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Sustainable Processes and Planned Obsolescence in the Textile and Clothing Sector in Portugal

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Abstract
Planned obsolescence emerged as a way to overcome the challenges of producing durable goods and increase the profitability of companies. Recognizing the environmental and social impacts, some companies have adopted different strategies of planned obsolescence (quality, psychological, technological, economic, ecological). This study aims to understand whether companies in the textile and clothing sector in Portugal are implementing quality and psychological obsolescence strategies to be competitive in the fashion market. To this end, a qualitative methodological approach was adopted, using semi-structured interviews with managers from six companies in Portugal's textile and clothing sector, to determine whether strategies of quality or psychological obsolescence are being practiced. The results indicate that quality planned obsolescence strategies were not used by the companies. However, all of them use psychological obsolescence to a limited degree and are mainly related to customer relationship management strategies.

Keywords:
planned obsolescence; quality obsolescence; psychological obsolescence; circular economy; textile and clothing sector

Highlights:

- Companies focus on timeless and versatile products that do not trigger psychological obsolescence;
- The launch of new collections is not very regular;
- A strong focus on marketing communication and customer relationships is found;
- There is a high level of concern about the quality and durability of the products;
- No practices are found that suggest quality obsolescence strategies;
- Low familiarity of companies with the concept of planned obsolescence.

1. Introduction

The emergence of planned obsolescence can be traced back to the early 20th century, when durable goods companies, facing a sharp decline in sales volume, recognized the challenges that marketing such long-lasting products posed to maintaining their competitive advantage [1,2]. In particular, the production of durable goods is associated with a significant number of difficulties, among which are the high level of competition in the market and the decline in demand that results from the "duration" of the products sold [1,3].

In such an unfavorable scenario, companies can resort to several strategies to minimize the negative effect on the durability of goods. As suggested by Guiltinan [4], there are two main options that companies can pursue: (i) they can change their business model, moving from a sales-based model to a rent-based model, which can provide a more stable income stream; or (ii) they can maintain a sales-based model, to introduce planned obsolescence

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strategies that increase demand for the product in the marketplace by shortening the product lifecycle.

The use of either of these two strategies allows the companies to increase expected future revenues for the product and to reduce the risk of working within the durable goods market [5–7].

Planned obsolescence can take several forms. These include: (i) quality obsolescence, which is based on the degradation of the quality of products in such a way that they deteriorate faster than they should; (ii) functional obsolescence, which refers to the introduction of innovative and disruptive products to the market that make the previous obsolete; and finally, (iii) psychological obsolescence, which is based on the introduction of products that appear to be more aesthetically appealing to consumers, even though they have the same functionality as the old versions [8–10].

Despite the economic benefits that planned obsolescence strategies can offer companies, the negative environmental and social consequences of such strategies have also been recognized over time [9,11,12].

In recent years, as society and economic agents have become aware of the environmental impact of overproduction and overconsumption, the circular economy has emerged as a new paradigm that aims to increase the value of resources and reduce waste using closed material cycles. As noted by Sauvé et al. [13], the circular economy is an approach to the production and consumption of goods through closed-loop material flows that internalize the environmental externalities associated with the extraction of virgin resources and the generation of waste, including pollution. Preston [14] also highlights that the adoption of the circular economy aims to increase the value of resources in the economy, allowing for the conversion of factory waste into valuable inputs for other processes.

Similarly, in the textile and clothing sector, some companies have invested in the transition to a circular economy system to reduce their negative environmental impact and meet the environmental concerns of some consumers, by redesigning their business models and adopting sustainable production practices [15,16].

To create and deliver value, organizations can redesign their business models and adopt circular economy strategies. These strategies could involve different approaches such as extending the life cycle of products to maintain the value of the product for the consumer for as long as possible, ecological design, modular and more resilient products that ensure the extension of the product lifecycle, and investing in educating consumers about the duration of use of each product [17–20]. Circular practices could include either approaches that aim to drastically reduce waste by closing loops based on recycling, upcycling, or cascading models [18,19], as well as the use of renewable sources such as renewable energy or natural, biodegradable or recycled materials.

Despite the potential that the circular economy offers in terms of social and environmental effects, it is unable to overcome the economic challenge associated with the production of durable products, as explained above. Considering this potential paradox, the investigation aims to assess whether companies implementing circular economy strategies in the textile and clothing sector in Portugal do or do not exhibit planned obsolescence strategies.

The relevance of this research is related to the fact that the fashion sector is one of the most polluting industries worldwide and is also highly competitive and heavily dependent on the launch of new collections to stimulate sales [21,22] and on the reduction of clothing quality to influence future consumption [23]. In Portugal, the textile and clothing industry is one of the country's oldest, most traditional, largest, and most important economic sectors [24]. In addition, the issue of planned obsolescence in the textile and clothing sector is still largely unexplored [25].

