





Going Green and Socially Responsible – Textile Industry in Transition to Sustainability and a Circular Economy

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Abstract

The textile industry is faced with many problems today. In addition to having to meet customers' changing preferences and expectations, who wish to stay abreast of fashion trends and stand out from the crowd, it also needs to make efforts to change its image of one the biggest polluters in the world it has earned due to production processes consuming large amounts of resources that end up as piles of household waste. The circular economy (CE) model to reduce the environmental footprint seems to be the right solution for textile companies implementing sustainable development strategies. This paper discusses the principles of the CE model and makes an attempt at explaining how textile companies transition to it. It is based on the analysis of 34 textile companies sampled from among the members of the European Circular Economy Stakeholder Platform, which was conducted using a special analytical checklist compiled from the ReSOLVE and BECE frameworks. Because of the proportions and degree of integration between strategic and operational practices they used to achieve circularity, they were divided into integrated, hybrid, and selective organisations.

Key words: textile industry, circular economy, sustainability, business models, transition path, circular business model.

Introduction

The textile industry (defined herein broadly as consisting of textile, apparel and leather, clothing and fashion industries) is under constant pressure caused by customers' changing preferences and the need to deliver products and services at an ever increasing pace. Its chains of supply are frequently criticised for the unfair behaviours and environment-threatening practices of those who participate in them [1]. Moreover, the textile industry is still deemed one of the biggest polluters in the world [2]. The annual carbon footprint of the fashion industry's product life cycle (3.3 billion tons of CO₂ emissions) is almost equal to the carbon footprint of the EU's 28 countries/regions (3.5 billion tons) [3]. Fischer and Pasucci, who studied its environmental footprint, concluded that in addition to consuming huge amounts of resources, the textile industry is also responsible for 5% of the global volume of waste [2]. It is hardly surprising given that the fast fashion companies strive to meet the expectations of their customers by placing new collections on the market every month [4, 5]. As tastes and fashion change fast and the quality of clothes is low [6], they are soon discarded to be replaced by new ones. According to the available estimates, in the Netherlands, Great Britain and the Nordic countries, 61% of used clothes end up in landfills or are incinerated. Of the remaining 39%, 84% are reused and 16% are recycled (actually down-cycled),

which gives them a second life as cleaning towels, etc., which are ultimately also incinerated or landfilled. In other words, the proportion of textile waste that goes to recycling today is greatly insufficient for the system to be called circulatory. Therefore, the right solution for textile manufacturers pursuing sustainable development strategies seems to be a transition to the circular economy (CE).

The importance of moving towards the circular economy has been acknowledged by the international political agenda for sustainable development. The members of the UN Conference on sustainable development in Rio de Janeiro in 2012 adopted a document entitled *The Future We Want*, which was a plan concerning the development of Sustainable Development Goals for guiding economies' transition towards circularity and inclusiveness [7]. Three years later, in 2015, the world leaders established the *Agenda for Sustainable Development 2030* as well as seventeen *Sustainable Development Goals* [8], which replaced the *Millennium Goals*. Although research shows [9] that the CE model can support the accomplishment of all *Sustainable Development Goals*, it is important to note, regarding the purpose of this study, that it seems particularly useful for Goal 12, concerning sustainable production and consumption. The Goal 12 tasks are believed to ultimately reduce the volumes of waste through prevention, reduction, recycling, and reuse. The European

Commission also found the CE model worth recommending [9, 10]. Its communication of December 2015: “Closing the loop – An EU Action Plan for the Circular Economy” contained a document with proposals of amendments to the directives on waste management.

The concept of a closed-loop economy (also known as a circular economy or cradle-to-cradle (C2C) economy) derives from the green economy model, which integrates sustainable consumption and production, green growth, low-emission economy, and efficient use of resources. According to the most popular definition proposed by the Ellen MacArthur Foundation [11], the CE is an industrial system that builds and regenerates by assumption and design. A similar definition was presented by Geissdoerfer et al. [12], who described it as a regenerative system where resource use, emissions and waste generation are minimised by closing material and energy loops. The key elements of the system are long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling processes [12]. Products which have completed their useful life do not end in a waste bin or on a landfill but are recovered and recycled for future use [13]. Accordingly, the circular economy enables products to keep their ‘value added’ for as long as it is possible, thus eliminating all waste and saving resources [10]. The CE concept reconciles production and service-delivery processes with the environment and economy in which companies operate, and promotes regeneration as a method for improving the life and economy models [14]. Overall, its main goal is to save resources from depletion and to ensure development sustainability at three levels: micro (enterprises and consumers), meso (eco-industrial parks), and macro (cities, regions, and governments) [15].

At the micro level, the CE concept model has been embraced as a novel circular business model (CBM) offering a new logic for creating value and entrepreneurialism based on the recovery and reuse of the economic value contained in products past their useful life, as well as on their eco-design or cleaner production [14, 16, 17]. The adoption of the logic must be followed by systemic and innovative adjustments inside and outside the company, which are necessary to enable the increased circulation of materials in the production system and the functioning of circular (reverse) supply chains. The CE

concept also involves a new approach to designing (eco-designing) products which allows them to be turned into new products and services after their useful lives, as well as the use of technologies improving the eco-efficiency of production processes, the management of resource, material and components flows data, fostering partnerships with suppliers and customers, the implementation of circular sales models, the redefinition of organisational culture including efforts to raise employees’ environmental awareness and competencies [18], and the creation of innovative job opportunities [11, 19].

