RESEARCH IN PROGRESS

EXPLORING THE RELATIONSHIP BETWEEN PERSONAL VALUES AND PERCEIVED OBSOLESCENCE OF HIGH-TECH PRODUCTS

MEHMET CEM BÖLEN,¹ BURAK BORULU,¹

FULYA ACIKGOZ²

¹Ataturk University, Faculty of Open and Distance Education, Erzurum, Turkey mehmetcem.bolen@atauni.edu.tr, burak.borulu@atauni.edu.tr ²University of Sussex, Marketing, Brighton, United Kingdom of Great Britain and Northern Ireland f.acikgoz@sussex.ac.uk

This study explores the relationship between personal values (biospheric, altruistic, egoistic, and hedonic) and perceived obsolescence of high-tech consumer products. Obsolescence, characterized by the loss of product value, functionality, or desirability, is a significant concern in the consumer technology sector, influencing product life cycles and consumer demand. The study proposes that the degree of perceived obsolescence may differ based on individuals' personal values. For example, individuals who strongly endorse biospheric values may be less likely to replace their smartphones, while those who strongly endorse egoistic values may be more likely to do so. The study employs "Multivariate Analysis of Variance" to examine the relationship between personal values and the perceived obsolescence types (economic, functional, technological, and aesthetic). A representative sample of individuals who have voluntarily replaced their working smartphones will be recruited, and personal values will be measured using a validated value scale. The study expects to find significant differences in the perceived importance of obsolescence types among individuals with varying personal values. The findings may help manufacturers adapt their strategies to effectively meet consumer demands and foster long-term relationships with their target audience while addressing the environmental concerns associated with rapid product obsolescence.

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1 Introduction

In an era dominated by rapid technological advancement, the notion of obsolescence looms significantly, casting a shadow over the lifecycle of high-tech products. While technological progress brings forth innovation and convenience, it also fosters a sense of transience, whereby products once deemed cutting-edge swiftly become outdated. Within this dynamic landscape, understanding the phenomenon of perceived obsolescence has emerged as a critical pursuit that shapes consumer behaviors, market dynamics, and product development strategies (Guillard et al., 2023). Perceived obsolescence refers to the psychological aspect of a product becoming outdated, leading consumers to feel the need to upgrade to newer versions (Khetriwap & First, 2012). This perception drives consumers to constantly reevaluate product qualities, devalue existing products, and contribute to the disposal of functioning items (Spinney et al., 2012). Consumers often base their disposal decisions on the perceived obsolescence of a product, which is influenced by psychographic variables, technology trends, and market characteristics (Khetriwap & First, 2012). In conclusion, perceived obsolescence plays a significant role in shaping consumer behavior by influencing attitudes, purchasing decisions, and product disposal practices.

This study examines how individuals' personal values shape perceived obsolescence of high-tech consumer products. Specifically, we present new theorizing on how biospheric, altruistic, egoistic and hedonic values and perceived obsolescence are interrelated in the context of smartphones. Accordingly, we propose that the degree of perceived obsolescence regarding smartphones may differ based on the individuals' biospheric, altruistic, egoistic and hedonic values. For example, individuals who strongly endorse biospheric values are typically less likely to replace their smartphones due to aesthetics related obsolescence reasons, whereas individuals who strongly endorse egoistic values are typically more likely to replace their smartphones due to aesthetics related obsolescence reasons. By exploring the impact of personal values on perceptions regarding obsolescence of smartphones, manufacturers can adapt their strategies to effectively meet consumer demands and foster long-term relationships with their target audience. Accordingly, this study seeks to answer the following research question:

- How do personal values (biospheric, altruistic, egoistic, and hedonic) influence individuals' perceptions of different types of obsolescence (economic, functional, technological, and aesthetic) in high-tech consumer products such as smartphones?

2 Theoretical Framework

2.1 Defining Obsolescence: A Conceptual Overview

Obsolescence refers to the state of a product or technology that is no longer useful or functional, often characterized by the loss of product value as social and symbolic currency, unfavorable cost-benefit expenditure to extend product life, or loss of product functionality. According to Packard (1960), a product becomes obsolete when it is still available for use, but it becomes "worn out" in the mind and starts to seem less desirable. This decline in utility occurs even if the product has a good shape and a good working order. According to Sandborn (2007), obsolescence is the inevitable end of manufacturing and is characterized as a weakness. He argued that eventually, the production of each product's spare parts would cease due to a lack of demand, the manufacturer's decision not to produce them anymore, or the inability to access raw materials. For instance, VHS tape is a classic example of a product that has become both functionally and technologically obsolete. Before the emergence of DVDs and online streaming services, VHS tapes were the primary means of watching movies at home. However, as technological advances and better alternatives emerged, the VHS format became increasingly outdated and less relevant. Today, it is rare to find VHS tapes in stores, and most people have switched to digital streaming or DVD/Blu-ray discs for their home entertainment needs, making this a prime example of obsolescence. This phenomenon occurs when a product or technology becomes outdated and less relevant due to the emergence of newer and better alternatives (Amankwah-Amoah, 2017).