According to the aims of the research, the paper has been divided into 5 main sections. Section 1 presents the introduction. Section 2 presents the theoretical framework by reviewing the literature on the concept of planned obsolescence, the different typologies that this concept encompasses, and the motivations and consequences of using planned obsolescence strategies. Section 3 describes the methodology used in the research and the data collection process. Section 4 presents and discusses the results obtained. Finally, Section 5 presents the main conclusions, limitations, and implications for future research.

2. Theoretical Framework

2.1. Planned Obsolescence: Origin and Concept

Planned obsolescence is a strategy that has been repeatedly adopted by companies whose main rationale is to maintain competitiveness and sales volume by encouraging consumption [5,26,27]. In this type of strategy, the product is designed and produced to have a short lifespan so that the consumer is forced to purchase new products regularly [1].

The use of planned obsolescence strategies by the companies began around the early 20th century, when the so-called Phoebus cartel, formed by leading businessmen in the incandescent light bulbs industry, met to decide on the future of the sector, which was in decline due to

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a sharp drop in sales caused by falling demand for light bulbs [2,25]. Therefore, to overcome the adversity caused by this decline in demand, it was decided that to increase sales, consumers would be encouraged to purchase more by reducing the lifetime of light bulbs from 2500 to 1000 h [2]. This strategy of planned obsolescence, aimed at stimulating demand and increasing sales volumes, became so widespread that it was adopted by numerous companies across various industries.

The concept was first introduced in literature in 1932 by the estate agent Bernard London in his article "Ending Depression through Planned Obsolescence" [28]. According to the author, planned obsolescence was the key to overcoming the Great Depression of 1929, as its adoption would make it possible to put the whole country on the road to recovery and eventually restore normal employment conditions through prosperity. According to London [28], this proposal had numerous advantages at both microeconomic and macroeconomic levels, since the adoption of this strategy would trigger an increase in consumption, production, and employment, which would be reflected in the increase in competitiveness of companies and the growth of the national gross domestic product. The issue became more prominent in 1954, when the industrial designer Brooks Stevens observed that, to "make money", companies producing durable goods had to create in the minds of their customers the desire to have something newer, better, and faster [29].

There is a consensus among researchers in the literature that this is a deliberate strategy to encourage consumption. Slade [30] defines planned obsolescence as a general term for the variety of techniques used to artificially limit the durability of a manufactured good to encourage repeated consumption. Similarly, Maggiolino [31] refers to planned obsolescence as a variety of behaviors used to schedule the useful life of products and force their premature replacement. Vanderseypen [32], on the other hand, describes planned obsolescence as all techniques that induce a higher replacement rate of products not due to normal wear and tear. Some authors even refer to planned obsolescence as a marketing strategy used by firms to shorten the life cycle of products and encourage repeat purchases. For example, Cadena [11] defines planned obsolescence as a marketing strategy used to expand the constant creation of products designed to become obsolete, useless, or non-functional. Similarly, Kuppelwieser [33] interprets planned obsolescence as a marketing strategy used by companies to motivate consumers to repeatedly purchase new products.

2.2. Different Types of Planned Obsolescence

In recent years, several typologies of planned obsolescence have been developed to explain how companies apply this strategy. Table 1 summarizes the different types and definitions of planned obsolescence.

Based on the literature review, Figure 1 shows the different typologies of planned obsolescence.

An analysis of the various types of obsolescence identified is then presented.

(i) **Quality obsolescence**

According to Packard [9], quality obsolescence occurs in a planned manner when a product deteriorates or breaks down within a specified, usually short period. According to Barros and Dimla [36], qualitative obsolescence occurs when a product ceases to function due to a defect or a broken component whose life cycle has been deliberately shortened by the company that produced it.

The pursuit of this type of obsolescence can take three different forms: (i) the design of time-limited products, (ii) the design of products with limited repair, and, finally, (iii) the design of products whose aesthetics deteriorate rapidly. In the design of time-limited products, the firm predetermines the lifetime of its products in such a way that they deteriorate rapidly, thus forcing the consumer to repeat the purchase [4,37]. In this type of obsolescence, the product is designed to deteriorate rapidly, and the components of the product are typically designed to be short-lived [12]. According to Satyro [12], limited product durability is implemented by incorporating brittle materials in key components to accelerate the product deterioration process.

In limited repair product design, the company designs the product so that when it breaks, it is difficult to repair, either because it is more expensive than buying a new product or because there are no spare parts [4,37]. By adopting these strategies, companies encourage unnecessary waste, which is ultimately reflected in an increase in waste production [4].

When designing products that rapidly deteriorate aesthetically, companies reduce the life cycle of key parts so that as they deteriorate, the product becomes less attractive in the mind of the consumer [4,12]. This type of strategy demonstrates the importance of aesthetic features to consumers and how they can influence premature disposal [4].

(ii) **Psychological obsolescence**

Psychological obsolescence [9] occurs when a product that is still in good condition and of good quality becomes obsolete in the consumer's mind because the de-

Table 1: Types and definitions of planned obsolescence.