The morphological analysis of the designs of 26 CBMs discussed in the literature prompted Lüdeke-Freund, Gold, and Bocken to formulate six major CBM patterns [20]: repair and maintenance models, reuse and redistribution models, refurbishment and remanufacturing models, recycling models, cascading and repurposing business models, and organic feedstock business models. M. Lewandowski [21] noted that most CBMs described in the literature draw on the ReSOLVE framework created by the Ellen MacArthur Foundation, which is considered the precursor of the CE. The ReSOLVE framework contains six transition paths to circularity [11]: (1) regeneration – the use of renewable resources, the conservation and reconstruction of ecosystems, the introduction of recovered biological resources back to the biosphere; (2) sharing – of cars/premises/appliances, using second-hand products; (3) optimisation – by increasing the efficiency of production processes, minimising waste, using big data, and automation; (4) closing the loops by recycling, reuse, etc.; virtualisation – indirect (e.g. online shopping) as well as direct (e.g. electronic books and records); (5) exchange – replacing the existing solutions with new technologies (e.g. 3-D printing) or new types of transport.

The rationality of using the ReSOLVE framework as a basis for our analysis is confirmed by Mendoza, Sharmina, Gallego-Schmid, Heyes, and Azapagic, who report that the framework is used by the majority of businesses switching to CE business models [22]. These authors proposed the backcasting and eco-design CE framework (BECE), a participative tool combining strategic planning and operations [22]. Backcasting is a top-down, strategic business planning approach with which eco-design processes can be

guided toward the achievement of a business vision defined as per CE principles and requirements. Eco-design is a bottom-up, operational approach allowing additional opportunities to be identified, as well as supporting the development of backcasting scenarios toward CE. Accordingly, the BECE framework focuses on a strategic vision and a plan to create a CBM and design product and/or services in line with CE principles. A circular business model derived from the BECE framework is an emanation of a circular business strategy.

The acceptance and integration of sustainability and circularity by an organisation has a significant impact on its strategies. Stubbs and Cocklin argue that sustainable organisations express their strategic purpose, vision and mission in terms of social, environmental and economic outcomes [23]. The company’s mission is a vital element of organisational strategy aimed at explaining why it was founded and how it sees its functioning in social, economic and environmental spheres.

Experiments are often driven by subjective and intuitive judgements [24]. The subjectivity of decision-making during circular business model experimentation was noticed by Konietzko et al. [25], according to whom participants in circular experiments never enter into the process with a blank slate. Rather, they have a set of predetermined means consisting of their identity, strong sustainability and circularity aspirations, skills and knowledge, and social network. The company’s awareness of the importance of sustainability and circularity is usually reflected in its brand story, a retrospective narrative explaining whether, and to what extent, its founders were inspired by the environmental degradation [26]. Brand stories are “a natural entry point to understanding and intervening in the culture(s) of an organization” [27]. In summary, mission statements, mottos, and brand stories are used by companies to explain the motivations and values that made them adopt the circular business model.

It is reported that value creation and delivery for circular business models incorporate multiple stakeholders in the innovation process as collaborative partners [28]. Therefore, a company must make sure that its strategy will be effective in promoting sustainable development among its suppliers and the users of its

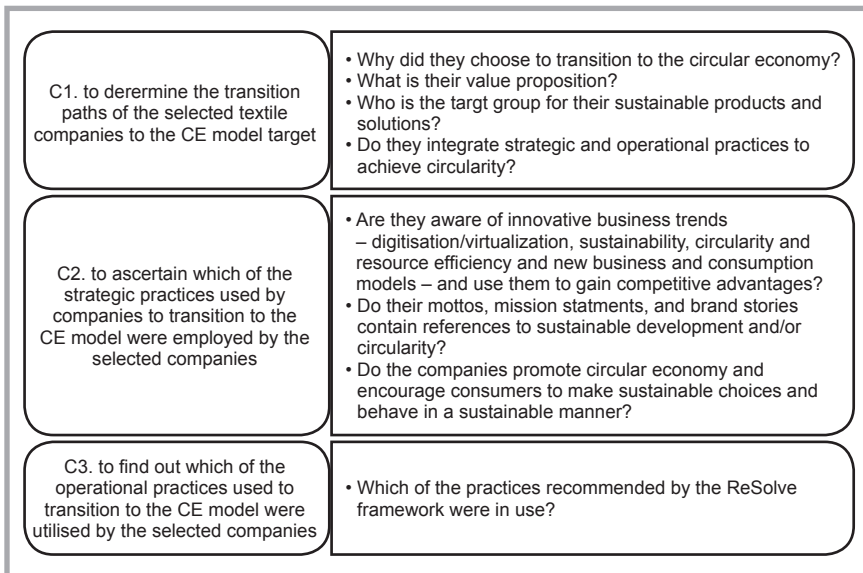


Figure 1. Research goals and research questions. Source: created by the authors.

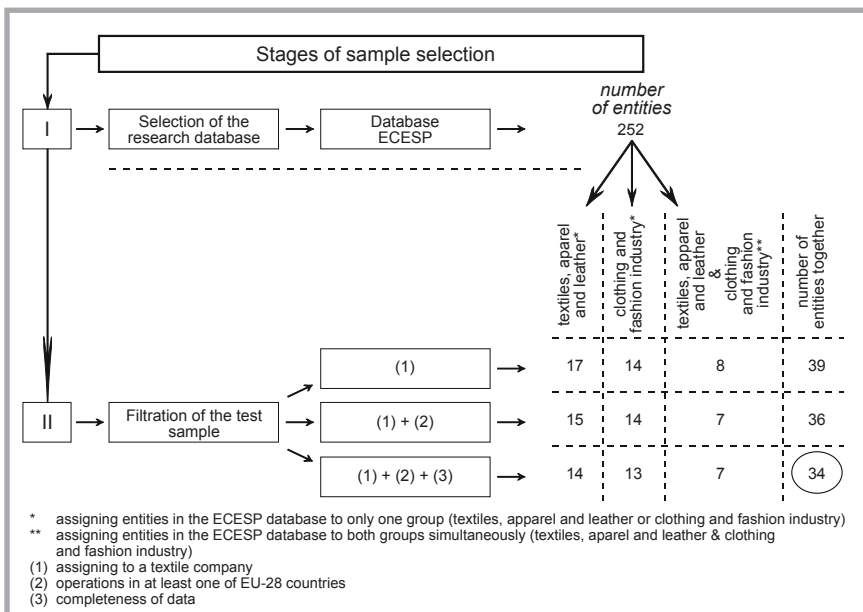


Figure 2. Company selection flowchart. Source: created by the authors based on [34].

