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Consumer Perceptions and the Transition Toward Product-as-a-Service in the Smartphone Industry

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1. ABSTRACT & KEYWORDS

This study examines how young consumers perceive product durability versus technical longevity, and how these perceptions influence the transition toward Product-as-a-Service (PaaS) models in the smartphone industry. As European regulations introduce stricter energy and repairability labelling, understanding whether promoting a device's lifespan compromises its perceived innovation and consumer appeal has become particularly relevant. To address this, the research adopts a mixed-methods approach combining a qualitative analysis and a quantitative survey.

The findings reveal that young adults do not perceive technical durability as inherently outdated but rather experience a deep conflict between the psychological need for physical novelty and the fear of software-driven exclusion. The results highlight that, on a conceptual level and without considering price constraints, 51.9% of participants perceive an ethical waste-free subscription model as more "Elite" than the traditional purchase of a high-end smartphone. This indicates that while social prestige can be theoretically transferred from possession to service access, actual adoption would remain highly price-elastic regarding the monthly fee. Overall, the study contributes to dismantling the linear "fast-tech" cycle where good hardware is discarded prematurely, demonstrating the potential of the PaaS model.

Keywords: Product-as-a- Service (PaaS), Circular Economy, Eco-Premium Status, Smartphone Obsolescence.

RESUMEN

Este estudio examina cómo perciben los consumidores jóvenes la durabilidad del producto frente a la longevidad técnica, y cómo estas percepciones influyen en la transición hacia modelos de Producto como Servicio (PaaS) en la industria de los móviles. A medida que las regulaciones europeas introducen un etiquetado de energía y reparabilidad más estricto, resulta especialmente relevante comprender si promover la vida útil de un dispositivo compromete su percepción de innovación y su atractivo comercial. Para abordar esto, la investigación adopta un enfoque de métodos mixtos que combina el análisis cualitativo y una encuesta cuantitativa.

Los resultados demuestran que el público joven no asocia la durabilidad con un concepto anticuado. Por el contrario, se identifica un dilema interno entre la necesidad psicológica de adquirir novedad física y el temor real a la exclusión provocada por la obsolescencia del software. El hallazgo más destacado señala que, a nivel conceptual y sin considerar restricciones económicas, el 51.9% de los participantes percibe un modelo de suscripción ético y libre de residuos como más “Elite” que la compra tradicional de un móvil de alta gama. Esto indica que el prestigio social puede transferirse de la posesión al acceso del servicio, aunque la adopción real final mantendría una alta elasticidad respecto al precio de la cuota mensual. En general, el estudio contribuye a desmantelar el ciclo lineal del “fast-tech”, donde el buen hardware se desecha prematuramente, demostrando el potencial del modelo PaaS.

Palabras clave: Producto como Servicio (PaaS), Economía Circular, Estatus Eco-Premium, Obsolescencia de Teléfonos móviles.

2. INTRODUCTION

Seeking to increase customer awareness of product efficiency, battery performance, durability, and reparability, the European Union have introduced the energy label for smartphones and tablets in June 2025 (Haukkala, 2025). Although this new policy represents a significant step toward more sustainable consumption, it also raises a major marketing and innovation dilemma: Does encouraging durability make a product appear less “new” or appealing?

Brands have historically fought for dominance in the smartphone industry via fast technical updates, fresh designs, and ongoing model renewals. Consequently, consumers often link innovation with uniqueness, elite status, and technical complexity (Kwon, 2020). The new legislative emphasis on longevity, repairability and sustainability, however, contradicts this traditional way of thinking.

For customers, the danger is that products made to last longer could be seen as less cutting-edge, therefore contradicting the emotional appeal of owning the most recent gadget. From the Business to Consumer (B2C) point of view, TFG aims to investigate this conflict between sustainability and technology. Particularly it seeks to ascertain whether consumers perceive durability and reparability as integral value-drivers of a high-end service experience, compatible with responsible innovation, or if these traits are still associated with an outdated ownership model that fails to satisfy the psychological need for novelty.

Ultimately, the goal is to bridge the gap between regulatory requirements and customer desire, determining whether the Product-as-a- Service (PaaS) model can be established as a viable alternative to traditional smartphone ownership among young consumers. Despite its potential, PaaS is currently scarcely established in our society, often limited by the consumer´s psychological attachment to ownership. To overcome this barrier, this study intends to formulate actionable marketing and operational recommendations designed to push this business model into the mainstream market. Under a PaaS framework, the incentive for manufacturers shifts from selling high volumes of short-lived devices to ensuring continuous functional availability and long-term product utility (Bocken & al., 2016). Furthermore, by concentrating on PaaS, this study can evaluate how the strategic shift in ownership directly influences design decisions and durability requirements, providing a measurable roadmap for reconciling corporate profitability with the institutional demands for a circular economy in the

smartphone industry (Hidalgo-Crespo et al., 2024; Mélon 2019).

A fundamental aspect of this model is the clarity of the maintenance infrastructure. In a functional PaaS system, the consumer is relieved of the repair burden. For instance, as investigated in current market applications, if a user´s smartphone (rented through a provider like Rentik) breaks down, the process is the following: the user takes the device to a partner point of sale, such as Phone House, which then manages the logistics to send the terminal to the original manufacturer, such as Apple, for an official repair.

This study aims to analyze whether such models can effectively decouple status-seeking consumption from environmental impact, freedom from technological obsolescence and financial flexibility. This transforms the smartphone from a disposable asset into sustainable service that aligns with both the European Green Deal and the evolving expectations of the modern user.

3. RESEARCH OBJECTIVES

The primary research goal of this study is to determine whether the Product-as-a-Service (PaaS) model can be established as a viable alternative to traditional smartphone ownership among young consumers and evaluate how a PaaS model can satisfy the human need for status and innovation perception. By focusing on individual consumers, this investigation seeks to demonstrate that a shift from ownership to access can mitigate the psychological barriers and planned renewal cycles driven by current market leaders. To operationalize this goal, the study pursues the following specific objectives:

1. To identify the cognitive lay theories that lead individual consumers to categorize a repairable smartphone as a high-status technological design rather than an anti-innovative product (Gershoff & Frels, 2015).

2. To examine the impact of public signaling contexts on the choice of circular business models, determining if the reputation of being ethically superior outweighs the benefit of owning a traditional luxury brand (Griskevicius et al., 2010).

3. To evaluate how the integration of green attributes into the core performance of the device influences the perceived innovation and customer satisfaction of the PaaS subscription among youth segments (Sondoh Jr et al., 2020).

4. To analyze the role of modularity as a tool to provide a hedonic reset, satisfying the consumer's appetite for novelty without necessitating physical replacement (Hidalgo-Crespo et al., 2024).

5. To quantify the economic and social viability of the PaaS model by measuring the willingness of individual users to adopt a subscription-based ownership frame. (Hidalgo-Crespo et al., 2024).

The following comparative framework outlines the transition from traditional Veblenian status to the redefined "Eco-Premium "status:

Dimension of Analysis	Traditional Status (Luxury Ownership)	Redefined Status (Ethical PaaS)	Key Reference
Primary Motivation	Display of wealth and technical "newness."	Display of altruism and ethical awareness.	Griskevicius et al. (2010)
Innovation Type	Visible hardware updates and aesthetics.	Integration of central sustainable attributes.	Gershoff & Frels (2015)
Social Signal	"I have the most expensive model."	"I am an informed, responsible citizen."	Griskevicius et al. (2010)
Attribute Centrality	Green benefits are seen as peripheral.	Sustainability is central to product identity.	Gershoff & Frels (2015)
User Perspective	Fear of obsolescence drives replacement.	Subscription guarantees constant updates.	Zheng & Chen (2020)

Table II: Comparison between traditional and redefined status. (Own elaboration)

4. THEORICAL FRAMEWORK

4.1 Evolution of the innovation paradigm: from technical novelty to efficiency and circular sustainability.

The definition of innovation within the technology industry has undergone a radical transformation in recent decades, moving from a supply-driven model toward one centered on longevity and environmental responsibility. Historically, the commercial success of emerging technologies relied heavily on the ability of firms to define specific market segments and capture them through the uninterrupted launch of new products (Gautschi & Sabavala, 1995). Under this conventional framework, competitiveness was primarily perceived as a reactive and dynamic process, where technical novelty served as the main tool to satisfy the volatile demands of consumers (Gautschi & Sabavala 1995).

Nevertheless, the current landscape demands a much deeper approach than the mere deployment of "enabling technologies" to secure a sustainable competitive advantage. As argued by Plaza et al. (2011), the digital transformation of the innovation process must transcend the rigid boundaries of the Furth Industrial Revolution; instead, it should focus on integrating intelligent systems that prioritize resource efficiency. Consequently, the competitive edge of a technology is no longer defined merely by its launch speed or its immediate "newness". Rather, it is now assessed through sophisticated quality metrics such as originality, the ability to generalize across platforms, and most crucially, the longevity of the innovation itself (Lee, 2021).

The adoption of this perspective has led a specific segment of governments and private enterprises to pivot toward long-term value generation from existing technologies (Lee, 2021). For these actors, this transition highlights a mandatory shift toward the principles of the circular economy. Designing for a circular model involves more than just seeking efficiency; it requires strategic planning to ensure that the value of materials and components remains active within the economic loop for the maximum possible duration by "slowing" down product life cycles (Bochen et al., 2016).

Despite this theoretical push for durability, the smartphone industry presents a unique paradox. While there is a widespread belief that hardware deteriorates rapidly, empirical big data analysis indicates that the objective technical performance of devices like the iPhone remains surprisingly stable over several years (Makoy and Fitzpatrick, 2021). This suggests that

"obsolescence", is often not a mechanical failure but a result of "mental depreciation," where users perform frequent performance checks that lead to a premature loss of interest in the device (Makoy and Fitzpatrick, 2021).

Furthermore, the complexity of today's digital environment adds another layer of difficulty. The actual lifespan of a device is frequently shortened by software limitations; many applications lose functionality on hardware considered "vintage," even when the device is still technically sound (Goodwin and Woolley, 2024). Therefore, the modern innovation challenge is not just about building tougher hardware, but about understanding how digital support systems shape consumer behavior and expectations (Goodwin and Woolley, 2024). Ultimately, the next generation of technological design must harmonize hardware robustness with long-term software ecosystem and a social perception of status that encourages, rather than discourages, an extended product life (Goodwin and Woolley, 2024).

4.2 Consumer Psychology: Status Signaling vs. Functional Durability.

The decision to replace a smartphone is a multifaceted process that transcends simple technical necessity. While the previous section established that hardware performance remains remarkably stable over time, consumer behavior is driven by a complex interplay of social signaling, psychological needs, and perceived value. As noted by Makoy and Fitzpatrick (2021), the phenomenon of "mental depreciation" creates a critical gap between the objective utility of the device and the user's subjective interest in it. This discrepancy suggests that the "end-of-life" of a terminal is often a psychological construction rather than a physical reality, where the symbolic meaning of the technology takes precedence over its functional longevity (Makoy & Fitzpatrick, 2021; Chen & Fu, 2018).