Types and Definitions	References
Functional—Obsolescence of function refers to the tangible, technological, and objectively measurable improvements in the features of new products over their predecessors. Quality—refers to the deliberate design of product components to wear out soon after the end of a minimum warranty period, or the promotion of cosmetic, incremental changes to products as significant improvements that justify the purchase of the newer version. Desirability—refers to those advertising practices that aim to systematically educate consumers over generations to value the newest as the best, leading to a universal acceptance of neophilia (addiction to newness).	[9]
Absolute or quality obsolescence—Occurs when companies degrade the quality of their products by designing products that are limited in time, giving products limited repair capabilities, or allowing the aesthetics of products to deteriorate faster than normal. Relative obsolescence—Occurs when products continue to function but lose consumer interest, such as marketing strategies that change consumers' perceptions of their product, leading them to believe that the product is obsolete and needs to be replaced with a new one. To achieve this type of result, companies invest in strategies such as introducing new products with changes in aesthetics, improving products in terms of performance and function, and introducing products whose production respects the environment and has ecological characteristics.	[34]
Relative obsolescence: Psychological obsolescence—occurs when the consumer is no longer attracted to a particular product. Technological obsolescence—occurs when the consumer is attracted to a product with new features. Economic obsolescence—occurs when the consumer places little or no value on an existing product and concludes that it is not worth keeping.	[8]
Physical obsolescence—occurs when companies shorten the life cycle of a product through its quality, such as designing products with a limited life cycle, designing products with limited repairability, and designing products whose aesthetics deteriorate rapidly.	[8]
Technological obsolescence—occurs when firms shorten the life cycle of a product through consumer perceptions, such as the design by fashion and functional design by incorporating or updating new features.	[4]
Technological—the company deliberately limits the lifespan of a product by weakening one of its components: by undersizing an electronic element, by not reinforcing a part frequently subjected to stress or deformation, etc. Expiry—companies sell products or services with an artificial expiry date Aesthetic—linked to marketing, pushing consumers to always replace their objects with new ones, to be fashionable, etc. Ecological—occurs when a product no longer meets new environmental standards and therefore becomes obsolete from the consumer's point of view	[35]
Absolute obsolescence—limited lifetime and limited repair Relative obsolescence—psychological, economic, and functional obsolescence	[10]

sign of a new product transforms the previous one into something less desirable. Most of the changes developed by companies in new products are not made so that the product presents significant functional improvements, but rather so that it presents new aesthetic characteristics that differentiate it from the previous one [38].

To implement this strategy, companies rely on market forecasts to keep up with emerging trends and desires, and from there they develop new products that present aesthetic changes that encourage consumers to give up owning one product and buy another that performs the same functions [12,39]. The most effective way to implement this type of strategy is through marketing and advertising campaigns. Through these two tools, companies can generate a new need in consumers, leading them to prioritize changes in product design over improvements in performance and utility. The perception that a particular product no longer meets current standards of beauty triggers a decrease in consumer satisfaction and, consequently, a desire to purchase a more aesthetically appealing product [8,40,41]. According to Padilha [40], the combination of recurrent changes in the style, appearance, and shape of products with the implementation of marketing and advertising strategies is the optimal recipe for sales success.

A classic example of this type of strategy can be found in companies in the textile and clothing sector, es-

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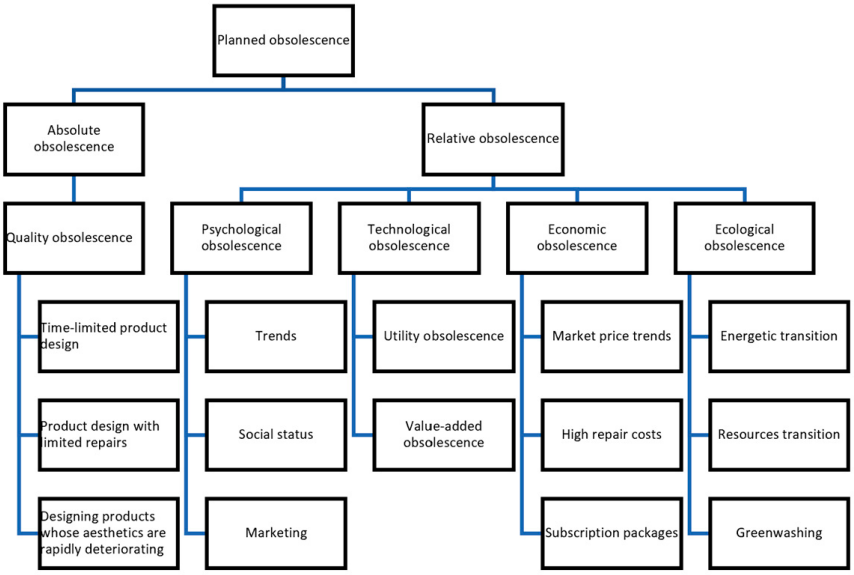

Figure 1: Different types of planned obsolescence.

pecially those that adopt fast fashion models [21]. The regular introduction of new collections with new aesthetic features leads consumers to replace perfectly functional pieces with new ones that fit the trends of the moment [35].

