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## UPCYCLING IN FASHION – A LITERATURE REVIEW

BY

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**Abstract.** The concept of upcycling is an integral part of modern fashion. It involves reusing clothing products that are no longer useful or have reached the end of their life cycle by converting them into new, value-added products. Because of its potential to improve environmental efficiency, the concept has attracted widespread attention from business and academic communities. This study highlights how academic research has been conducted on this topic. The methodology was developed through a systematic literature review and data analysis from the last ten years. The study explored the distribution of papers through different approaches (year, country, authors, methodology). This study will help academics and researchers expand the scientific literature's scope. As a result, 102 papers were obtained from various sources such as conferences and journals. The scope of this paper is to review the literature on this topic and to examine how it is disseminated in the digital age.

**Keywords:** sustainability, review, reuse, circular economy, redesign.

### 1. Introduction

The fashion industry has grown increasingly, amplifying its environmental impact. Current economic and industrial systems are based on a 'take, produce, throw away' approach to waste management (Stahel, 2016). This

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method involves extracting resources to produce products that end up in landfill or incineration. This system contributes to environmental pollution and economic and social impacts (Rostek and Biernat, 2013). Thus, different approaches are being pursued to increase production efficiency and develop sustainable processes (Webster, 2015; Caldera *et al.*, 2019).

The importance of sustainable development and progress toward a circular economy has increased significantly in recent years due to changing consumer habits and attitudes (Razminiene, 2019; Bridgens *et al.*, 2018). There is also a growing awareness of sustainable consumption and production practices (Leal *et al.*, 2019).

One of the primary contributors to the circular economy is the upcycling process. A circular economy is characterized by zero waste going to landfill and minimal use. Products and resources at the end of their life can be directed to the upcycling process to bring them to a higher quality to continue sustainability (Bocken *et al.*, 2016).

Upcycling can help reduce the amount of solid waste in landfills (Sung, 2017). Both consumers and businesses should consider waste as a resource to support a more circular economy (Ünal *et al.*, 2019; Henry *et al.*, 2020; McDonough and Braungart, 2002).

The Oxford Dictionary defines upcycling as transforming waste items into something of higher quality and aesthetic value (Oxford Dictionaries, 2022). Upcycling can serve as an industry-wide definition for a product or textile. Thus, the Dictionary of Sustainable Management describes upcycling as "a process of transforming a material (industrial nutrient) into something similar but of high value" (Kyungeun *et al.*, 2014). According to Szaky, product upcycling is one of the most sustainable practices in the circular economy, as it requires minimal energy consumption (Szaky, 2014).

In terms of connotations in the literature, when it comes to sustainability through upcycling, most authors focus on the study of textile waste for remodeling, reuse, or surface transformation (Fraser *et al.*, 2011). The number of books, articles, and scientific papers on upcycling has increased recently, with titles published in fields such as art, craft, product and interior design, business, and economics.

This study analyses the different views presented in academic texts on upcycling. We sought to respond to how the process of upcycling has been presented in academic studies since 2012. By analyzing data collected from various sources, such as journals, research areas, and countries, we could identify the type of approach used and the current state of scientific research on the concept of upcycling. This study was conducted through a systematic review, research that aims to collect data to develop a better understanding of the topic. This analysis allows us to gather vital information to improve scientific knowledge.

## 2. Research methodology

This review aims to identify the different elements of upcycling in the fashion industry and synthesize published research. It also aims to analyze data and improve the transparency of industry efforts. This analysis has been undertaken to identify what drives the fashion industry's continuous improvement in the upcycling process and how it can improve its performance.

A systematic review was conducted to analyze the various scientific articles on upcycling. This type of research is beneficial when evaluating data as it allows the researcher to evaluate the information directly. A systematic review is generally appropriate for studies that focus on a narrow scope and are usually conducted with a limited objective. It can be used to identify the most relevant secondary data and to develop a strategy to address the problems identified (Saunders *et al.*, 2016).