Voluntary or involuntary actions can lead to obsolescence in several ways (Amankwah-Amoah, 2017; Mellal, 2020). In the literature, several types have been identified, which are summarized in Table 1. Although there are different opinions on the diversity of obsolescence types in the studies on this subject, it is stated in

(Acikgoz et al., 2024) study that only four types are more effective in high-tech products. For this reason, in this study, these four obsolescence factors will be discussed since only cell phones will be examined.

Dimension	Definition	Reference
Technological obsolescence	occurs when advancements in technology make older product less desirable or older product is overshadowed by newer, more advanced technology.	(Barros & Dimla, 2021)
Economic obsolescence	happens when external factors such as changes in market conditions or regulations make a product less financially advantageous.	(Trabelsi et al., 2021)
Functional obsolescence	occurs when a product is still operational but no longer meets current needs or standards. It may also occur when a product or system no longer performs its intended function effectively, even if it's still operational.	(Bradley & Dawson, 1998; Mellal, 2020)
Environmental obsolescence	occurs when environmental factors, such as increased awareness of sustainability and eco-friendly practices, can lead to obsolescence of products with high energy consumption, limited recyclability, or environmentally unfriendly components.	(Trabelsi et al., 2021)
Cultural/social obsolescence	occurs when products become obsolete due to shifts in cultural or societal norms. Changes in lifestyle trends, values, or social perceptions can impact the demand for certain high-tech products, especially those associated with specific cultural or social contexts.	(Guillard et al., 2023; Wilson et al., 2017)
Aesthetical obsolescence	occurs when products become outdated owing to changes in design trends or aesthetics. Consumer preferences for specific styles or visual appearances can impact on the desirability of products, leading to a decline in the demand for older models.	(Guillard et al., 2023); (Lilley et al., 2016)
Logistical obsolescence	refers to the state in which a product or technology becomes less desirable or useful owing to changes or limitations in its logistical support system. This can include challenges in sourcing replacement parts, obtaining technical support, and accessing compatible software or infrastructures.	(Trabelsi et al., 2021)
Psychological obsolescence	occurs when a product is perceived as outdated or no longer desirable by consumers, not because it lacks functionality or has been surpassed by newer technology, but simply because of changing trends, aesthetics, or marketing influences. This revolves around the idea that consumers are constantly enticed by the latest trends and innovations, creating a sense of dissatisfaction or inadequacy with their current possessions. Marketers often harness this phenomenon to instill a desire for the newest products and create a perception of obsolescence in the minds of consumers, prompting them to seek constant upgrades or replacements.	(Cooper, 2004; Hagedorn et al., 2018)

Table 1: Typology of Obsolescence

2.2 Values and Perceived Obsolescence

Personal values are stable, universally desired goals that transcend specific situations, with individuals sharing the same basic values but differing in the intensity and priority they assign to each (Bauman et al., 2021). Four value types-biospheric, altruistic, egoistic, and hedonic-are particularly critical in the environmental domain (De Groot & Steg, 2007, Schultz & Zelezny, 1999; Steg et al., 2014; Stern, Dietz, & Guagnano, 1998). The interplay of biospheric, altruistic, egoistic, and hedonic values significantly shape consumer perceptions of obsolescence in consumer tech products. Each value type contributes to a complex decision-making process that influences whether consumers feel compelled to upgrade or resist the pressures of obsolescence related reasons. For example, hedonic motivations are found to have a significant effect on consumer satisfaction and purchase intentions since people try to select products that enhance their enjoyment and lifestyle (Gan & Wang, 2017). Therefore, the enjoyment in the use of the latest gadgets may create the perception of obsolescence as consumers may not feel that the older models are as satisfying or exciting (Ozturk et al., 2023). Furthermore, consumers tend to assess products based on the consumers' utilization of the product and the consumers' assessment of the worth of the benefits received. Egoistic motivations are known to include a perceived loss of value in the current product which can result in the desire to upgrade to a new product when a new product is introduced (Levinthal & Purohit, 1989). This is especially the case in technology markets where people may feel that they must upgrade to the latest devices to keep up with the social status or simply to increase their personal satisfaction (Widarmanti et al., 2024).

On the other hand, individuals with strong biospheric orientations may have more concerns about products that are made to be used for a short period of time because they think about the negative impact on the environment through waste and natural resource depletion. The literature also indicates that those who have biospheric values as their norm are more likely to participate in environmentally friendly actions like refusing products that may harm the environment through the planned obsolescence strategy (De Groot and Steg, 2006). This indicates that biospheric values can lead to a heightened awareness of product lifespan and sustainability, affecting consumer choices.

In the consumer technology sector, obsolescence risk is a significant concern that impacts product life cycles and consumer demand (Jennings et al., 2016). It influences consumers' decisions on whether to replace or repair products, as it indicates the actual or perceived loss of value of the products (Sonego et al., 2022). Previous studies have noted that high-tech industries face rapid obsolescence due to factors such as increased competition, changing customer needs, and short product life cycles (Goktan & Miles, 2011; Pangburn & Sundaresan, 2009).