(iii) **Technological obsolescence**

According to Packard [9], technological obsolescence occurs when an existing product becomes obsolete due to the introduction of a new product with superior performance in the market. Cooper [8] defines this strategy from a consumer perspective, suggesting that it occurs when the functional quality of a product in use is lower than that of recently introduced models.

The development of products with significant functional improvements triggers a decline in the value of previous products and, as a result, an increase in the demand for new products, which is reflected in an increase in the firm's sales and an improvement in the firm's competitive position. Technological obsolescence is essential for firms that are part of a competitive market structure [36]. As Schumpeter [42] once stated, innovation is the engine of economic development, and without it, the economy would stagnate. For this reason, firms need to invest in research and development to achieve innovation and development, otherwise, they would decline [43].

In this sense, obsolescence can be seen as the other side of the innovation coin [43]. As early as 1942, Schumpeter noted that innovation drives the replacement of old solutions with new products in a process of "creative destruction". According to the author, the process of destruction of traditional business and economic models is indispensable for the achievement of revolutionary technologies and for the innovation of processes that follow current patterns [42]. Packard [9] admits that this type of obsolescence is the least harmful and the only one that can be adopted by companies from an ethical and sustainable point of view, since it is responsible for introducing something that meets the needs of consumers and contributes to the evolution of humanity.

(iv) **Economic obsolescence**

Economic obsolescence occurs when consumers assign low or no value to an existing product, and the company concludes that it is no longer economically viable to maintain the product [8]. After analyzing the economic disadvantages of purchasing a particular product, consumers choose to replace it with another product that meets their needs [44]. This consumer perception is often influenced by the cost of replacing older models with new ones. According to Cooper [8], the introduction of new models that are more energy efficient and less expensive to maintain leads consumers to perceive that their previous product is no longer economically viable, as buying a new one may lead to greater savings. Repair costs also have a major impact on consumers' perception of the current value of their product. According to Vanderseypen [32], when the repair price is very high or similar to the price of a new product, the consumer perceives that keeping the product is no longer economically viable, as for the same amount of money they can buy a newer product with different features and functionalities, more energy savings and with warranty.

(v) **Ecological obsolescence**

Growing awareness of the environmental problems caused by mass production and consumption in recent years has led to a more conscious and reflective act of consumption. The awareness that certain products can be extremely harmful to the environment has led to an increase in their replacement with new goods that appear to be more ecological and energy efficient [32,35].

While this appears to be a very beneficial initiative, it should be noted that adhering to this type of transition on a large scale would lead to a significant increase in waste and even greater pressure on natural resources [35]. Furthermore, there is insufficient knowledge about the real environmental impact of the production and consumption of these new devices [32]. It should also be noted that the increase in environmental awareness has also been accompanied by a strategic change in companies, which, to increase the consumption of their products and reach other market segments, have chosen to adopt ecological arguments and claim environmentally responsible behavior. Some of these practices may fall under what is currently referred to as greenwashing [32].

2.3. Reasons for Adopting Planned Obsolescence Strategies

From a microeconomic point of view, planned obsolescence is seen as a necessary strategy for the survival of companies that are part of a market economy system [3]. Throughout production cycles, companies that produce durable goods tend to find it increasingly difficult to maintain their sales growth rate [4]. According to Bulow [1], the more durable the goods they produce, the more difficult it is for them to maintain sales growth. This is explained by the law of supply and demand, which states that the higher the supply and the lower the demand, the lower the price of the goods sold. Thus, in the case of durable goods, there is a rapid saturation of the market, motivated by a reduction in demand and an unchanged supply. There is also the emergence of a second-hand market, stimulated by products with a longer life [1]. Durability is therefore an obstacle to the growth of sales and profits, especially when there is a second-hand market, to the replacement of goods at a lower price [4].

From a macroeconomic perspective, planned obsolescence is seen by some authors to achieve social, economic, and technological development. Regarding social development, some positions [11,37,38] argue that the advantages of this strategy for society are more obvious than its disadvantages. According to Karakus et al. [38], planned obsolescence is a kind of invisible agreement between the consumer and the producer. Sielska [37] supports this position by quoting Ludwig von Mises, who states that individuals prefer immediate consumption over delayed consumption, as present satisfaction is more gratifying than future satisfaction. Furthermore, it is mentioned that shortening the life cycle of products allows for reducing the price of products and consequently increases the availability to all types of consumers, which increases social equality [37].

In terms of economic development, the literature points out that the adoption of planned obsolescence strategies stimulates the economic growth of sectors and countries, as it strengthens the competitiveness between companies and increases the number of jobs, thus reducing unemployment and contributing to the increase of national GDP [45].

Finally, it is also worth mentioning the argument that this strategy contributes to the technological development and progress of the economy, since it is responsible for triggering continuous innovation, which leads to the obsolescence of previous products and their repeated replacement by new versions with different functionalities from the previous ones [37,38].

