



## Review Article

## Investigating the challenges of applying the principles of the circular economy in the fashion industry: A systematic review

Aya Abdelmeguid, Mohamed Afy-Shararah \*, Konstantinos Salonitis

Sustainable Manufacturing Systems Centre, Cranfield University, Cranfield, United Kingdom

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## ABSTRACT

This is a systematic literature review paper that aims to synthetically report on the challenges of implementing circular economy (CE) in the fashion industry, to help key stakeholders in the industry shape their strategies and turn these challenges into opportunities. The method adopted to achieve the purpose of the paper is the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA). Following the PRISMA 2020 flow diagram, 55 studies and 7 other sources were included and used to analyze the findings. Using a deductive research approach, the paper categorises the aspects related to the circular economy and their challenges identified through the systematic review of hard aspects and soft aspects of business management. The hard aspects identified include business model innovation, regulatory pressures, stakeholders' pressures, and financial pressures. Whilst the soft aspects identified include green intellectual capital and consumer-related issues. A conceptual framework is proposed to represent the hard and soft aspects identified in the literature, which could provide a guideline to management to facilitate the implementation of circular economy. The main implication of the paper is that management needs to focus on managing and overcoming the challenges of soft aspects first, by emphasizing the different practices identified in the paper, to be able to manage the challenges of hard aspects effectively and achieve better outcomes. However, it is recommended that the implications of this paper are empirically tested to uncover their values.

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\* Corresponding author.

E-mail address: [m.a.shararah@cranfield.ac.uk](mailto:m.a.shararah@cranfield.ac.uk) (M. Afy-Shararah).

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## 1. Introduction

In recent years, the concept of circular economy has been gaining greater attention from individuals, industries, governments, as well as academia (D'Adamo et al., 2022). This attention is mainly due to the increased awareness of environmental and social issues requiring conscious choices and responsible consumption of finite resources (Stanescu, 2021). In addition, the circular economy is one of the ways of achieving the United Nations Sustainable Development Goals (SDG) consisting of 17 goals, mainly SDG 12 that focuses on sustainable production and consumption through reduced use and efficient management of goods and natural resources (Gabriel and Luque, 2020; United Nations, 2016).

Globally, the fashion industry is regarded as a significant sector in the economy considering the important role it plays in our day-to-day life, as well as having over 300 million people employed across the value chain and supporting employment in countries with low income (Ellen MacArthur Foundation, 2017). The fashion industry also plays a significant role in the European manufacturing industry, employing around 1.7 million employees and generating a revenue of approximately 166 billion euros (European Commission, 2022). However, the fashion industry is built on the concept of change mainly due to the 'fast-fashion' phenomenon which adds excessive pressure on the environment. As the availability of more collections per year, new styles and lower prices accompanied by a continuous change in demand and trends has resulted in an almost 50% increase in the production of clothing using and around 40% drop in the usage of clothing (Atstja et al., 2021; Wiederhold and Martinez, 2018). Circular premium is also usually part of the increased consumption of fast fashion when recognised by users (D'Adamo and Lupi, 2021). Additionally, the fashion industry uses around 60% of the total global textiles which includes numerous natural and non-renewable resources (Ellen MacArthur Foundation, 2017) and contributes to around 10% of global carbon emissions and 20% of water waste (World Economic Forum, 2021). Globally the fashion industry is one of the highest (Gabriel and Luque, 2020) industries that causes water consumption and water pollution. Moreover, only 1% of the materials used in the production process of clothes are recycled back even though around 95% could be recycled (Atstja et al., 2021). This is because it is cheaper for fashion brands and retailers to dispose of or burn the returned clothes, hence over 10 million tonnes of textiles and clothing are lost to landfills every year (US Environmental Protection Agency, 2018). Therefore, fashion brands and retailers need to feel the urgency to tackle these problems. Some features of circular fashion include offering affordable, high quality, and customized clothing to encourage buying the products and lessen the attitude-behaviour gap (Berberyan et al., 2018; Wiederhold and Martinez, 2018).