A primary driver for frequent smartphone upgrades is "conspicuous consumption," where the device serves as a social display of wealth and status rather than a mere communication tool (Lim &Amoroso, 2023). In contemporary digital culture, the smartphone has transitioned from being a neutral utility to a visible signal of personal identity and economic power. According to Lim and Amoroso (2023), this behavior is deeply influenced by social influence and the need for connection, where the specific model of a phone acts as a proxy for the user's social standing. This signaling is particularly evident in the loyalty shown towards premium brands, which act as mediators of social of social prestige. Brand experience directly influences loyalty

through “conspicuous brand usage,” where owning a flagship device from manufactures like Apple or Samsung provides the user with a sense of distinction (Kwon, 2020). For these consumers, the brand indicates a “person with taste” and facilitates integration into specific social groups (Sondoh Jr et al., 2020).

Furthermore, the relationship between the user and the device is often mediated by “brand image” and “brand attachment”. As explored by Hab, Hassan and Dastane (2017), the perceived value of a smartphone es not only functional but also emotional. When a brand successfully aligns its image with the consumer’s self-concept, the device becomes an extension of the self. Consequiently, the replacement cycle is accelerated not by hardware failure, but by the desire to maintain a “modern” social image and the emotional gratification derived from owning the latest iteration of a trusted brand, reinforcing the shift from functional durability to status-driven consumption (Kwon, 2020; Lim & Amoroso, 2023; Haba et al., 2017).

The psychological pressure to upgrade is further intensified by the “fear of product obsolescence” (FPO), which acts as a mediating effect between personal traits and the intention to purchase new models. Zheng and Chen (2020) identify that individuals with a high “need for uniqueness” or a strong tendency toward “conformity” are more susceptible to this fear. While those seeking uniqueness upgrade to stay ahead of technological trends, those driven by conformity do so to avoid the social stigma of being perceived as technologically “laggard” (Zheng &Chen, 2020). This “fear” is not unfounded; it is often reinforced by the marketing narratives of major manufacturers who emphasize “novelty” as a prerequisite for social and professional relevance.

Individual psychological profiles, such as attachment styles, also play a significant role in how status-signaling goods are consumed. Research suggests that anxiously attached consumers, who possess a higher need for social validation and external approval display a greater propensity to purchase status-signaling products to boost self-esteem and social security (Gasiorowska, Folwarczny & Otterbring, 2022). For these individuals, the smartphone serves as a “social shield” that mitigates the anxiety of exclusion. When this internal pressure meets the systemic barriers of the digital ecosystem, where older devices are labeled as “vintage” and lose software functionality, the psychological obligation to replace a functional device becomes almost unavoidable for full social participation (Gasiorowska et al., 2022; Goodwin & Woolley, 2024).

The concept of "vintage" in the smartphone industry is particularly damaging to durability. Unlike other product categories where "vintage" implies value or timelessness, in the mobile industry, it is synonymous with incompatibility and technological death. Goodwin and Woolley (2024) demonstrate that the inability to install or update essential applications creates a "forced" psychological obsolescence. Even if a user is willing to overlook the lack of status, the software ecosystem eventually marginalizes the device, creating a sense of frustration that inevitably leads to replacement. This digital exclusion acts as a powerful psychological trigger that overrides any intention of long-term usage (Goodwin & Woolley, 2024).

Finally, the modern "mobile moment" is increasingly defined by the distinction between utilitarian and hedonic values. Consumers do not judge their devices solely on "perceived usefulness" or "ease of use" (Haba et al., 2017). Instead, satisfaction is increasingly tied to hedonic value, the pleasure and excitement derived from new features and sociability value, the capacity to remain integrated into visual and social networks (Chen & Fu, 2018). Satisfaction, therefore, is no longer tied to the device's ability to perform basic tasks; it is tied to the emotional satisfaction of owning a device that feels "new" and "capable" (Sondoh Jr et al.,2020).

This "satisfaction paradox" implies that as devices become more durable and technically similar, manufacturers must rely more heavily on psychological triggers to maintain sales volumes. Even when a device is technically sound, the lack of "perceived novelty" leads to a rapid decrease in subjective value, triggering a replacement intention (Haba et al.,2017). This creates a fundamental conflict where the pursuit of sustainability through circular design and business models (Bocken et al.,2016) is constantly undermined by a consumer culture that values the "newness" and social prestige of the latest model over the environmental and functional benefits of durability. To achieve a truly circular economy in the smartphone sector, strategies must address not only the technical repairability of the hardware but also the psychological drivers that render functional devices obsolete in the eyes of the consumer (Chen & Fu, 2018; Bocken et al., 2016).

The following table summarizes the core tensions between the functional attributes of the device and the psychological drivers that influence the consumer's replacement cycle.

FACTOR	FUNCTIONAL/DURABILITY PERSPECTIVE	PSYCHOLOGICAL/ STATUS PERSPECTIVE	MAIN REFERENCES
PRIMARY VALUE	Utilitarian: The device is a tool for productivity and convenience.	Hedonic & Social: The device is a source of pleasure and social prestige.	Chen & Fu (2018); Sondoh Jr et al. (2020
OBSOLESCENSE TYPE	Technical: Focus on hardware failure or battery degradation.	Mental/Psychological: Focus on loss of interest and "Fear of Obsolescence" (FPO).	Makov & Fitzpatrick (2021); Zheng & Chen (2020)
SOCIAL DRIVER	Individual Utility: Need for communication and task management.	Conspicuous Consumption: Social display of wealth and "signaling" status.	Lim & Amoroso (2023); Kwon (2020)
CONSUMER MOTIVATION	Efficiency: Seeking a reliable device that performs well over time.	Conformity & Uniqueness: Need to fit into a social group or stand out.	Zheng & Chen (2020); Gasiorowska et al. (2022)
END OF LIFE CRITERIA	Functional: The device no longer works or cannot be repaired.	Symbolic: The device is perceived as "vintage" or lacks "newness."	Goodwin & Woolley (2024); Haba et al. (2017)

Table I: Comparison between Functional Durability and Psychological Replacement Drivers. (Own elaboration)

4.3 The Multifaceted Nature of Obsolescence: Technical, Psychological, and Software-Driven Barriers.

The transition of a smartphone from a high-value tool to an obsolete item is rarely a simple matter of hardware failure; rather, it is the result of a complex convergence of "synergetic" forces that actively pus the consumer toward premature replacement (Fernández Rey, 2014). This phenomenon represents a strategic intersection where real technical limitations meet sophisticated market engineering. As explored by Asla López (2025), industry leaders like Apple have effectively normalized a cycle where "perceived" obsolescence, the feeling that a device is no longer desirable, is just as potent as "functional" failure in driving behavior. Consequently, understanding the multifaceted nature of this process requires an analysis that moves beyond the physical device and into the economic, digital, and psychological structures that surround it.

In this regard, while hardware is often technically capable of functioning long after its initial purchase (Makoy & Fitzpatrick, 2021), consumers frequently encounter a significant "economic barrier" to repair. According to the findings of Laitala et al. (2021), the decision to fix a device is typically a pragmatic calculation; when the price of a professional screen or battery replacement approaches the residual value of the terminal, the "rational" choice for the user becomes total replacement. Furthermore, this economic pressure is exacerbated by the lack of affordable spare parts and the increasing complexity of modern designs. This creates what

Martínez and Porcelli (2016) describe as a fundamental dilemma for sustainable consumption: a production model that prioritizes profit margins over environmental health, effectively trapping users in a “disposable” tech culture where durability is treated as a secondary concern.

Beyond these physical and economic constraints, the software layer has emerged as perhaps the most significant invisible wall to longevity. Even if a device remains physically robust, it may succumb to “software-induced” decay. Goodwin and Woolley (2004) highlight the “vintage” phenomenon, where functional terminals are marginalized simply because they no longer support the latest application updates. This is largely driven by the broader digital transformation toward cloud-based services and complex infrastructures which, as Itten et al. (2020) observe, demand a level of resource efficiency that older hardware cannot provide. Moreover, recent research by Vats ek al. (2024) identifies critical data and security challenges as a modern form of obsolescence. Systemic issues such as “account locking” and rigid security protocols often prevent devices from being refurbished for second-hand use. Even if a user intends to extend a device’s life, the inability to decouple software accounts frequently turns perfectly good hardware into “technological bricks,” thereby sabotaging circular economic efforts (Vats et al., 2024).

Ultimately, these physical and digital barriers are tied together by the strategic manipulation of consumer perception. Asla López (2025) discusses the “Apple case” as a prime example of how corporate practices, such as the controversial slowing of devices via battery management software, impact the user experience. These tactics do more than just limit performance; they serve as a signal to the user that their current device is “failing.” When combined with aesthetic redesigns and aspirational marketing that equates “newness” with social status, the consumer internalizes a need for renewal that is divorced from functional necessity (Fernández Rey; Asla López, 2025). Therefore, the synergy between software frustration and status anxiety is what drives the unsustainable pace of modern consumption. Addressing these multifaceted barriers is essential if the industry is to comply with increasingly robust environmental regulations aiming for a circular economy, as technical repairability alone cannot overcome the psychological and systemic forces pushing for constant replacement.

4.4 The European Regulatory Framework: Strategies for the Right to Repair and Circularity.

In recent years, the European Union has shifted from a role of passive observation to becoming a decisive legislative architect, aiming to systematically dismantle the linear "take-make-dispose" paradigm (Haukkala, 2025). This institutional pivot is fundamentally anchored in the Circular Economy Action Plan (CEAP), a strategic pillar of the European Green Deal which targets a future where economic prosperity is decoupled from the unfettered consumption of finite resources by 2030. Within this context, the smartphone industry has been identified as a priority value chain. As argued by Haukkala (2025), the CEAP is not merely a collection of technical adjustments; it represents a strategic reorientation of the European market, forcing corporations to view durability and resource efficiency as mandatory prerequisites for market access rather than optional marketing features.

The centerpiece of this regulatory offensive is the Directive (EU) 2024/1799, popularly known as the Right to Repair (R2R) Directive. This legislation is specifically engineered to break down the systemic barriers that manufacturers have historically utilized to consolidate a culture of replacement. According to the legal analysis provided by Sagar (2025), the directive introduces a transformative obligation: producers must offer repair services at reasonable prices even after the statutory guarantee period has expired. By mandating that original equipment manufacturers (OEMs) provide independent repair shops and end-users with access to genuine spare parts, diagnostic software, and maintenance manuals, the EU is directly attacking the roots of "economic obsolescence." The goal, as Sagar (2025) identifies, is to ensure that repair is always a more attractive and viable option than a total replacement, thereby preventing functional hardware from becoming premature electronic waste.

Simultaneously, the EU has leveraged technical standardization as a tool against hardware-driven obsolescence. A landmark example of this is the universal charging mandate, which requires the adoption of USB-C ports for all smartphones and portable electronic devices by late 2024. As Reland (2024) points out, this initiative is a strategic blow against "technological lock-in" strategies, where proprietary hardware was used to tie consumers to specific brand ecosystems. By enforcing a common standard, the EU not only simplifies the consumer experience but also targets the elimination of thousands of tons of e-waste generated by redundant cables and adapters. This move serves as precursor to more ambitious "Ecodesign" regulations which, in the near future, will mandate that batteries be easily replaceable by the

user, effectively challenging the sealed, ultra-slim designs that currently limit device longevity.