2.4. Adverse Consequences of Planned Obsolescence

The context in which the planned obsolescence paradigm was developed is very different from the one in which we live today. In the early twentieth century, the idea behind planned obsolescence was that natural resources were unlimited, making mass production appear beneficial rather than harmful [12]. The fact that the world's population was three times smaller than it is today, and that consumption was insufficient to sustain the growth of businesses and economies at the time, eventually triggered the need to develop mechanisms to induce consumption [12]. Over the years, the population gradually increased and, as a result, society changed, leading to a paradigm shift in the global economy, characterized by a sharp increase in demand and progressive pressure on natural resources. The prevalence of a linear economic model and the implementation of strategies that induce unnecessary consumption are no longer compatible with existing conditions [10,12]. The implementation of strategies of planned obsolescence has led to an increase in the production of goods that could be considered unnecessary and, consequently, in the long term, represents an overexploitation of natural resources, which has led to a decrease in available resources and an increase in pollution [10,11].

At a social level, some authors even argue that the implementation of this strategy has exacerbated social inequalities. According to Cadena [11], while companies

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have become richer by selling products with a predefined life cycle, consumers have become poorer by being forced to buy these types of goods. The discrepancy between developed and developing countries is another consequence of the massive use of this strategy in recent years. According to the European Economic and Social Committee [46], European consumption of natural resources has increased by 50% in just 30 years. While a European citizen consumes on average 43 kg of resources per day, an African citizen consumes only 10 kg of the same resources [46]. With only 12% of the world's population, developed countries are responsible for around 50% of greenhouse gas emissions over the past 170 years [47]. The United Nations recognizes the responsibility of developed countries for global warming and warns of the differences with developing countries, stating that the emissions produced by developing countries are necessary for their survival, while those released by developed countries are superfluous and only serve to satisfy consumer desires. The export of waste and the relocation of production to developing countries also pose a threat to the public health and safety of people in these countries [46]. In this sense, strategies that promote the reduction of the life cycle of products have been strongly criticized by academics, politicians, and consumer organizations, who state that the excessive use of this type of mechanism may endanger the future of the next generations and the planet Earth.

From a different perspective, for Packard [9], the desire to increase production through the adoption of planned obsolescence strategies was an obstacle to the improvement of existing products, since resources that could be applied to new products with significant improvements were simply wasted and turned out to be a new source of waste.

3. Methods

The investigation aims to assess the extent to which companies operating in the context of the circular economy in the textile and clothing sector in Portugal have introduced, or refrained from introducing, strategies of planned obsolescence. The research method chosen to achieve the research objective was a qualitative method, due to the exploratory nature of the research and the fact that it allows for a more in-depth understanding of the phenomenon under study. The primary data collection was conducted through semi-structured interviews, based on a script developed by the researchers from the literature review (Appendix A). The script first consisted of questions to characterize the company and the interviewees, followed by a set of questions to explore the possible presence of planned obsolescence practices in the strategies adopted by the interviewees. Taking into account the type of sector analyzed (textiles and clothing), the typologies of psychological and quality obsolescence were studied. Technological, economic, and ecological obsolescence are not relevant in this type of sector. A final question was introduced to analyze whether the respondents were familiar with the concept of planned obsolescence. As planned obsolescence is a sensitive concept for companies that could potentially use it, no explicit reference to this concept was made during the interviews until the final question. This approach aimed to encourage authentic responses and avoid biasing the research results.

Based on the literature review, different subcategories of analysis were created to assess the dimensions of psychological and quality obsolescence, as shown in Table 2.

As units of analysis, we considered Portuguese companies in the textile and clothing industry, directly related to the production of clothing, with circular economy practices. The research was focused on companies with a sales-based model, according to the typology proposed by Guiltinan [4].

The methodological process used is summarized in Figure 2.

In total, between 20 July and 30 September 2022, interviews were conducted with 6 companies distributed throughout the national territory. Table 3 lists the enterprises interviewed and the date of data collection.

Once the interviews were completed and transcribed [48], the collected data were analyzed and interpreted using content analysis techniques [49,50]. Based on the literature review and the information collected through interviews, the following categories and sub-categories of analysis were considered, constructed on the dimensions presented in Table 2.

4. Results

4.1. Psychological Obsolescence

4.1.1. Follow the Fashion Trends

Only companies B and C explicitly mention paying attention to new fashion trends, stating that they do research before launching their collections to be aware of the main trends in the fashion world. Interestingly, companies A, D, E, and F state that they are not very interested in understanding the main trends in the sector. Company D justifies this by saying that one of their pillars is the creation of timeless and versatile clothing, and therefore, they are not concerned with the main trends in the fashion market. Similarly, the interviewee from Company E believes that trends lead to clothes becoming obsolete, and therefore, they avoid following trends. In the words of the intervie-

Table 2: Systematization of the dimensions of data analysis.

Category	Sub-Category	Author(s) of Reference
Psychological obsolescence	Follow the fashion trend	[12]
	Launch of new collections (Creation of new consumer desires)	[39]
	Marketing and customer relationship	[40]
Quality obsolescence	Durability of the products	[9]
	Internal processes for quality control	[12]
Knowledge of the term planned obsolescence		-

Source: Authors' elaboration.