Moreover, Ellen MacArthur Foundation (2017) suggests three focus areas enable circular fashion: implementing innovative business models to increase the use of clothing, using renewable and harmless inputs, and finding new techniques to transform old clothes into new ones. Firstly, a growing number of established brands in the industry have been introducing new methods to try to keep clothes in use (Ellen MacArthur Foundation, 2017; Pieroni et al., 2019). Using the clothing for an extra 9 months of active use per item, equating to an average garment life span of 3 years, results in around a 20–30% reduction in waste and carbon emissions (Berg and Magnus, 2020; WRAP, 2012). There are various ways of keeping clothes in use, including attractive designs, subscription services, enhanced clothing care, clothing rental, peer-to-peer sharing, attractive marketing, and more. For example, one of the

children wears brands designed clothes that stretch out and rescale depending on the child's growth to provide an extension in the life of clothing over the years. While some other brands seek to offer repairing and restyling facilities as a different means of keeping the clothes intact. Secondly, the use of renewable resources and waste from natural resources (such as wood and fruits) could be a better alternative in creating and dying clothing besides being biodegradable, hence less problematic when disposed of or burnt. In addition, some brands use waste from production to produce new items, for example, using leather cut-offs from adults' footwear production to produce children's shoes. Despite the importance of sustainable materials being the focus of fashion brands and retailers, it alone will not be able to tackle the problem and cut the waste. Thirdly, finding new techniques to transform old clothes into new ones, requires that brands and retailers implement offers like take-back-program (i.e., offers to collect used clothes from consumers) and it requires a shift in consumers' attitudes and needs (Ki et al., 2021). However, there are still several challenges that face the brands and retailers in the fashion industry when implementing principles of the circular economy.

The fashion industry is facing complex challenges in transitioning to a circular economy which is needed to address the environmental and social issues, whilst maintaining its overall performance and profitability. Moreover, circular fashion research available is very limited, which impedes the implementation of circular economy practices in the fashion industry (Ki et al., 2021). Nevertheless, despite the extensive literature focusing on the hard aspects of business management (physical and statistical evidence, systems and techniques, technology utilisation, and policy) including business model innovation (Kumar et al., 2019), little attention has been given to the vital role of human-related dimensions – also referred to in the paper as “soft aspects” – in transferring from a linear economy towards a circular economy such as organisational behaviour (Bertassini et al., 2021). Therefore, the paper aims to provide a systematic review of the reported challenges of implementing a circular economy in the fashion industry and aims to categorise the challenges into soft and hard aspects of business management to establish a new direction to the existing literature.

The paper is divided into five parts: Introduction, Literature Review, Methods, Results and Discussion, and Conclusions. The paper will demonstrate the challenges of applying the principles of circular economy in the fashion industry. However, as the existing literature linking the challenges of circular economy and circular fashion is very limited, the literature on circular economy and circular fashion will be used simultaneously to explore a wider scope of research and provide a better understanding of how the challenges faced in other sectors could be applied to the fashion industry. Finally, a conceptual framework will be provided to support the managerial implications.

## 2. Literature review

According to Ellen MacArthur Foundation (2012), “a circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems”. Circular economy has also been articulated as an umbrella concept in the last decade as it is considered a new economic model that aims to transform the current linear economic model (Blomsma and Brennan, 2017), which follows the “take-make-dispose” approach, to achieve global sustainability by slowing, narrowing or closing the loops of materials and energy (Atstja et al., 2021; García-Quevedo et al., 2020). Therefore, circular economy is a new sustainability

paradigm that focuses explicitly on economic dimensions, while protecting the environment and social interests (Geissdoerfer et al., 2017). The shift to a circular economy entails changes throughout all stages of the process of production and consumption of materials and energy. The following literature review sections discuss the circular economy in the fashion industry, as well as the challenges of implementing the circular economy business models.

### 2.1. Circular fashion

The fashion industry is characterised as one of the largest and most significant industries in the world with the possibility of damaging the environment and having significant social and ecological footprints due to the exhaustive use of natural and non-renewable resources, as well as high pollution levels in its production and consumption processes, thus creating uncertainty for the future availability of these resources (Armstrong et al., 2015; Ki et al., 2021). However, the fashion industry has been making significant efforts to implement circular strategies. There are four strategies proposed by Dissanayake and Weerasinghe (2021) that help in implementing the principles of circular economy to the fashion industry, these are (1) resource efficiency (the use of renewable, regenerative, and non-toxic raw materials), (2) circular design (design for longevity, customization, disassembly, recycling, and decomposing), (3) product life extension (repair, lease, swap and rent), and (4) end-of-life circularity (reuse, resale, recycle and remanufacture).

