

# Circular Fashion

Subjects: Others

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The textile and fashion industry has had significant technological developments but is currently criticised for its environmental and social impacts and for being a major contributor to waste. The rise of the circular economy (CE) has promoted more sustainable concepts, including the trending of recycling strategies to add value to the textile and plastic waste. However, adding value to products and for users implies technical upscaling and clear communication about the benefits of recycling.

Keywords: Circular Fashion, Recycled Textiles, Human Perceptions

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## 1. Introduction

One solution to cope with the issue of textile waste is to establish recycling of synthetics and to develop large-scale textile-to-textile recycling <sup>[1]</sup>. There are different methods of textile recycling from several suppliers with varieties of outcomes regarding price and quality <sup>[1]</sup>. Recycling is defined in the EU legal acts such as “The European Waste Framework Directive” (Directive 2008/98/EC) <sup>[2]</sup>. The definition of recycling refers to material recovery and includes recovery other than energy recovery, in terms of reuse, recycling and backfilling, and other forms of material recovery <sup>[3]</sup>. Waste management is based on the “waste hierarchy” with the following priorities (from most to least preferred option): prevention, (preparing for) reuse, recycling, recovery, and disposal (landfilling and incineration) <sup>[4]</sup>. The definition and distinction of the different terms are essential to apply this legislation. However, there is no common definition, and many descriptions are used for “textile recycling” such as “the reprocessing of pre- or post-consumer textile waste for use in new textile or non-textile products (...) also including the recycling of non-textile materials and products (...)” <sup>[2]</sup> (p. 2). The global Non-profit Organization Textile Exchange describes “preferred fibres” <sup>[1]</sup>, such as “preferred recycled synthetic fibres” defined as “synthetic fibres that have been manufactured from materials recovered from the waste stream” <sup>[5]</sup>. The Ellen MacArthur Foundation <sup>[6]</sup> describes a long-term vision for a new circular textiles economy by aiming for closed-loop clothing recycling, described as “clothing fibres that are recycled back into fibres in clothing production” (p. 122). Moreover, the Mistra Future Fashion research program focused on a circular fashion economy and presented several reports and papers on the topic of textile recycling, including a comprehensive “topology of textile reuse and recycling”, which summaries related terminology of textile recycling from fabric and fibre recycling to polymerisation <sup>[7]</sup>, and “general terminology used in the textile area” in the two reports “The Fiber Bible Part 1 and 2” <sup>[8]</sup>. Recycling of textiles reduces “environmental contacts” in terms of impacts, but different scenarios provide more or less environmental benefits <sup>[7][8]</sup>. In comparison to virgin textile fibres, the authors summarised that textile reuse and recycling have environmental benefits in terms of avoided production—environmental-friendly textiles are supposed to be manufactured with clean processes, and high replacement rates are essential for recycling, as well as short transports and long use phases for reuse, with recycling including non-textile materials and products <sup>[7]</sup>. The use phase estimates one-third of the environmental impacts throughout a product’s life, according to the European Clothing Action Plan (ECAP) <sup>[9]</sup>. Besides environmental and business benefits, there are also advantages for consumers. Filho et al. <sup>[10]</sup> reviewed the socio-economic advantages of textile reuse and recycling models. Economic and social benefits were “empowering consumers, suppliers and involved workers as well as adding value to businesses and communities” (p. 4). Furthermore, it can include design as a “complimentary strategy”, such as “Design for Cyclability”. This strategy designs virgin materials for future recycling and closed-loop systems in terms of “recyclable fashion” with a “short life duration”. It includes design for recycling, up-cycling, design for mono materiality, and design for disassembly <sup>[11]</sup>. This design strategy could be applied for fast fashion consumers of “disposable fashion”, as pre-consumer waste can increase volumes of particular styles <sup>[10]</sup>.

## 2. Human Perceptions of Recycled Textiles and Circular Fashion

### 2.1. Measures for Consumer and Industry Awareness

Awareness was measured towards

- Sustainability in general;
- Consumer recycling and disposal;
- Industrial recycling.

Various articles discussed consumer awareness as well as industry awareness in terms of companies, brands, and designers. For example, Patagonia was one of the pioneering companies using recycled polyester [12]. The two case studies by Baier et al. [13] and Wang and Shen [14] analysed the sportswear brands Adidas and Patagonia and their recycled products. Additionally, researchers are interested in industry awareness of recycling in terms of designer awareness. This study proved that the “sustainability gap” also exists among practitioners [15]. Still, manufacturers felt the pressure towards increased recycling practices.

When analysing the awareness towards sustainability, on the one side, it was found that consumers have an increasing awareness of sustainability in general. On the other side, little and complete lack of awareness exists among consumer groups. Awareness was measured in different ways. Awareness was assessed in terms of environmental issues and ocean plastic recycling [16]. Recycling was seen as an ancient process that is even linked to reincarnation [17].

Awareness can influence sustainable fashion consumption. For example, clothing disposal was positively affected by philanthropic awareness [18]. Accordingly, the development of strategies is needed to foster consumer clothing recycling [18], and unique consumer experience can help to raise awareness through, for example, collaborative redesign [19]. Hence, such sustainable fashion models and concepts mentioned in the reviewed articles were, for example, upcycling and collaborative redesign.