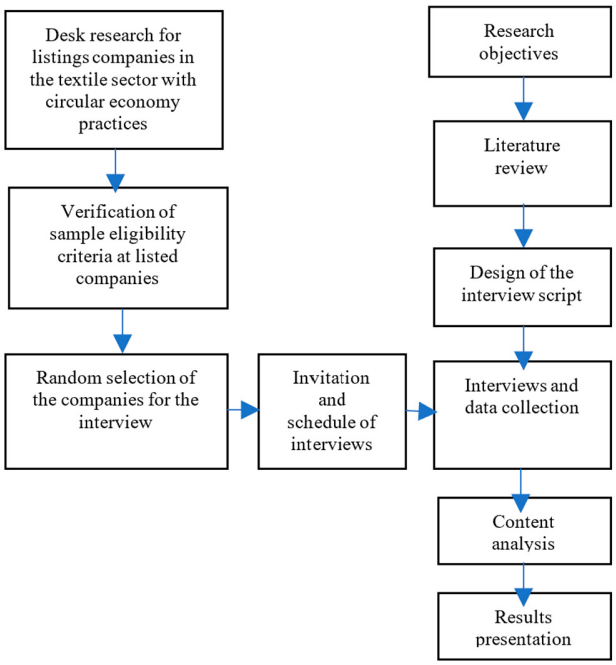

Figure 2: Flowchart of the methodological process.

Table 3: Systematization of the interviews carried out.

Companies Interviewed	Date of the Interview	Duration in Minutes	Geographical Area of the Companies
Company A	20 July 2022	52 min	North
Company B	4 August 2022	48 min	Alentejo
Company C	18 August 2022	37 min	North
Company D	19 August 2022	31 min	Lisbon
Company E	29 August 2022	36 min	Lisbon
Company F	30 September 2022	39 min	North

wee, 'trends pass from one moment to the next, whereas the clothes they produce are designed to last for generations'.

In contrast, the manager at company F asserts that their work is founded upon a distinctive and authentic conceptual framework, centered on the themes of nature and a conscious lifestyle, irrespective of prevailing market trends in the field of fashion.

One of the participating companies says that the attention to market trends goes beyond the analysis of fashion trends, but also to consumer behavior in terms of times of the year when consumers show a higher level of

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demand (Company A). As mentioned by the interviewee, being a slow fashion company does not preclude them from paying attention to market fluctuations, as 'such times present a great opportunity to sell' (Company A).

4.1.2. Launch of New Collections

Regarding the launch of new collections, the interviews revealed that the textile companies introduce a relatively small number of new collections, with none of the interviewees launching more than four collections per year. The launch of new collections mainly considers the seasons of the year. While some companies, such as company A, only launch two collections (autumn/winter and spring/summer), others still launch mid-season collections (e.g., company B).

As argued by one of the companies, the claim that it specializes in slow fashion provides a rationale for the limited release of new collections (Company A). The use of capsule collections, featuring a smaller number of pieces per release, is a current practice among the interviewed companies (Companies A and E). This option is also aimed at creating the image of a certain exclusivity of the brand (company E). Some companies even indicate that they only launch new collections when the previous ones are sold out (companies B and E).

Another respondent expressed their future desire to launch only one collection per year (company C).

Company B also states that the launch of new collections is influenced by the circular economy practices it adopts. First, because they work with dead stock, the availability of fabrics is limited, which affects their ability to launch new collections. On the other hand, they prefer not to launch all the new products at the same time, to avoid over-consumption and to promote conscious consumption, by adjusting the timing of the launch to the appropriate times when needed.

In contrast, another company interviewed (Company D) mentioned only work with small collections, on a drop-by-drop basis. In such a context, the company launches pieces as they are finished and does not work with larger collections. This approach is justified mainly by the constraints imposed by the small size of the company, rather than for strategic reasons.

Another company (Company A) stated that their strategy is to re-use pieces that did not sell in previous collections and to introduce small updates to be included in the new collection. Company A also believes that its customer base is not particularly excited by the fact that the company is launching new products on the market, but rather by the assessment they make of the products the company has in its portfolio.

4.1.3. Marketing and Customer Relationship

Several approaches are followed by companies related to their marketing strategies and customer relationships.

According to all companies interviewed, there is a focus on online sales through the website and social networks as one of the main channels for customer contact.

There is also an emphasis on participation in face-to-face events and trade fairs, which are seen as important for direct contact with customers and as a way of obtaining feedback (Company A and E).

Feedback from customers is also offered on social networks (Company B and D) and in direct contact with the company (Company B). One participant (Company D) also emphasized the importance of more personalized interaction with customers. Company B, on the other hand, considers that, as the company has been in the market longer, the website and social networks have taken a more central role in sales success, requiring less and less customized contact.