The circular economy concept consists of 2 parts that could be illustrated by the “butterfly diagram” and is also referred to as the “value circle”. The first part is the biological cycles and lowering the impact on the environment, and the other part is the technical which helps in creating new business models that enable performing the first part (Torstensson, 2016). The biological cycles are where consumption occurs, and thereby sustainable management of biologically based resources ensures the creation of renewable flows and processes. The technical cycles help in restoring and recovering resources through circularity strategies, such as repairing, reusing, remanufacturing, and recycling, to capture and recapture their value (Ellen MacArthur Foundation, 2019). Based on Boiten et al. (2017), repairing is a service provided for minimal wear and tear to recover the textile fibers; reusing – refers to second-hand fashion – is eliminating waste through the optimal design of products, materials and business models and systems to allow the products to be used for a longer time and to prolong the lifecycle of the product in its original form or with a few improvements or changes without the need for production; remanufacturing is restoring and disassembling the materials back to their components level so that new products are rebuilt; and lastly, recycling is where products are recovered to their material level in order to be made into new products. However, out of the four circularity strategies, recycling is of the lowest value due to the increased costs and loss of energy and labour associated with the replication of the entire production process to produce a new product (Ellen MacArthur Foundation, 2012).

Circular economy in the fashion industry proposes that products are returned to the production cycle various times in the biological or technical cycles. Biological cycles are usually suitable for are bio-based textiles, materials and fibers which are compostable or degradable such as bio-based polyester (Dissanayake and Perera, 2016). Also, to ensure that the products are compostable and degradable, toxic chemicals used in the production process should be replaced with bio-based materials and coatings and natural dyes, such air dying technology, should be used to reduce the water contamination (Dissanayake and Weerasinghe, 2021). However, biological cycles are not always a viable option because most of the existing textiles and fibers are made from synthetic materials, and therefore non-compostable and non-degradable (Colucci and Vecchi, 2021; Niinimäki, 2018). In such circumstance, companies in the fashion industry choose the technical cycle circularity strategies – reuse, repair, remanufacture and recycling – to

ensure product life longevity, keep the materials and textiles in the loop, and minimise waste (Palm et al., 2021).

Furthermore, circular economy is one of the ways of achieving the United Nations SDG consisting of 17 goals, particularly SDG 12 that focuses on sustainable production and consumption through reduced use and efficient management of good and natural resources (Gabriel and Luque, 2020; United Nations, 2016). Therefore, SDG 12 aligns with the core circular economy practices. Additionally, circular economy can potentially assist with the development of new strategies that help with the accomplishment of the SDG outcomes successfully (D'Adamo et al., 2022). The SDG has become a central topic in the literature considering its positive influence on sustainability practices, including circular economy, and its important role in pursuing the challenges incurred. Therefore, following the commitment to achieve the SDG, the introduction of circular economy in the fashion industry is essential for promoting sustainable development considering the importance of the industry in people's everyday life and the economy as whole despite it being one of the most polluting industries. This changes the main drivers of business models from solely focusing on economic revenue and profit maximisation to prioritising environmental protection and social capital for a better future on the earth.

The drivers for implementing circular economy strategies have been classified by Ostermann et al. (2021) into internal and external factors. Internal factors include organisational culture, commitment to help achieve circularity and aligned goals between stakeholders, collaborations and partnerships, product development related factors, innovation, material efficiency, quality enhancement, increased customers' satisfaction and loyalty, risk management, production process stability and financial gains (Agyemang et al., 2019; Govindan and Hasanagic, 2018; De Mattos and De Albuquerque, 2018). Whereas, external factors include government regulations and legislation, political regulations, economy, environmental concerns, health and safety measures, humans' and animals' rights, geographical and cultural differences, corporate social responsibilities, stakeholders' pressures, and societal pressures (Agyemang et al., 2019; Govindan and Hasanagic, 2018; De Mattos and De Albuquerque, 2018). Moreover, the “driver-state-response” framework developed by Palm et al. (2021) illustrate that social activities drive ecological pressures that create changes to the state of the environment, hence circularity and sustainability actions are required to respond to the significant impacts. This argues that circularity strategies in all industries, including the fashion industry, is not only limited to closing the loops of materials and energy, but also the need to respond to the challenging social and ecological pressures.