3 Methodology

This study will employ Multivariate Analysis of Variance (MANOVA) as the primary analytical method to examine the relationship between personal values (biospheric, altruistic, egoistic, and hedonic) and the perceived importance of different types of obsolescence (economic, functional, technological, and aesthetic). MANOVA is particularly suitable for this research as it allows for the simultaneous analysis of multiple dependent variables, helping to identify whether individuals with different personal value orientations prioritize specific obsolescence types differently. MANOVA is an appropriate assessment to investigate "groups of subjects on several dependent variables simultaneously; focusing on cases where the variables are correlated and share a common conceptual meaning" (Stevens, 2002, p. 173). Since participants could rate the importance of multiple obsolescence reasons on a Likert scale, MANOVA enables the detection of significant differences across personal value groups while accounting for potential interdependencies between obsolescence perceptions. This approach provides a comprehensive understanding of how personal values influence perceptions of smartphone obsolescence beyond what univariate analyses can offer. Accordingly, we propose the following main hypothesis:

H1: There is a significant difference in the perceived importance of obsolescence types (economic, functional, technological, aesthetic) based on personal values (biospheric, altruistic, egoistic, hedonic).



Figure 1: Theoretical model

1 abic 2. Value Scale	Table	2:	Value	Scale
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Hedonic values	
1. Pleasure	
2. Enjoying life	
3. Gratification for oneself	
Egoistic values	
4. Social power	
5. Wealth	
6. Authority	
7. Influential	
8. Ambitious	
Altruistic values	
9. Equality	
10. A world at peace	
11. Social justice	
12. Helpful	
Biospheric values	
13. Respecting the earth	
14. Unity with nature	
15. Protecting the environment	
16. Preventing pollution	

The study will recruit a representative sample of individuals who are currently using a smartphone. These individuals must have decided to replace their smartphones voluntarily, even though they are still in working condition. The decision to replace the product should also not be based on products that are not of the person's choice, such as gifts or rewards. Interviewees are also expected to be over 18 years of age and have sufficient economic freedom to replace their old device. People who meet these criteria will be allowed to see the questions of the online survey. Otherwise, the survey will be terminated for those who do not meet the criteria. In addition, convenience sampling will be conducted in order to collect data with a distribution similar to Turkey's demographic data (age, gender, educational status and income) distribution.

Table 3:	Obsol	lescence	Scale
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Technological Obsolescence
The technology was outdated (Wilson et al.,2017).
The phone was not compatible anymore with the latest devices and software (Wieser & Tröger,
2018).
It is less efficient than the latest models (Guillard et all., 2023).
There are more modern products that I could use better (Guillard et all., 2023).
Economic Obsolescence
It cost too much money to repair (if broken) (Wilson et al.,2017).
I was offered a free/discounted upgrade in my current contract (Wilson et al.,2017).
I wanted a different contract with better cost value (Wilson et al.,2017).
Functional Obsolescence
It didn't have the specific functions that I wanted (Wilson et al.,2017).
I wanted a different contract with better features (Wilson et al.,2017).
Aesthetic Obsolescence
It was no longer novel, stylish or prestigious (Wilson et al.,2017).
It was no longer clean, shiny, or new (Wilson et al.,2017).
The phone made me look oldfashioned (Wieser & Tröger, 2018)
The phone had a lot of scratches (Wieser & Tröger, 2018)

Personal values were measured using a value scale (Table 2) developed and validated by Steg, Perlaviciute, van der Werff, and Lurvink (2012). Participants evaluated the significance of values "as a guiding principle in their lives" using a 9-point scale, ranging from -1 (opposed to my guiding principles), 0 (not important at all), to 7 (extremely important). The constructs related to obsolescence types (Table 3) adopted in this study will be adapted from Wilson et al. (2017), and a 9-point Likert scale ranging from -1 (opposed to my guiding principles), 0 (not important at all), to 7 (extremely important) will be employed to measure the related items. Values were measured in the same way in present studies. If the same values demonstrate the expected relationship across studies, irrespective of the various methods for measuring the dependent variables, that would provide strong support that the relationship indeed exists and is not merely an artifact of a specific measurement used (Perlaviciute & Steg, 2015.

4 Preliminary/Expected Results

We believe that the findings of this study is likely to reveal significant differences in the perceived importance of different types of obsolescence (economic, functional, technological, aesthetic) among individuals with varying personal values (biospheric, altruistic, egoistic, hedonic). Consistent with consumer behavior theories and prior research on personal values and consumption patterns, we expect the following results:

- Egoistic individuals rate aesthetic obsolescence significantly higher than biospheric and altruistic individuals.
- Biospheric individuals rate functional obsolescence significantly higher than hedonic and egoistic individuals.
- Altruistic individuals rate economic obsolescence significantly higher than egoistic and hedonic individuals.
- Hedonic individuals rate technological obsolescence significantly higher than biospheric and altruistic individuals

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