products and services. Like the authors of other studies [29, 30], we assumed that in order to meet the criterion ‘promotion of sustainable development’, a company must (1) apply the circular economy criteria to select suppliers and work with them to develop circular products, (2) promote the use of closed-loop production systems, etc., (3) encourage sustainable consumption, (4) encourage customers to buy recycled or refurbished products, or products made from recovered raw materials, etc. (5) advise on sustainable product development, use, and reprocessing, (6) promote presumption, and (7) issue certificates (white certificates, green certificates) confirming other

organisations’ adherence to the circular economy concept and principles.

There are three powerful innovation trends that drive the textile industry today, all of which are closely related to the new circular economic model. These are (1) the digitisation of products, their design, manufacturing, distribution and retail processes, consumer/end-user interaction, factories, workplaces and supply chains, (2) the sustainability, circularity and resource efficiency of materials, processes and overall business operations, and (3) new business and consumption models based on the sharing of productive resources and final products, serviti-

sation, pay-per-use or subscription models [31, 32].

The common use of linear supply chains in the textile industry largely prevents the CE model from being adopted by individual companies [33], as the process requires all apparel production and distribution processes to be closed-looped, and clearly recognises the importance of design and the customer’s role, as well as of strong relations among partners throughout the T&A supply chain.

The relatively small number of studies on business models in the textile industry prompted us to investigate the business models used by textile companies to transition to a circular economy, and to assess the degree to which the models integrate the strategic and operational requirements of CE.

Methodology

In keeping with the BECE framework, our analysis, also made a distinction between the strategic and operational practices used by companies to build sustainable circular business models. The need to examine the strategic aspect was due to the fact that the sources of company value and the rules for creating – in order to achieve strategic advantages – are established at the strategic level. The operational aspect was studied in terms of the ReSOLVE framework that the literature review indicated as being used by the majority of companies building circular business models for their business.

The object of our study was textile companies selected from among organisations participating in the European Circular Economy Stakeholder Platform (ECESP) [34]. To be eligible for analysis, an organisation had to meet the following criteria: (1) a textile, apparel and leather, and/or clothing or fashion company, (2) present in at least one of the EU-28 countries, and (3) using at least one circular practice on which a full set of data is readily available.

As of the day of analysis, all three criteria were fulfilled by 34 textile companies (Figure 2), accounting for approx. 13.5% of all organisations participating in the ECESP platform.

The primary goal of the study (C1) was to determine the selected organisations’ transition paths to the CE model.

The secondary research goals, C2 and C3, were as follows:

- C2 – to find out which of the strategic practices used to transition to the CE model (a motto, mission statement, brand story referring to sustainable development and/or circular economy, promoting sustainable development and/or circular economy, the use of innovative CE trends) were employed by the selected organisations,
- C3 – to find out which of the operational practices used to transition to the CE model (proposed by the ReSolve framework) they utilised.

In order to fulfil the three goals, the following research questions were formulated (*Figure 1*).

Using an analytical checklist created specifically for the study, the selected companies were examined to establish if their value propositions had the following two characteristics:

- the type of product or service,
- the type of market – B2B, B2C, or both (B2B&C),

and which of the 12 circular practices they used:

- a mission statement or motto with references to sustainability and the circular economy,
- a brand story with reference to sustainability and circularity issues,
- promotion of sustainable development,
- seeking competitive advantages by following innovation trends in the textile industry (the digitisation and virtualisation of products, product designs, manufacturing, distribution and retail processes, consumer/end-user interaction, factories, workplaces and supply chains),
- seeking competitive advantages by following innovation trends in the textile industry (sustainability, circularity and resource efficiency of materials, processes and overall business operations),
- seeking competitive advantages by following innovation trends in the textile industry (new business and consumption models),
- the ReSolve circular practice: “regenerate”,
- the ReSolve circular practice: “share”,
- the ReSolve circular practice: “optimise”,
- the ReSolve circular practice: “loop”,
- the ReSolve circular practice: “virtualise”,
- the ReSolve circular practice: “exchange”.