Beyond the physical aspects of the device, the European framework is pioneering a digital revolution in transparency through the Digital Product Passport (DPP). Arising from the Ecodesign for Sustainable Products Regulation (ESPER) of 2024, the DPP is envisioned as a "digital twin" that tracks a product's entire lifecycle, from the extraction of raw materials to specific disassembly procedures. Research by Pistoia (2025) suggests that the DPP is the key to solving the "information asymmetry" that often paralyzes the secondary market. By providing recyclers and second-hand buyers with verified data on a device's material health and repair history, the DPP facilitates safer and more efficient refurbishment. In conclusion, the synergy between the R2R Directive, hardware standardization, and digital transparency constitutes a multifaceted institutional response. Together, these measures seek to overwrite the logic of programmed disposal with a system that values the long-term utility and environmental integrity of digital goods (Haukkala, 2025; Pistoia, 2025).

4.5 Towards an Eco-Premium Design: Reconciling Business Models with Circular Objectives.

The transition toward a circular economy in the high-end smartphone industry demands more than just incremental changes in manufacturing; it requires systemic reconfiguration of how value is created, delivered, and captured. The current linear model, characterized by "take-make-dispose," is increasingly at odds with the European Union' sustainability mandates and the physical limits of resource extraction. To Bridge the gap between technical durability and corporate profitability, the industry is pivoting toward an "Eco-Premium" design framework (Haukkala, 2025). This framework is built upon three strategic pillars: the transition to servitization through Product-as -a -Service (PaaS) models, the redefinition of luxury through tech-infused transparency, and the institutionalization of sustainable reverse logistics.

A fundamental pillar of this transition is the strategic shift from ownership to access, materialized though the Product-as-a-Service (PaaS) business model. As explored by Hidalgo-Crespo et al. (2024), PaaS represents a radical departure from traditional sales-based models by decoupling economic growth from resource throughput. In a PaaS context, the manufacturer remains the legal owner of the smartphone throughout its entire lifecycle, while the consumer pays for the utility or service provided by the device. This alignment of interests is

transformative: for the first time, the manufacturer is financially incentivized to maximize the product's lifespan. If a device fails or becomes obsolete the cost of repair, refurbishment, or replacement is internalized by the producer, effectively making durability a driver of higher profit margins rather than a barrier to future sales (Hidalgo-Crespo et al., 2024).

Implementation of these models PASS is currently most visible in Northem and Western European markets, such as the Netherlands and Scandinavia (Hidalgo-Crespo et al., 2024), where regulatory support is more advance. Despite this, consumer acceptance remains selective; it is predominantly embraced by "early adopters" and younger urban demographics, Gen Z and Millennials, who prioritize access over possession (Arnett, 2000). This will be further quantified in the quantitative survey, where user´s willingness to adopt these models is measured. In contrast, a significant portion of the broader market still exhibits "ownership anxiety", showing hesitation toward abandoning permanent product ownership (Laitala et al., 2021; Hidalgo-Crespo et al., 2024).

However, the viability of PaaS depends on a rigorous "design for circularity" approach. Hidalgo-Crespo et al. (2024) emphasize that electrical and electronic equipment (EEE) destined for PaaS must be engineered specifically for multiple use cycles. This involves implementing modular architectures that facilitate easy disassembly and component upgrading. When a device is returned at the end of a service contract, the manufacturer must be able to cost-effectively refresh the hardware, replacing only the battery or the processor module, to prepare it for a new user. This "design for remanufacturing" ensures that the core value of the product is preserved across several lives. Furthermore, as noted by Mélon (2019), this shift addresses the critical issue of access to finance. Circular business models, by retaining the residual value of the hardware on the balance sheet, provide a more stable and predictable asset base, which can attract sustainable investment and favorable credit terms from financial institutions increasingly wary of linear risks (Mélon, 2019; Hidalgo-Crespo et al., 2024).

The second dimension of the Eco-Premium framework involves the psychological and aesthetic redefinition of the smartphone as a luxury object. For decades, the "premium" status of a phone was tied to its novelty and the perceived exclusivity of owning the latest iteration. To sustain a circular model, brands must transition toward what AI-Issa and Thanasi (2024) identify as "tech-infused luxury." Their research indicates that high-end consumers are increasingly seeking products that harmonize advanced technical performance with ethical integrity. In this new landscape, advanced technologies such as Artificial Intelligence (AI) and Augmented

Reality (AR) are not just functional tools but are used to enhance consumer experience and reinforce the brand's commitment to sustainability. An Eco-Premium design leverages these technologies to create a deeper emotional bond between the user and the device, where the "luxury" is found in the device's ability to remain at the cutting edge through software and modular hardware updates rather than replacement (AI-Issa & Thanasi, 2024).

Digital transparency acts as the backbone of this new luxury proposition. The implementation of the Digital Product Passport (DPP), as analyzed by Pistoia (2025), is essential for establishing trust in long-lasting products. The DPP functions as a "digital Twin" that records every maintenance event, component upgrade, and material source. For the premium consumer, this provides an immutable "pedigree" for the device. By eliminating the information asymmetry that often devalues pre-owned electronics, the DPP allows high-end smartphones to retain significant residual value over time. As Ai-Issa and Thanasi (2024) observe, luxury brands that adopt this digital transparency tools can differentiate themselves by offering "verifiable sustainability" that appeals to the sophisticated, socially conscious consumer. The smartphone thus evolves from a disposable gadget into a durable investment, whose value is anchored in both its physical resilience and its digital history (Pistoia, 2025; AI-Issa &Thanasi, 2024).

Despite these advances in design and business strategy, the successful implementation of the circular model faces a critical bottleneck: the inefficiency of the recovery stage. As Uddin (2025) highlights, the global economy currently suffers from a massive "leakage" of value; over 90 percent of mined materials are wasted, with only a marginal 8.6 percent being cycled back through circular systems. In the context of Business-to-Consumer (B2C) platforms, the challenge is to build resilient systems for returns, refurbishment, and resource recovery. For a premium brand, sustainable reverse logistics (SRL) is not merely a logistical necessity but a strategic defensive move to secure access to critical raw materials. However, Uddin (2025) identifies that successful resource recovery depends heavily on consumer engagement and, most importantly, the perceived safety of the return process regarding data privacy (Uddin, 2025).

The success of these recovery systems depends heavily on consumer engagement and the friction-less nature of the return process. Uddin (2025) identifies that B2C platforms must play a decisive role in building consumer trust, particularly regarding data security and the ease of the return journey. When reverse logistics is integrated with the modular design principles

discussed by Hidalgo-Crespo et al. (2024), the economic feasibility of the circular model is significantly enhanced. Instead of low-value recycling, where devices are shredded for raw metal recovery, the brand can engage in high-value remanufacturing. This holistic integration proves that an Eco-Premium approach can reconcile the high standards of the smartphone industry with the urgent requirements of a circular economy, ensuring long-term resilience and competitive advantage (Uddin, 2025; Hidalgo-Crespo et al., 2024).

Ultimately, while each pillar of the Eco-Premium framework is essential, the present research will focus specifically on the transition toward Product-as-a-Service (PaaS) models. This area represents the most accessible and practical entry point for empirical investigation, as it allows for a clear comparative analysis between traditional sales metrics and subscription-based revenue streams. By concentrating on PaaS, this study can evaluate how the strategic shift in ownership directly influences design decisions and durability requirements, providing a measurable roadmap for reconciling corporate profitability with the institutional demands for a circular economy in the smartphone industry (Hidalgo-Crespo et al., 2024; Mélon 2019).

5. METHODOLOGY

5.1 Research Design: Exploratory Sequential Strategy.

The present investigation is famed within an exploratory sequential mixed-methods design, a methodological choice necessitated by the multifaceted nature of the transition from a linear to a circular mobile phone market. As established in the theoretical framework, the smartphone industry has historically operated under a supply-driven model where technical novelty was the primary tool for market capture (Gautschi & Sabavala, 1995). However, the introduction of the European Union's energy and reparability labels in June 2025 creates a regulatory inflection point that demands a shift toward longevity. To evaluate if a business model based on access rather than ownership, Product-as-a-Service (PaaS), is implementable in today's society a single-method approach would be insufficient to capture the tension between policy requirements and consumer psychology.

The rationale for selecting an exploratory sequential strategy lies in the current gap between functional durability and perceived value. While the technical longevity and generality of a device can be measured through patent analysis and hardware lifecycle metrics (Lee, 2021), the human "fear of product obsolescence "(FPO) remains a subjective construct that mediates the decision to upgrade (Sheng and Chen, 2020). Therefore, this study initiates with a qualitative phase to explore the lay theories that consumers hold regarding repairable designs. This first stage is crucial to identifying whether the lack of uniqueness or technical complexity typically associated with innovation, as seen in traditional brand dominance strategies, acts as a psychological barrier to accepting a PaaS model.By prioritizing qualitative exploration first, the research can uncover the symbolic and status-related meanings that users attach to owning a device versus subscribing to a service. As youth consumer segments often derive satisfaction from the perceived value and brand status of their smartphones (Sondoh Jr et al., 2020), the qualitative findings will provide the necessary nuances to construct a robust quantitative instrument.

Furthermore, this design aligns with the need to reconcile corporate profitability with the EU's circular objectives The move toward "Eco-Premium" designs requires a deep understanding of the software-driven barriers that often render physical hardware obsolete (Vats et al., 2024). A sequential strategy allows the researcher to first map these barriers qualitatively and then quantifies their impact on the social acceptance of PaaS. Ultimately, this methodological framework provides the rigor necessary to determine if the European society of 2025 is

prepared to decouple social status from physical possession, moving toward a model where the value resides in the continuous utility and ethical maintenance of the device rather than in the ephemeral novelty of the hardware.

5.2 Phase I (Qualitative): Narrative Laddering and Lay Theories.

The first stage of this empirical research is qualitative in nature, utilizing semi-structured interviews based on the laddering technique. This methodological choice is fundamental to addressing the metal depreciation that often overrides the physical utility of a device. While technical metrics can quantify the originality or longevity of a patent and its hardware (Lee, 2021), the human decision to replace functional smartphone is frequently driven by subjective perceptions of status and the "fear of product obsolescence" (FPO) (Zheng & Chen, 2020). Therefore, this phase aims to deconstruct the lay theories that consumers use to categorize a device as either an innovative asset or a "vintage" and socially obsolete burden.

The laddering technique is specifically designed to uncover the Attribute-Consequence-Value (A-C-V) chain. (Sondoh Jr. & al., 2020). In the context of the smartphone industry's transition toward a circular economy, this method allows the researcher to move beyond surface-level technical preferences and reach the core personal values that define "Econ-Premium" status. As noted by Camacho-Otero, Boks and Pettersen (2018), the acceptance of circular models like Product-as-a-Service (PaaS) is not merely a matter of price or technical availability, but a profound shift in cultural and psychological values regarding ownership. By tracing how a specific attribute (e.g., a modular battery or a reparability label) leads to a functional consequence (e.g., ease of maintenance) and ultimately to a psychosocial value (e.g., ethical identity, self-esteem, or social prestige), the study can identify the "invisible walls" that prevent the mass adoption of durable designs.

A critical component of these interviews involves the exploration of software-driven barriers. As established in the theoretical framework, the "vintage" phenomenon occurs when hardware, despite being physically sound, is marginalized by an ecosystem of applications that no longer support older operating systems (Vats et al., 2024). This qualitative phase seeks to capture the specific narratives of digital exclusion that trigger the replacement cycle. By understanding the specific language consumers use to describe these frustrations, the research can better define the status framing required for the subsequent quantitative phase. The objective is to determine

if the PaaS model, by guaranteeing continuous software updates and hedonic resets through modularity (Hidalgo-Crespo et al., 2024), can affectively neutralize the anxiety associated with falling behind the technological curve.