### 2.2. Challenges of implementing circular economy business models

The study by Kumar et al. (2021) identifies 15 challenges in the supply chain. These challenges include risk of mismanagement, insufficient legislation and control, insufficient strategy for integration of industry 4.0 and C.E, lack of skilled workforce, lack of funding for the industry, ineffective performance of framework, use of materials as energy, lack of waste management, poor resource quality, lack of government support, employee resistance for change, insufficient market demand, lack of management support, short term goals, and lack of awareness of industry 4.0. However, after analysis of the barriers, lack of skilled workforce appears to be the most important challenges as a skilled workforce is required to implement the circularity strategies.

Moreover, as cited by Colucci and Vecchi (2021), the “close the loop” framework developed by Flanders (2020) and presented by Vecchi (2020) in the literature, demonstrates that all stakeholders involved in the fashion industry are challenged to consider the full six phases of the lifecycle of clothing and garments which include resources, design, production, retail, consumption, and end-of-life. In addition to that, the paper categorises the challenges into three subcategories: technical issues, operational issues, and customer-related issues. Firstly, technical issues refer to the poor level of quality of recycling technologies, time-

consuming and costly research and development, unreliable certificates, and difficulty in producing fabrics (such as denim fabrics) with low environmental impact. Secondly, operational issues refer to difficulties associated with take-back programs, forming collaborations and innovation at the industrial level. Finally, consumer-related issues refer to consumers attitudes and behaviour regarding fast-fashion, rental models, and high pricing of sustainable products.

Furthermore, the framework proposed by Tura et al. (2019) categorises the drivers and challenges of the introduction of circular economy business models, drawn from the literature and the study's empirical evidence, into seven areas: environmental, economic, social, institutional, technological, and informational, supply chain, and organisational factors. This categorisation is to allow decision-makers to focus on the main areas affecting the implementation of circular economy. However, the paper highlights the importance of analysing the internal and external business environments to identify the drivers and barriers that need to be considered when designing circular economy business models since those drivers and barriers are context specific.

Internal and external challenges have been highlighted by Hina et al. (2022) as the most widespread approach to the categorisation of the challenges to implementing circular economy business model. Drawing upon the literature, the paper classifies the internal challenges into seven sub-categories: internal stakeholders, product design, technological challenges, financial challenges, lack of other resources, organisational strategies and policies, and collaborations. Whereas classifies the external challenges into four sub-categories: supply chain challenges, consumer-related challenges, legislation and economic challenges, and social, cultural, and environmental barriers.

The paper by García-Quevedo et al. (2020) also categorises the barriers to circular economy in European small and medium-sized firms into two categories: lack of resources (human and financial) and capabilities, and the presence of regulations and complex administrative requirements. Firstly, the lack of resources and capabilities category is based on the resource-based view (RBV), which highlights the importance the valuable, rare, imitable, and non-substitutable resources of organisations in achieving organisations' competitive advantage (Asante et al., 2022; Bag et al., 2021b). Therefore, the organisations' inability to recognise and use the resources and capabilities efficiently makes it difficult for SMEs to develop and engage in circular economy practices. Secondly, the regulations and costly administrative requirements which could be barriers or drivers to implementing circular economy. This is because having strict regulations and low taxes for implementing circular business models are crucial in incentivising businesses to adapt circular economy practices. On the other hand, this will add administrative burden and costs that could be challenging for SMEs especially at the start of the transition.

Despite the extensive literature focusing on the hard aspects of business management (such as circular practices, business model innovation, product as a service business model, infrastructure, and circular metrics and public policies) that refer to the technical aspects and ability to implement strategies, Bertassini et al. (2021) argue that little attention has been given to the vital role of soft aspects of business management (such as organisational culture) that comprise of human-related aspects that help with the introduction of circular economy business models and shape the organisation's identity. Furthermore, the paper proposes a framework of the five building blocks for the introduction of circular economy business models including behaviours, values, mindsets, capabilities, and competencies. The framework categories these five building blocks into two categories soft aspects (behaviours, values and mindsets) and hard aspects (capabilities and competencies). Therefore, the framework illustrates the importance of implementing the soft and hard aspects and overcoming their challenges to support the introduction of circular economy business models.