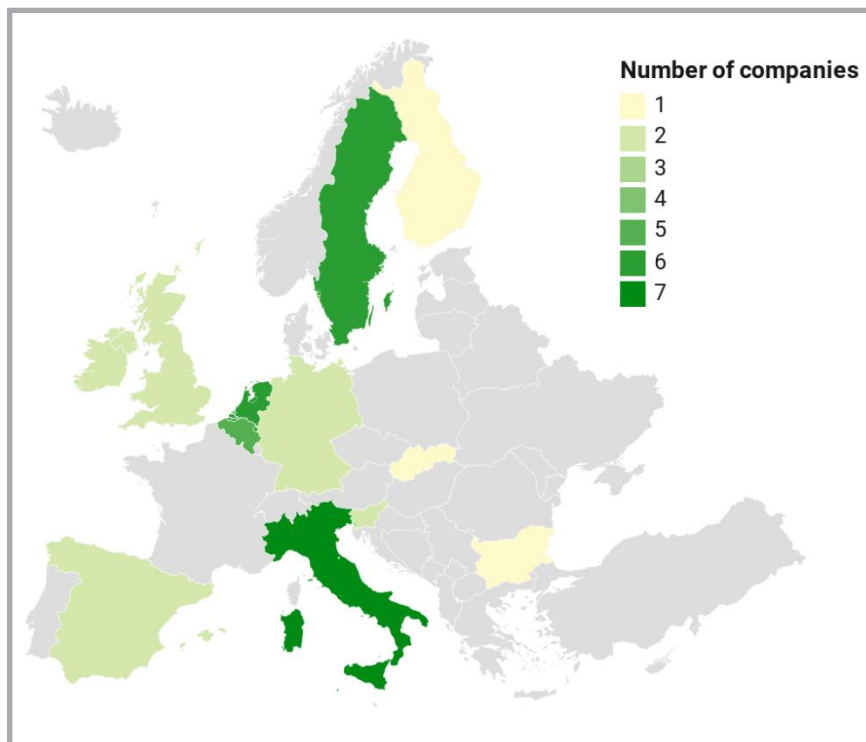


Figure 3. Numbers of companies in transition to the circular economy by country. *Source:* developed by the authors.

The study was conducted between January and March 2020.

Results and discussion

The 34 textile companies selected from the European Circular Economy Stakeholder Platform for closer examination were based in different European countries (*Table 1* and *Figure 3*). The countries can be divided into three groups based on the number of companies in each of them. Group 1 contains Italy (7 companies), deemed the world capital of fashion, the Netherlands (6), Sweden (6), and Belgium (5). Group 2 includes Germany, Ireland, Great Britain, Spain, and Slovenia (2 companies per country). Group 3 comprises Slovakia, Finland, and Bulgaria (1 company per country). It needs to be noted that some organisations were present in more than one country and some even operated outside the EU-28 (e.g. in the USA). The largest concentrations of textile companies in transition to the CE model were found in Nordic countries and some Mediterranean countries.

Most of the 34 organisations made products from recycled materials (e.g., disposable plastic bottles, fishing nets, biodegradable and recycled materials, materials from beaches and oceans, recycled denim fibres) or innovative eco-products,

or used eco-friendly solutions (e.g., CO-dyeing, thermo-dissolvable threads, re-processing of cellulose-based materials, preventing microfibres from entering the wastewater from washing machines) (*Table 1*). The sample also contained companies that used natural raw materials to make their products (e.g., yarn made of orange peel, natural silk) and clothing-rental companies using a sharing economy business model. Few companies in the sample created a wide range of solutions based on CE principles for private customers (e.g., a repair service for its older models of shoes, use of waste materials as resources, and delivery skills training for unemployed people) or corporate customers (e.g., a new technology for sorting clothes, certification activity, a platform for people from the fashion industry, and creating synergies in the textile sector). As regards the companies' markets of operation, slightly more than half of them (16) operated in the B2B market and less than half (15) delivered products and services to the final consumers. Only three companies were present in both markets.

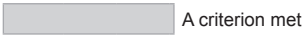
The circular practices used by the sample companies are presented in *Table 1*.

Of the 34 companies in *Table 1*, none used all 12 circular practices. Ten (i.e. around one-third) used an average of

Table 1. Circular practices used in the selected textile companies. **Source:** created by the authors based on ("European Circular Economy Stakeholder Platform", 2020).

Organisation's name/location	Value proposition Types of products or services on offer	The target market	Strategic dimension						Operational dimension					
			Mission or a motto with reference to a sustainability and circular economy	Brand story referring to sustainability and circularity issues	Promotion of sustainable development	Awareness of innovation trends as an inspiration for building competitive advantages			The ReSOLVE framework					
						Digitization, virtualization	Sustainability circularity	New business and consumption models	Regeneration	Sharing	Optimising	Looping	Virtualising	Exchanging
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Karun/Italy, Sweden, Chile	Production of sunglasses whose frames are made entirely from recycled ocean plastics and nylon fishing nets	C												
Raytent/Italy	Production of high-quality yarn and fabrics from cuttings from awning production	C&B												
Rifò/Italy	Regeneration of noble textile fibres, such as cashmere	C												
3SIXTY Sustainable Linens Ltd/Ireland	Production of towels for the hotel industry from disposable plastic bottles and ocean waste combined with cotton	C&B												
SK-TEX/Slovakia	Production of recycled textile-insulation building materials	B												
DyeCoo/Netherlands	CO-dyeing	B												
Orange Fibre/Italy	Production of yarn made of orange peel	C&B												
Van Hulley/Netherlands	Repurposing used shirts into custom boxers	C												
Infinited Fibre/Finland	Re-processing cellulose-based materials into new natural fibres	B												
ShareWear/Sweden	Creating a collection of clothes that customers could not buy for money, only borrow	C												
CelluTex/Sweden	Manufacture of cellulose fibres	B												
Re:newcell/Sweden	Dissolving used cotton and other natural fibres into a new, biodegradable raw material – cellulose pulp	B												
Resortecs/Belgium	Production of thermo-dissolvable threads	B												
The ECOALF/Spain, Thailand	Processing of waste from beaches and oceans (PET bottles, fishing nets, used tyres, etc.) into fashion articles and accessories.	C												
Verdura/Italy	Production of shoes using fishing nets	C												
Raubersachen/Germany	Rental and repair of babies' and children's clothing	C												
The London Waste and Recycling Board/UK	A strategic approach to waste management in London	B												
Tale Me/Belgium	A dressing room to rent clothing for maternity (pregnancy and breastfeeding) and babies/ children from 0 to 6 years old	C												
HNST/Belgium	Production of jeans made out of 56% recycled denim fibres	C												
Van de Sant Innovations BV/Netherlands	Collection of in- and outdoor designer furniture from recycled plastic gathered from land and oceans	C												
ReMade/Italy	Issuing certified labels indicating the recycled material content of the product	B												
The Circular Economy Demonstration Projects/Spain	Creating synergies in the textile sector with important potential innovators	B												
The PlanetCare Filter/Slovenia, United Kingdom	A solution to prevent microfibres from entering the wastewater from washing machines	C												
Mistra Future/Sweden	A research program that focuses on how to turn today's fashion industry and consumer habits toward sustainable fashion and behaviour	B												
IVL/Sweden	Development of a new technology for sorting clothes	B												

