance, the value of  $p$  is set at 0.5. This choice is often

recommended because it produces the highest possible variance and therefore yields a more conservative estimate of the required sample size (Cochran, 1977). When these values are substituted into the formula, the minimum required sample size is approximately 384 respondents. This figure serves as a reference point, indicating the number of observations needed to achieve a reasonable level of representativeness and statistical confidence.

The dataset collected in this study includes 824 valid responses, well above the minimum threshold. This difference is not merely numerical but carries methodological implications. A larger sample reduces the impact of random sampling error, making the estimated relationships between variables more stable. It also improves the consistency of statistical outputs, especially in analyses that involve multiple constructs and observed indicators. As the sample grows, the likelihood that results are influenced by outliers or irregular responses tends to decrease, thereby strengthening the overall credibility of the findings.

This study employed a simple random sampling method. Respondents were required to (a) be Vietnamese residents, (b) own or regularly use a smartphone, and (c) be at least 16 years old, consistent with ethical guidelines for online survey research. For participants aged 16–17, digital parental consent was obtained through the survey platform in accordance with national ethical standards for research involving minors.

The sampling frame was constructed from a panel of Vietnamese smartphone users collected via a professional online survey platform. From this panel, respondents were randomly selected through a computer-generated randomization process. Each individual in the population had an equal probability of inclusion, reducing selection bias and enhancing the sample's representativeness. This procedure enhances data reliability and strengthens the generalizability of the findings compared to non-probability sampling approaches.

Data were collected between May and July 2025 through both online and offline channels. The online questionnaire was distributed via the survey panel provider, with stratified outreach to ensure representation across demographic segments. Offline data collection was conducted in parallel to complement the online sample and improve overall coverage while maintaining respondent relevance.

To ensure data quality, a screening procedure was implemented before and during the survey. Screening questions were used to verify that participants met the eligibility criteria, particularly their prior exposure to smartphones. Respondents who did not satisfy these conditions were excluded from the survey. This procedure helps ensure participants have



sufficient familiarity with the research context, enabling them to provide informed and meaningful responses rather than speculative opinions.

The integration of online and offline data collection, together with the screening procedure, supports both sample coverage and data validity. Online channels facilitate broader reach across different user groups, while offline engagement helps include relevant respondents. The screening process further enhances the dataset's quality by ensuring only qualified participants are retained.

Overall, the sampling strategy strikes a balance between inclusiveness and relevance to respondents. It achieves broad coverage while maintaining control over data quality through random selection and systematic screening. As a result, the study provides a reliable empirical basis for examining consumer perceptions and behavioral intentions, supporting the robustness and credibility of the research findings.

### **SUMMARY CHAPTER 3**

Chapter 3 presents the methodological foundation of the study by outlining the research context, the overall research design, and the procedures used to develop the measurement instrument. The chapter situates the investigation within the contemporary context of increasing technology consumption and growing environmental concerns associated with electronic waste, where refurbished smartphones are considered a relevant alternative for consumption within the circular economy. Vietnam is adopted as the empirical context, with particular attention to major urban markets characterized by intensive use of electronic devices and emerging practices of product reuse and refurbishment.

In addition, the chapter describes the process through which survey questions and measurement items were constructed and refined. Drawing on established scales from prior studies, the questionnaire was adapted to ensure conceptual relevance to refurbished smartphone consumption. The chapter further explains the analytical procedures used to assess measurement quality and to prepare the dataset for empirical testing. Together, these methodological considerations provide the basis for examining the proposed research relationships in the subsequent chapters.

## CHAPTER 4: RESULTS OF RESEARCH

This chapter presents the empirical findings of the study, covering the characteristics of the research sample and the outcomes of data analysis and measurement validation. It also provides descriptive statistics and reports the results of hypothesis testing. Particular attention is given to examining how the proposed relationships operate within the research framework, with a focus on the mechanisms by which key antecedent factors influence consumer preferences and purchase intentions for refurbished smartphones. In doing so, the chapter offers a comprehensive evaluation of the model's structural paths and lays the groundwork for subsequent discussion of its theoretical implications and practical relevance.

### 4.1. Research sample

Table 4. 1: Demographic Characteristics of Respondents

Criteria		Frequency	Percentage
<i>Gender</i>	Male	503	61
	Female	321	39
<i>Age</i>	Below 18 years old	101	12.3
	From 18 to 25 years old	326	39.6
	From 26 to 35 years old	146	17.7
	Above 35 years old	251	30.5
<i>Occupation</i>	Employed	336	40.8
	Other	185	22.5
	Students	303	36.8
<i>Education level</i>	High school	151	18.3
	Associate degree	52	6.3
	Bachelor's degree	359	43.6
	Graduate studies	135	16.4
	Other	127	15.4
<i>Place</i>	Hanoi	344	41.7
	Da Nang	215	26.1
	Ho Chi Minh City	265	32.2

*Source: Authors' own work*

Table 4.1 presents the demographic characteristics of the 824 respondents, providing a crucial basis for understanding the context of the ensuing analytical findings. The survey sample provides adequate representation across various dimensions (gender, age, occupation, education, and residential location) and reveals notable distribution trends that warrant consideration in interpretation.

Initially, males comprise 61% (503 individuals), and females constitute 39% (321 individuals). This disparity indicates a masculine bias in the sample, implying that the attitudinal or behavioral markers in the study may predominantly represent the male perspective. Nonetheless, the female fraction remains sufficiently substantial to preclude a “representative absence,” particularly if the study incorporates gender comparisons or adjusts for gender factors within the model. The essential aspect here is not merely the disparity in proportions but also the methodological ramifications: if the research variables are gender-sensitive (such as consumer behavior, risk tolerance, or trust), then the sample structure must be evaluated in this context to prevent over-interpretation.

The sample exhibits age diversity; nonetheless, it predominantly concentrates on the 18–25 age range, comprising 39.6% (326 individuals). This group possesses extensive access to information, technology, and media outlets, frequently responds rapidly to emerging consumer trends, and engages robustly with the digital landscape. The demographic aged over 35 constitutes 30.5% (251 individuals), establishing a distinct generational “counterbalance” within the sample. The 26–35 age demographic comprises 17.7% (146 individuals), while those under 18 constitute 12.3% (101 individuals). This structure indicates that the data not only reflect the perspectives of the younger demographic but also capture the opinions of the adult demographic, thereby enhancing the capacity to discern variations in life cycles, consumer experiences, and financial stability. While the under-18 demographic is not predominant, it necessitates caution when evaluating characteristics associated with purchasing behavior, as their independent decision-making and financial control may diverge from those of adults.

The occupational distribution of the sample is roughly even between working professionals and students. The employed cohort constitutes 40.8% (336 individuals), students represent 36.8% (303 individuals), and the “other” category comprises 22.5% (185 individuals). This combination enables the data to concurrently represent two distinct market segments: one comprising individuals with relatively stable incomes and shopping experiences, and the other comprising trend-sensitive individuals, heavily influenced by peers and the social milieu, yet frequently constrained by financial constraints. From an

interpretive standpoint, if the research pertains to consumer behavior or purchasing intentions, this occupational framework facilitates the examination of the convergence between economic factors (affordability) and social factors (community influence), mechanisms that often operate concurrently but not necessarily in a uniform direction.

The sample exhibits a preponderance of individuals with advanced educational qualifications. Individuals with bachelor's degrees accounted for 43.6% (359 individuals), while those with postgraduate degrees accounted for 16.4% (135 individuals). The amalgamation of these two categories represents a substantial proportion, indicating that a considerable number of respondents exhibit proficient information processing and evaluative abilities, especially in subjects that require logical comprehension or deliberation. The cohort of high school graduates accounted for 18.3% (151 individuals), the cohort of college graduates accounted for 6.3% (52 individuals), and the "other" category accounted for 15.4% (127 individuals). This distribution ensures consistent response quality while indicating potential bias towards individuals with a university degree or higher; thus, extrapolation to lower educational levels should be made cautiously.

The sample is predominantly located in three main cities, with a rather balanced distribution: Hanoi comprises 41.7% (344 individuals), Ho Chi Minh City 32.2% (265 individuals), and Da Nang 26.1% (215 individuals). This distribution enhances the study's representation of the urban consumer context, characterized by greater access to products, services, and information, as well as more pronounced social norms and media influence than in rural locations. The pronounced "urbanization" of the sample indicates a limitation: the conclusions may be more applicable to the urban population, while their relevance to non-urban areas requires stronger statistical evidence.

Table 4. 2: Descriptive statistics of measurement items

Descriptive Statistics							
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
EA1	824	1	5	3.92	.796	-1.264	.085
EA2	824	1	5	3.92	.820	-.798	.085
EA3	824	1	5	3.92	.841	-.858	.085
EA4	824	1	5	4.03	.865	-1.017	.085
EC1	824	1	5	3.90	.733	-.570	.085
EC2	824	1	5	3.39	.941	-.228	.085

<b>EC3</b>	824	1	5	3.33	1.018	-.147	.085
<b>EC4</b>	824	1	5	3.28	.975	-.091	.085
<b>EC5</b>	824	1	5	3.74	.826	-.479	.085
<b>SI1</b>	824	1	5	3.90	.715	-.637	.085
<b>SI2</b>	824	1	5	4.16	.748	-.862	.085
<b>SI3</b>	824	1	5	3.87	.755	-.365	.085
<b>SI4</b>	824	1	5	3.84	.739	-.338	.085
<b>SI5</b>	824	1	5	3.97	.735	-.494	.085
<b>SI6</b>	824	1	5	4.02	.758	-.706	.085
<b>SI7</b>	824	1	5	4.02	.759	-.547	.085
<b>SI8</b>	824	1	5	4.00	.754	-.665	.085
<b>CP1</b>	824	1	5	3.72	.808	-.548	.085
<b>CP2</b>	824	1	5	3.69	.837	-.549	.085
<b>CP3</b>	824	1	5	3.56	.856	-.356	.085
<b>CP4</b>	824	1	5	3.23	.981	-.181	.085
<b>CP5</b>	824	1	5	3.36	.929	-.382	.085
<b>PI1</b>	824	1	5	3.94	.788	-.849	.085
<b>PI2</b>	824	1	5	3.74	.835	-.382	.085
<b>PI3</b>	824	1	5	3.69	.821	-.419	.085
<b>TRS1</b>	824	1	5	3.62	.883	-.311	.085
<b>TRS2</b>	824	1	5	3.61	.831	-.427	.085
<b>TRS3</b>	824	1	5	3.75	.862	-.543	.085
<b>TRS4</b>	824	1	5	3.70	.821	-.429	.085
<b>TRS5</b>	824	1	5	3.79	.822	-.839	.085
<b>TRS6</b>	824	1	5	4.12	.722	-.986	.085
<b>TRSR1</b>	824	1	5	3.40	.949	-.241	.085
<b>TRSR2</b>	824	1	5	3.16	.978	.003	.085
<b>TRSR3</b>	824	1	5	2.88	1.125	.100	.085
<b>TRSR4</b>	824	1	5	3.03	1.087	-.021	.085
<b>Valid N (listwise)</b>	824						

*Source: Authors' own work*

Table 4.2 presents the descriptive statistics for all observed variables. Overall, the mean scores ranged from 2.88 to 4.16, indicating that respondents reported moderate to high levels of agreement across the measurement items. The highest mean was recorded for SI2 (M = 4.16, SD = 0.748), followed by TRS6 (M = 4.12, SD = 0.722) and EA4 (M =

4.03, SD = 0.865). These values suggest that respondents strongly agreed with several items related to social influence, trust, and environmental awareness.

The environmental awareness construct showed consistently high mean values, with all four items ranging from 3.92 to 4.03. In particular, EA1, EA2, and EA3 had the same mean score of 3.92, while EA4 had a mean score of 4.03. This pattern indicates that respondents generally expressed a relatively strong awareness of environmental issues. By contrast, the environmental concern items were lower and more dispersed. Their mean values ranged from 3.28 to 3.90, with EC1 (M = 3.90, SD = 0.733) showing the highest score in this construct, whereas EC4 (M = 3.28, SD = 0.975) and EC3 (M = 3.33, SD = 1.018) were notably lower. This difference may imply that although respondents were aware of environmental issues, their level of concern was not equally strong across all aspects.