This systematic review process involves five steps. The first stage of this study involved the selection of academic platforms to collect the data needed for the analysis. The following databases were considered: Scopus, Web of Science, Google Scholar, Academia Edu, and Science Direct. Due to their high quality and extensive coverage, these databases reliable sources for analyzing scholarly papers. The second step is to develop strategies for filtering papers according to the limitations of the search terms. This stage should include the publication title, keywords, and abstract.

After collecting information about the concept of upcycling, a list of keywords was developed. These were then used to conduct a systematic search of related articles. The following search strings were used: "textile upcycling", "fashion", "sustainability", "reuse", "longevity", and "redesign upcycling". The aim was to search as precise and targeted as possible. Articles from the selected journals were chosen based on their quality over ten years (2012-2022).

By entering the phrases listed above in the search box, documents related to this topic were obtained. In total, 299 documents were found.

The literature review process was inductive and involved modifying and grouping categories. A manual analysis of abstracts, titles, and keywords was also conducted to identify those most relevant and focused on upcycling in fashion. The inclusion criteria focused on the database's scope, covering many English studies. Quotation marks were also used to prevent specific articles from being excluded from the database.

Selected research that did not meet the requirements of the systematic review was excluded from the search. This decision was based on various criteria used to select texts, such as the need for comprehensive online resources and the superficiality of the topics. Papers published in 2023 were not included in this review due to the ongoing nature of the research cycle and the need for a defined completion date to develop these studies. At this stage, we eliminated 127 papers unrelated to the study topic. Selected articles were excluded from the scope of the

research due to their external references. The entire text of the publications was assessed and subjected to the final criterion of the exclusion procedure.

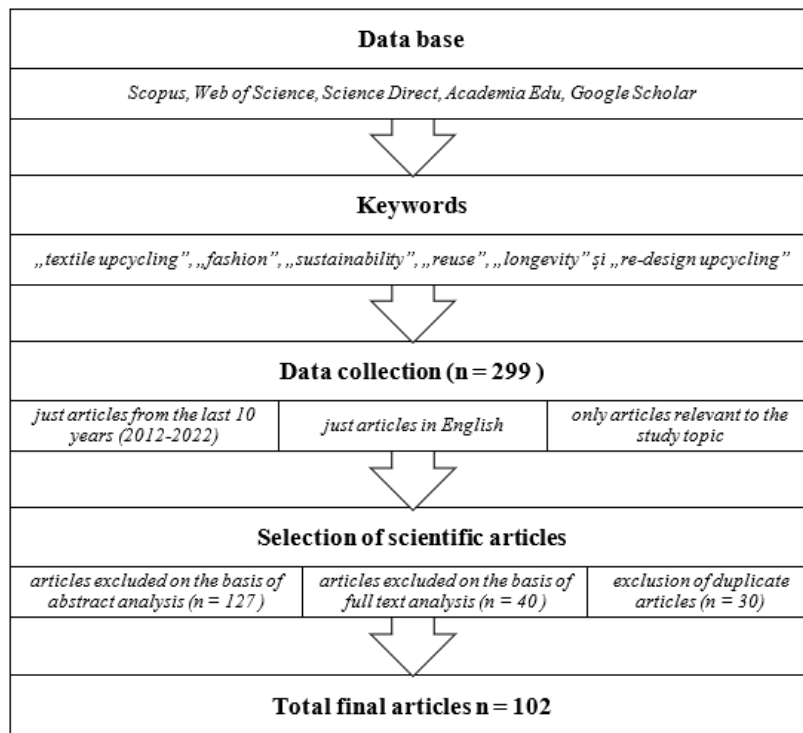


Fig. 1 – Flow chart of the research process.

To ensure that the analysis was carried out systematically, parameters were established and used to guide the most critical points of the analysis. To understand the research context, we also looked at the sources of information and where it was applied. In this way, we can identify the factors that influenced the development of the research topic. Another critical aspect of the analysis is the consideration of the methodologies used to build the basis of the upcycling concept.