5.2.1 Interview Protocol and Detailed Script Desing

The main goal of this qualitative stage is to really understand how people relate to their smartphones. Instead of using just a survey, we use a conversational framework that feels natural but stays focused. This allows users to share their honest stories and personal experiences with their devices in a way that a simple questionnaire couldn't capture (Sondoh Jr. & al., 2020).

The interviews will be conducted with a diverse sample of smartphone users, intentionally selected to represent various levels of market engagement, from technology enthusiasts to pragmatic consumers, thereby ensuring a broad spectrum of perspectives on the transition toward circularity. The sessions are designed to explore, in a chronological and emotional sequence, the participants' experiences with product repair, their underlying feelings toward brand loyalty, and their openness to a subscription-based ownership model.

To ensure the technical depth required for a successful laddering analysis, the script is meticulously divided into thematic blocks. These blocks are strategically designed to enable an upward laddering trajectory, guiding the participant from the identification of concrete product attributes to the discovery of higher-level personal value (Sondoh Jr. & al, 2020). This structure ensures that the conversation does not remain at a superficial level of "liking" a feature but instead reveals how those features impact the user's sense of self and social standing (Lim & Amoroso, 2023).

The protocol establishes a safe and neutral environment for the interview, allowing users to reflect on their past behaviors, such as the specific triggers for device replacement and the emotional weight of brand affiliation. Moreover, the comprehensive discussion guide, including the specific questions and the sequence of prompts asked for in the interview, is detailed in the Appendix.

Block 1: The Dualism of Innovation and Functional Durability

This block serves as the foundation of the qualitative interview, aiming to deconstruct the user's internal definition of innovation and determine if it is evolving from "technical

novelty" and superficial aesthetics towards a sustainable paradigm. The research explores how the impulse for immediate technological gratification and the social prestige of owning the latest features influence long-term thinking regarding product cycles (Chen & Fu, 2018). Furthermore, it investigates whether consumers perceive visible longevity features, such as modular batteries, as high-tech premium attributes or as anti-innovative compromise on performance and status.

Block 2: Deciphering the Psychology of Replacement and Obsolescence

The second block transitions into the complex phenomenon of product obsolescence, seeking to isolate the moment of mental depreciation, where a functional device is deemed useless by the user. A critical focus is placed on the Fear of Product Obsolescence (FPO) and the role of software driven challenges, such as slow updates, which act as a psychological trigger for replacement. By analyzing these hidden barriers, the study aims to understand if users stop using devices due to hardware failure or a perceived loss of social connection and status.

Block 3: The transition Toward Circular Business Models (PaaS)

The final block focuses on the potential for PaaS, investigating the radical cultural shift from owning a device to using a service. The goal is to understand the psychological barriers associated with non-ownership and determine if an Eco-Premium shift can be achieved, where users derive status from belonging to an ethical community. Additionally, it tests if transparency tools like the Digital Product Passport (DPP) can reduce the uncertainty and build trust in refurbished or "non-owned" technology (Sagar, 2025; Pistoia, 2025).

5.3 Phase II (Quantitative) : Consumer Opinion Survey.

The second phase of this research involves a quantitative study designed to gather empirical data on current smartphone consumption patterns and the general willingness of users to transition toward circular business models. To analyse this, the phase II utilizes a descriptive survey methodology. The primary goal is to empirically test the research hypotheses by mapping the lay theories of a broader audience and quantify the prevalence of the psychological barriers identified during the qualitative interviews. By focusing on a standardized set of questions, the research evaluates how variables such as "brand status"

(Sondoh Jr et al., 2020) and the "fear of product obsolescence" (Zheng & Chen, 2020) correlate with the potential acceptance of the Product-as-a-Service (PaaS) model.

5.3.1 Detailed Survey Instrument and Objectives

The quantitative phase of this research is made through a structured survey comprising 15 strategically sequenced questions. To ensure respondent engagement the survey follows a logical progression from basic demographic details to more complex behavioural insights. And the structure is divided into four thematic sections, each evaluating a primary factor in the transition toward a circular economy. Moreover, the complete questionnaire, including response scales, is provided in the Appendix.

Block 1: Technical and Demographic Profiling

This initial section establishes a baseline by focusing on age segmentation as a key variable for analysing "conspicuous usage" and social signalling among younger demographics. By correlating age groups with phone replacement frequency, the block identifies the accelation of the linear consumption model and pinpoints which segments are most susceptible to rapid renewal cycles or open to sustainable alternatives.

Block 2: Perceptions of Innovation and Obsolescence

This block explores the psychological drivers of the "fast tech" cycle, measuring the influence of brand status and whether consumers still define "innovation" as minor technical updates rather than longevity. Additionally, it aims to isolate triggers of obsolesce, especially "software-driven exclusion" and "software anxiety", to quantify how much of the replacement drive stems from a perceived loss of utility and social relevance versus actual hardware failure.

Block 3: Repairability, Transparency, and Trust

Transitioning into the "Right to Repair" movement, this block evaluates the symbolic meaning of repairable technology and whether modular designs are perceived as "cutting-edge" or "outdated." It further assesses the potential of the Digital Product Passport (DPP) to reduce information asymmetry and mitigate perceived risks, testing if consumers value technical transparency as a substitute for the traditional appeal of "newness."

Block 4: Acceptance of Product-as-a-Service (PaaS) and the "Eco-Premium" Shift

The final block investigates the market viability of circular models by identifying psychological ownership barriers that arise level of discomfort or risk associated with non-ownership. While the SHIFT framework (White et al., 2019) encompasses five core dimensions of sustainable consumer behaviour change (social influence, habit formation, the individual self, feelings and cognition, and tangibility) the survey instrument specifically targets the elements of social influence and the individual self. By narrowing the focus to these specific dimensions the research precisely tests the status framing of sustainability to determine if consumer status can be successfully transferred from material possession to belonging to a service-based community, validating the emergence of an "Eco-Premium" segment.

The survey consists of 15 questions strategically ordered to minimize respondent fatigue while maximizing the depth of information. Each question is categorized by its typology and linked to a specific research objective based on the established framework.

5.4 Sampling and Participants.

The selection of a representative and relevant sample is fundamental to ensuring that the insights regarding the Product-as-a-Service (PaaS) model are grounded in real-world consumer behaviour. Given the exploratory nature of this research, a non-probability convenience sampling strategy has been adopted for both the qualitative and quantitative phases. This approach allows the researcher to focus on the demographic segment that currently drives the smartphone market and is most likely to be early adopters of circular economy services: the youth consumer segment (aged 18 to 30).

This demographic choice is strategically grounded in the work of Sondoh Jr et al. (2020), who argue that younger consumers place a significantly higher value on "conspicuous usage" and the social prestige associated with smartphone brands. Furthermore, as identified by Vats et al. (2024), this group is the most susceptible to software-driven exclusion, as they rely heavily on high-performance applications that often trigger premature hardware replacement. By focusing on this age bracket, the research can effectively analyse whether the transition to a PaaS model is perceived as a social upgrade, an "Eco-Premium" status, or as a functional compromise.

5.4.1 Phase I: Qualitative Sample (8 In-depth Interviews)

For the first phase of the research, a sample of 8 participants has been selected to undergo semi-structured, narrative laddering interviews. While this number may seem small in terms of statistical breadth, it is a standard and highly effective size for qualitative research focused on deep psychological exploration. Most importantly, it was during the final interviews of this group that theoretical saturation was achieved, where the core lay theories regarding obsolescence and ownership started to repeat across different narratives. These participants are chosen based on their history of smartphone usage, ensuring they have experienced at least one cycle of mental depreciation, the feeling that a phone is obsolete despite still being functional (Zheng & Chen, 2020). The diversity within this small group ensures that the Attribute-Consequence-Value (A-C-V) chains identified reflect broader psychological patterns rather than isolated cases, allowing for a detailed deconstruction of why consumers feel forced to replace devices.

Respondents	Gender	Age	Studies / Profession	Location	Device
R1	Male	22	Bachelor's Degree in Industrial Engineering	Switzerland (UTH)	Samsung
R2	Female	20	Bachelor's Degree in Business Administration	Madrid (ICADE)	Samsung
R3	Female	21	Bachelor's Degree in Nursing	Madrid (ICADE)	Samsung
R4	Female	23	Master's Degree in Translation	Oviedo (UNIOVI)	iPhone
R5	Female	21	Bachelor's Degree in Education	Madrid (UFV)	iPhone
R6	Female	21	Bachelor's Degree in Physical Engineering	Madrid (UC3M)	iPhone
R7	Male	26	Naval Officer	Galicia	iPhone
R8	Male	28	Nurse	Valencia	iPhone

Table III: people interviewed (Own elaboration)

5.4.2 Phase II : Quantitative Sample (Survey)

The second phase expands this inquiry to a broader sample of 100 survey respondents. This sample size is appropriate for a descriptive exploratory study, providing a dataset to generate descriptive statistics, such as frequencies and percentages, which are essential for mapping general trends. Recruitment for these 100 participants is conducted through digital channels and academic networks to ensure the respondents are active participants in the digital economy. By using different typology of questions to maintain data integrity, the study can

conclude whether the interest in a PaaS model is a marginal curiosity or growing trend among the next generation of consumers (Camacho-Otero et al., 2018).

5.5 Ethical Considerations and Data Analysis.

This final section of the methodology addresses the ethical responsibility toward participants and the strategy for interpreting their insights. Since this study explores personal habits, social status, and privacy concerns regarding the Digital Product Passport (DPP), building a framework of trust is essential. The research strictly follows General Data Protection Regulation standards, ensuring that every participant provides informed consent. As Sagar (2025) suggests, a key ethical challenge is balancing the transparency of the DPP with user intimacy; therefore, this study treats hardware "health" data as entirely separate from personal digital footprints to ensure circular consumption feels safe and reliable (Camacho-Otero et al., 2018).

Regarding the qualitative analysis, to analyse the eight in-depth interviews, the study adopts a laddering lens, a method designed to look beyond surface-level answers and uncover the deeper motivations behind consumer choices (Sondoh Jr. & al., 2020). By mapping the most frequent mental paths participants take when deciding to replace a functioning device, it becomes possible to define lay theories. These represent the real-world justifications, such as perceived software lag or the fear of being left behind, that weaken the emotional bond with technology (Vats et al., 2024).

On the other hand, the objective of the quantitative analysis with 100 survey responses, is to transform individual opinions into a clear map of market trends, using descriptive statistics to highlight pressures like declining app performance (Zeng & Chen, 2020). The analysis also includes a comparison between age groups (18-25 vs 26-30). This segmentation is based on the premise that individuals in their late teens and early twenties exist in a distinct developmental phase defined by identity exploration and social signalling, whereas those in their late twenties typically transition toward more stable social and professional roles (Arnett, 2000).

6. QUALITATIVE RESULTS

The following section presents the findings derived from the eight in-depth interviews conducted during Phase I of this research. The analysis is structured according to the three thematic blocks defined in the methodology. To ensure the credibility and transparency of the findings, numerous verbatims are included, identified by participant number (R1 to R8).

6.1 Block 1: Current Relationship and Perceived Innovation.

The initial stage of the investigation aimed to redefine what the young consumer of 2026 considers innovative. The data suggests a clear fracture in the traditional definition of innovation, which for decades was tied exclusively to aesthetic change and the "unboxing" experience. Within the sample, this shift is particularly among participants with a technical background, such as engineering students, who associate innovation with the integrity and longevity of the internal architecture. For these specific users, a device that performs consistently under high demand for several years is more advanced than one that merely offers new colour or a slightly thinner frame. This shift represents a move from symbolic innovation to functional innovation, where the value lies in the engineering's ability to resist the passage of time.