The social influence construct reported relatively high evaluations, with item means ranging from 3.84 to 4.16. Besides SI2, several other items also exceeded the value of 4.00, including SI6 (M = 4.02, SD = 0.758), SI7 (M = 4.02, SD = 0.759), and SI8 (M = 4.00, SD = 0.754). These results indicate that social influence was strongly perceived by respondents. For consumption priority, the mean values ranged from 3.23 to 3.72. Among these items, CP1 (M = 3.72, SD = 0.808) and CP2 (M = 3.69, SD = 0.837) were higher than CP4 (M = 3.23, SD = 0.981) and CP5 (M = 3.36, SD = 0.929), suggesting a moderate rather than a strong level of preference.

A similar pattern appeared in the perceived importance and purchase intention-related items, where the mean values ranged from 3.69 to 3.94. Specifically, PI1 achieved the highest score in this group at 3.94 (SD = 0.788), while PI2 and PI3 were slightly lower at 3.74 and 3.69, respectively. Trust items also showed moderately positive evaluations, with means varying from 3.61 to 4.12. Notably, TRS6 stood out with the highest value in this construct, while the remaining items were clustered between 3.61 and 3.79.

In contrast, the trust risk-reduction items received the lowest ratings in the table. Their mean scores ranged from 2.88 to 3.40, with TRSR3 (M = 2.88, SD = 1.125) being the lowest among all observed variables, followed by TRSR4 (M = 3.03, SD = 1.087) and TRSR2 (M = 3.16, SD = 0.978). These lower values suggest that respondents were less convinced by the factors expected to reduce perceived risks in the context under study.

Regarding variability, the standard deviation values ranged from 0.715 to 1.125. The lowest dispersion was found for SI1 (SD = 0.715), indicating relatively consistent responses, whereas the highest was observed for TRSR3 (SD = 1.125), suggesting greater



disagreement among participants. In terms of distribution shape, skewness values were mostly negative, ranging from -1.264 to 0.100. The most negatively skewed item was EA1 (skewness = -1.264), showing that responses were concentrated toward the higher end of the scale. Only TRSR2 (skewness = 0.003) and TRSR3 (skewness = 0.100) exhibited values close to zero or slightly positive, indicating a more symmetrical distribution.

Taken together, these descriptive statistics suggest that respondents generally held favorable views toward environmental awareness, social influence, and trust related items, while showing weaker agreement on risk reduction indicators. The data also exhibit acceptable dispersion and no severe distributional problems, providing an appropriate basis for subsequent reliability and validity assessment.

#### **4.2. Data analysis and assessment of measurement validity**

Confirmatory Factor Analysis (CFA) was conducted to examine the adequacy of the measurement model and to assess the psychometric properties of the latent constructs. The findings indicate that the proposed measurement structure demonstrates an acceptable level of overall fit, as defined by widely accepted criteria in consumer behavior research. In particular, the chi-square statistic was 1084.687, with a chi-square-to-degrees-of-freedom ratio of 4.093 and a significance level of  $p = 0.000$ . Additional goodness-of-fit indicators further support the model's suitability, including a goodness-of-fit index of 0.891, a Tucker-Lewis index of 0.912, a Comparative Fit Index of 0.922, and a Root Mean Square Error of Approximation of 0.061. These values fall within ranges commonly regarded as acceptable according to the guidelines proposed by Hu and Bentler (1999), suggesting that the measurement model provides an appropriate basis for subsequent structural analyses.

As reported in Table 4.3, the measurement scales' internal consistency is satisfactory. Cronbach's Alpha coefficients varied from 0.807 for Purchase Intention to 0.884 for both Social Influence and Consumer Preference related to refurbished smartphones. Similarly, composite reliability estimates ranged between 0.808 and 0.889 across the constructs. These statistics exceed the recommended minimum thresholds, indicating that the observed indicators exhibit sufficient consistency in representing their respective underlying dimensions.

The examination of standardized factor loadings revealed that two items, EC1 and TRS6, had loadings below the commonly referenced cutoff of 0.50: 0.368 and 0.409, respectively (see Table 4.3). Although such results may typically prompt item removal, the decision was made to retain both indicators after careful consideration. From a conceptual standpoint, these items capture essential facets of environmental concern and trust in

refurbished smartphones. Excluding them could therefore limit the conceptual coverage of the constructs and weaken content validity, as emphasized by Hair *et al.* (2024) in their methodological discussions. In addition, the constructs to which these items belong continued to display strong reliability coefficients, indicating that their inclusion did not meaningfully compromise scale quality. Furthermore, the associated values of Average Variance Extracted and composite reliability remained above recommended levels, providing additional empirical justification for maintaining these items within the measurement framework.

Convergent and discriminant validity were further assessed using the Average Variance Extracted metric. All constructs achieved AVEs at or above the threshold of 0.50, indicating that the indicators accounted for a substantial proportion of the variance in their corresponding latent variables. Evidence of discriminant validity was also established, as the AVE for each construct exceeded the squared correlations observed between that construct and others in the model, as detailed in Table 4.4. This pattern confirms that the constructs are empirically distinguishable, thereby reducing concerns related to conceptual redundancy and strengthening confidence in the integrity of the measurement structure.

Taken together, the CFA results support the adequacy of the proposed measurement model for advancing to structural model estimation and hypothesis evaluation. The measurement instruments satisfy established requirements concerning reliability, convergent validity, and discriminant validity. These findings provide empirical support for using constructs such as environmental awareness, environmental concern, social influence, trust-related perceptions, and consumer preferences to explain purchase intention for refurbished smartphones in a circular economy context.

Nevertheless, certain fit statistics suggest opportunities for further refinement. For instance, the Goodness-of-Fit Index of 0.891 falls marginally below the conventional benchmark of 0.90. This outcome may indicate that additional improvements could be achieved by reconsidering specific measurement items or by modestly respecifying the measurement model. Future investigations may benefit from refining scale items to better capture contextual nuances in refurbished technology markets, particularly in emerging economies. Expanding the sample size or conducting multi-group validation across distinct consumer segments could also improve model performance. Overall, the CFA findings provide robust evidence of the measurement framework's validity while simultaneously highlighting avenues for continued methodological enhancement.

Table 4. 3: Summary of the measurement model and convergent validity

<b>Construct</b>	<b>Standardized factor loading</b>	<b>Cronbach Alpha</b>
<i>Environmental awareness (EA)</i>		.828
EA1: I consider the potential environmental impact of my actions when making my decisions.	.699	
EA2: I would like to describe myself as environmentally responsible.	.649	
EA3: I am worried about wasting and destroying the Earth's resources.	.626	
EA4: Even if I feel inconvenient, I would like to take more environmentally friendly actions.	.645	
<i>Environmental concern (EC)</i>		.810
EC1: I am very concerned about the environment.	.368	
EC2: I would be willing to reduce my consumption to help protect the environment.	.690	
EC3: Major political change is necessary to protect the natural environment.	.738	
EC4: Major social changes are necessary to protect the natural environment.	.695	
EC5: Anti-pollution laws should be enforced more strongly.	.500	
<i>Social influence (SI)</i>		.884
SI1: It is important what my friends or colleagues think about me purchasing a refurbished smartphone.	.630	
SI2: I often identify with people by choosing to purchase a refurbished smartphone.	.685	
SI3: I like to know that purchasing a refurbished smartphone makes a good impression on my friends or colleagues.	.646	

SI4: I purchase a refurbished smartphone based on the expectations of my friends and colleagues.	.633	
SI5: I feel a sense of belonging with my friends and colleagues by purchasing a refurbished smartphone.	.664	
SI6: When I purchase a refurbished smartphone, I often consult other people for useful information to help choose the alternative that best fits my needs.	.661	
SI7: When I purchase a refurbished smartphone, I often ask my friends for useful information to solve problems.	.659	
SI8: When I purchase a refurbished smartphone, I frequently gather information from friends or colleagues.	.633	
<i>Consumer preference (CP)</i>		.884
CP1: I like using refurbished smartphones.	.668	
CP2: I am favorable toward using refurbished smartphones.	.702	
CP3: It is beneficial to use refurbished smartphones.	.764	
CP4: It is wise to use refurbished smartphones.	.732	
CP5: Overall, my attitude toward using refurbished smartphones is positive.	.744	
<i>Purchase intention (PI)</i>		.807
PI1: I plan to purchase a refurbished smartphone in my next smartphone purchase.	.643	
PI2: I plan to recommend my peers to purchase refurbished smartphones in their next smartphone purchase.	.673	
PI3: I plan to ask for a refurbished smartphone in my next smartphone purchase.	.649	
<i>Trust in refurbished smartphones (TRS)</i>		.845

TRS1: I trust that refurbished smartphones are high-quality.	.538	
TRS2: Refurbished smartphones are reliable.	.731	
TRS3: I trust that refurbished smartphones are safe.	.659	
TRS4: I trust that refurbished smartphones are fully traceable back to their origin.	.713	
TRS5: I trust that refurbished smartphones are truthful.	.712	
TRS6: I trust that refurbished smartphones still retain the core quality and value of the original product.	.409	
<i>Trust in refurbished smartphones retailer (TRSR)</i>		.864
TRSR1: I trust in refurbished smartphone retailers.	.630	
TRSR2: I rely on refurbished smartphone retailers.	.763	
TRSR3: These are honest refurbished smartphone retailers.	.753	
TRSR4: The refurbished smartphone retailer is very concerned about my welfare.	.713	

*Source: Authors' own work*

Table 4. 4: Discriminant validity

	<b>CR</b>	<b>AVE</b>	<b>MSV</b>	<b>MaxR(H)</b>	<b>SI</b>	<b>CP</b>	<b>EC</b>	<b>EA</b>	<b>PI</b>
<b>SI</b>	0.889	0.501	0.439	0.890	<b>0.708</b>				
<b>CP</b>	0.885	0.607	0.408	0.888	0.488*	<b>0.779</b>			
<b>EC</b>	0.831	0.508	0.408	0.879	0.390*	0.639*	<b>0.713</b>		
<b>EA</b>	0.829	0.549	0.406	0.833	0.630*	0.396*	0.281*	<b>0.741</b>	
<b>PI</b>	0.808	0.584	0.439	0.809	0.663*	0.635*	0.455*	0.637*	<b>0.764</b>

*Note(s): EA: Environmental awareness; EC: Environmental concern; SI: Social influence; CP: Consumer preference; PI: Purchase intention.*

*CR = Composite Reliability; AVE = Average Variance Extracted; MSV: Maximum Shared Variance; \*  $p < 0.05$ ; \*\* $p < 0.01$*

*Source: Authors' own work*

### 4.3. Structural model and Hypothesis testing

The structural equation modeling (SEM) results indicate that the proposed model achieved an acceptable level of overall fit with the observed data. Specifically, the chi-square value was 905.062 with 203 degrees of freedom, yielding a chi-square-to-degrees-of-freedom ratio of 4.458, which falls within the commonly accepted threshold for model adequacy. Additional fit indices further support the model's suitability, including GFI = 0.895, TLI = 0.912, and CFI = 0.923, all of which meet recommended benchmark values. The RMSEA value of 0.065 also indicates a reasonable approximation error, suggesting that the structural model adequately represents the dataset's covariance structure.

It served to evaluate the structural relationships outlined in the research framework. The model fit indices indicate a reasonable level of alignment between the hypothesized model and the observed data:  $\chi^2(265) = 1084.687$ ,  $\chi^2/df = 4.093$ , GFI = 0.891, AGFI = 0.866, CFI = 0.922, TLI = 0.912, RMSEA = 0.061 with a 90% confidence interval between 0.058 and 0.065, and PCLOSE = 0.000. Although the chi-square value is significant ( $p < .001$ ), as expected in large-sample studies, the remaining fit statistics, such as CFI above 0.90 and RMSEA below 0.08, suggest that the model is sufficiently robust for hypothesis testing.

Table 4. 5: Hypothesis testing results (standardization)

Structural path	Estimate	S.E	C.R	<i>p</i> -value	Hypotheses
EA → CP	0.143	0.055	2.596	**	H1: Accepted
EC → CP	0.503	0.037	13.558	***	H2: Accepted
SI → CP	0.333	0.073	4.579	***	H3: Accepted
CP → PI	0.267	0.036	7.439	***	H4: Accepted

**Note(s):** EA: Environmental awareness; EC: Environmental concern; SI: Social influence; CP: Consumer preference; PI: Purchase intention; S.E: Standard Error; CR: Critical Ratios; C.R: Composite Reliability.