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Take Back Chemicals/ Belgium and Netherlands	Increasing the efficiency of the chemical industry's active products and processes	B												
Aquafil/Italy, Slovenia, UK, USA, Thailand	Processing used nylon (mainly from the fishing industry – fishing nets) into econyl	B												
Dick Moby/Netherlands	Manufacturing glasses from biodegradable and recycled materials	C												
Lopyanko's Agri_ Gaya'18/Bulgaria	Developing sustainable and circular exploitation of the bombix mori (silkworm)	B												
Lena/Netherlands	Fashion library, where clothing can be borrowed for a subscription, or bought through the 'try-before-you-buy' principle	C												
Kavat/Sweden	Offering a repair service for its older models of shoes for women and men	C												
Bracenet/Germany	Processing of fishing nets into clothes, jewellery and various other items	C												
Close the loop/Belgium	Creating a practical tool for people from the fashion industry (internet platform) focused on the circular economy	B												
The Wiser Life/Ireland	Using waste materials as resources and delivering skills training for unemployed people	B												



five practices, hence they were half-way to a full-fledged CE model as defined by the criteria in this study. In terms of the average and median numbers of practices used by a company, the leaders were organisations operating in the B2C and B2B markets (Table 2). This seems to suggest that textile companies are aware of the main sources of waste and of the need to encourage sustainable behaviours among consumers (see the Methodology section). Further research is, however, necessary to confirm that textile companies in the B2C and B2B markets are moving towards the CE model for environmental reasons and not to colonise market niches, gain strategic advantages in the competitive textiles market, to be more effective, etc.

Almost all organisations in the sample (32; all in the B2B sector) had mission statements or mottos containing references to sustainable development, thus meeting one of the strategic criteria for being a circular organisation. These organisations probably combine environmental awareness with understanding that transitioning to a sustainable business model can bring them competitive advantages. Twenty six companies promoted sustainable development, suggesting that they believed that influencing consumers and other stakeholders could make them more successful in the market. Twenty four companies built their competitiveness on sustainability and broadly-understood circularity. This group consisted of all companies operating in the B2C and B2B & C markets (3), almost all (12 out of 15) providers

Table 2. Use of circular practices by the selected companies. *Source:* created by the authors.

Specification		Market segment – B2C	Market segment – B2B	Market segment – B2C & B
General statistics	No. of organisations	15	16	3
	Average number of practices per company	5.67	4.06	6
	Median of practices	6	4	7
Strategic – level practices	Mission/motto	14	16	2
	Brand story	9	2	1
	Promotion of sustainable development	13	11	2
	Digitisation	—	2	1
	Sustainability, circularity and efficiency	12	9	3
	New business and consumption models	5	3	2
Operational – level perspectives (ReSolve)	Regenerate	5	5	2
	Share	7	2	—
	Optimise	4	3	1
	Loop	10	7	2
	Virtualise	5	2	2
Exchange	1	3	—	

of B2C services, and most companies (9 out of 15) from the B2B market (Table 2). The numbers imply that transition to sustainable development and a circular economy is deemed important by textile companies and that they are aware and willing to take advantage of the trends in the global textile business. The brand stories of almost half of the companies in the sample, mainly the providers of B2C services, in one way or another referred to circularity.

As regards ReSolve operational practices, more than half of the companies (19) used 'closed-loop' systems, usually adding 'regeneration' to make them complete. 'Exchange' was only used by four

organisations. Most companies using ReSolve practices provided B2C services.

Using the numbers of circular (strategic and operational) practices used by the sample companies, they were divided into three groups: Red, Yellow, and Green (Figure 4). The Red Group consists of 7 companies with the greatest number of circular practices, circular business models, and CE-promoting strategies designed around values. These companies were called integrated because of their coherent approach to the deployment of strategic and operational practices. The Yellow Group, the largest of the three, has 19 companies using a loose combination of strategic and op-