Finally, organisations and brands need to consider and focus on the product-related factors and consumer-related factors that influence

the customers' decisions. According to Berberyan et al. (2018), the product-related factors include price, quality, fashion design/style, information about ethical sourcing, and availability and accessibility of the product. Whereas consumer-related factors include habits, values, social desirability bias, personal interests, subjective norms, perception, and convenience. However, the balance between the factors could be challenging and contradicting in some cases.

### 3. Methods

Systematic literature review is the method chosen to provide a synthetic overview of the reported challenges for implementing circular economy business models in the fashion industry. As systematic literature review enables the investigation, synthesis, and evaluation of the literature of any specific research area in order to expand of the existing knowledge base of the research area especially for new or emerging topics (such as circular economy), by drawing robust conclusions and implications, generating initial conceptualisation (e.g., theory or framework), recognising and addressing research gap, and promoting future research (Siddaway et al., 2019). Also, systematic review helps in providing a holistic reporting of challenges. The systematic approach method adapted in the paper is PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analysis), which modifies and replaces PRISMA 2009 proposed by Moher et al. (2009) to reflect the advancements in the methodology and terminology of systematic review to support its implementation (Page et al., 2021). PRISMA 2020 consists of 27-item checklist and a flow diagram (including: identification, screening and included phases) (Fig. 1) that help with providing a transparent, accurate and comprehensive reporting of systematic reviews (Moher et al., 2010). Therefore, PRISMA 2020 is used in the processes of reviewing the literature and analysing and synthesising the findings to enable clear and complete identification of the challenges of applying the principles of circular economy in the fashion Industry (Saunders et al., 2019). To achieve this objective, the process of selecting the studies was constructed to follow the PRISMA 2020 flow diagram and checklist.

Moreover, the research approach used for the purposes of this paper is the deductive approach. This means that the data collection is guided by a specific research objective that originate from relevant theory in the existing literature (Bell et al., 2019; Saunders et al., 2019). Therefore, in this paper, the research design and data collection are guided by the categorisation of circular economy business models into hard and soft aspects, which was proposed by Bertassini et al. (2021) in the literature. As most literature focuses on the hard aspects, and thereby more research was needed to explore the soft aspects (human related aspects) of business models and the collective action and applicability of both aspects. Also, using systematic literature review to synthetically report an overview of challenges of implementing circular economy business models in the fashion industry and using deductive approach to categorise these challenges establish a new direction to the existing literature.

The hard aspects and soft aspects in the paper are based on the classification suggested by Lenka et al. (2010). Therefore, the hard aspects in the paper refer to the technical and/or quantitative characteristics incorporated in the organisation, including physical evidence, statistical evidence, systems and tools, strategies and practices, technology, and policies. While soft aspects in the paper refer to the behavioural and/or qualitative characteristics that shape the identity of the organisation, thereby, related to collective human behavioural factors, human related dimensions, and human resource management within the organisation.

#### 3.1. Identified studies

The records used for the purposes of this research are identified through 3 databases, including Scopus, Science Direct and Business Source complete, and 2 register (Table 1). For the identification phase, relevant keywords were searched in different combinations using