*n.s: Not Significant; \*\* $p < .01$ ; \*\*\* $p < .001$ .*

*Source: Authors' own work*

Table 4.5 displays the outcomes of hypothesis testing within the structural model, including the estimated coefficients (Estimate), standard errors (S.E.), critical ratios (C.R.),

and statistical significance levels (p-values). The results indicate that the majority of the proposed links are supported, except for the direct influence of environmental concern on purchase intention. This implies a well-organized model and indicates that the processes via which environmental influences affect purchase behavior may function along several pathways rather than a straightforward linear trajectory.

Initially, the mediating variable consumer preference (CP) is positively and statistically significantly influenced by all three input factors: environmental awareness (EA), environmental concern (EC), and social influence (SI). Environmental Awareness (EA) significantly influences consumer preference (CP) with a coefficient of 0.143 (C.R = 2.596;  $p < 0.01$ ), suggesting that increased consumer awareness of the environmental consequences of their consumption leads to more favorable attitudes and preferences for refurbished smartphones. Although this impact is modest, it is empirically relevant, as environmental awareness frequently underpins behavioral orientation; however, it does not invariably result in substantial shifts in preferences when consumers also weigh functional variables or perceived hazards.

Among the factors affecting CP, environmental concern (EC) has the greatest influence, with a coefficient of 0.503 (C.R = 13.558;  $p < 0.001$ ). This outcome indicates that emotional and normative “concern” substantially affects the desire for refurbished smartphones. When consumers regard environmental challenges as significant and requiring intervention, they are more inclined to translate that perspective into a preference for sustainable purchases. Additionally, social influence (SI) exerts a considerable effect on consumer perception (CP), as evidenced by a coefficient of 0.333 (C.R. = 4.579;  $p < 0.001$ ), underscoring the role of reference groups in perceptions of refurbished smartphones. In situations where products raise concerns about quality, warranty, support, or expectations, peer support can mitigate uncertainty, thereby increasing the likelihood that consumers develop favorable preferences.



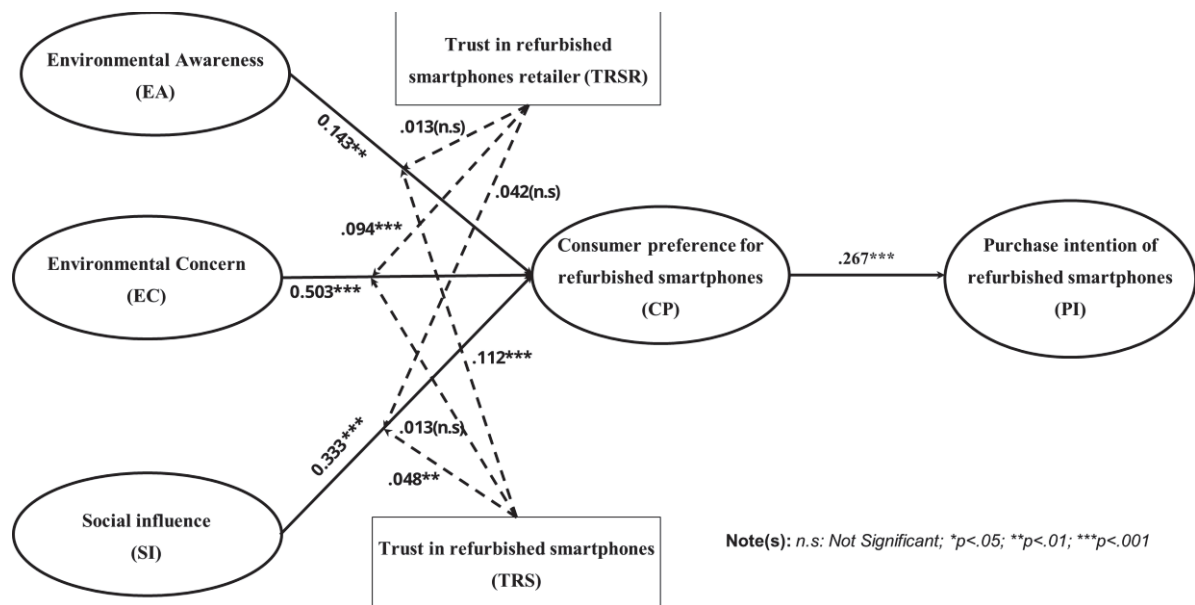


Figure 4. 1: Test results of the theoretical research model (standardization)

*Source: Authors' own work*

Figure 4.1 illustrates the standardized route coefficients of the structural model, indicating the magnitude and direction of influence among the study's concepts. The study evaluates the presented hypotheses using these coefficients and examines the mediating effect of consumer preference, with trust-related variables as moderators.

Initially, an analysis of the interplay among environmental factors, social influences, and consumer preference for refurbished smartphones reveals that environmental perception (EA) positively and significantly affects consumer preference (CP), with a standardized coefficient of  $\beta = 0.143$  ( $p < 0.01$ ). This result indicates that, while the effect is modest, consumers with greater knowledge of the environmental consequences of their consumption behaviors are more likely to develop more favorable views and preferences toward refurbished smartphones. Consequently, hypothesis H1 is affirmed.

Moreover, environmental concern (EC) exhibited the most significant influence on consumer choice (CP), with a  $\beta$  value of 0.503 ( $p < 0.001$ ). The association among the variables influencing CP is the most robust, indicating that perceptions of environmental urgency and the inclination to safeguard the environment are pivotal in determining the preference for refurbished smartphones. This outcome validates hypothesis H2 and underscores that the "concern" variable exerts a more significant impact than the "awareness" variable alone.

The analysis indicates that social influence (SI) has a positive and statistically significant effect on consumer choice (CP), with a  $\beta$  coefficient of 0.333 ( $p < 0.001$ ). This

indicates that the views, expectations, and actions of friends, colleagues, or reference groups significantly influence customers' attitudes and choices regarding refurbished smartphones. Consequently, hypothesis H3 is affirmed, substantiating the assertion that social influence serves as a substantial determinant in the realm of perceived product risk.

The analysis of the correlation between consumer preference (CP) and purchase intention (PI) reveals a standardized path coefficient of  $\beta = 0.267$  ( $p < 0.001$ ). This suggests that when consumers develop a favorable inclination towards refurbished smartphones, their propensity to convert that attitude into a purchase intention increases markedly. Consequently, hypothesis H6 is validated, affirming the significant mediating function of CP within the model.

In addition to the indirect channel via CP, environmental awareness (EA) directly influences purchase intention (PI), as evidenced by a  $\beta$  value of 0.290 ( $p < 0.001$ ). This suggests that consumers aware of the environmental consequences of their purchasing habits value eco-friendly products and are inclined to seek refurbished smartphones. Consequently, hypothesis H4 is affirmed, indicating that EA exerts both direct and indirect influence on buying behavior.

Figure 4.1 also illustrates effect curves for trust in refurbished smartphones (TRS) and trust in retailers (TRSR). The curve coefficients from EA, EC, and SI to TRS are statistically significant; however, the impact curves from TRS and TRSR to CP in the model are not. The results suggest that although environmental and social factors may influence trust formation, trust in the product or retailer does not distinctly moderate the link between these factors and consumer preference within the study context. This indicates that trust, although cognitively significant, may lack the strength to alter the primary effect structure once consumers have formed attitudes and preferences shaped by environmental and social factors.

The hypothesis-testing outcomes from the structural model indicate that most hypotheses are supported, except for the direct correlation between environmental concern and purchase intention. These findings validate the pivotal role of consumer preferences in translating environmental and social factors into purchase intention, while underscoring the importance of social influence and environmental perceptions in driving the purchase of refurbished smartphones.

#### **4.4. Moderation test**

Table 4.6 delineates the findings regarding the moderating influence of two types of trust: Trust in refurbished smartphones (TRS) and trust in refurbished smartphone retailers

(TRSR), in conjunction with input variables (environmental awareness – EA, environmental concern – EC, social influence – SI) and the proximal outcome variable (consumer preference for refurbished phones – CP). The EA×TRS/TRSR, EC×TRS/TRSR, and SI×TRS/TRSR interaction tests are designed to determine whether trust enhances or diminishes the influence of underlying factors on preference. Results are shown as standardized path coefficients  $\beta$ ,  $t$ -values,  $p$ -values, and 95% confidence intervals (C.I.). In moderation testing, a crucial aspect is that confidence intervals that exclude zero typically indicate strong interaction effects; conversely, if the confidence interval includes zero, judgments about the interaction's statistical significance are not substantiated.

Table 4. 6: Moderating Effects of Trust in Refurbished Smartphones and Retailers

Structural path	$\beta$	$t$ -value	$p$ -values	95% C.I.	Conclusion
EA x TRSR $\rightarrow$ CP	0.013	0.472	n.s	(-0.042, 0.069)	H5a: Not supported
EA x TRS $\rightarrow$ CP	0.112	6.739	***	(0.079, 0.144)	H6a: Accepted
EC x TRSR $\rightarrow$ CP	0.094	3.791	***	(0.045, 0.142)	H5b: Accepted
EC x TRS $\rightarrow$ CP	0.013	0.732	n.s	(-0.022, 0.048)	H6b: Not supported
SI x TRSR $\rightarrow$ CP	0.042	1.734	n.s	(-0.006, 0.090)	H5c: Not supported
SI x TRS $\rightarrow$ CP	0.048	2.928	**	(0.016, 0.080)	H6c: Accepted

**Note(s):** EA: Environmental awareness; EC: Environmental concern; SI: Social influence; CP: Consumer preference; TRSR: Trust in refurbished smartphones retailer; TRS: Trust in refurbished smartphones.

$\beta$ : standardized path coefficient; C.I.: Confidence Interval; n.s: Not Significant; \*\* $p < .01$ ; \*\*\* $p < .001$ .

**Source:** Authors' own work

Table 4.6 indicates that moderating effects manifest asymmetrically between TRS and TRSR. TRS considerably moderates two interactions (EA $\rightarrow$ CP and SI $\rightarrow$ CP), whereas TRSR significantly moderates just the EC $\rightarrow$ CP link. The three non-significant interactions (EA×TRSR, EC×TRS, SI×TRSR) indicate that not all types of trust function as “amplifiers” of the model's effect. This distinction has significant empirical ramifications: customer confidence in the refurbished phone market may vary based on whether consumers trust the product or the retailer.

The analysis of the relationship between environmental perception and retailer confidence indicates that the interaction term EA  $\times$  TRSR  $\rightarrow$  retailer is not statistically significant ( $\beta = 0.013$ ;  $t = 0.472$ ; n.s.), with a 95% confidence interval of (-0.042; 0.069) that includes zero. This suggests that trust in the merchant does not substantially influence

the correlation between environmental perception and the demand for refurbished smartphones. An appropriate explanation is that environmental awareness (EA) signifies a personal value orientation; when consumers are cognizant of the environmental consequences of their purchasing habits, they are inclined to develop eco-friendly preferences largely independent of the retailer's influence. In the EA→CP relationship, the “anchor” is rooted in individual perception and standards rather than the seller's reputation. Consequently, hypothesis H5a lacks support.

In contrast,  $EA \times TRS \rightarrow CP$  has a robust and statistically significant moderating effect ( $\beta = 0.112$ ;  $t = 6.739$ ;  $p < 0.001$ ), accompanied by a wholly positive confidence interval (0.079; 0.144). This outcome substantiates hypothesis H6a and suggests that confidence in the quality, reliability, or fundamental value of refurbished phones is essential for environmental awareness to more effectively influence preference. Consumers with heightened environmental consciousness may be reluctant to develop favorable preferences if they harbor skepticism about the trustworthiness of remanufactured products. Conversely, if TRS is elevated, environmental consciousness transcends mere abstraction and influences tangible consumer decisions, therefore enhancing CP. This behavior illustrates a pragmatic mechanism: while environmental motivation may be present, consumers must be assured that prioritizing it does not significantly compromise quality.