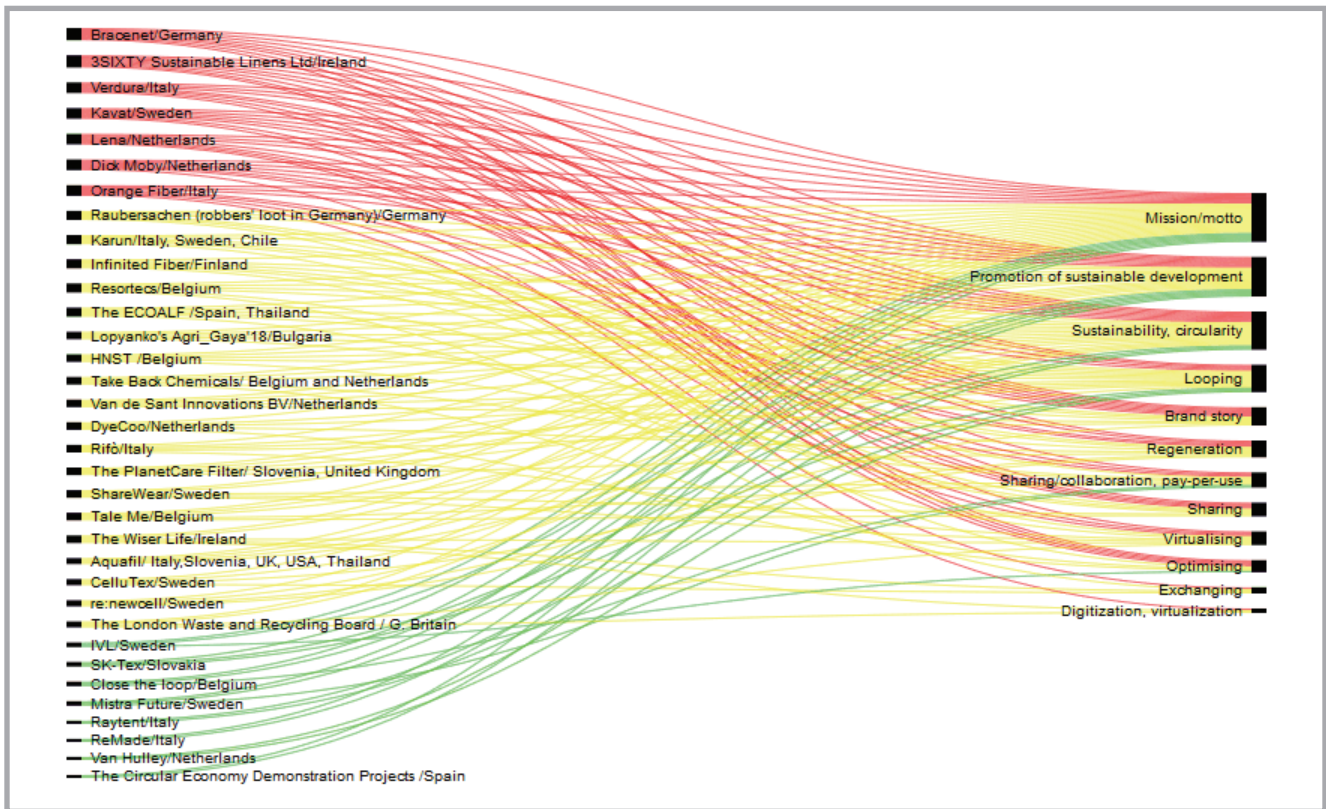


Figure 4. Practices used by the selected textile companies to transition to a circular economy. Source: created by the authors.

erational practices, hence it was named a hybrid group. The Green Group comprises 8 organisations at an early stage of transition to a circular economy that used a combination of somewhat randomly selected strategic and operational practices. Accordingly, it was called a selective group.

The integrated companies operated in the B2C market and used most of the strategic and operational circular practices. Their approach to transitioning to a CE model was thus the most comprehensive. The mottos and mission statements they used highlighted sustainable development, and the way of promoting CE was purposefully and strategically designed. Their awareness that the “sustainability, circularity and resource efficiency of materials, processes and overall business operations” and “new business and consumption models” are important for the future of the textile industry made them seek ways to use them to their advantage. What especially distinguished them from the other two groups was that they had brand stories, usually emotional, expressing their fascination with conscious fashion and creativity, and praising workmanship, handicraft, and the best local traditions of manufacture. The stories concentrated on high-quality products,

their style, potential, and timeless design. They were frequently designed in a holistic manner in the sense that they combined entrepreneurialism and activity with environmentalism, sustainable development, and concern about the planet. Common to them were references to figures of authority, either leading experts or prominent fashion, environmental or sports influencers who live in concert with nature, use the services of local suppliers, and respect the interests of local communities. They also emphasised as important the feeling of sense, responsibility, integrity, and awareness of the need for inclusion. Many brand stories contained accounts explaining why the organisation embarked on the transition to the circular economy model and what impulse (frequently a negative one) contributed to the decision. Unlike the majority of retrospective narratives that pointed to some bad experience as the cause of the transition, contemporary ones rather emphasised the importance of cooperation and customers becoming part of the process – “it’s your turn now”. Because all integrated companies promoted sustainable behaviours and attitudes among consumers, they can also be called socially responsible organisations. In order to reach customers, they used measures ranging from traditional chan-

nels of communication, such as newsletters, to the engagement of eco-fluencers. Their commitment to sustainability and social responsibility could be seen in HRM policies recommending that workers be recruited from nearby areas and workers’ downshifting¹⁾. Most integrated companies made their products from waste materials and modified their business models in line with the closed-loop concept, consequently meeting most of the circularity criteria, including 3-5 practices recommended by the RESOLVE framework.

The hybrid companies operated in both the B2B and B2C markets. These organisations used brand stories relatively rarely, but made efforts to live by their mission statements. To promote sustainability, circularity, and business efficiency, they used various tools, including the delivery of workshops to other producers and the preparation of publications (content marketing). Some of them posted on their websites videos or educational films promoting the findings of their research to reach a wider public. One of the instruments they used to promote sustainability and circularity was certification activity. They either granted or sought sustainability certificates, thus contributing to the es-

tablishment of a system of circular economy standards, criteria, and evaluation rules. A few companies committed their time and energy to large-scale projects. One of them was WISER Life, which converted a famous industrial landmark in north Dublin – the civic boiler house in Ballymun – into a unique experiential learning centre aimed at stimulating curiosity about the natural, physical and cultural environments. The hybrid companies were also committed to supporting local communities, understanding that corporate social responsibility must also address local needs as well as social and economic inclusion. One of the companies promoted itself by citing the opinions of social leaders, writers, filmmakers, and activists from across the world (“our messengers”). To make the sources of their competitive advantages more visible, companies highlighted some aspects of their business and used specially selected “key words”. The language of their messages was matter-of-fact, business-oriented, and fairly technocratic, stressing the company owners’ awareness of the need to maintain business and social aspects in balance. Some organisations in Group 2 used for promotional purposes letters from satisfied customers or the photographs of the “company’s friends”, which they displayed on their websites. The hybrid companies used an average of 4-6 circular practices, such as closing the loops by recycling or reuse; the regeneration of resources, the conservation and reconstruction of ecosystems, the introduction of recovered biological resources back to the biosphere, and virtualisation.