> *"Since I study engineering, for me innovation is more about technical efficiency than aesthetics. I value a device that performs well under pressure and whose internal architecture allows the hardware to last five years without degrading" (RI).*

Beyond the technical performance, the interviews explored how specific physical attributes, such as a visible repairability tab, impact the user's perception of the product's quality. In the past, modularity was often associated with cheap or prototype aesthetics. However, the quality evidence shows that for the new generation of professionals in science and health, these features are now interpreted as signs of professional-grade equipment. This honest design approach allows the user to feel a sense of agency over their device, transforming the act of repair into a sophisticated maintenance task rather than a desperate attempt to save a broken object.

> *"I would find it a very honest design solution. Seeing a tab for the battery would make*

me understand that it is a piece of equipment designed to be repaired, not to be thrown away" (RI).

"I would find it very practical. If the battery starts to fail due to heavy sue, being able to change it myself would save me a lot of time and money" (R3).

"I see it as a logical and functional solution I prefer a design that facilitates repair over a purely aesthetic one that is impossible to fix" (R6).

However, this transition is not uniform. In social environments where the smartphone acts as a primary signal of status and group belonging, such as in business schools or high-end social circles, visible repairability is still met with scepticism. For these participants, the seamless and sealed design remains the gold standard of luxury. Any visible mechanical element is perceived as a regression to older technology, potentially damaging the user's social image. This suggests that for a circular smartphone to reach the mass market, it must achieve invisible modularity or rebrand repairability as an elite, high-tech feature.

"It raises doubts for me. At ICADE University almost everyone carries an iPhone, and the design is very minimalist. Perhaps a visible tab would make the phone look less sophisticated or older" (R2).

"It would be a bit strange visually. I really value Apple's clean aesthetic, and a tab would remind me of older or less cared-for devices" (R4).

"I wouldn't like it. I feel it breaks the aesthetic of the phone. I prefer a sealed design that looks more luxurious and professional" (R5).

Finally, the social weight of the brand was analysed to see if it still dictates user satisfaction. While some users claim indifference, others admit that the brand provides a social shield and a sense of professional stability. For these users, the phone is a presentation letter that validates their position in the social hierarchy. Carrying a recognized brand like Apple or Samsung is not just about the operating system; it is about projecting an image of reliability and success that is recognized by their peers.

"Sometimes I notice my friends take note that I don't have an iPhone because of things like AirDrop, but I feel comfortable with my Samsung; I find it to be a very professional device" (R2).

"I admit that the iPhone gives me a certain peace of mind. It is a standard of quality that makes you feel well-equipped in any environment" (R4).

"At my age, carrying a good phone is a small symbol of professional stability. It makes you feel like you can afford a good tool after years of effort" (R8).

6.2 Block 2: The Psychology of Replacement (Lay Theories of Obsolescence).

The second block explores the psychological tipping point that triggers the replacement of a device. The data reveals that obsolescence is rarely a binary state of working or broken; instead, it is a gradual process of mental depreciation. This occurs when the user notices small discrepancies between their current experience and the perceived "ideal" performance offered by newer models. This gap is often exacerbated by the launch of new flagships, which act as a mirror reflecting the aging flaws of the user's current device, creating a sense of anxiety and a loss of the social freshness the product once provided.

"When I see that the cameras on new phones take much better photos. That's the moment when my phone suddenly starts to look old to me" (R2).
"I feel a mix of curiosity and the feeling that my device has lost that initial freshness. It makes me focus more on my own phone's flaws" (R4).
"The launch of a new colour or a major aesthetic improvement. At that moment, even if mine works, I feel it has become outdated" (R5).

A fundamental discovery in this block is how software acts as a silent executioner of hardware. Most participants do not wait for the screen to crack or the processor to burn out; they react to a loss of fluidity. Interestingly, users develop lay theories to explain this slowdown, often suspecting that manufacturers intentionally use software updates to degrade older models. This creates a feeling od forced obsolescence where the user feels thy are being pushed out of the digital ecosystem by updates that their hardware can no longer support, leading to a sense of frustration and distrust toward the industry.

"It makes me angry because I feel the software forces the hardware to run slower than it should. It's a feeling of forced obsolescence" (R3).
"I think new updates are too heavy for my current model I feel like the phone is becoming too small for the new software" (R4).
"I usually suspect system updates. Sometimes it seems they are designed so that older models seem slower than they actually are" (R8).

Physical fatigue, particularly battery life, remains the most tangible trigger for the average user. Once the device fails to complete a full working day, it ceases to be a reliable tool and becomes a source of stress. For professionals in demanding fields like military service or nursing, this reliability is non-negotiable. When the device requires multiple charges or stars to freeze during critical tasks, the emotional depreciation is grounded in a practical failure of the hardware to meet the user's rhythm of life.

> *"Battery degradation. When I see that it doesn't last until the end of the day doing the same things as always, that's when I assume the phone is reaching its end" (R4).*
> *"When the physical damage is irreparable or when the battery no longer guarantees me autonomy for a full day of intense work" (R7).*
> *"As soon as applications start taking longer than usual to open, I start to feel that the phone has been left behind" (R8).*

6.3 Block 3: Transition to Product-as-a-Service (PaaS).

The final block probes the viability of shifting from an ownership-based model to a service-based one. This is perhaps the most complex area of the research, as it touches upon the deep-seated psychological need for possession. Many participants expressed a significant ownership barrier, fearing that not owning the device would lead to a loss of control and privacy. The smartphone is no longer just a tool; it is a repository of personal identity. The idea of returning it or paying a continuous fee without eventual ownership creates a sense of instability for many, especially those who value the ability to customize their digital tools.

> *"I like to have ownership of my tools so I can personalize them. Renting gives me the feeling that I don't have total control over the object" (R1).*
> *"I don't like the idea of having one more monthly fee. I prefer to save, buy the device, and know that it's mine no matter what happens" (R3).*
> *"I find it hard to accept because the phone contains very personal information. The idea of 'renting' it generates a significant psychological barrier for me" (R4).*

However, a parallel narrative emerged regarding the convenience and peace of mind that a subscription model could provide. For users who view the phone primarily as a high-performance service, the burden of ownership, dealing with repairs, insurance, and the rapid loss of resale value, is something they would gladly exchange for a guaranteed working device.

The PaaS model is seen here as an intelligent and comfortable evolution, provided the service is seamless. This suggests that for a segment of the youth market, access is becoming the new ownership, especially if it includes protection against the very obsolescence fears discussed previously.

> *"If the fee ensures that I will always have the phone in perfect condition and with breakage insurance, it seems like a very intelligent and convenient option to me" (R2).*
> *"If that allows me to get the latest model every year without shelling out so much money at once, it will seem like a very attractive option to me" (R5).*
> *"If the service includes a quick replacement in case of failure, it would be very convenient for me so as not to stay disconnected due to my work pace" (R8).*

The most promising finding for the circular economy is the shift toward "Ethical Status". The interviews indicate that a new form of "cool" is emerging among university students and young professionals: the status of being a conscious and responsible consumer. This "Eco-Premium" positioning could potentially replace the "Technical Novelty" status. Instead of showing off the newest camera, users could show off their participation in a waste-free, ethical ecosystem. This change in social identity is a powerful driver that could overcome the psychological barriers of non-ownership.

> *"In my university, it's starting to be 'cooler' to show that you are environmentally responsible than to have the latest model" (R1).*
> *"If brands manage to make it a trend, I think so. In my environment, the 'eco' factor is starting to gain importance over pure consumption" (R2).*
> *"Absolutely. For me, true status nowadays is demonstrating an ethical conscience and not participating in rampant consumption" (R6).*

Finally, the Digital Product Passport (DPP) was evaluated as a tool to bridge the trust gap. The consensus among participants was that transparency is the antidote to information asymmetry. Knowing exactly what parts have been replace, who has handled the device, and its overall health history transforms a used phone into a certified one. This level of traceability is especially valued by the more scientific and professional profiles, who see it as a medical record for technology, providing the necessary security to trust a device they do not technically own.

> *"That would give me a lot of peace of mind. Reducing that lack of information about*

what you are using would make it much easier for me to trust a subscription model" (R1).

"I find it fundamental. Knowing that the phone has been professionally serviced would give me the security needed to not be the legal owner" (R2).

"It is indispensable. As a scientist, I value traceability and data. Knowing the history of the device would give me full confidence in the service" (R6).

"I find it very professional, almost like a clinical history of the device. It provides a lot of transparency and would help me take the step toward the subscription model" (R8).

6.4 Conclusion: Connecting Qualitative Findings to the Research Objective.

The qualitative phase of this research has provided critical insights into the primary objective of this thesis is to determine whether the Product-as-a- Service (PaaS) model can be established as a viable alternative to traditional smartphone ownership among young consumers. The evidence gathered from the 8 in-depth interviews confirms that the transition is not merely a logistical or economic challenge, but a deeply psychological one. While traditional ownership is still tethered to a sense of control and personal identity, the emergence of a service-oriented mindset is visible, particularly when the model guarantees the elimination of the technical and social risks associated with obsolescence.

The findings support that sustainability and repairability are being redefined as new symbols of innovation and beginning to challenge the traditional status of owning the latest device. As the interviews demonstrated, being part of an "elite" that prioritizes professional maintenance (via the Digital Product Passport) and environmental responsibility can be a more powerful social signal than the mere possession of a disposable object. Moreover, although prioritizing professional maintained serves as a powerful social signal, a major behavioural barrier remains. While 9 of 10 youth express environmental concern, 95% fail to act due to high costs and lack of incentives, limiting their green habits to low cost actions like recycling or eating local produce. Therefore, this new prestige faces significant economic resistance before it can be achieving mass market adoption.

Furthermore, this qualitative analysis proves that the psychological barriers to PaaS, such as the fear of losing personal data or the burden of a monthly fee, can be overcome if the service is framed through status and reliability. However, the interviews also reveal that price remains a

critical factor; for the PaaS model to be attractive, the monthly cost must be perceived not as an additional debt, but as a predictable and fair investment that includes high-value services like immediate repairs and insurance. Repairability, once seen as a low-tech compromise, is now perceived as a high-tech honest design feature by the most influential users.

In conclusion, the qualitative data suggests that a PaaS model focused on “Access to Excellence”, where the user pays for constant performance rather than just renting a device has the potential to dismantle the culture of programmed obsolescence. This insight will now be used to quantitatively validate if this “Eco-Premium” framing is enough to trigger a mass-market shift in the next phase of this study.

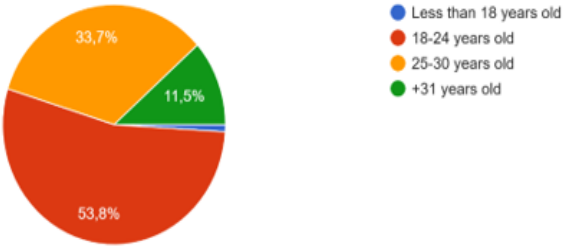
7. QUANTITATIVE RESULTS

Following the initial qualitative exploration, which identified subjective perceptions and psychosocial barriers toward access-based models, this chapter presents the quantitative analysis derived from the structured survey phase. The primary objective of this section is to statistically validate whether the trends observed during the interviews, such as the anxiety surrounding obsolescence and the search for social status, manifest as generalized patterns within the young consumer segment.