To deepen the literature review, it was decided to configure the current state of knowledge to be guided by the different topics related to the upcycling process. These include the terms used for this concept, the companies studied in this field, and the performance objectives related to this specialization. First, the concept of upcycling was identified, and then its application in the fashion industry was analyzed. A total of 102 publications were then read and recorded.

### 3. Descriptive analysis

This study aimed to comprehensively analyze different aspects of the upcycling theme by exploring its methodological features. This study also aims to identify factors influencing the distribution of articles from the following perspectives: (1) distribution of publications over time, (2) distribution of publications within journals, (3) distribution of publications by author, (4) distribution of publications by country, (5) distribution of publications by methodology.

#### 1. Distribution of publications over time

The figure below shows the evolution of the number of articles published on fashion and upcycling over the last ten years. In 2014, the number of articles on this topic increased exponentially. The sharp increase in the volume of articles in 2014 shows how relevant the topic of fashion upcycling is in the current era.

The first three years of the upcycling research program were auspicious, with around 11 articles published. Figure 2. shows that the number of studies published in the second three-year period (2015-2017) has steadily increased. The average annual figure was about 10.7. This figure is still higher than in the previous three years (about 3.7). The last five years of the field research program have shown significant trends in studies. In the period 2018-2022, about 59 studies in total were published. This distribution from 2018-2022 represented an increase over previous years and exceeded the average. It was also the period with the most academic debates.

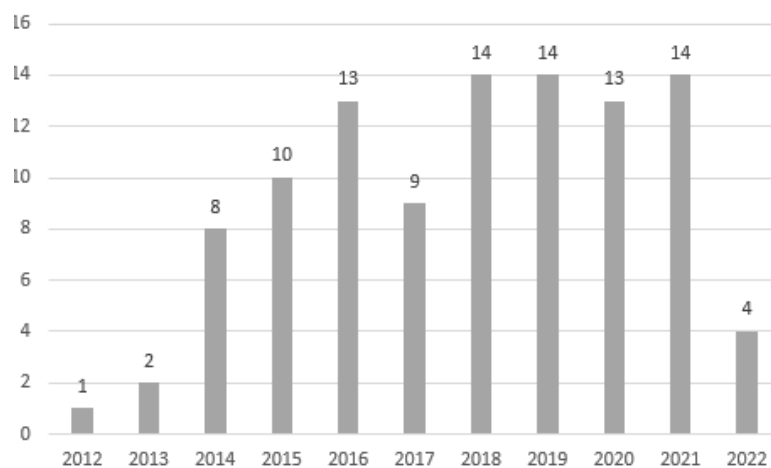


Fig. 2 – Distribution of publications over time.

The topic of developing and implementing the upcycling process continued to be discussed. Various studies have been carried out on the subject. For example, the company specializing in trends and color prospecting is known as Pantone (Nascimento *et al.*, 2018; Barros and Barden, 2019) identified 2019 as the year of Greenery.

In 2013, Gardetti and Torres published a book highlighting the different aspects of fashion and the gradual evolution of society toward adopting a more sustainable lifestyle. The information presented in the book also indicated that the number of studies focused on the fashion market has increased. This happened because the growing number of people aware of their consumption has become more widespread.

## 2. Distribution of publications within journals

The leading journals in which these articles on upcycling have been published cover various topics and are part of different fields of interest. The table and figure below show the journals with the most publications on fashion upcycling within the databases selected for research.