Subsequently, regarding the relationship with environmental concern (EC), the findings reveal a distinct pattern. The interaction of EC and TRSR significantly influences CP ( $\beta = 0.094$ ;  $t = 3.791$ ;  $p < 0.001$ ), with a wholly positive confidence interval (0.045; 0.142), so H5b is affirmed. This indicates that as consumers become more environmentally aware, their inclination towards refurbished smartphones rises markedly, contingent on their trust in the store. A useful perspective is that EC is often associated with a sense of duty and normative expectations, making it responsive to indicators of transparency and ethical business conduct. When a shop is perceived as trustworthy, buyers may view refurbished products as genuinely embodying sustainability (e.g., quality assurance, transparent refurbishment methods, explicit standards), thereby turning environmental concerns into distinct preferences. The favorable moderating effect indicates that TRSR functions as a “trust bridge,” alleviating skepticism about the veracity of “sustainability” assertions in the refurbished market.

In contrast,  $EC \times TRS \rightarrow CP$  is not statistically significant ( $\beta = 0.013$ ;  $t = 0.732$ ; n.s), with confidence intervals (−0.022; 0.048) encompassing zero; thus, H6b is unsupported.

This outcome is significant as TRS is substantially moderating for EA. The distinction between EA and EC can be elucidated by their inherent attributes. Environmental awareness typically reflects the degree of understanding of the environment.

Ultimately, the analysis of the interaction group involving social influence (SI) reveals that  $SI \times TRSR \rightarrow CP$  is not statistically significant ( $\beta = 0.042$ ;  $t = 1.734$ ; n.s.), with confidence intervals  $(-0.006; 0.090)$  around zero that still encompass zero. This indicates that confidence in the retailer does not substantially modify the effect of social influence on preference. An appropriate view is that social influence (SI) predominantly operates through group norms and information disseminated through social networks; the effect of SI may be substantial even if consumers do not regard the retailer highly. Consumers may depend on counsel, anecdotal experiences, or endorsements from acquaintances to establish preferences, rather than on the retailer's established reputation. Consequently, the H5c theory lacks support.

In contrast,  $SI \times TRS \rightarrow CP$  is statistically significant ( $\beta = 0.048$ ;  $t = 2.928$ ;  $p < 0.01$ ), and the confidence interval  $(0.016; 0.080)$  is entirely positive, signifying the acceptance of H6c. Despite the moderating coefficient being less than  $EA \times TRS$ , the findings indicate that product conviction enhances the efficacy of social influence on preference. When customers perceive refurbished smartphones as reliable, they are more likely to be influenced by their reference group, as the psychological barrier of risk has diminished. In a low TRS scenario, counsel from acquaintances may be insufficient to establish a durable preference, as customers continue to harbor concerns about quality. When TRS is elevated, information and social norms are more readily converted into favorable preferences.

Two overarching implications can be inferred from the aforementioned results regarding the moderating test. Initially, trust is not a “universal” moderating variable that concurrently influences all interactions. TRS and TRSR serve as moderators through distinct mechanisms: TRS is more effective in enhancing the impact of perceptions and social influence on preferences, whereas TRSR is most prominent when environmental issues necessitate a “guarantee” of transparency and credibility in the sales channel. Secondly, statistically significant results feature positive confidence intervals that exclude zeros, supporting the validity of the conclusion. Conversely, trivial interactions had confidence intervals that intersected zero, indicating that the data lacked adequate evidence to substantiate the moderating effect in these instances.

In summary, Table 4.6 indicates that the moderating model provides a more nuanced understanding of customer behavior toward refurbished smartphones. Environmental and

social factors directly affect preferences and are also shaped by “trust conditions” unique to each type of trust. From a managerial standpoint, the findings suggest that enterprises must enhance trust in product quality (TRS) through refurbishment standards, warranties, certifications, and transparent information to convert environmental motivation into consumer preferences. Concurrently, engaging environmentally conscious consumer segments by enhancing retailer reputation (TRSR) through after-sales service, ethical pledges, and transparent verification methods can significantly augment EC’s influence on CP.

#### **4.5. Demographic differences in purchase intention**

One-way ANOVA was used to examine whether purchase intention toward refurbished smartphones differed across demographic groups. This method is appropriate when comparing the mean score of a continuous dependent variable across two or more independent groups. In this study, purchase intention was the dependent variable, while gender, location, and level of education completed were treated as grouping variables. This approach is consistent with prior consumer behavior studies that used ANOVA to compare group differences in perceptions, evaluations, or intentions. For example, Wang and Li (2024) used one-way ANOVA to compare online and offline consumer groups, while Zhu, Duan and Sarkis (2024) and Miao, Magnier and Mugge (2025) applied ANOVA to examine differences across experimental conditions.

Accordingly, one-way ANOVA was conducted to test H7, H8, and H9. The mean, standard deviation, F statistic, and p-value were reported for each demographic variable. A hypothesis was supported when the p-value was below 0.05 (Association, 2024; Field, 2024). One-way ANOVA was conducted to examine whether consumers’ purchase intention toward refurbished smartphones differed across three demographic control variables: gender, location, and level of education. Purchase intention was represented by the standardized regression factor score of PI. The PI variable was extracted as a standardized factor score, so its values are interpreted relative to the sample mean rather than as original-scale scores. Values above zero suggest stronger purchase intention, and values below zero suggest weaker purchase intention. All demographic comparisons were based on the same 824 valid responses. The reporting follows the common structure used in ANOVA-based consumer research, in which descriptive statistics are first presented, followed by the F statistic, p-value, robust test result, and an interpretation of the hypothesis test.



Table 4. 7: Descriptive statistics of purchase intention by demographic groups

Demographic variable	Group	N	Mean	SD	SE
Gender	Male	503	0.070	0.931	0.042
	Female	321	-0.110	1.091	0.061
Location	Hanoi	344	-0.078	1.098	0.059
	Da Nang	215	0.046	0.921	0.063
	Ho Chi Minh City	265	0.063	0.921	0.057
Completed education level	High school	151	0.065	0.892	0.073
	Associate degree	52	-0.039	0.860	0.119
	Bachelor's degree	359	0.011	0.986	0.052
	Master's or Doctoral degree	135	-0.105	1.161	0.100
	Other	127	0.020	1.035	0.092

Note: PI was measured using the standardized regression factor score.

**Source:** Authors' own work.

Table 4.7 shows that the clearest descriptive difference appeared in the gender comparison. Male respondents reported a positive mean score for purchase intention ( $M = 0.070$ ,  $SD = 0.931$ ), whereas female respondents reported a negative mean score ( $M = -0.110$ ,  $SD = 1.091$ ). This indicates that male respondents, on average, expressed a slightly stronger intention to purchase refurbished smartphones than female respondents. However, both means remained close to the standardized sample mean of zero, suggesting that the descriptive gap should be interpreted as modest rather than large.

For location, the mean scores showed a gradual increase from Hanoi to Da Nang and Ho Chi Minh City. Respondents from Hanoi had a below-average purchase intention score ( $M = -0.078$ ,  $SD = 1.098$ ), while respondents from Da Nang ( $M = 0.046$ ,  $SD = 0.921$ ) and Ho Chi Minh City ( $M = 0.063$ ,  $SD = 0.921$ ) had above-average scores. This descriptive pattern suggests that respondents in Da Nang and Ho Chi Minh City slightly more open to purchasing refurbished smartphones than respondents in Hanoi. Nevertheless, the mean differences were small, and statistical testing was required to determine whether these differences were meaningful.

For completed education level, the pattern was less consistent. The highest mean purchase intention score was found among respondents with a high school education ( $M = 0.065$ ,  $SD = 0.892$ ), followed by the Other group ( $M = 0.020$ ,  $SD = 1.035$ ) and those with



a bachelor's degree ( $M = 0.011$ ,  $SD = 0.986$ ). Respondents with an associate degree ( $M = -0.039$ ,  $SD = 0.860$ ) and those with a master's or doctoral degree ( $M = -0.105$ ,  $SD = 1.161$ ) reported below-average scores. However, the differences across education groups were small and did not suggest a clear linear pattern.

Table 4. 8: One-way ANOVA results for demographic differences in purchase intention

Hypothesis	Grouping variable	Between-group SS	Within-group SS	df	F	p-value	Welch statistic	Welch p-value	$\eta^2$	Result
H7	Gender	6.373	816.627	1, 822	6.415	0.011	5.984	0.015	0.008	Supported
H8	Location	3.580	819.420	2, 821	1.794	0.167	1.695	0.185	0.004	Not supported
H9	Completed education level	2.312	820.688	4, 819	0.577	0.680	0.516	0.724	0.003	Not supported

Note:  $\eta^2$  was calculated as between-group sum of squares divided by total sum of squares.

**Source:** Authors' own work.

As shown in Table 4.8, the ANOVA result for gender was statistically significant,  $F(1, 822) = 6.415$ ,  $p = 0.011$ . The Welch robust test also confirmed this result, Welch = 5.984,  $p = 0.015$ . Since the p-value was below 0.05, H7 is supported. This means that male and female respondents differed significantly in their purchase intention toward refurbished smartphones. The direction of the difference shows that male respondents had a higher mean purchase intention score than female respondents. However, the effect size was small ( $\eta^2 = 0.008$ ), indicating that gender explained less than 1% of the variance in purchase intention. Therefore, gender can be interpreted as a statistically significant but weak demographic differentiator.

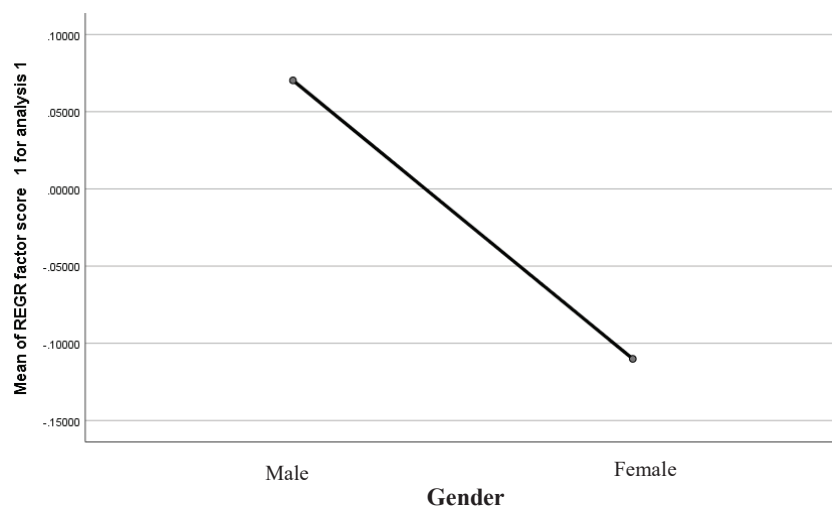


Figure 4. 2: Mean plot of purchase intention by gender

*Source: Authors' own work.*

Figure 4.2 visually supports the ANOVA result for gender. The mean plot shows a downward movement from Male to Female, indicating that male respondents had a higher mean purchase intention score than female respondents. This graphical pattern is consistent with the significant ANOVA and Welch results. However, the relatively short distance between the two points reinforces the interpretation that the gender difference is statistically significant but of modest practical magnitude.

For location, the ANOVA result was not statistically significant,  $F(2, 821) = 1.794$ ,  $p = 0.167$ . The Welch robust test produced the same conclusion, Welch = 1.695,  $p = 0.185$ . Therefore, H8 is not supported. Although respondents from Ho Chi Minh City and Da Nang showed slightly higher mean purchase intention scores than respondents from Hanoi, these differences were not statistically significant. This suggests that the observed variation across locations may reflect sampling fluctuations rather than a reliable difference in consumers' purchase intentions.