The selective companies were at the early stage of transition to the circular business model, as they only used from 2 to 3 practices recommended by the ReSOLVE framework. Most of them had customers in the B2B market. These companies frequently engaged in educational activity (e.g., created special browsers for their stakeholders), participated in thematic conferences, and published studies and reports. They also used traditional communication channels such as blogs and newsletters. All these activities testify to their commitment to making the textile market more sustainable.

■ Discussion

The transitioning of textile companies towards sustainable or even circular business models examined in this ar-

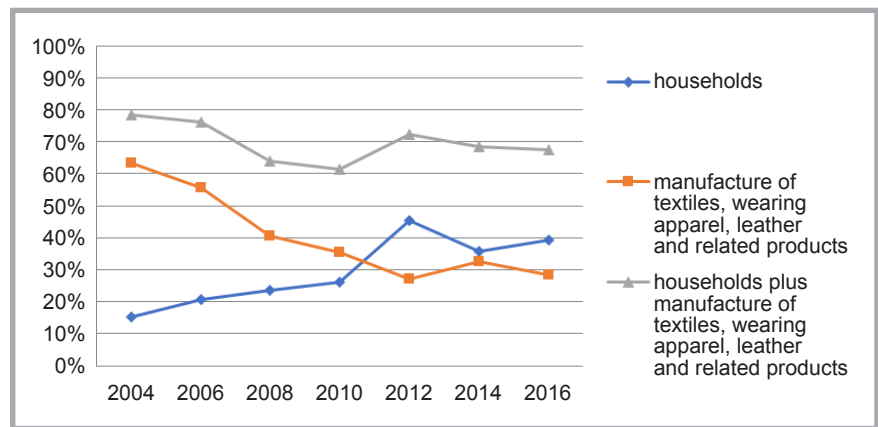


Figure 5. Textile waste generated by all NACE activities and households. *Source:* developed by the authors based on [42].

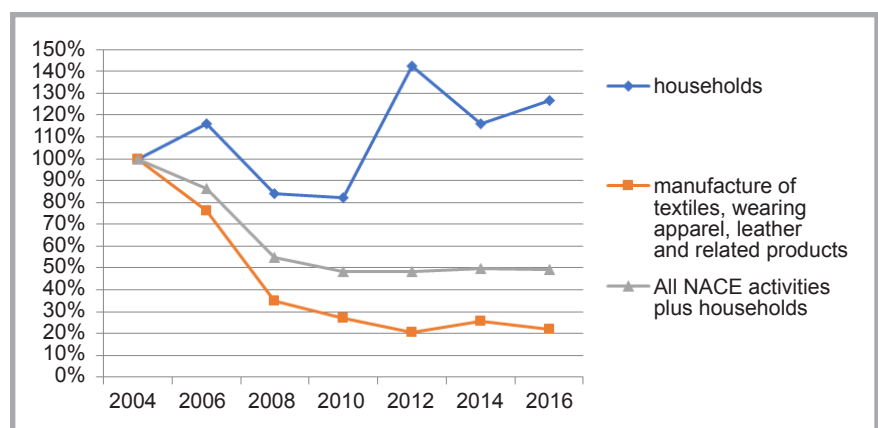


Figure 6. Textile waste generated in selected years since 2004 by source. *Source:* developed by the authors based on [42].

ticle has also been noted by other researchers. They, too, point to numerous sustainability problems – growing sales of clothing, declining clothing recycling rates, pressure on resources, pollution, and negative social image – faced by the textile industry [32, 35, 36]. Even so, textile companies’ business models are rarely analysed. The bulk of studies conducted by researchers, lobbyists, and global organisations have focused on systemising theories about sustainable and circular business models [20, 22, 37] or analysing the macroeconomic factors behind the eco-transition of the textile sector [38, 39]. Few authors have so far attempted to look at the practical use of circular models by textile companies [40, 41]. Because of this knowledge gap, we undertook to analyse a sample of textile companies to ascertain what strategic and operational practices they used to transition to CE. The majority of the ‘mature’ textile companies (i.e., organisations integrating both types of practices to achieve circularity) promoted sustainability and circularity to influence consumer behaviours, which implies that

this practice is probably essential to the eco-transition of the textile industry. This conclusion is supported by the findings of other authors and the available statistics. Linder and Wiliander, for instance, reported a close relationship between the spread of the circular economy and the evolution of consumers’ environmental attitudes and behaviours [16]. It is important to note here that Eurostat data identify final consumers as the primary source of textile waste today (**Figure 5, Figure 6**).

Most companies in the sample can be called socially responsible, because they actively promoted sustainable behaviours and attitudes among consumers. This finding indicates that they aptly identified the environmental weaknesses of their industry. It also confirms the results reported by other authors [33, 41], according to whom consumers’ increasing acceptance of sustainable development causes the textile industry to offer them eco-friendly products and promote sustainability principles. The authors of one study [43] have also noted that ad-

addressing a wider range of stakeholders, e.g., people or organisations committed to the protection of the environment or local communities, is closely related to a company's positive brand reputation, which increases consumers' trust and, consequently, the purchases of its products, thus ultimately leading to a positive business case.