This analysis is grounded in the necessity of measuring the actual viability of the Product-as-a-Service (PaaS) model in a market that has historically been supply-driven and dictated by technical novelty. The data serves to bridge the gap between theoretical circular economy frameworks and the empirical reality of consumer behaviour. The following sections are organized into the four thematic blocks, moving from current consumption habits to the acceptance of the “Eco-Premium” concept as a new driver of social differentiation.

7.1 Block 1: Technical and Demographic Profiling.

The first step in evaluating the transition toward a circular economy in the smartphone industry consists of defining the current user profile and the velocity of their consumption cycles. For a PaaS model to be operationally successful, it requires a user base with high digital literacy and a renovation frequency that justifies third-party management of the device’s lifecycle.



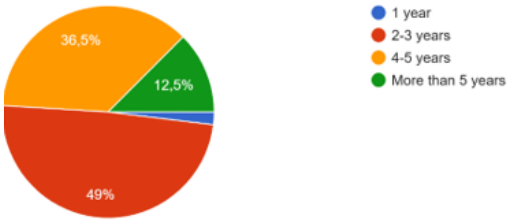
Sample structure reveals a highly homogeneous sample that is representative of the target audience: the vast majority of participants are between 18 and 30 years old. This demographic concentration is vital as this segment not only possesses greater technological agility but is also the primary recipient of the phenomenon known as Fear of Product Obsolescence (FPO). As indicated by Zheng &Chen (2020), FPO is subjective construct that directly mediates the decision to upgrade. Younger users are notably more susceptible to feeling that their terminal has become socially or technically "out of play."

Furthermore, the occupational distribution, consisting mainly of students (47.1%) and employed individuals (40.4%), reinforces the suitability of the PaaS model. This profile

suggests a consumer base that values efficiency and constant updates but may face financial constraints when dealing with the high upfront costs of premium hardware. In this context, as suggested by Hidalgo-Crespo et al. (2024), the quantification of economic viability is essential to ensure that circular models align with the financial reality of the user.

Regarding the gap between Technical Longevity and Market Behaviour, a significant finding regarding the potential for a PaaS transition is the frequency with which users replace their devices. According to the results:

- Nearly half of the participants change their mobile phone every 2-3 years.
- Only a small minority of the sample maintains their terminal for more than 5 years.



This behaviour confirms the thesis of Gautschi & Sabavala (1995) regarding supply-driven markets, where the constant introduction of technical "novelties" dictates the rhythm of obsolescence, regardless of the physical condition of the product. This illustrates what Lee (2021) describes as the conflict between "technical longevity" (the hardware's actual capacity to function) and "perceived longevity."

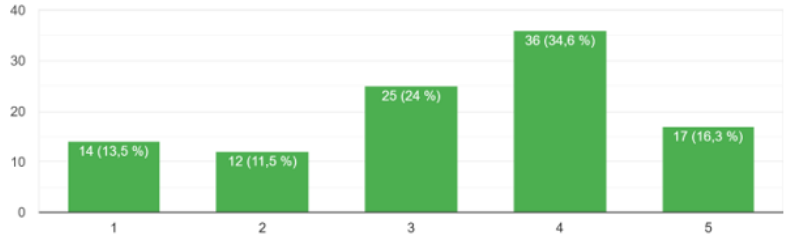
Despite current hardware standards allowing for lifecycles exceeding five years, market pressure and the perceived degradation of value cause majority of users to discard the product long before its technical end-of-life. This premature obsolescence represents the structural vacuum that the PaaS model intends to fill. When consumers feel compelled to replace their devices every two to three years due to external or psychological pressures, the traditional ownership model becomes inefficient and a significant increase in electronic waste. Conversely, a service-based model allows for the professional capture and reintegration of these devices into a circular cycle of refurbishment or recycling, aligning consumer behaviour with environmental sustainability.

7.2 Block 2: Perceptions of Innovation and Obsolescence.

This block moves beyond demographics to explore the "lay theories" and psychology drivers that push a user to discard a functional device. The data reveals a tension between the desire for genuine progress and the anxiety of being left behind by an industry that, as Gautschi & Sabavala (1995) argued, has historically used technical novelty as its primary tool for market

capture.

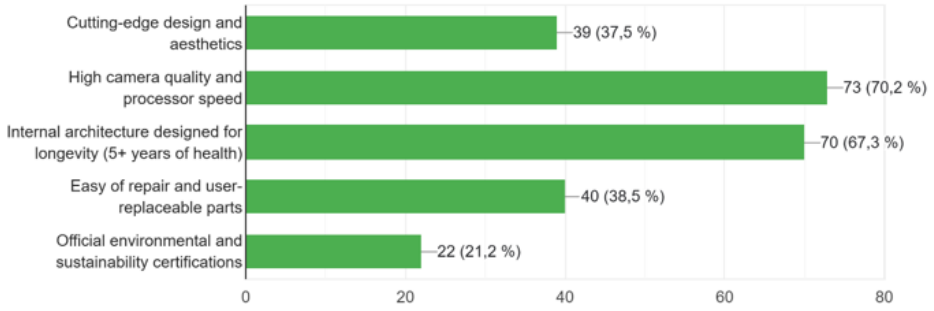
The quantitative results confirm that for the young consumer, the smartphone is not merely a tool but a visible extension of their identity. A significant majority of the sample rated the importance of brand for their social and professional image with high scores, suggesting that conspicuous usage remains a dominant force.



"The brand of my phone is important for my social or professional image" (1-disagree 5-agree)"

This emotional attachment to the brand explains why many users resist circular models that appear utilitarian. According to the SHIFT framework (White et al., 2019), for a sustainable habit to take root, it must align with the user's self-concept; currently, owning a premium brand provides a sense of belonging and status that the market has yet to replicate in service-based models.

In this study it can be seen the evolution of the "Innovative" term. While high-spec cameras and processing speeds are still valued by 70.2% of participants, there is a clear fatigue regarding "surface-level" updates. A remarkable 67.3% of respondents now associate innovation with "internal architecture designed for longevity. This indicates that the "Fear of Product Obsolescence" (FPO) described by Zhen &Chen (2020) is evolving, and users are no longer just afraid of their phone being old, but of their phone being fragile or unrepairable. This shift represents a psychological opening for PaaS, since the user is starting to value more a device that lasts over the excitement of a new aesthetic design.



"*When you think of an ¡innovative' smartphone, which features come to mind?"*

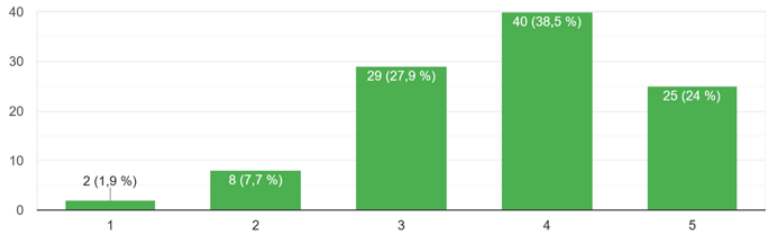
Furthermore, the slowing down of the software is the most striking evidence of the gap between hardware and software appears in the ranking of reasons for device replacement. The data clearly shows that "software slowing down" is the leading cause for upgrade, far outpacing battery failure or physical damage. This confirms the conflict between "technical longevity" and "perceived longevity" identified by Lee (2021).

Users feel a sense of betrayal when a perfectly intact piece of hardware becomes unusable due to software lag, and this is a phenomenon that Zhen & Chen (2020) categorize as a key driver for Fear of Product Obsolesce. This programmed software obsolescence forces users into a cycle of forced consumption. Consequently, a PaaS model that guarantees fluid performance through software optimization and component modularity directly addresses this cycle, turning a technical failure into a service opportunity.

7.3 Block 3: Repairability, Transparency and Trust.

This section examines how technical transparency and modular design can transform consumer mistrust into a sense of security. For the Product-as-a-Service (PaaS) model to truly thrive, the user must stop perceiving a repaired or refurbished device as an inferior object and begin to see it as a high-performance tool maintained by professionals.

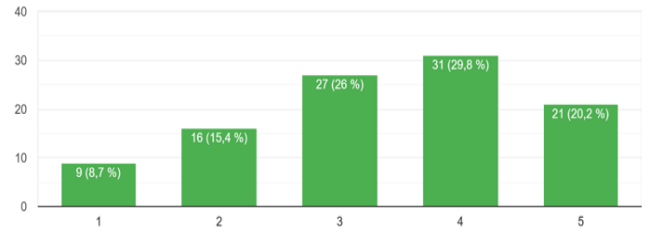
The quantitative results, regarding the redemption of the repaired device from "Old" to "Cutting-edge", show a hopeful shift in the consumer's mindset: 38.5% of respondents associate a modular phone designed for easy repair with "high quality and vanguard".



"For me, a phone that is designed to be easily repaired feels: [1- Low-quality/Outdated...5- High-quality/Cutting-edge]"

This statistic reveals that young consumers are no longer solely seduced by the minimalist aesthetics, instead, the users have an interest in understandings how their devices work. Modularity gives the user back a sense of control over their tool, moving away from the concept of the smartphone as a disposable object.

The Digital Product Passport (DPP) as a solution to technical anxiety transparency is not just a regulatory requirement, it is a profound emotional need. A significant 50% of participants (ratings 4 and 5) stated that their trust in a non-owned or refurbished device would increase drastically if they had access to its full repair and component history through a Digital Product Passport.

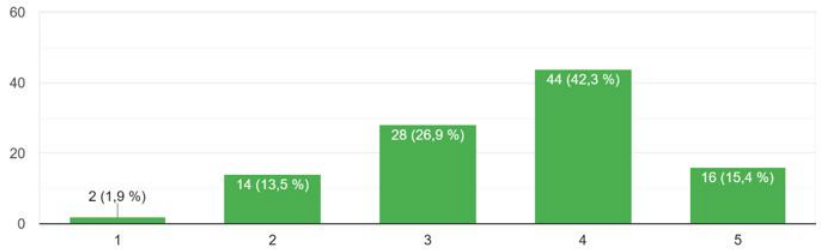


"I would feel more comfortable using a second-hand or refurbished phone if I had access to its full repair history (1-disagree, 5-agree)"

This demand for direct information, targets the core of the "Fear of Product Obsolescence" (FPO) that Zheng & Chen (2020) identify as a critical psychological barrier. By providing clear data on battery health or previous maintenance, the PaaS model reduces subjective uncertainty, transforming the fear of failure into a relationship of trust based on technical evidence.

Moreover, the modular satisfaction and the end of ecological sacrifice. The reaction to the

possibility of upgrading individual components, such as the camera or processor, was remarkably positive, with 42.3% of the sample reporting a high level of potential satisfaction.



"If you could upgrade only the camera module or the processor of your current phone to match the latest market model, would you feel the same satisfaction as if you had bought a completely new phone? (scale 1 not satisfaction, to 5 total satisfaction)"

From a human perspective, this suggests that users do not necessarily want to discard their phones; they want to "evolve" their experience without losing their configuration or personal history.