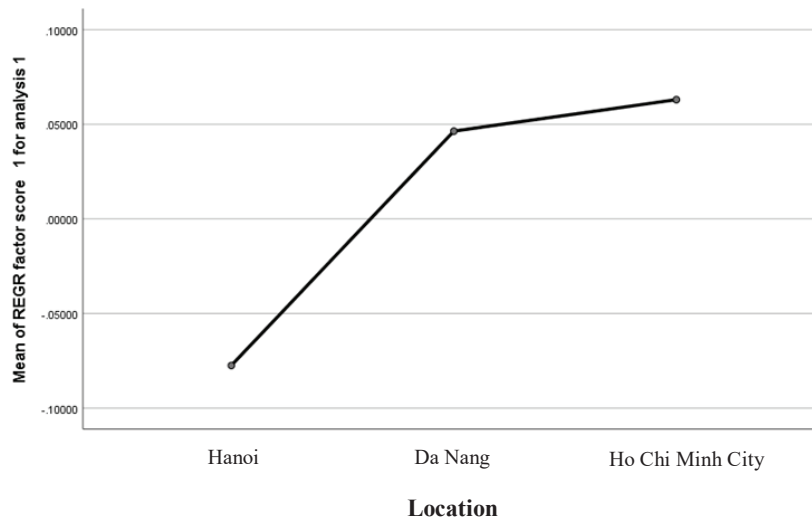


Figure 4. 3: Mean plot of purchase intention by location

*Source: Authors' own work.*

Figure 4.3 shows that purchase intention increased from Hanoi to Da Nang and Ho Chi Minh City. Respondents from Hanoi had a negative mean score, while respondents from Da Nang and Ho Chi Minh City had positive mean scores. Nevertheless, this visual tendency should be interpreted with caution, as the ANOVA result was not significant. Thus, the figure suggests a descriptive pattern, but it does not provide sufficient statistical evidence to conclude that location differentiates purchase intention toward refurbished smartphones. For completed education level, the ANOVA result was also not statistically significant,  $F(4, 819) = 0.577$ ,  $p = 0.680$ . The Welch robust test confirmed the same conclusion,  $Welch = 0.516$ ,  $p = 0.724$ . Therefore, H9 is not supported. The result indicates that consumers with different levels of completed education did not differ statistically in purchase intention toward refurbished smartphones.

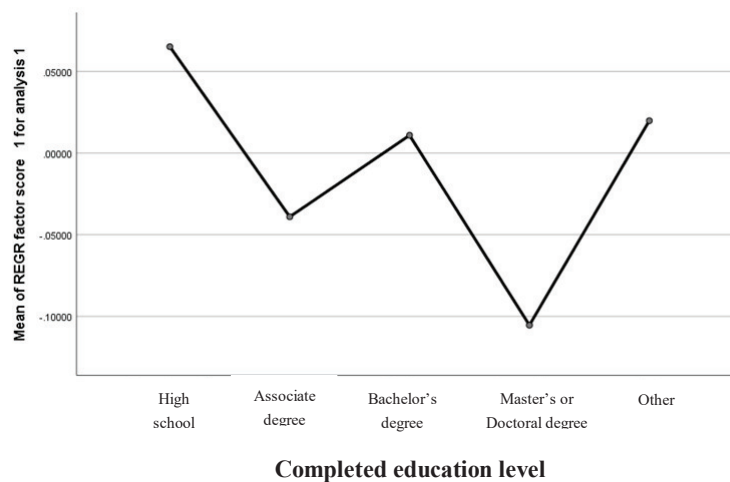


Figure 4. 4: Mean plot of purchase intention by completed education level

*Source: Authors' own work.*

Figure 4.4 illustrates the unstable pattern of purchase intention across education groups. The mean score was highest among respondents with a high school education and lowest among respondents with a master's or doctoral degree. However, the line fluctuates across categories rather than showing a consistent upward or downward trend. This supports the statistical conclusion that completed education level does not meaningfully distinguish consumers' purchase intention in this sample.

Overall, the ANOVA findings indicate that demographic differences in purchase intention were only partially observed. Among the three demographic control variables, only gender produced a statistically significant difference. Location and completed education level did not significantly differentiate purchase intention. Therefore, H7 is supported, whereas H8 and H9 are not. These results suggest that gender may be relevant to interpreting consumers' purchase intentions for refurbished smartphones, although the effect is small. In contrast, location and education-based segmentation appear to have limited explanatory value in this study.

#### **4.6. Gender-based multi-group structural analysis**

Because gender was the only demographic variable showing a statistically significant difference in purchase intention, although with a small effect size, a gender-based multi-group structural analysis was further conducted to examine whether gender differences were limited to mean-level variation or also reflected differences in the structural relationships among environmental awareness, environmental concern, social influence, consumer preference, and purchase intention. Thus, to further investigate whether the structural relationships proposed in the research model operate differently across demographic segments, a gender-based multigroup analysis was conducted. Figure 4.5 presents the integrated structural framework estimated simultaneously for male and female respondents, while Table 4.9 summarizes the overall goodness-of-fit statistics for the multi-group model. As shown in Table 3, the default model provides an acceptable fit to the observed data. The chi-square value was 1552.427 on 530 degrees of freedom, yielding a chi-square-to-degrees-of-freedom ratio of 2.929. This value falls below the commonly accepted upper threshold of three, suggesting that the discrepancy between the empirical covariance matrix and the model-implied covariance matrix remains within a reasonable range.

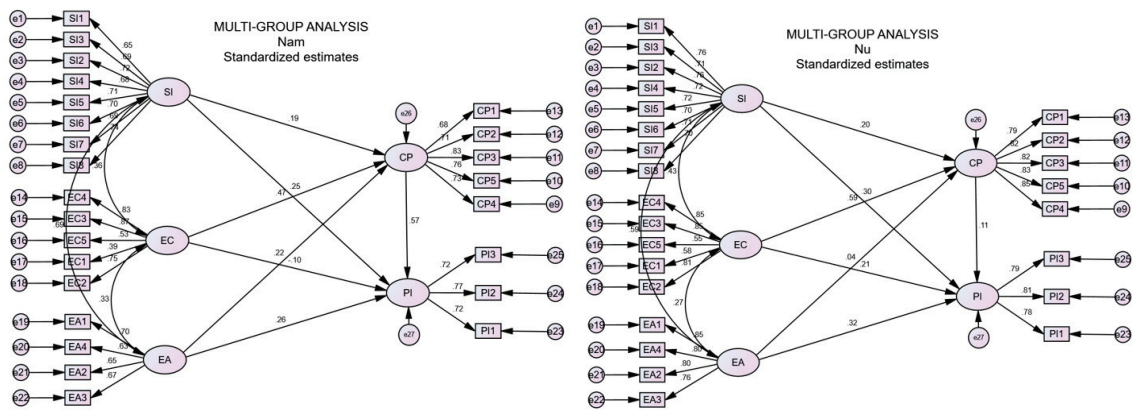


Figure 4. 5: Multi-group analysis by gender of the proposed model (Male and Female)

*Source: Authors' own work*

Additional fit indices further support the adequacy of the proposed model for cross-group comparison. The goodness of fit index reached 0.855, while the Tucker-Lewis index and comparative fit index were estimated at 0.892 and 0.904, respectively. Although some of these values are slightly below the ideal benchmark of 0.90, they remain acceptable in complex behavioral models. More importantly, the root-mean-square error of approximation was estimated at 0.048, indicating a close fit between the hypothesized model and the observed data. The superiority of the default model becomes particularly evident when contrasted with the independence model shown in Table 4.9, which produced substantially poorer fit statistics. This comparison confirms that the theoretical structure illustrated in Figure 4.5 captures meaningful associations among environmental perceptions, social influence, consumer preference, and purchase intention.

Table 4. 9: Goodness-of-fit indices of the multi-group structural model by gender

Model	Chi-square	Df	P	GFI	TLI	CFI	RMSEA
Default model	1552.427	530	0.000	0.855	0.892	0.904	0.048
Saturated model	0.000	0	—	1.000	1.000	1.000	0.000
Independence model	11286.894	600	0.000	0.239	0.000	0.000	0.147

*Source: Authors' own work*

Following confirmation of the model's overall adequacy, the analysis examined whether individual structural paths differed between male and female respondents. The detailed results of hypothesis testing are presented in Table 4.10. Regarding the relationship between environmental awareness and consumer preference, the findings indicate a statistically significant effect among male consumers but not among female consumers. As shown in Table 4.10, the estimated coefficient for the pathway from

environmental awareness to consumer preference was 0.319 in the male group, with a t-statistic of 3.144 and a p-value below conventional significance levels. This pattern suggests that male consumers are more likely to translate cognitive understanding of environmental issues into favorable evaluations of refurbished smartphones. In contrast, the corresponding effect in the female group was negligible and statistically insignificant, implying that awareness alone may not be sufficient to shape preference unless supported by additional motivational drivers.

Environmental concern, on the other hand, emerged as the most influential determinant of consumer preference in both gender groups. As illustrated in Table 4.10, the estimated coefficient reached 0.388 for male respondents and increased substantially to 0.649 for female respondents. Both relationships were statistically significant, indicating that concern for environmental sustainability plays a central role in shaping favorable perceptions of products. The stronger magnitude observed among women suggests that value-based considerations related to ecological responsibility may carry greater psychological weight for female consumers. In the context of refurbished smartphones, perceptions of reducing electronic waste and prolonging product lifecycles appear to elicit more pronounced evaluative responses among women.

Social influence was also found to exert a positive and statistically significant effect on consumer preference across both gender segments. The estimated coefficients of 0.280 for males and 0.318 for females indicate that normative pressures and interpersonal recommendations contribute meaningfully to the formation of product evaluations. However, the relatively small difference in magnitude between the two groups implies that social influence operates as a broadly shared mechanism in shaping sustainable consumption preferences. This finding is consistent with the structural pattern depicted in Figure 4.5, where social influence maintains direct connections with consumer preferences in both gender-specific models.

A more substantial divergence becomes evident in the relationship between consumer preference and purchase intention. According to the results summarized in Table 4.10, this pathway was strong and statistically significant for male respondents, with an estimated coefficient of 0.463. This indicates that once favorable evaluations of refurbished smartphones are established, male consumers tend to convert these evaluations into concrete purchase intentions in a relatively direct manner. In contrast, the corresponding effect in the female group was weak and not statistically significant. This suggests that female consumers may rely on a broader decision framework in which preference alone does not necessarily lead to intention. Instead, additional considerations, such as social



expectations or alignment with environmental values, may arise later in the decision-making process.

Overall, the gender-based multi-group analysis provides partial support for H10. The results indicate that the proposed structural relationships do not operate uniformly across male and female consumers. Specifically, environmental awareness significantly influenced consumer preference only among male respondents, whereas the relationship between consumer preference and purchase intention was significant only among males. By contrast, environmental concern and social influence significantly affected consumer preferences in both gender groups, although the magnitudes of the effects differed. Therefore, H10 is partially supported.

Taken together, the gender-based multigroup analysis reveals that the behavioral mechanisms underlying the adoption of refurbished smartphones are not entirely uniform across male and female consumers. While men appear to follow a more linear evaluative route from environmental cognition to preference and, subsequently, to intention, women exhibit a more complex pattern in which value-oriented motivations and social contextual factors play a more prominent role in preference formation. These findings reinforce the importance of incorporating gender as a meaningful segmentation variable in research on sustainable consumption. From a practical standpoint, the structural differences highlighted in Figure 4.5 and Table 4.10 suggest that marketing strategies promoting refurbished products should be tailored accordingly. Communication targeting male consumers may benefit from emphasizing product performance and evaluative clarity, whereas campaigns directed at female consumers may be more effective when they highlight environmental responsibility and socially resonant narratives associated with circular economy practices. Moreover, these findings suggest that gender moderates some, but not all, structural relationships in the proposed model. Therefore, H10 is partially supported.

Table 4. 10: Results of structural relationship testing by gender (Male vs Female)

Relationship	Estimate (Male)	Estimate (Female)	S.E. (Male)	S.E. (Female)	C.R. (Male)	C.R. (Female)	P (Male)	P (Female)	Hypothesis
EA → CP	0.319	0.041	0.102	0.071	3.144	0.586	0.002	0.558	H1: Supported (Male only)
EC → CP	0.388	0.649	0.042	0.067	9.288	9.736	***	***	H2: Supported
SI → CP	0.280	0.318	0.101	0.108	2.756	2.934	0.006	0.003	H3: Supported
CP → PI	0.463	0.081	0.054	0.053	8.542	1.529	***	0.126	H4: Supported (Male only)

*Source: Authors' own work*

## SUMMARY OF CHAPTER 4

Chapter 4 presents the quantitative analysis findings of the study, including a sample description, descriptive statistics, evaluation of scale reliability and validity, examination of methodological bias, hypothesis testing within the structural model, analysis of the moderating influence of trust, and cross-group comparisons by gender. These findings offer a significant empirical foundation for the subsequent discussion and managerial implications in the following chapter.