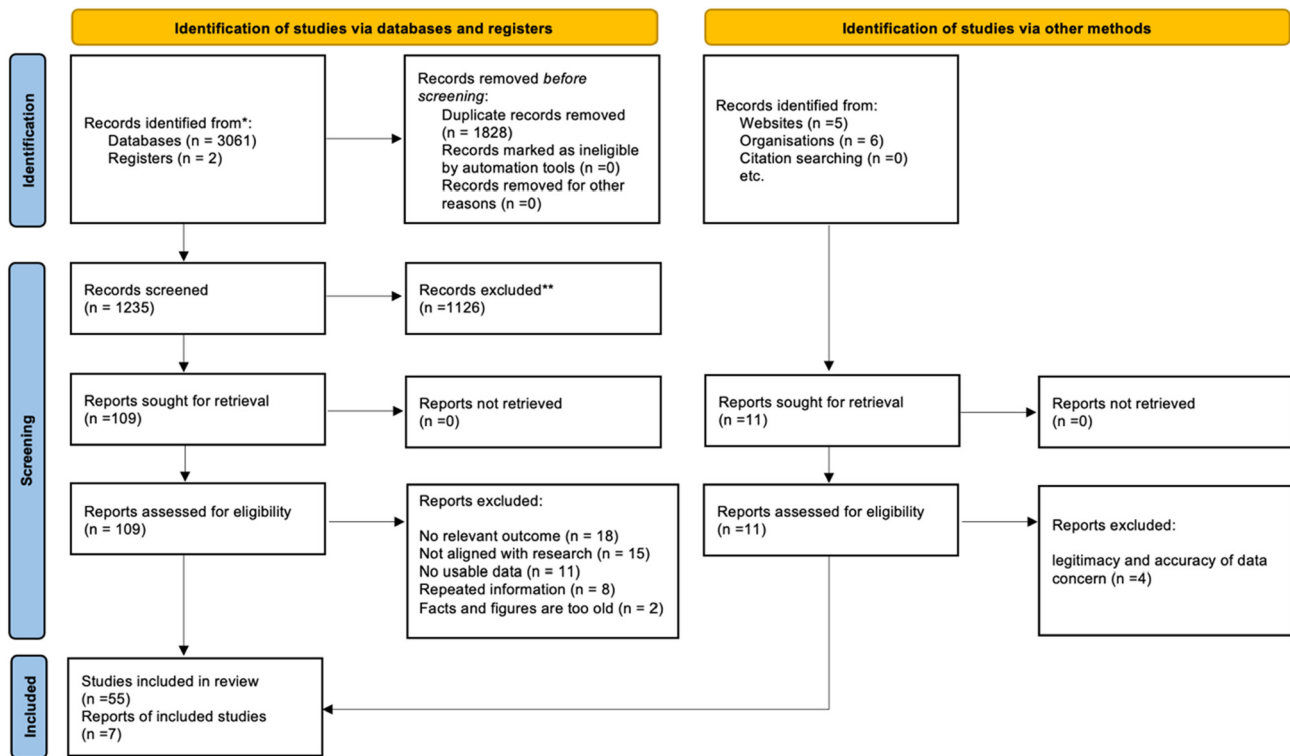


Fig. 1. PRISMA 2020 flow diagram.

“AND” or “OR” whenever it is appropriate in the databases. The first search on Scopus used the combination “circular economy” AND 2 (“challenges” OR “Barriers”), resulting in 1875 studies. The second search on Scopus used the combination “circular economy” AND “fashion industry” AND (“challenges” OR “Barriers”) and limited to (Business, Management and Accounting), (Economics, Econometrics and Finance) and (Social Sciences), resulting in 890 studies. The third search on Scopus used the combination “Circular Economy” AND “Fashion Industry”, resulting in 67 studies. Finally, the combination “Circular Economy” AND “Fashion Industry” was used in both ScienceDirect and Business Source Complete, resulting in 194 and 35 studies, respectively. All searches found in the databases were limited to English studies between the years 2000 and 2022. However, studies related to this research have only appeared between the years 2007 and 2022. Furthermore, in addition to these databases, 6 websites were directly searched to obtain relevant research. Therefore, the total number of records identified through databases is 3061 of peer-reviewed papers. Moreover, 2 registers, ‘US

Environmental Protection Agency’ and ‘EU Commission’, which were identified by looking for reliable facts and figures about materials waste and recycling. Therefore, the total number of records identified through databases and registers is 3063. In addition to that, 5 website and 6 organisations were identified as they contained useful facts and figures related to circular economy and sustainability, and which were required to achieve the objective of this research.

To avoid reviewing duplicated papers, the entire lists of papers that appeared for each of the searching criteria in the three databases were exported to EndNote to be compared and 1828 duplicates were removed. However, due to the nature of identifying the registers, websites and organisations, there were no duplicates found.

### 3.2. Screened studies

The total number of records screened was 1235 records, and 1126 records were removed after screening the titles and/or abstracts of papers to check if the records were relevant to the research objective. Therefore, 109 records were sought for retrieval and assessed for eligibility. However, there was a total number of 54 records excluded from the records identified through databases and registers for a few reasons: no relevant outcome ( $n = 18$ ), not aligned with research ( $n = 15$ ), no usable data ( $n = 11$ ), repeated information ( $n = 8$ ), and facts and figures were too old ( $n = 2$ ). Additionally, the 5 website and 6 organisations identified were all sought for retrieval and assessed for eligibility, but 4 websites were excluded at this point due to the concern about the legitimacy of the websites and the accuracy of the facts and figures provided. Therefore, resulting in 58 records excluded in total.