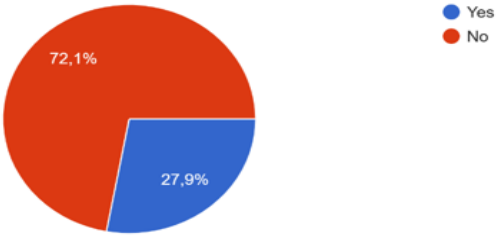
As Lee (2021) points out, "technical longevity" is only valuable if it translates into real utility for the user's life. By allowing for modular updates, the PaaS model aligns with the SHIFT framework (White et al., 2019), as it allows sustainable behaviour (not throwing the phone away) to be perceived as a personal benefit of customization and technical excellence rather than a limitation.

In conclusion, the data from Block 3 demonstrates that repairability is not an arid technical concept, but a bridge toward a more honest and durable relationship between the user and their technology.

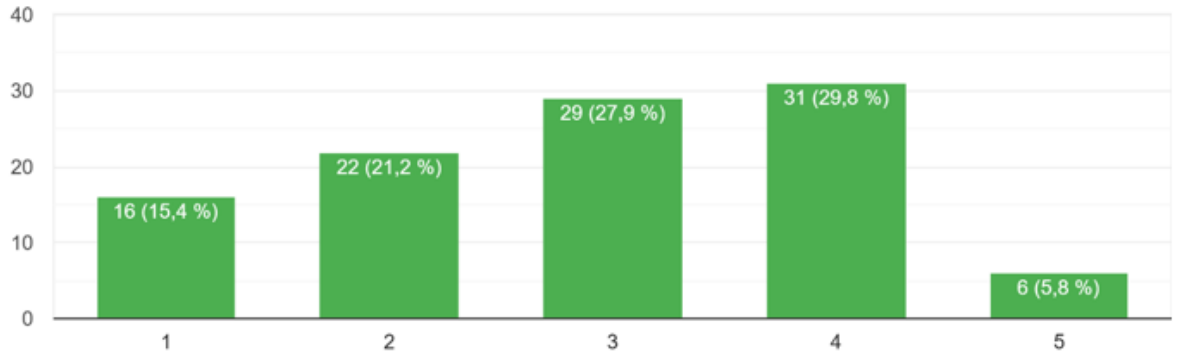
7.4 Block 4: Acceptance of Product-as-a-Service (PaaS).

This final block synthesizes the economic and psychological feasibility of transitioning from a market of owners to a market of users. The data reveals that while the financial path is relatively clear, the human transition involves overcoming deeply rooted notions of possession and social prestige.

A primary hurdle identified in the transition to circular models is the current lack of renting market familiarity. The survey reveals that 72.1% of respondents are not familiar with the concept of renting smartphone.



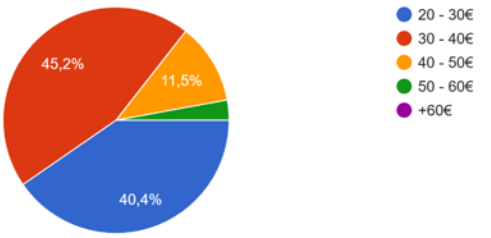
This widespread lack of awareness explains why the model is not yet widely utilized. However, it also presents a significant opportunity to rebrand the service and introduce it as a modern trend. This lack of familiarity correlates with the significant emotional hurdle regarding non ownership. A vast majority of respondents placed themselves in the "Uncomfortable/Risky" spectrum when asked about renting instead of owning their devices, with a mere 5.8% feeling "Totally Comfortable" with the idea of renting.



"The idea of transitioning from owning a phone to renting it, feels: [Uncomfortable/Risky...Comfortable/Secure]."

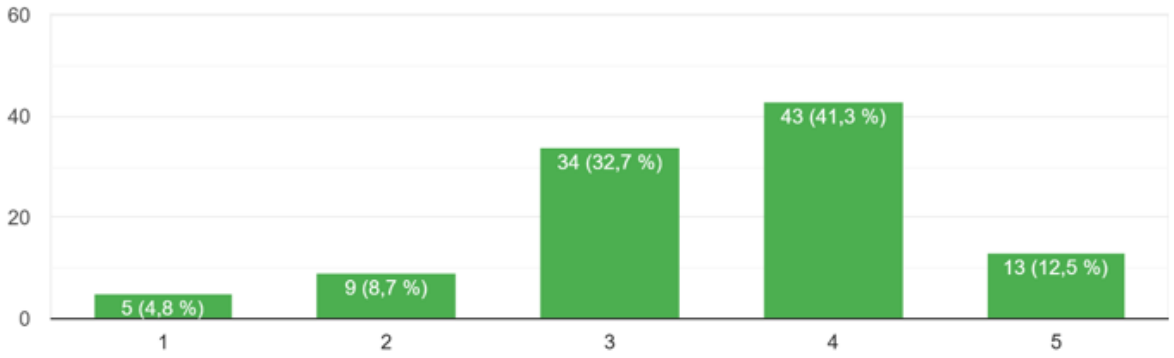
This data humanizes the challenge of the circular economy; it is not just a logistical shift but a psychological one. As Camacho-Otero et al. (2018) describe, the barriers of ownership are tied to the sense of security and control that physical possession provide. For the consumer, letting go of the "my phone" concept feels like losing a personal asset, even if that asset is technically destined to become waste in a few years.

Despite these barriers, when asked to value a monthly fee for an 800€ device, the responses clustered around two main brackets: 20-30€ (40.4%) and 30-40€ (45.2%). This provides the quantification of economic viability that Hidalgo-



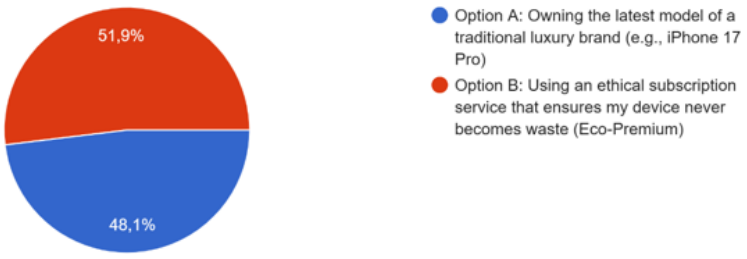
Crespo et al. (2024) argue is essential for any PaaS implementation. From a human perspective, this suggests that users are willing to trade the burden of a high upfront cost for a manageable monthly subscription to excellence, provided the price feels fair and covers the anxieties of repair and updates.

Perhaps the most transformative finding of this research is the shift in status signalling and the sense of personal contribution. When participants were asked to rate how "responsible" they would feel using a sustainable subscription instead of buying a traditional new phone, the majority responded positively with 41.3% giving a high rating of 4 out of 5.



"Rate how 'responsible' you would feel by using a sustainable subscriptions service instead of buying a traditional new phone. (1-no responsible, 5-very responsible)"

This emotional satisfaction is further reflected when respondents were forced to choose between the prestige of owning the latest luxury brand and the prestige of an ethical "Eco-Premium" service, the sample was split almost down the middle, with a slight preference (51.9%) for the ethical option.



"In a social setting, which option do you think projects a more 'Elite' image of yourself?"

This proves that sustainable behaviour ca be successfully framed as a high-status choice. As Kwon (2020) suggests, the "Eco-Premium" concept redefines luxury, it transforms social signalling from a focus on material accumulation ("I have this") to a focus on conscious participation ("I am responsible for this"). The fact that more than half of the participants feel that a zero-waste subscription projects a more "Elite" image than traditional ownership indicates that the social currency of the future is shifting from material accumulation to environmental stewardship. For the young consumer, being "Elite" is starting to mean being conscious.

7.5 Conclusion: Quantitative Validation of Research Goals.

After the quantitative analysis of the survey results, it can be stated that the data suggests that while the transition toward a PaaS model is technically and economically feasible, its success depends on addressing the deep-seated psychological needs of the modern consumer discovered throughout this study.

Firstly, the results confirm that the "Fear of Product Obsolescence" (FPO) is not merely a technical concern but a systemic byproduct of a supply-driven industry. By identifying that software degradation is the primary driver of replacement (ranking higher than physical hardware failure), this study proves that the current ownership model is ill-equipped to handle the digital lifecycle of smartphones. As Gautschi & Sabavala (1995) predicted, the market's historical obsession with technical novelty has created a cycle of premature disposal that the young consumer is starting to find both financially and emotionally exhausting.

Secondly, the most transformative conclusion lies in the successful testing of the SHIFT framework (White et al., 2019) through the "Eco-Premium" concept. The finding that 51.9% of users now perceive an ethical subscription service as more "Elite" than traditional luxury ownership represents a cultural inflection point. While broader literature often suggests that youth segments many not consistently prioritize "green" behaviours in all contexts, these results indicate the emergence of a specific segment within this demographic, that is starting to decouple social prestige is successfully being decoupled from material accumulation and redirected toward environmental responsibility. For this particular group, there is a readiness to redefine innovation not as a superficial "new look," but as the capacity for a device to remain functional through professional maintenance, transparency, and modularity.

In summary, this survey demonstrates that the “Eco-Premium” segment is evolving from a theorical niche into a significant consumer group. The transition to PaaS in an opportunity to offer a service that provides technical excellence, financial predictability, and most importantly, a sense of status that aligns with the values of a generation that contains a growing proportion of individuals who prefer prefers being a “conscious user” over a “burdened owner”. This quantitative evidence provides the necessary rigor to support the move toward a model where value resides in continuous utility and ethical maintenance rather than the ephemeral novelty of hardware.

8. DISCUSSION

This section integrates the qualitative and quantitative insights gathered throughout this study to evaluate to what extent the Product-as-a-Service model can become a competitive alternative to traditional smartphone ownership. By bridging individual consumer narratives with our survey data, this discussion serves as a concise synthesis of the entire thesis.

In summary, this TFG tackled a major challenge in the circular economy: the fact that current smartphone consumption is driven by a linear "fast-tech" cycle where perfectly good hardware is discarded prematurely. By concentrating on PaaS, this study directly evaluates how a strategic shift away from consumer ownership influences corporate design decisions and device durability requirements. This investigation was framed around the European Union's introduction of the energy label for smartphones and tablets in June 2025 (Haukkala, 2025), a policy explicitly designed to increase customer awareness of product efficiency, battery performance, durability, and reparability. By analysing this regulatory milestone, the project explored how removing the concept of physical property forces a re-evaluation of corporate design decisions, service logistics, and long-term device durability requirements.

Crucially, this comprehensive summary addresses a major marketing and innovation dilemma central to the thesis objective: whether encouraging such institutional durability inherently makes a premium product appear less "new" or appealing to the market Ultimately, the data shows that switching to a service-based model is not just a technical puzzle, but a socio-psychological one, providing a measurable roadmap for reconciling corporate profitability with institutional demands for a circular economy (Hidalgo-Crespo et al.,2024; Mélon, 2019). It requires balancing the economic realities of businesses with the deep-rooted cultural habits and status-seeking behaviours of younger consumers

The first major contribution this study offers to the world is a complete redefinition of what "innovation" means to consumers, directly answering the critical dilemma of whether encouraging product durability inherently makes a smartphone look less "new" or appealing. While previous research by authors like Bocken et al. (2016) mostly focuses on factory engineering or recycling logistics, this study looks at consumer lay theories. It proves that innovation does not have to be tied to shiny new looks or superficial hardware updates (Gautschi & Sabavala, 1995). If framed correctly, some consumers can change their mental models and start viewing circular traits, like modular designs and easy reparability, as

premium, high-status features rather than low-quality compromises, aligning with the attribute theories of Gershoff & Frels (2015).