There are also collaborative advertising campaigns with other sustainable partner companies (Company A). The aim of this strategy is to reach a wider audience at no extra cost and to achieve the desired objective. The representative of company B emphasized the importance of word of mouth in promoting the brand and attracting new customers.

The costs related to marketing activities are not negligible for this type of company (Companies A, B, C, and E). As mentioned by company E, marketing is one of the company's main costs, along with production costs. For company C, in turn, the high marketing costs are part of the business of this type of company. The same phenomenon is observed with the manager from company B, which emphasizes the importance of increasing investment in marketing to grow and succeed in the business.

Most companies consider they have a good ability to retain customers (Companies B, C, D, E, and F). This is an important indicator for managers as it reflects the customers' satisfaction with the brand (Company C).

In addition, some of the companies interviewed say that consumers follow the company closely, monitoring and anticipating news (Company C and E).

As mentioned by the interviewees, "Interviewee D stated, most of the customers are very active," and "Interviewee E said that they like to buy our pieces again". According to the interviewees, customers pay attention to the launch dates of new products (F), although they ask questions about the sustainability of a new product (B). Although it has a good customer loyalty rate, company B emphasizes that it does not want to "appeal to excessive consumption, but rather to conscious consumption".

4.2. Quality Obsolescence

4.2.1. Durability of the Products

When asked about the durability of their clothes, all the respondents mentioned that their products were expected to be highly durable. Some companies (A, B, C, and E) mentioned difficulty quantifying durability as they are relatively new to the market, though consumer feedback on durability has been very positive. Although the feedback they get from consumers about durability is very positive. The companies indicate that they are very concerned about the durability of their products, which is one of the objectives of the organization itself (companies A, B, C, and F). In the words of the person in charge of company B: "As a slow fashion brand, our main purpose is to make sure that the pieces last and can be used several times". As expressed by the head of company E, their pieces have the potential to be passed down from generation to generation.

Even so, the interviewees added that the durability of their products depends not only on the company but also on the care of the consumer (companies A, B, D, E, and F). For the interviewee from company D, "it all depends on the care that the customers take with the pieces. If they take good care of them, they will last a lifetime". Similarly, the representative of company E mentions that they inform consumers about how to take care of the items to increase their durability and encourage them to donate or recycle them at a later stage.

4.2.2. Internal processes for quality control

When evaluating the quality control processes applied by the companies, it can be seen that they implement processes that they consider to be very demanding (Company A). In all cases, quality assurance begins with attention given to the materials used in production, which are carefully selected and/or evaluated (companies A, B, C, D, E, and F).

The quality control process can include several tests that are applied from the fabric test to the final product test (companies B, C, D, E, and F), including packaging, to ensure the control of the product before it is sent to the customer (companies D and F). According to one of the interviewees, the selection of suppliers is also an important element to ensure the quality of the materials (company C).

It should be noted that the quality control process implemented by one of the companies (Company A) also benefits from the knowledge previously acquired from working with other brands in the sector, which is highlighted as important by the interviewee.

4.3. Knowledge of the Term Planned Obsolescence

Finally, at the end of the data collection process, an analysis was conducted to assess whether respondents were familiar with the concept of planned obsolescence. The results show that most of the companies claim not to be familiar with this concept (companies A, B, C, D, and E). Only one of the companies interviewed claimed to know what the term meant (Company F), mentioning that their strategy was exactly the opposite. All the other companies, once they were aware of its meaning, stated that they did not apply planned obsolescence practices within the company (companies A, C, B, E, and F). To refute the use of planned obsolescence practices, the respondents cited the quality of their products (Company A) or the timelessness and versatility of the products offered (Company E). One company (company F) stated that planned obsolescence contradicts their business model, which emphasizes using design to transform products and resources (company F).

5. Discussion

The analysis of the presence of planned obsolescence strategies in companies in the textile and clothing industry is summarized in Table 4.

The study indicates that there is no presence of quality obsolescence strategies in the textile and clothing companies operating within the scope of the circular economy. This is reflected in their concern about the quality and durability of the products they offer, which has been a major focus since the companies began operating.

The findings of the study indicate that companies prioritize the perceived value of products over the quantity sold, particularly if sales are driven by the necessity of replacing a damaged product.

Given the positioning these companies want to achieve in the market, they reject the possibility of resorting to strategies aimed at increasing sales by reducing the quality of the products.

Concerning the potential presence of psychological obsolescence strategies, the findings are somewhat ambiguous.

Although some companies claim not to change their products in line with new market trends and to be very cautious when launching new collections, all of them have a strong marketing orientation, which is recognized as very important for the commercial dimension of the company and the success of the business.

Although these practices constitute some kind of strategy of psychological obsolescence, they are less environmentally and socially evasive than that adopted by

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Table 4: Systematization of the results attained.