**Table 1**  
*Distribution of publications within journals*

Journals	Quantity	Percent
Journal of Business Research	2	4%
Journal of Cleaner Production	5	9%
Sustainability	6	10%
Fashion Practice	5	9%
Journal of the Korean Society of Clothing and Textiles	2	4%
The Research Journal of the Costume Culture	2	4%
Fashion and Textiles	2	4%
Journal of the Korean Society of Costume	2	4%
Others	32	55%

Table 1 shows that of the 58 papers published in journals, the journal Sustainability, published by the Institute for Multidisciplinary Digital Publishing, accounted for 10 percent of the publications released. The number of publications in the table increased as more journals were added. These include the Journal of Cleaner Production, Fashion Practice, The Research Journal of the Costume Culture, Journal of Business Research, Journal of Korean Society of Clothing and Textiles, and Fashion Practice. The most significant proportion is 55%, representing journals with only one publication on fashion upcycling. This theme is essential for these journals as it allows them to reach a broader audience and develop a multidisciplinary approach. In addition to offering a variety of research topics, these magazines also focus on the fields of sustainability, marketing, and management.

### 3. Distribution of publications by author

The primary authors presenting a wide range of publications on the concept of upcycling are shown in the figure below.

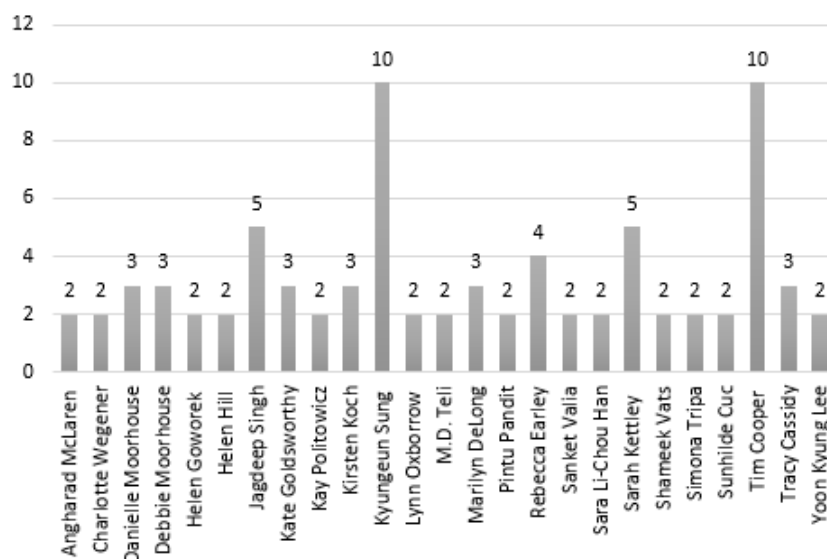


Fig. 3 – Distribution of publications by author.

Distribution of published works is crucial to any author's career. It can help them establish a strong and lasting presence in the community and increase their visibility. However, in terms of fashion upcycling, the work of Kyungeun Sung and Tim Cooper is frequently published in fashion magazines. This defines them as among the most prolific authors in the field, followed later by Sarah Kettley, Jagdeep Singh, and Rebecca Earley, with fewer papers. The most significant percentage is represented by authors with three, two, or one published paper in this area of upcycling.

### 4. Distribution of publications by country

The range of studies covered by the scientific work included several countries. The United Kingdom, India, South Korea, and the United States were the most frequently mentioned, followed by Australia and Sweden. Other countries included Brazil, Egypt, Estonia, Finland, France, Indonesia, Portugal, and Romania. The remaining countries not listed here are mentioned in Figure 3.4 below, with several publications of one or two papers. The United Kingdom leads the list with 30 papers, followed by India with 26, South Korea, and the United States with 19 publications. The leading position of the UK and India is

because most of the research in these two countries takes place in their respective regions. This allows us to study the different contexts of these two countries.