It is reported that 'value' is of essence in conventional and sustainable business model innovation [44] and that radically new products and services lead to new business models [45]. The textile companies in our study had built their CMBs around innovative value propositions conforming to CE principles. The majority of them based their value propositions on products made from recycled waste, which suggests that they believed in sticking to their environmental mission as a way to increase their economic value. Consistent with this, their mission statements also laid emphasis on social values. Weissbrod and Bocken are of the opinion that generating value added in the economic, environmental and social spheres is the foundation of a descriptive framework for radical innovation for sustainability in large firms [46].

The new textile economy has been found to rely on four ambitions: (1) to phase out substances of concern and microfibre release (the new textile economy needs to ensure that the material input is safe and healthy to allow recycling and to avoid negative impacts during the production, use, and after-use phases); (2) to transform the way clothes are designed, sold, and used to break free from their increasingly disposable nature; (3) to radically improve recycling by transforming clothing design, collection, and reprocessing; and (4) to make effective use of resources and move to renewable inputs [35]. In our opinion, transitioning to a sustainable and circular economy model also requires the coordinated use of circular practices from the strategic and operational domains. Using the latter as a criterion allowing the transition paths of the selected textile companies to a green and socially responsible business model to be identified (the primary goal of the study), we divided the organisations into 'aspiring', 'eclectic', and 'mature'.

The authors of a meta-analysis [47] of business model literature also proposed a new taxonomy to explain different degrees of circularity in firms from a variety

of industries. In particular, they focused on the distinction of Circular Economy Business Models (CEBM) with respect to differences emerging in two major dimensions: (i) customer value proposition and interface, i.e., the implementation of the circularity concept in proposing value to customers; (ii) a value network, i.e., the ways to interact with suppliers and reorganise own internal activities. Their work points to four available modes of adoption of a circular economy: Linear, Upstream Circular, Downstream Circular, and Full Circular. Our map of the circularity adoption modes seems to properly identify the different ways that companies use to establish their CEBM, i.e., the ways of leveraging on CE principles from a business model perspective.

In our study, only 7 of the 34 companies analysed had integrated strategic and operational practices to achieve circularity. The other 27 organisations used circular practices in a less structured manner. However, the fact that in both integrated and hybrid companies circular strategic practices outnumbered operational ones, seems to indicate that declarations of commitment to sustainability values (which are strategic in nature) are an important element of the transition to circular business models.

Our findings are a valuable supplement to the existing research, which generally focuses on changes in institutional support for transition to a circular economy (especially in the attitudes of public agencies), the textile industry's environmental footprint, or raw resource management supporting the sustainable development of the textile industry [2, 48-51].

Limitation of research and conclusion

The textile companies selected for analysis realised that transition to the CE model was necessary and required good knowledge of environmental challenges faced by their industry. At the same time, however, they addressed them in different ways. The smallest number of organisations (the mature ones) integrated strategic and operational practices to shift to circularity. While this outcome may be due to some weakness of the research methodology, it also shows the directions for future research. Firstly, the ECESP members should be subjected to regular surveys using the analytical checklist to capture new trends or changes in the ex-

isting ones. Secondly, it seems advisable to extend the range of criteria to better understand why companies adopt the model CE and how they benefit from it and to enlarge the sample of organisations, as this would help to fill a major gap in the monitoring of textile companies in transition to a circular economy.

All companies in the 'mature' group operated in the B2C market. The message they sent to customers was very clear and they took as their mission to fight negative phenomena in their surroundings. Their efforts are deemed credible because they choose their business, partners, suppliers, and distribution channels in line with their values and beliefs. Their interests centre on customers who act as ambassadors of their products and services while closely watching their activities. Fashion companies especially are operating in an increasingly 'moralised brandscape' and any unethical behaviour is rapidly noticed by consumers. Thus, it is becoming crucial for a company to demonstrate their social and environmental responsibility, as customers are quick to respond on social media to perceived discrepancies between the brand story and brand actions [52]. As for B2B companies, a company's branding – creating initiatives to 'look good' – is less important than a pragmatic approach to tackling fashion's endemic problems of pollution and waste at an operational level [52]. An in-depth study of company owners and management staff's motivations and attitudes to sustainability and circularity seems, therefore, necessary, as it might cast new light on the textile sector's transition to a circular economy. Despite some weaknesses of the research methodology, the study identified strategic and operational practices that the sampled textile companies used to transition to CE, thus achieving goals 2 and 3. The primary goal of the study (determination of the companies' transition paths to a green and socially responsible business model) was achieved by identifying three groups of companies varying in the degree of circularity: aspiring, eclectic and mature.

The literature review and study's results lead to a conclusion that a prerequisite to sustainable development that the world is pursuing today is a change in the consumer mindset. If the textile industry wants to thrive and not just to survive, its business model must be radically redesigned. In contrast with the "take-make-

dispose” approach, which leaves a heavy environmental footprint and leads to economic value loss, the adoption of circularity provides an opportunity for the textile industry to unlock enormous economic potential. The CE model, with clothes being rented, resold, or recycled more easily, summons the creative power of the textile industry to develop a new textile economy. However, the model’s ultimate effectiveness will depend on concerted, global, systemic, and collaborative efforts.



Editorial notes

1) *Downshifting is an innovative HRM practice aimed at ensuring the work-life balance and well-being of employees.*

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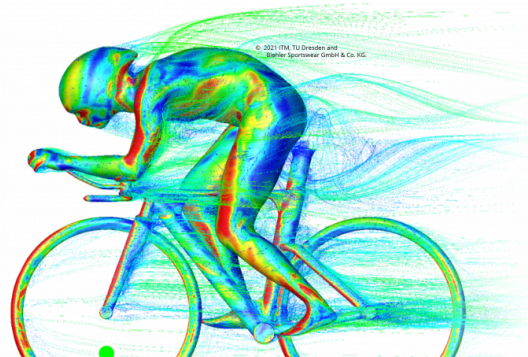
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