Category	Sub-Category	Company A	Company B	Company C	Company D	Company E	Company F
Psychological obsolescence	Follow the fashion trend	Low	Yes	Yes	No	No	No
	Creation of new consumer desires (Launch of new collections)	Limited (2 collections per year + a small special collection). Introduction of previously unsold items into the new collection	Limited (4 collections per year)	Limited (4 collections per year)	Very limited (work with drops)	Limited (2 to 3 collections per year)	Limited (2 collections per year)
	Marketing and customer retention relationship	Use of both online and offline marketing strategies. Marketing costs are high.	Mainly use online marketing strategies. Rising marketing costs. High customer retention rate.	Mainly use online marketing strategies. Marketing costs are high. High customer retention rate. Consumers are actively involved.	Mainly use online marketing strategies. High customer retention rate. Personalized support and communication.	Use of both online and offline marketing strategies. Marketing costs are high. High customer retention rate. Consumers are actively involved.	Mainly use online marketing strategies. High customer retention rate.
Quality obsolescence	Durability of the products	High	High	High	Very high	High	High
	Internal processes for quality control	Yes (material selection).	Yes (material selection and evaluation carried out)	Yes (selection of materials and suppliers; assessment carried out)	Yes (material selection and evaluation carried out)	Yes (material selection and evaluation carried out)	Yes (material selection).
	Knowledge of the term planned obsolescence	No	No	No	No	No	Yes (is the opposite of what the company wants to do)

fast fashion companies. As a result of their commitment to circular economy strategies, these companies are more concerned about the negative impacts of their activities and how they can minimize them, despite working in a highly competitive sector that is recognized as one of the most polluting. The fact that these companies use more environmentally friendly materials and try to reuse dead stock in production helps to reduce the overall amount of waste produced.

The results indicate that the role of the consumer is crucial in maintaining the value of the product, since it is the use and care of the piece that determines the extension of its life cycle [20] and in adopting more ethical and sustainable purchasing behaviors.

6. Conclusions

The main objective of this research was to understand the possible use of planned obsolescence strategies in companies in the textile and clothing industry using circular practices. Based on the results obtained, it can be found that quality obsolescence strategies are not used, although a slight presence of psychological planned obsolescence strategies could be found. In an increasingly fast-moving world and a market as competitive as fashion, it is difficult to stand out from the crowd, especially with fast fashion companies as competitors. Companies working within the circular economy must know how to implement strategies to differentiate themselves and, most importantly, survive.

Therefore, in the presence of planned obsolescence strategies in the textile and clothing industry, the launch of limited-edition collections and exclusive designs are a way to ensure the success and survival of this type of business, since they give the consumer a sense of exclusiveness, which translates into a later interest in the launch of new collections. It should be noted, however, that while these companies resort to psychological obsolescence strategies, this application does not necessarily have to be negative. This study has shown that there are several ways to overcome the challenges posed by the application of planned obsolescence. The first way is related to the implementation of circular economy strategies in the context of extending the product life cycle or waste recovery through reuse and reintroduction of waste into the production process. The second is to reduce the number of collections launched each year. Unlike fast fashion companies, which can launch up to fifty-two collections per year, these companies launch a maximum of four collections per year, following a slow fashion logic where each collection launched has a limited number of pieces. The third type is linked to the reuse of materials and dead stocks. The implementation of this type of policy leads to a reduction in the waste associated with planned obsolescence, as garments that consumers are no longer interested in keeping are given a second life and a new value, which otherwise would not be possible.

Understanding the presence of planned obsolescence strategies in circular economy models has allowed us to observe that companies do not resort to quality obsolescence strategies, as it is a strategy that goes against everything they stand for.

Despite some limitations of the research, related to the limited number of interviews, important practical conclusions could be derived, especially for professionals in the sector and for policymakers.

Future studies could extend the knowledge attained by this exploratory study by conducting a quantitative analysis of the relationship between these strategies and company performance.

Author Contributions

Conceptualization. S.B., J.F.S., and M.S.; Data curation: M.S.; Formal analysis: M.S., S.B., and J.F.S.; Investigation: M.S.; Methodology: M.S., S.B., and J.F.S.; Project administration: J.F.S. and S.B.; Software: S.B.; Supervision: J.F.S.; Validation: S.B., J.F.S.; Visualization: S.B. and M.S.; Writing---original draft: S.B., J.F.S., and M.S.; Writing---review & editing: J.F.S., S.B. All authors have read and agreed to the published version of the manuscript.

Availability of Data and Materials

The data supporting the findings of this study are included within the manuscript.

Consent for Publication

No consent for publication is required, as the manuscript does not involve any individual personal data, images, videos, or other materials that would necessitate consent.

Conflicts of Interest

There are no conflicts of interest to report.

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Appendix A

Script for the semi-structured interviews

Section 1: Introductory questions: general characterization of the interviewee and the company

Section 2: Programmed obsolescence

a. Psychological obsolescence

How many collections does your company typically launch each year?

Do these collections usually follow current fashion trends?

Do your consumers respond actively to the launch of new products?

b. Quality obsolescence

What is the average lifetime of your products?

Do you take care in the selection of the raw materials that make up your garments?

Can you please describe how the quality control process for your garments is carried out?

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c. Familiarity with the concept of planned obsolescence

Have you heard about the topic of planned obsolescence?

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