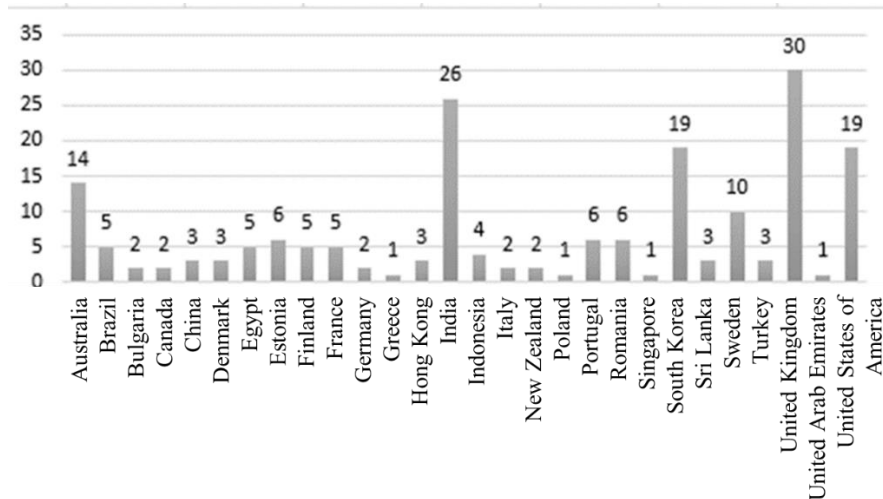


Fig. 4 – Distribution of publications by country.

##### 5. Distribution of publications by methodology

Figure 5 shows the distribution of works according to the methodology used. Most of them use quantitative methods such as mathematical models and surveys. Case studies, on the other hand, use qualitative approaches. Other studies include literature review, analytical research, experimental research, survey, interviews, and focus groups. These methods of analysis have the following objectives and directions:

- Case studies are usually conducted intensively and systematically to examine a single group, community, or individual. They involve examining data that are related to several variables. The literature review is a type of research that aims to identify a specific topic and comprehensively analyze its different aspects (Woods, 1980).
- Analytical research is a type of research that focuses on the analysis of a particular issue.
- Experimental research is a type of research that uses variable selection to identify the effects of these factors on a study.
- The survey is a type of research that uses quantitative data (McGraw and Watson, 1976).



- The interview is a type of research to obtain verbal information from a specific target audience (Fontana *et al.*, 2005).
- A Focus group is a type of research that aims to bring a group together to acknowledge a particular research design (Bloor *et al.*, 2001).

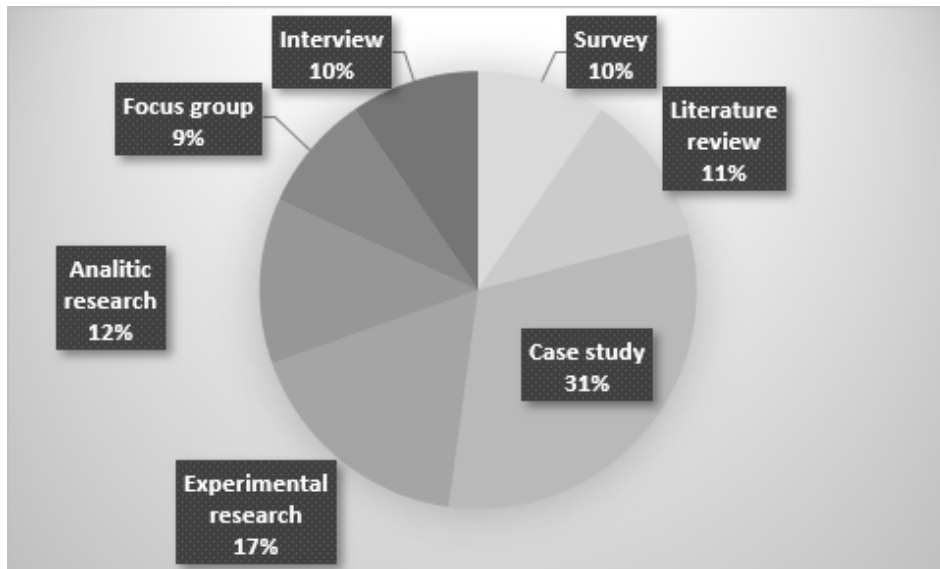


Fig. 5 – Distribution of publications by methodology.