The sample comprised 824 participants representing a variety of genders, ages, occupations, and geographical areas. The sample was predominantly located in metropolitan regions and had high educational attainment, indicating a consumer demographic with substantial access to knowledge and technology; however, this also limits the generalizability to other population segments. Descriptive statistics indicate that environmental awareness and concern have relatively high average scores, whereas variables associated with trust, particularly trust in retailers of refurbished products, have lower average scores and greater variability, highlighting consumers' prudence in assessing product quality and distribution channels.

The results of the scale validation indicate that the observed variables demonstrate satisfactory reliability and validity. The structural model analysis validates the majority of the research hypotheses, indicating that environmental concern is the predominant factor driving consumer demand for refurbished phones. Consumer choice significantly mediates the conversion of environmental incentive into purchase intention. Moderating analysis indicates that trust in the products and trust in the merchant exert distinct influences, affecting each unique link within the model differently.

The analysis of demographic differences indicates that gender is the only demographic factor associated with a statistically significant difference in purchase intention toward refurbished smartphones, although its effect is small. Location and completed education level do not meaningfully distinguish consumers' purchase intentions. The gender-based multi-group analysis further suggests that the proposed model operates somewhat differently across male and female respondents: environmental awareness and consumer preference play a stronger role among male consumers, whereas environmental concern and social influence are relevant for both groups. Overall, the control variables have limited explanatory power for purchase intention: only gender shows a statistically significant but weak effect, whereas location and education do not significantly affect consumers' purchase intention toward refurbished smartphones.

## CHAPTER 5: DISCUSSION AND IMPLICATIONS

### 5.1. Discussion of the results

The empirical results indicate that consumer intention to purchase refurbished smartphones does not stem from a single dominant factor but is shaped by a sequence of interrelated evaluations. Environmental awareness, environmental concern, and social influence all contribute to shaping consumer preferences, which subsequently drive purchase intention. This structure suggests that consumers do not move directly from general trust or external influences to intention. Instead, they first form an overall judgment about the product, and this evaluation becomes the basis for their behavioral readiness (Chang, Lin and Bin, 2024; Shirmohammadi and Askari, 2025). The model, therefore, reflects a process in which motivation must be translated into perception before it becomes actionable.

Among the antecedent factors, environmental concern exerts the strongest influence on consumer preference. This result underscores the importance of emotional engagement with environmental issues over mere awareness. Individuals who perceive environmental degradation as urgent and personally relevant are more inclined to view refurbished smartphones positively. This pattern suggests that concern carries a normative dimension that encourages consumers to align their choices with their values (Alam *et al.*, 2025b; Keshavarz, Alvarez and Garcia, 2025). In contrast, environmental awareness alone represents a cognitive understanding that may not necessarily lead to behavioral commitment. The strength of environmental concern in this study indicates that consumers are not only informed about sustainability but also willing to reflect it in their product evaluations. This finding is consistent with prior research suggesting that affective and value-based motivations often play a more decisive role in sustainable consumption than general knowledge.

Environmental awareness remains statistically significant, yet its effect is noticeably weaker. This difference highlights the gap between knowing and acting. Consumers may recognize that refurbished smartphones help reduce electronic waste, but this recognition does not automatically translate into a favorable evaluation. The relatively modest coefficient suggests that awareness functions as a background condition rather than a driving force (Kautish, Thaichon and Soni, 2024; Sukiennik and Dziadkiewicz, 2024). One plausible explanation lies in the nature of the product itself. Unlike low-risk green products, refurbished smartphones involve concerns about performance, durability, and reliability (Bigliardi, Filippelli and Quinto, 2022). As a result, awareness alone may not be sufficient to overcome hesitation. Consumers appear to require additional reassurance before

translating environmental knowledge into preferences, which helps explain why the effect of awareness remains limited compared to that of concern.

Social influence also plays a significant role in shaping consumer preference. This finding reflects the social nature of smartphone consumption, in which products are used not only for functional purposes but also for symbolic meaning. The opinions and behaviors of peers can influence how refurbished smartphones are perceived, especially when such products may still be associated with uncertainty or lower status (Mohammadrezaei, Meredith and McNamara, 2023). When individuals observe acceptance within their social environment, the perceived risk of choosing refurbished devices is reduced. Social influence, therefore, operates as a mechanism that legitimizes the product category and makes it more acceptable. The strength of this effect suggests that consumer evaluations are not formed in isolation but are embedded in broader social interactions.

Consumer preference emerges as a central mechanism in the model, linking upstream influences to purchase intention. The positive relationship between preference and intention indicates that favorable evaluations are a necessary condition for behavioral commitment. Preference is therefore not merely an intermediate variable but a decisive stage in the decision-making process.

The descriptive statistics provide additional context for interpreting these relationships. Respondents report relatively high levels of environmental awareness and social influence, suggesting that the general mindset toward sustainability and peer interaction is well established (Henningsen *et al.*, 2003). However, trust in retailers is lower and more dispersed, indicating that confidence in the distribution channel remains uneven. This contrast implies that while consumers may be receptive to the idea of refurbished smartphones, they are less certain about the actors delivering these products. Such hesitation may limit the extent to which favorable attitudes are converted into actual purchase intention. The issue, therefore, is not only whether consumers accept the concept, but whether they trust the process through which the product reaches them.

The moderation analysis reveals that trust operates in a selective rather than uniform manner. Trust in refurbished smartphones strengthens the relationship between environmental awareness and consumer preference, as well as the relationship between social influence and preference. This suggests that confidence in product quality allows consumers to act on both cognitive understanding and social cues (Morgan and Hunt, 1994; Tsai, Chin and Chen, 2010). Without such confidence, awareness and peer influence may

remain insufficient to generate a favorable evaluation. In this sense, trust in the product reduces perceived risk and enables other factors to become effective.

A different pattern is observed in the case of environmental concern, where trust in retailers plays a significant moderating role. This indicates that when consumers are motivated by environmental values, they become more attentive to the credibility of the purchasing channel. Concern introduces an ethical dimension, prompting individuals to question whether their choices genuinely contribute to sustainability (Faver and Muñoz, 2013; Zhang and Luo, 2021). Trust in the retailer, therefore, becomes important because it signals transparency and authenticity. If the retailer is perceived as reliable, environmental concern is more likely to translate into a positive evaluation of refurbished smartphones.

The non-significant moderating effects further clarify the role of trust. Trust in retailers does not strengthen the impact of environmental awareness or social influence, while trust in the product does not enhance the effect of environmental concern. These findings suggest that different types of trust correspond to different types of motivation. When this alignment is absent, the moderating effect becomes negligible. Trust is, therefore, not a universal factor that amplifies all relationships. Its influence depends on how consumers interpret both the product and the context in which it is offered (Srivastava, Dash and Mookerjee, 2016; Yılmaz and Balcıoğlu, 2026).

The measurement results also provide insight into how respondents evaluate the constructs. Certain items, particularly those expressing general environmental concern or strong claims about product equivalence, show lower factor loadings. This may indicate that respondents are willing to agree with broad environmental statements but become more cautious when assessing specific product attributes. The difference reflects a common pattern in sustainable consumption, where general attitudes do not always align with detailed product evaluations. In the case of refurbished smartphones, this gap is likely linked to concerns about functionality and reliability.

The gender-based analysis suggests that the decision-making process may differ across demographic groups, although the findings should be interpreted with caution. The results indicate that environmental awareness and the relationship between preference and intention are more pronounced among male respondents, while environmental concern appears stronger among female respondents. This pattern implies that men may follow a more direct path from evaluation to intention, whereas women may rely on a broader set of considerations before forming purchase intention. However, the imbalance in sample composition and the absence of measurement invariance testing mean that these

differences cannot be treated as definitive. They nevertheless point to the possibility that sustainable consumption behavior is shaped by distinct evaluative processes across groups.

Overall, the findings suggest that the adoption of refurbished smartphones is shaped by the interaction between environmental motivations, social context, product evaluation, and trust conditions. Environmental concern provides the strongest initial push, social influence reinforces acceptance, and consumer preference acts as the key mechanism that translates these factors into intention. Trust does not operate uniformly but becomes relevant when it aligns with the type of motivation involved. This pattern highlights that sustainable consumption in the context of refurbished technology is not simply a matter of values, but also depends on the credibility of the product and market conditions that support those values.

Moreover, the one-way ANOVA results provide a more nuanced understanding of demographic differences in consumers' purchase intention toward refurbished smartphones in Vietnam. Among the three demographic control variables examined, only gender produced a statistically significant difference in purchase intention. Male respondents reported a higher mean purchase intention score than female respondents, and the difference was statistically significant,  $F(1, 822) = 6.415$ ,  $p = 0.011$ . The Welch robust test also confirmed this result ( $p = 0.015$ ). Therefore, H7 was supported. However, the effect size was small ( $\eta^2 = 0.008$ ), indicating that gender explained only a limited proportion of the variance in purchase intention. This means that gender is statistically relevant but should not be interpreted as a dominant determinant of purchase intention.

This result could be understood in relation to the product category examined in this study. Refurbished smartphones are not only sustainable products but also technology products that may involve perceived quality, perceived risk, warranty concerns, and product performance evaluation. Previous research on refurbished smartphones shows that consumer responses depend strongly on perceived value, product quality, perceived risk, and incentives that reduce uncertainty (Mugge, Jockin and Bocken, 2017; Nasiri and Shokouhyar, 2021). Therefore, the higher purchase intention among male respondents may reflect greater familiarity with technology products or greater confidence in evaluating refurbished electronics rather than a purely environmental motivation.

The result differs in part from some green consumption studies, which often suggest that women are more environmentally conscious or more willing to purchase green products. However, the difference between this study and prior research on green consumption is understandable, as refurbished smartphones combine environmental value with product risk and technology assessment (Nasiri and Shokouhyar, 2021; Bigliardi,



Filippelli and Quinto, 2022). In this context, purchase intention may not depend only on environmental concern. It may also depend on whether consumers trust the quality and reliability of refurbished devices.

The ANOVA results for location were not statistically significant ( $F(2, 821) = 1.794$ ,  $p = 0.167$ ), and the Welch test also showed a non-significant result ( $p = 0.185$ ). Therefore, H8 was not supported. Although respondents in Ho Chi Minh City and Da Nang showed slightly higher mean purchase intention scores than those in Hanoi, these differences were not statistically meaningful. This suggests that purchase intention toward refurbished smartphones may be relatively similar across the three surveyed cities. Prior research shows that online shopping behavior can vary geographically because consumers differ in physical and virtual accessibility, including delivery infrastructure and online access (Shao, Derudder and Witlox, 2022). However, the present findings suggest that such location-based differences may not be sufficient to differentiate refurbished smartphone purchase intention within this sample.

Completed education level also did not have a significant effect on purchase intention,  $F(4, 819) = 0.577$ ,  $p = 0.680$ , with the Welch test confirming the same conclusion,  $p = 0.724$ . Therefore, H9 was not supported. This finding suggests that consumers' intention to purchase refurbished smartphones does not vary significantly across education groups. This is consistent with studies indicating that demographic effects in green and sustainable purchase contexts are often inconsistent. Chekima *et al.* (2016) examined demographic characteristics in green purchasing intention and emphasized that consumers' degree of greenness can vary across demographic profiles, but demographic variables do not always operate uniformly across contexts. Meet, Kundu and Ahluwalia (2024) also showed that socio-demographic factors can matter in green purchase intention, but their effects are context-specific and depend on the product category and consumer segment.

Taken together, the demographic ANOVA results show that purchase intention toward refurbished smartphones is only partially differentiated by demographic characteristics. Gender matters statistically, but location and completed education level do not. This pattern suggests that demographic variables alone are insufficient to explain purchase intention toward refurbished smartphones. Instead, psychological and product-related factors, such as perceived value, trust, product preference, environmental concern, and perceived risk, are likely to provide stronger explanations of consumer intention in this market.