The second contribution is the empirical validation of a developing “Eco-Premium” market segment among younger demographics using the SHIFT framework (White et al., 2019). Traditional literature often brands youth as hypocritical green actors who talk about the environment buy cheap, disposable tech. Our survey data reveals a more balanced, emerging cultural shift: 51.9% of users feel that an ethical subscription service could be seen as more “Elite” than standard luxury ownership. While the market is currently split down the middle, this proves that social prestige can be detached from physical hoarding and attached to responsible service access.

The third contribution is isolating “software anxiety” as the true psychological trigger behind premature product obsolescence. This work proves that app lag and software exclusion drive people to replace their phones much faster than actual physical damage (Vats et al., 2024). By identifying these technical and digital barriers to device longevity and reuse (Goodwin & Woolley, 2024), this study proves that software updates dictate the perceived value of a smartphone during any given mobile moment (Cen & Fu, 2018). It shows that brands must adopt modular setups (Hidalgo-Crespo et al., 2024) and bridge the current market-price gap by bringing fees closer to the consumer’s 20€-40€ target, while utilizing retail partnerships like Phone House to lower repair stress. Simultaneously, it gives policymakers a tool to enforce Digital Product Passports and legally mandate longer software support windows to ensure the 2025 labelling initiatives actually succeed in shifting long-term consumer habits.

In conclusion, this discussion demonstrates that transitioning the smartphone industry toward a circular economy is a gradual socio-psychological process rather than an immediate hardware revolution. When modular engineering, corporate pricing services, and supportive European regulations finally align, the smartphone can successfully evolve from a highly disposable commodity unto an elite, sustainable service asset.

9. LIMITATIONS AND FUTURE RESEARCH

While this thesis provides valuable insights into how the PaaS model might offer an alternative to traditional smartphone ownership, it is important to acknowledge the specific boundaries that limit the conclusions. Recognizing these constraints is about ensuring academic transparency and providing a clear, realistic roadmap for future investigations in consumer behaviour and the circular economy.

The first limitation relates to the sample size and demographic focus of the quantitative data, as the survey was constrained to 100 participants from a localized younger demographic. While this offered a useful snapshot of tech-oriented youth behaviour, it restricts the ability to generalize the findings across different age groups with varying socioeconomic backgrounds. To build upon these findings, future research should implement larger, national sampling strategies. Additionally, as noted by Arnett (2000) regarding different life stages, future studies comparing generations would help see if older people face the same software anxiety, or if their stronger cultural need to own things makes them less open to these models than the younger users studied here.

A second limitation stems from the data collection platform, since the survey was distributed entirely through online channels and social networks. This methodology inevitably introduces a self-selection bias because the form was mostly completed by people within my own social circle and immediate environment, rather than a truly diverse mix of the population. So, since the survey was limited to this close digital circle, it likely distorted the findings, perhaps inflating the positive perceptions of transparency tools like the Digital Product Passport (DPP) since my peers are likely more tech-savvy and active online. Consequently, future research should combine online forms with in-person, field-based data collection, such as sampling shoppers directly at physical electronics stores or public spaces to capture a much more realistic and diverse participant profile.

Furthermore, a significant economic limitation arises from the real-world market-price gap. The survey successfully captured what consumers theoretically perceive as a “fair” monthly fee for a high-end device, which clustered heavily between the 20€ and 40€ bracket. However, this creates a stark mismatch with current commercial reality, as existing platforms, like Rentik, operate with noticeably higher monthly premiums. Because this study measured prospective intentions rather than actual purchasing behaviour under real financial constraints, it is difficult to predict how many respondents would sign a PaaS contract today. To address this gap, future

research should employ discrete choice experiments or real-world market simulations. Testing how users trade off different combinations of monthly fees, insurance coverages, and upgrade frequencies would provide brands with the exact, data-driven blueprint needed to design viable services, building on the financial frameworks suggested by Hidalgo-Crespo et al. (2024).

Finally, this investigation faces a classic methodological challenge in sustainability research, known as the intention-behaviour gap. While 51.9% of respondents expressed that an ethical subscription service could be perceived as “Elite,” consumer psychology consistently shows that what individuals say in an anonymous survey does not always translate into real purchasing choices. This is closely tied to social desirability bias, where participants answer in a way that sounds environmentally responsible simply because it feels like the politically correct thing to do. In reality, much research suggests that younger generations are often the least “green” demographic when it comes to actual lifestyle compromises and shopping habits, as today’s youth generally prioritize immediate convenience and brand trends over deep environmental concern. Therefore, to bypass these biases and see past what young consumers claim to care about, future investigations should move toward experimental and indirect methodologies. Using the SHIFT framework (White et al., 2019) to observational tracking of actual pilot subscription programs, would allow researchers to measure purchasing behaviour, ultimately verifying if this “Eco-Premium” segment is truly ready to invest their own money into a circular relationship with technology.

10. IA TOOLS USE DECLARATIONS

WARNING: From the University we consider that ChatGPT or other similar tools are very useful tools in academic life, although their use is always under the student's responsibility, since the answers provided may not be truthful.

I, Beatriz de Marcos González, students of E-2 ING at Comillas Pontifical University, hereby declare that we have used the ChatGPT Generative Artificial Intelligence tool or other similar IAG tools to generate code only in the context of the activities described below:

1. *Brainstorming research ideas: used to ideate and outline possible areas of research.*
2. *References: Used in conjunction with other tools to identify preliminary references that we have then contrasted and validated.*
3. *Methodologist: To discover methods applicable to specific research problems.*
4. *Template builder: To design specific formats for sections of the work.*
5. *Literary and language style checker: To improve the linguistic and stylistic quality of the text.*
6. *Synthesizer and disseminator of complicated books: To summarize and understand complex literature.*
7. *Example problem generator: To illustrate concepts and techniques.*
8. *Reviewer: To receive suggestions on how to improve and refine the work with different levels of demand.*
9. *Survey generator: To design preliminary questionnaires.*
10. *Translator: To translate texts from one language to another.*

I affirm that all information and content presented in this work is the product of our individual research and effort, except where otherwise indicated and credit has been given (I have included appropriate references in the final work and have made explicit that ChatGPT or other similar tools have been used). I am aware of the academic and ethical implications of submitting non-original work and accept the consequences of any violation of this statement.

Date: 02-06-2026

Signature: __Beatriz de Marcos__

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12. ANNEX

12.1 Qualitative: interview questions.

Block 1: Current Relationship and Perceived Innovation

- *"When you think of an 'innovative' phone, what is the first thing that comes to mind? Is it the newest aesthetics or the device's ability to remain functional for five years?"*
- *"If you saw a phone with a visible tab for battery replacement, what is your immediate reaction to that design?"*
- *"Does the visible age or model of your smartphone affect how you feel in social or professional settings?"*

Block 2: The Psychology of Replacement (Lay Theories of Obsolescence)

- *"Think of the last time you changed your phone. If the previous one still worked, what was the specific trigger that made you feel it was no longer useful?"*
- *"When a daily-use application stats to run slowly, do you blame the software developer, or do you feel your phone has suddenly become old?"*
- *"How do you feel when a new flagship model is launched? Is it curiosity, or a sense that your current device has lost its social 'shield'?"*

Block 3: Transition to Product-as-a-Service (PaaS)

- *"Imagine you no longer own your phone but pay a monthly fee that guarantees it is always updated and repaired. How does not owning the object change your sense of pride in using it?"*
- *"Would you feel more 'elite' by showing you use a durable, ethically managed service rather than just buying the latest traditional model?"*
- *"How much does having access to a 'Digital Product Passport' (showing the full repair history) increase your trust in a device you do not own?"*

12.2 Quantitative: survey questions.

Block 1: Technical and Demographic Profiling

1. "*Gender?* (Female or Male)"

Objective: To identify gender-based differences in perceived value and purchase intent (Sondoh Jr et al., 2020).

2. "*Which age group do you belon to?* (18-24, 25-30, 31+)"

Objective: To segment the data and analyse if younger segments place a higher value on "conspicuous usage" (Sondoh Jr te al., 2020).

3. "*What is your current status?* (High school, University, Master or Working)"

Objective: To analyse how developmental stages and professional status influence tech consumption (Arnett, 2000).

4. "*On average, how often do you replace your smartphone?* (1 year, 2-3 years, 4-5 years, more than 5 years)"

Objective: To establish a baseline for the speed of the current linear consumption model.

Block 2: Perceptions of Innovation and Obsolescence

5. *"The brand of my phone is important for my social or professional image"* (1-disagree 5-agree)"

Objective: To measure the weight of social signalling and prestige in the ownership experience.

6. "*When you think of an ¡innovative' smartphone, which features come to mind?"* (Cutting-edge design and aesthetics, High camera quality and processor speed, Internal architecture designed for longevity (5+ years of health), Easy of repair and user-replaceable parts, Official environmental and sustainability certifications)

Objective: To identify if consumers still equate innovation with technical novelty (Gautschi & Sabavala, 1995).

7. *"Rank the reasons that usually make you change your phone from 1 (Most common) to*

4 (Least common): Physical damage, Software slowing down, Lack of new features, Desire for a newer model Battery degradation"

Objective: To isolate the impact of software-driven exclusion (Vats et al., 2024) versus hardware failure.

Block 3: Repairability, Transparency and Trust

8. *"For me, a phone that is designed to be easily repaired feels*: [Low-quality/Outdated...High-quality/Cutting-edge]"

Objective: To detect if repairability carries a negative or positive status connotation.

9. *"If you could upgrade only the camera module or the processor of your current phone to match the latest market model, would you feel the same satisfaction as if you had bought a completely new phone?* (scale 1 not satisfaction, to 5 total satisfaction)"

Objective: To test consumer acceptance of modular design and product life extension (Bocken et al., 2016).

10. *"I would feel more comfortable using a second-hand or refurbished phone if I had access to its full repair history* (1-disagree, 5-agree)"

Objective: To assess the potential of transparency tools to reduce information asymmetry (Saar, 2025).

Block 4: Acceptance of Product-as-a-Service (PaaS)

11. *"Are you familiar with the concept of renting a smartphone* (Yes/No)"

Objective: To determine the current market awareness of circular business models.

12. "*Instead of paying for a new phone. How likely would you be to pay a monthly fee for a service that guarantees a perfectly working, updated phone with all repairs included?* (1-less likely, 5-very likely)"

Objective: To measure the direct market potential for a PaaS transition.

13. *"For an 800€ phone, during 24 months, I would be willing to pay a monthly fee* of (20, 30, 40, 50, + 60 €8)"

Objective: To quantify the economic viability of PaaS models for electronic devices (Hidalgo-Crespo et al., 2024).

14. *"The idea of transitioning from owning a phone to renting it, feels*: [Uncomfortable/Risky...Comfortable/Secure]."

Objective: To identify the psychological ownership barriers described by Camacho-Otero et al. (2018).

15. *"Rate how 'responsible' you would feel by using a sustainable subscriptions service instead of buying a traditional new phone*. (1-no responsible, 5-very responsible)"

Objective: To test the "Status Framing" and the SHIFT framework (White et al., 2019).

16. "In a social setting, which option do you think projects a more 'Elite' image of yourself?"
Option A: Owning the latest model of a traditional luxury brand (e.g., iPhone 17 Pro).
Option B: Using an ethical subscription service that ensures my device never becomes waste (Eco-Premium).

Objective: To compare traditional status signalling against "eco-premium" luxury (Kwon, 2020; AL-Issa & Thanasi, 2024).