The systematic review of the literature on this topic has highlighted the different types of studies that have been carried out. Some presented multiple methods, highlighting the importance of the principal research methodology. The number of cases supported by case studies was 31%, while the literature review was 11%. This percentage shows that a significant part of the research is still at the stage of theoretical development. The direction of the upcycling process of the business sector toward the consolidation phase will continue. After the qualitative case study research, experimental research was the most common type of study. Other studies included analytical research at 12%, surveys at 10%, focus groups at 9%, and interviews at 10%.

#### 4. Conclusions

In conclusion, analysing upcycling in fashion provides valuable insights into the existing literature and research landscape. Investigating various factors, such as dissemination of work overtime, journals, methodology, and authors, highlighted the emerging nature and growing curiosity towards upcycling in the fashion sector.

Researchers' interest in upcycling in the fashion sector is found to have grown progressively, as reflected in the distribution of articles over time. This indicates its growing importance as a topic of analysis. The significant role of upcycling in the fashion industry supports the broader global shift towards sustainability and circularity.

An examination of the articles published in the journal demonstrates that upcycling in fashion is interdisciplinary. There are contributions from environmental science, design, business, and sustainability. To address the challenges and opportunities related to upcycling, it is essential to take an interdisciplinary approach and promote collaboration between different fields.

The methodology of the work reveals a variety of research approaches. Qualitative and quantitative methodologies are included here, with theoretical frameworks and survey-based research techniques. This diversity shows how complex upcycling in fashion can be, highlighting the importance of comprehensive and multifaceted investigations.

The analysis of countries and authors revealed a worldwide interest and contribution to fashion upcycling. Researchers from different countries research upcycling, indicating widespread recognition and involvement in the topic internationally. This highlights collaborative efforts and global dialogue to advance the understanding and implementation of upcycling practices.

In addition, inspecting the people writing for the literature exposes a diverse crowd of scholars, researchers, and practitioners. The topic of upcycling in fashion actively engages them. The enrichment of the discourse comes from the diversity of perspectives, promoting a holistic understanding with varied expertise on the topics.

Overall, although there are some constraints on current studies of garment upcycling in a new product line within the fashion industry, they are still sufficient to set the stage for further studies. We can improve our understanding of upcycling of fashion garments by recognizing and addressing current limitations through thorough research efforts. Our contribution can also develop a more sustainable and circular fashion industry.

This paper has provided a theoretical analysis of the literature. New opportunities for research and exploration have been identified, as well as trends and gaps. This paper has created a starting point for further studies to expand the conversations about upcycling in fashion by scrutinizing and synthesizing existing work. Future studies can refer to this work as a resource to advance the conversation about upcycling in fashion.

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## UPCYCLING ÎN MODĂ – O ANALIZĂ A LITERATURII

(Rezumat)

Conceptul de upcycling face parte integrantă din moda modernă. Acesta presupune reutilizarea produselor de îmbrăcăminte care nu mai sunt utile sau care au ajuns la sfârșitul ciclului lor de viață, prin transformarea lor în produse noi, cu valoare adăugată. Datorită potențialului său de îmbunătățire a eficienței de mediu, conceptul a atras atenția pe scară largă din partea comunităților de afaceri și academice. Acest studiu evidențiază modul în care s-au desfășurat cercetările academice pe această temă. Metodologia a fost elaborată printr-o revizuire sistematică a literaturii și o analiză a datelor din ultimii zece ani. Studiul a explorat distribuția lucrărilor prin diferite abordări (an, țară, autori, metodologie). Acest studiu va ajuta cadrele academice și cercetătorii să extindă domeniul de aplicare al literaturii științifice. Ca urmare, au fost obținute 102 lucrări din diferite surse, cum ar fi conferințe și reviste. Scopul acestei lucrări este de a trece în revistă literatura de specialitate pe această temă și de a examina modul în care aceasta este diseminată în era digitală.