## 5.2. Theoretical Contributions

The findings of this study contribute to the literature on sustainable consumption and the circular economy by addressing several important theoretical gaps identified in prior research. One of the most significant contributions lies in bridging the separation between environmental psychology and trust-based perspectives in explaining consumer behavior. Previous studies have tended to examine environmental motivations and trust as independent explanatory frameworks, with limited attention to how these dimensions interact (Snyder, 2019; Wang *et al.*, 2022; Senali *et al.*, 2024; Paiva, 2025). The results of this study challenge the fragmented view by demonstrating that environmental drivers, such as awareness and concern, do not operate in isolation. Instead, their influence on consumer preference depends on the presence of appropriate trust conditions. This interaction suggests that environmental motivation alone is insufficient to explain consumer behavior in high-uncertainty product categories, such as refurbished smartphones. Rather, these motivations require supporting trust systems that reduce perceived risk and enable consumers to translate abstract values into concrete evaluations.

The differentiation between environmental awareness and environmental concern provides further theoretical refinement. Much of the existing literature treats environmental motivation as a unified construct, which limits the ability to explain variation in consumer responses (Nacchiero, Massari and Giannoccaro, 2024; Alam, 2025). By separating these two dimensions, the study reveals that they exert distinct effects within the decision-making process. Environmental awareness functions as a cognitive foundation, reflecting knowledge and recognition of environmental issues. However, environmental concern introduces an affective and value-based dimension that carries stronger motivational force. The finding that environmental concern has a greater impact on consumer preference suggests that sustainable consumption is more strongly driven by emotional engagement and ethical considerations than by knowledge alone. This distinction extends prior theoretical models by showing that the pathway from environmental motivation to behavior is not uniform, but depends on the nature of the underlying psychological driver.

Another important contribution relates to the conceptualization of trust. The literature has frequently treated trust as a unidimensional construct or positioned it as a direct antecedent of behavioral intention (Snyder, 2019; Agarwal *et al.*, 2025; Paiva, 2025). This study advances the theoretical understanding of trust by introducing a dual-trust framework and examining its role as a moderating mechanism. The empirical results indicate that trust in refurbished smartphones and trust in retailers function differently within the model. Product-related trust strengthens the influence of environmental awareness and social

influence on consumer preference, while retailer-related trust becomes more relevant when environmental concern is involved. This finding suggests that trust is not a general-purpose factor that uniformly enhances all relationships. Instead, its effect depends on the alignment between the type of trust and the type of motivation being activated. By demonstrating this conditional and differentiated role, the study addresses the “trust gap” in circular economy research and provides a more nuanced theoretical explanation of how trust operates in consumer decision-making.

The study also contributes to the extension of the Theory of Planned Behavior (TPB) by incorporating consumer preference as an intermediate evaluative stage. Traditional applications of the model often assume a relatively direct link between attitudes and behavioral intention (Ajzen, 1991). However, the findings indicate that environmental motivations and social influence do not directly lead to purchase intention unless they first shape a favorable evaluation of the product. This highlights the importance of distinguishing between general attitudes toward sustainability and product-specific evaluations. Consumer preference captures this distinction by representing a more concrete and behaviorally relevant form of evaluation. Its central role in the model suggests that sustainable consumption cannot be fully understood without considering how consumers assess specific product alternatives within a given market context.

In addition, the study extends the role of social influence beyond its traditional interpretation as a normative factor (Henningesen *et al.*, 2003; Ibrahim *et al.*, 2025). The results show that social influence significantly affects consumer preference and becomes more effective when supported by trust in the product. This suggests that social influence operates not only through social pressure or conformity, but also as a mechanism for reducing uncertainty. In markets characterized by perceived risk, such as refurbished electronics, consumers rely on the experiences and opinions of others to evaluate product quality and reliability. By highlighting this informational function, the study enriches the theoretical understanding of social influence within sustainable consumption models.

The empirical context of Vietnam provides further theoretical value. The findings of this study reveal a different pattern, in which environmental awareness and social influence are relatively strong, but trust in retailers remains uneven. This imbalance suggests that consumer readiness for sustainable consumption may not always be matched by the maturity of market structures. By examining this dynamic in an emerging economy, the study contributes to the generalizability of circular economy theories and highlights the importance of contextual factors in shaping consumer behavior.

Moreover, the non-significant moderating effects offer an important theoretical insight. The absence of moderation in several relationships indicates that trust does not universally strengthen all influences. This challenges the assumption that increasing trust will always enhance sustainable consumption behavior. Instead, the findings suggest that trust only becomes influential when it aligns with the underlying motivation. This conditional nature of trust adds complexity to existing models and suggests that future research should pay closer attention to the interactions among different psychological and contextual factors.

In addition, the ANOVA results contribute to the literature by showing that demographic characteristics have limited and uneven explanatory power regarding refurbished smartphone purchase intention. While gender significantly differentiated purchase intention, location and completed education level did not. This finding extends sustainable consumption research by showing that demographic variables should not be assumed to have uniform effects across all green- or circular-economy product categories. In the case of refurbished smartphones, demographic differences appear weaker than the psychological mechanisms examined in the main structural model.

The finding that gender significantly differentiates purchase intention contributes to studies that treat gender as a relevant segmentation variable in green and sustainable consumption. However, the small effect size suggests that gender should be interpreted cautiously. This supports a more balanced theoretical position: gender may help explain some variation in sustainable purchase intention, but it should not replace core psychological constructs such as environmental concern, trust, perceived value, or product preference. This is consistent with prior research showing that demographic effects in green consumption are often mixed and context-dependent (Chekima *et al.*, 2016; Meet, Kundu and Ahluwalia, 2024).

The non-significant effects of location and completed education level also make an important theoretical contribution. These findings suggest that, at least in the Vietnamese urban context examined in this study, purchase intention toward refurbished smartphones may not be strongly segmented by consumers' place of residence or level of education. This result supports the idea that refurbished smartphone adoption should be explained less by broad demographic categories and more by product-specific perceptions. Prior research on refurbished smartphones indicates that consumers evaluate these products through perceived quality, perceived benefits, perceived risk, warranty assurance, and product information (Mugge, Jockin and Bocken, 2017; Nasiri and Shokouhyar, 2021).

Overall, these results refine the role of control variables in the research model. They show that demographic variables can be useful for checking group heterogeneity, but they should not necessarily be treated as central theoretical predictors. This supports the structure of the present study, in which gender, location and education are retained as control variables, while the main explanatory emphasis remains on environmental awareness, environmental concern, social influence, trust, consumer preference and purchase intention.

### **5.3. Practical Implications**

The findings of this study offer several important implications for businesses, policymakers, and organizations seeking to promote the adoption of refurbished smartphones and support the transition toward a circular economy. One of the most immediate implications concerns the role of environmental communication (Han, 2015; Kautish, Thaichon and Soni, 2024). The strong influence of environmental concern indicates that marketing strategies should move beyond simply providing information about environmental benefits. While raising awareness remains necessary, it is not sufficient to drive consumer preference. Instead, communication should aim to create a sense of urgency and personal relevance. Messages that connect refurbished smartphones to tangible environmental outcomes, such as reducing electronic waste or conserving resources, are more likely to resonate with consumers and encourage positive evaluations.

At the same time, the relatively weaker effect of environmental awareness suggests that information-based strategies must be complemented by efforts to reduce perceived risk (Karman and Gavryshkiv, 2022; Serra and Alfinito, 2025). Consumers may understand the environmental benefits of refurbished smartphones, but hesitation persists when product performance is uncertain. Businesses should therefore provide clear, detailed, and accessible information about product condition, testing procedures, and expected performance. Transparency plays a critical role in helping consumers move from general understanding to confident evaluation. Without this support, awareness is unlikely to translate into meaningful demand.

The significant role of social influence highlights the importance of leveraging social and community-based marketing approaches. Consumers are more likely to develop favorable perceptions when they observe acceptance within their social environment (Renn, 2011; Saima and Khan, 2020; Cho and Chan, 2021). This suggests that businesses should invest in strategies that amplify real user experiences, such as customer reviews, testimonials, and peer recommendations. Influencer partnerships can also be effective, but their credibility depends on authenticity and relevance. Rather than relying on broad

promotional messages, companies should focus on creating relatable narratives that demonstrate how refurbished smartphones are used in everyday life. These narratives help normalize the product and reduce the perceived stigma associated with second-hand devices.

The findings related to trust provide particularly important guidance for market development. Trust in the product and trust in the retailer play different roles and therefore require different strategies (Fischer, 2013; Duong *et al.*, 2024). To strengthen product-related trust, businesses should emphasize quality assurance mechanisms, including standardized refurbishment processes, clear grading systems, and reliable warranty policies. Providing evidence of product performance, such as diagnostic reports or certification labels, can help reduce uncertainty and make the product more acceptable. These measures are especially important in enabling environmental awareness and social influence to translate into positive evaluations.

Trust in the retailer, on the other hand, becomes more critical when consumers are motivated by environmental concern. This suggests that companies should focus on building credibility at the organizational level. Consistency in communication, transparency in business practices, and responsiveness in customer service all contribute to this form of trust. After-sales support is particularly important, as it reinforces the perception that the company stands behind its products. When consumers believe that the retailer is reliable and accountable, they are more likely to act on their environmental values.

The descriptive findings indicate that trust in retailers remains a weak point in the market. This has broader implications beyond individual firms. Policymakers and industry stakeholders may need to establish clearer standards and certification systems for refurbished products. Standardization can reduce uncertainty and create a more level playing field, allowing consumers to compare options more easily. Regulatory frameworks that ensure transparency, protect consumer rights, and enforce quality standards can also strengthen overall market confidence. Without such institutional support, individual efforts by firms may have a limited impact.

The role of consumer preference as a central mechanism in the model suggests that businesses should focus on enhancing the overall attractiveness of refurbished smartphones rather than competing solely on price. Positioning these products as smart, sustainable, and reliable alternatives can help shift consumer perception. This involves not only improving product quality but also reshaping how the category is understood. If refurbished



smartphones are seen as a compromise, demand will remain limited. If they are perceived as a rational and responsible choice, preference and intention are more likely to increase.

Furthermore, the observed differences across demographic groups suggest that a one-size-fits-all strategy may not be effective. Different segments may respond to different types of messaging and evaluation criteria. While some consumers may be more responsive to environmental arguments, others may prioritize product performance or social acceptance. Businesses should therefore consider segmenting their communication strategies to better align with the motivations of different consumer groups. Policymakers can also take these differences into account when designing public awareness campaigns, ensuring that messages are tailored to diverse audiences.

Overall, the findings indicate that promoting refurbished smartphones requires a coordinated approach that combines environmental messaging, social validation, product assurance, and institutional trust. Focusing on a single dimension is unlikely to produce substantial change. Instead, success depends on aligning these elements to reduce uncertainty, enhance perceived value, and support the translation of sustainable intentions into actual purchasing behavior.

In addition, the findings provide several practical implications for businesses selling refurbished smartphones in Vietnam. First, because gender was the only demographic variable that produced a significant difference in purchase intention, marketers may consider gender-sensitive communication strategies. Male consumers showed slightly higher purchase intention, suggesting that messages emphasizing product performance, technical reliability, warranty coverage, and value for money may be effective for this group. However, because the effect size was small, marketers should avoid treating gender as a rigid basis for segmentation. Gender can inform the tone of communication, but it should not be the only criterion for targeting.

Moreover, the non-significant result for location suggests that companies should not assume that consumers in Hanoi, Da Nang and Ho Chi Minh City differ strongly in their intention to purchase refurbished smartphones. The mean score was slightly higher in Da Nang and Ho Chi Minh City, but the difference was not statistically significant. Therefore, firms may develop relatively consistent national communication strategies across major urban markets. Instead of relying mainly on city-based segmentation, companies should focus on improving access to trustworthy product information, warranty policies, and transparent product grading. This is especially important because prior research on refurbished smartphones emphasizes that reducing perceived risk and improving perceived



value are central to increasing consumer acceptance (Mugge, Jockin and Bocken, 2017; Nasiri and Shokouhyar, 2021).