The accessibility of products in terms of widely available and mainstream point of sales might stimulate awareness and consumer behaviour, but consumer perception of fashion production processes such as usage of chemicals might still be limited [20]. The sustainability concept in the fashion industry is perceived as limited to the usage of organic materials and recycling [21]. However, there was limited awareness of fibre recycling and its sustainable contribution [20]. For example, Testa et al. [22] studied the implementation of LCA among SMEs as a collective strategy for exploiting recycled wool. Still, more concrete LCA studies are needed to determine the environmental and social impacts.

## 2.2. Opportunities and Barriers of Attitudes and Response

Attitudes included positive and negative consumer and industry (manufacture, retailer, brands) attitudes and were assessed towards

- Sustainable purchase behaviour;
- Sustainable use behaviour and consumption:

-Sharing economy (collaborative consumption: online rental clothing platforms);

-Upcycling community workshop;

-Collaborative redesign and co-design;

- Sustainable post-purchase behaviour.

There are numerous variables such as consumer demographics or product attributes that influence consumer attitudes towards RT and CF and recycling behaviour. As Park and Lin [23] showed, general consumer attitudes are positive toward circular products, but this might not positively influence green buying behaviour due to other factors, such as perceived values and the product type. For example, running shoes made of ocean plastic received higher purchase intention than a sweater [16]. In collaborative redesign, consumers can be uncertain and may have negative attitudes towards garment-type requirements and time [19], as convenience is crucial [24]. Additionally, consumers can feel powerless [25].

Perceived environmental and economic advantages exist and could be stimulated through additional value attributes in terms of novelty and play, as well as increased familiarity [20]. The positive attitudes towards the creation process of upcycling, such as enjoyment and fun [23], correspond to the findings of happiness in activities by Csikszentmihalyi and Wong [26]. Similarly, Kamleitner et al. [27] found that past identity salience through storytelling results in positive consumer response. Moreover, multiple communication channels, the shopping experience, and digital services could create additional value for consumers [28].

Industry attitudes were highly influenced by external factors such as client preferences [15]. Nevertheless, the benefits of recycling were perceived, such as the expertise in sorting that can increase the brand value [29]. In one study, it was suggested that chemically recycled fibres could be perceived as more “clean” and culturally acceptable than mechanically

recycled fibres [30].

### 2.3. Contexts

Various disciplines and studies were used to understand how RT and CF impact society. Research related to social sciences and humanities in terms of consumer behaviour, and subjects such as sustainable development and consumption, as well as sustainable products and services. Fields included marketing and branding, business, economy and waste management, product design, as well as fashion and culture. The growing trend of the CE concept created awareness among consumers and industry towards sustainable developments in terms of textile waste recycling. This movement could also involve firm engagement with NGOs to support consumer adoption of sustainable products [31]. For example, the registered UK charity WRAP works with governments, businesses, and communities to accelerate the move to a sustainable, resource-efficient economy. Global politics are keenly promoting the CE through consortia such as the Organisation for Economic Co-operation and Development (OECD) and United Nations Environment Programme (UNEP), as well as through reports and events [32]. For example, the UN environment programme presents a circularity platform ([www.buildingcircularity.org](http://www.buildingcircularity.org), 2020), focusing on the plastics, textiles, and electronics sectors. According to the European Urban Knowledge Network (EUKN) [33], the country leaders of CE policies in Europe are Denmark, Germany, the Netherlands, and the UK [32]; in Asia, early pioneers are Japan and China [32]. Several studies targeted the UK, and the survey carried out in the UK by Davis et al. [34] was the most cited paper. The UK has increased interest to implement the CE with reference to its heritage and economy—besides having the highest textile consumption rate in the EU [2], the UK is among the top 10 EU textile and clothing producers, with an economic value of GBP 9 billion [35]. According to the perspective of Hawley [36], the textile recycling process is a global system. Increased textile waste globally makes it necessary to implement disposal strategies and cross-cultural research. For instance, Ianole-Calin et al. [37] found different consumer attitudes toward collaborative consumption in Romania and Italy.

Several of the articles used case studies [31][38][22][14][39][40][41][13] and had various specific contexts to study consumer and industry perceptions in terms of textile manufacturers, brands and retailers, and designers, considering geographies, cultures, specific situations, as well as garment types. This more restricted context makes it difficult to generalise these results. For example, Baier et al. [13] focused on the perspective in an apparel and sportswear context. Furthermore, responses to RT and CF were discussed within the contexts of circular business models such as the CE [42][43], as well as sustainable design strategies such as “design for cyclability” [8]. Researchers in the sustainability field have established ground-breaking concepts for sustainable development and waste management, such as the “cradle-to-cradle” philosophy by architect McDonough, as well as the work of process engineer Braungart [44], who with regards to the notion of “why being ‘less bad’ is no good” states the limited benefits of merely reducing, recycling, or downcycling. In one article, consumers had similar attitudes towards the quality of recycled materials, perceived as “not as good” but “improving” compared to conventional materials [20] (p. 275). Negative perceptions towards RT were linked to contamination theories. In social sciences, de Coverly et al. [45] discussed “the social avoidance of waste” and stated that “waste is socially sensitive”. Derksen and Gartrell [46] studied the social context of recycling and found that besides concern and attitudes towards the environment, people need access to a structured recycling program to adopt pro-environmental behaviours in terms of recycling. Several articles considered accessibility and convenience as dominant factors. For example, availability and accessibility of recycling options were important factors to facilitate attitude formation of an intention to recycle garments [41], with widely available and mainstream point of sales stimulating awareness of recycled products [20]. Recycling exists far back in history and has often emerged in a new way or trend, for instance, upcycled saris that were used then and now in different contexts, with reference to “reincarnation” and creating cultural meaning [17].

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