Third, the non-significant result for completed education level implies that marketing strategies should not be limited to consumers with higher educational attainment. Consumers across different education groups may be similarly open to refurbished smartphones when the product offer is clear, credible and easy to evaluate. This means that retailers should use simple, transparent and accessible communication for all consumer groups. Information about device condition, battery health, warranty duration, return policy, price savings and environmental benefits should be presented in a way that does not require advanced technical knowledge.

Finally, the findings suggest that firms should emphasize product credibility more than demographic targeting. In practice, refurbished smartphones often face barriers related to perceived quality, perceived risk and uncertainty about product lifespan. Therefore, retailers should provide standardized product grading, certified inspection procedures, clear warranty terms, flexible return policies, and visible customer reviews. Recent research on refurbished products also suggests that return policies and online retail channel conditions can shape perceived risk and purchase intention, making risk reduction especially important for this product category

#### **5.4. Limitations of the research**

Future studies should extend the present findings by addressing several methodological and contextual limitations identified in this research. First, the current model does not incorporate certain potentially influential variables, such as economic incentives and perceived risk, which may also shape consumer decision-making in the refurbished smartphone market. Including these variables in future studies could provide a more comprehensive understanding of how rational evaluations and risk perceptions interact with the proposed constructs.

In addition, the cross-sectional design of this study limits the ability to establish causal relationships among variables, as the data were collected at a single point in time. Therefore, the findings primarily reflect associations rather than temporal or directional effects. Future research is encouraged to employ longitudinal approaches to better capture changes in consumer attitudes and purchase intentions over time and to provide stronger evidence regarding causal relationships among the constructs.

Another limitation relates to the use of nonprobability sampling, with respondents mainly drawn from urban areas with access to digital platforms. This may limit the representativeness of the findings and insufficiently capture the perspectives of individuals

with lower levels of digital access and engagement. Future studies should adopt more diverse sampling approaches to improve generalizability across different demographic and technological contexts. Building on these limitations, several directions for further investigation can be identified. The application of more advanced structural equation modeling techniques would allow researchers to refine the examination of moderation effects within the proposed framework. By adopting more sophisticated analytical approaches, future work could provide a clearer understanding of how different variables interact under varying conditions, thereby enhancing the robustness of theoretical interpretations.

Furthermore, comparative research across cultural and economic contexts would help assess the model's generalizability. Studies that examine differences between emerging and developed markets can reveal whether the relationships observed in this research hold consistently across diverse environments or are contingent on specific socio-economic conditions. Such cross-cultural analyses would not only strengthen external validity but also offer practical implications for organizations operating in multiple markets. Moreover, Future research should further examine the role of digital platforms, such as e-commerce and social media, in shaping consumer perceptions and purchase behavior. As these platforms increasingly influence trust, information sharing, and social influence, understanding their impact would provide valuable insights for consumer behavior research and digital marketing strategies.

In addition, regarding the ANOVA, one limitation is that demographic differences were examined only using broad categorical variables. Although gender, location, and completed education level help identify whether purchase intention varies across basic consumer groups, these variables do not fully explain the underlying reasons for such differences. For example, the significant gender difference may be related to other unobserved factors, such as familiarity with technology, perceived risk, product involvement, or trust in refurbished smartphone retailers. Therefore, future studies should combine demographic comparisons with more specific psychological and product-related variables to clarify why certain groups exhibit different purchase intentions.

Finally, although the study focuses on the primary psychological and behavioral factors influencing refurbished smartphone purchase intention, several potentially important control variables were not incorporated into the research model. Variables such as individual economic condition, income level, price sensitivity, and technical knowledge may also affect how consumers evaluate refurbished smartphones and form purchase intentions. The absence of these control variables may affect the robustness of the model's

testing results, as some relationships among the proposed constructs may be partially explained by consumers' financial capability or familiarity with smartphone technology. Therefore, future studies are encouraged to incorporate relevant demographic, economic, and behavioral control variables to provide a more comprehensive evaluation of consumer purchase intention and to strengthen the explanatory power and reliability of the proposed model.

## **5.5. Conclusion**

This thesis examined consumers' purchase intention toward refurbished smartphones in Vietnam by integrating environmental motivations, social influence, consumer preference, trust mechanisms, and demographic differences into a unified research framework. The findings show that purchase intention is not formed directly from environmental or social factors alone. Instead, consumers first develop a preference for refurbished smartphones, and this preference becomes a key mechanism through which environmental awareness, environmental concern, and social influence are translated into purchase intention. Among these antecedents, environmental concern emerged as the strongest driver of consumer preference, suggesting that affective and value-based engagement with sustainability plays a more decisive role than general environmental knowledge.

A key novelty of this thesis lies in its dual-trust perspective. Rather than treating trust as a single construct, the study distinguishes between trust in refurbished smartphones and trust in refurbished smartphone retailers. The results show that these two forms of trust do not operate uniformly. Trust in the product strengthens the effects of environmental awareness and social influence on consumer preference, while trust in the retailer becomes more important when consumers are driven by environmental concern. This finding contributes to a more nuanced understanding of trust in circular-economy consumption, especially in a product category where consumers face uncertainty about quality, durability, warranty coverage, and retailer credibility.

The demographic analyses further enrich the thesis's contribution. The one-way ANOVA results show that purchase intention differs significantly by gender, with male respondents reporting a slightly higher intention to purchase refurbished smartphones than female respondents. However, location and completed education level do not produce significant differences in purchase intention. These findings indicate that demographic heterogeneity exists, but only to a limited extent. Gender may provide some segmentation value, whereas location and education appear less useful for distinguishing consumers' purchase intention in this context. Importantly, this result supports the argument that

demographic variables alone cannot fully explain refurbished smartphone adoption; instead, psychological, trust-based, and product-specific factors remain more central.

Overall, this thesis contributes to the literature by positioning refurbished smartphones as a meaningful context for studying sustainable consumption, circular economy adoption, and technology-related consumer uncertainty in an emerging market. Its novelty lies in integrating environmental concern, social influence, consumer preference, dual trust, and demographic comparison into a single model. In practice, the findings suggest that promoting refurbished smartphones requires more than just communicating environmental benefits. Retailers and policymakers need to build product credibility, strengthen retailer trust, reduce perceived risk, and normalize refurbished smartphones as reliable, valuable, and environmentally responsible alternatives.

In conclusion, the adoption of refurbished smartphones in Vietnam should be understood as both a sustainability issue and a market trust issue. Consumers may be environmentally aware and socially influenced, but their purchase intention depends on whether refurbished smartphones are perceived as desirable, reliable, and credible. By clarifying this mechanism, the thesis provides both theoretical insight and practical direction for advancing sustainable technology consumption and supporting the transition toward a more circular economy in Vietnam.

## SUMMARY OF CHAPTER 5

This chapter discussed the study's main findings in relation to the existing literature on sustainable consumption and refurbished technology products. The results suggest that environmental motivations, social influence, and trust-related conditions jointly shape consumers' preferences and intentions toward refurbished smartphones. In particular, environmental concern emerged as a stronger driver of preference formation than environmental awareness, while consumer preference played a central role in translating upstream motivations into purchase intention. The moderating effects of trust further indicated that confidence in refurbished products and retailers influences how environmental and social cues are interpreted in decision-making contexts characterized by uncertainty.

Beyond theoretical implications, the chapter outlined several practical insights for firms and policymakers seeking to promote circular consumption. Strategies that combine value-oriented environmental messaging, social normalization, and credible quality signals may help reduce psychological barriers associated with refurbished products. At the same time, subgroup analyses highlighted that differences in the intensity of behavioral mechanisms across consumer segments can inform more targeted communication and market positioning approaches.

The chapter also acknowledged methodological and contextual considerations, including sample composition, cross-sectional design, measurement refinement, and evolving market dynamics. These reflections point to opportunities for future research to strengthen behavioral prediction by incorporating longitudinal evidence, richer risk-related constructs, and broader consumer contexts. Overall, the study contributes to a more nuanced understanding of how environmental values and market trust interact in shaping circular technology consumption.

**LIST OF WORKS RELATED TO THE DISSERTATION  
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## **APPENDIX 1. ENGLISH VERSION OF THE SURVEY QUESTIONNAIRE**

Dear Participant,

We are a research team from the National Economics University. As part of this study, we are conducting a survey on consumer purchase intention in the context of the circular economy, with a focus on the use of refurbished smartphones in Vietnam.

We would greatly appreciate your participation. Your responses will provide valuable insights that support the completion of this research.

All information collected will be kept strictly confidential and will be used solely for academic research purposes.

### **A. GENERAL INFORMATION**

1. What is your gender?

- A. Male                                      B. Female                                      C. Other

2. Where do you currently live?

- A. Hanoi                                      B. Da Nang                                      C. Ho Chi Minh City

3. What is your age group?

- A. Under 18 years old                                      B. From 18 to 25 years old  
C. From 26 to 35 years old                                      D. Over 35 years old

4. What is your current occupation?

- A. Employed                                      B. Student                                      C. Other

5. What is your highest level of education completed?

- A. High school                                      B. Associate degree  
C. Bachelor's degree                                      D. Master's or Doctoral degree  
E. Other

### **B. MAIN QUESTIONS**

The circular economy is a field of study that seeks solutions to optimize the use of resources that are currently being wasted. This research examines the factors influencing consumer purchase intention for products in the circular economy and the extent of their impact.

The study focuses on consumer purchase intention toward refurbished smartphones. Refurbished smartphones are devices that have been previously used or have minor defects



and are subsequently inspected, repaired, and restored to ensure proper functionality before being resold. These products are typically processed either by original manufacturers or by reputable third-party providers.

Please indicate your level of agreement with the following statements by selecting the option that best reflects your opinion:

- (1) Strongly disagree
- (2) Disagree
- (3) Neutral
- (4) Agree
- (5) Strongly agree

Statement	1	2	3	4	5
<b>A. ENVIRONMENTAL AWARENESS</b>					
I consider the potential environmental impact of my actions when making my decisions.					
I would like to describe myself as environmentally responsible.					
I am worried about wasting and destroying the Earth's resources.					
Even if I feel inconvenient, I would like to take more environmentally friendly actions.					
<b>B. ENVIRONMENTAL CONCERN</b>					
I am very concerned about the environment.					
I would be willing to reduce my consumption to help protect the environment.					
Major political change is necessary to protect the natural environment.					
Major social changes are necessary to protect the natural environment.					
Anti-pollution laws should be enforced more strongly.					

<b>C. SOCIAL INFLUENCE</b>					
It is important what my friends or colleagues think about me purchasing a refurbished smartphone.					
I often identify with people by choosing to purchase a refurbished smartphone.					
I like to know that purchasing a refurbished smartphone makes a good impression on my friends or colleagues.					
I purchase a refurbished smartphone based on the expectations of my friends and colleagues.					
I feel a sense of belonging with my friends and colleagues by purchasing a refurbished smartphone.					
When I purchase a refurbished smartphone, I often consult other people for useful information to help choose the alternative that best fits my needs.					
When I purchase a refurbished smartphone, I often ask my friends for useful information to solve problems.					
When I purchase a refurbished smartphone, I frequently gather information from friends or colleagues.					
<b>D. CONSUMER PREFERENCE</b>					
I like using refurbished smartphones.					
I am favorable toward using refurbished smartphones.					
It is beneficial to use refurbished smartphones.					
It is wise to use refurbished smartphones.					
Overall, my attitude toward using refurbished smartphones is positive.					
<b>E. TRUST IN REFURBISHED SMARTPHONES RETAILER</b>					

I trust in refurbished smartphone retailers.					
I rely on refurbished smartphone retailers.					
These are honest refurbished smartphone retailers.					
The refurbished smartphone retailer is very concerned about my welfare.					
<b>F. TRUST IN REFURBISHED SMARTPHONES</b>					
I trust that refurbished smartphones are high-quality.					
Refurbished smartphones are reliable.					
I trust that refurbished smartphones are safe.					
I trust that refurbished smartphones are fully traceable back to their origin.					
I trust that refurbished smartphones are truthful.					
I trust that refurbished smartphones still retain the core quality and value of the original product.					
<b>G. PURCHASE INTENTION</b>					
I plan to purchase a refurbished smartphone in my next smartphone purchase.					
I plan to recommend my peers to purchase refurbished smartphones in their next smartphone purchase.					
I plan to ask for a refurbished smartphone in my next smartphone purchase.					