### 3.3. Included studies

After the screening process, 55 studies and registers were included in the review to fulfil the objective of the paper. The paper also included 1 website and 6 organisations. The website used is the ‘Global Fashion Agenda’ website since it is a leading forum for sustainability in fashion,

**Table 1**  
Identification process for databases.

| Identification criterion | Description                                                                                                                                                                                                                                                                                                                                         |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Research objective       | Investigate the challenges of applying the principles of circular economy in the fashion industry                                                                                                                                                                                                                                                   |
| Databases                | Scopus, Science Direct and Business Source Complete                                                                                                                                                                                                                                                                                                 |
| Other sources            | Websites                                                                                                                                                                                                                                                                                                                                            |
| Keywords                 | Circular Economy, challenges, barriers, fashion industry                                                                                                                                                                                                                                                                                            |
| Language                 | English                                                                                                                                                                                                                                                                                                                                             |
| Research criteria        | Based on 3 research criteria: (1) ‘Circular economy’ and ‘challenges’ or ‘barriers’ (2) ‘circular economy’ and ‘fashion industry’ and ‘challenges’ or ‘barriers’ and limited to the subject areas ‘Business, Management and Accounting’, ‘Economics, Econometrics and Finance’ and ‘Social Sciences’ (3) ‘circular economy’ and ‘fashion industry’. |
| Research years           | 2000–2022                                                                                                                                                                                                                                                                                                                                           |

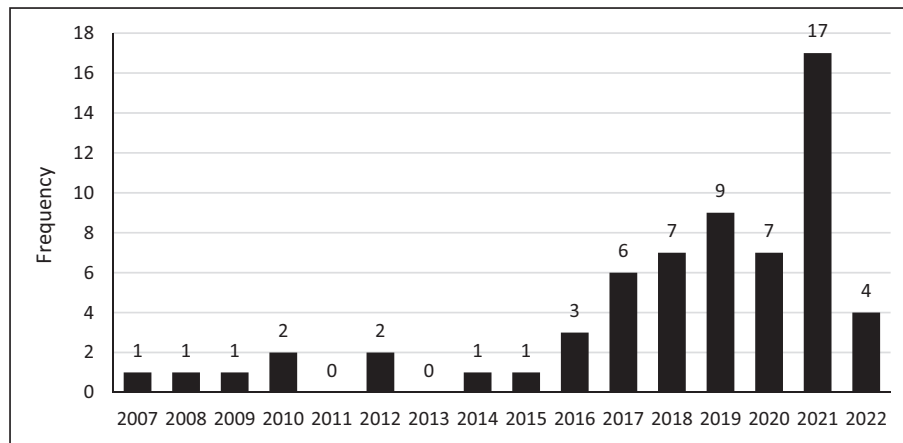


Fig. 2. Graph showing the frequency of years for the papers reviewed.

and the website contained useful up-to-date reports about circular economy and sustainability in fashion industry required in achieving the research objective and was also cited in a few of the literature reviewed. Finally, the 6 organisations included in the paper are 'Ellen MacArthur Foundation', 'United Nations', 'World Economic Forum', 'Flanders DC and Circular Flanders', 'McKinsey & Company', and 'WRAP'. As these organisations are worldwide known pioneers in the areas of circular economy and sustainability, and again, were cited frequently in the literature which proves their viability and reliability.

#### 4. Results and discussion

The results of the systematic literature review are presented and discussed in five sub-sections: hard aspects' examples and their challenges, soft aspects' examples and their challenges, conceptual framework, managerial implications, and policy implications.

Studies included in the paper were published between the years 2007 and 2022 (Fig. 2), where over quarter of the studies analysed have been published in 2021 alone which shows the growing importance of the researched criteria. Moreover, 50% of the studies included in this paper have employed the mixed method approach to conduct research within the areas of circular economy and sustainability, while 31% of the studies have employed a qualitative approach and 19% employed a quantitative methodological approach. This allows the systematic review provided in this paper to be more inclusive, and to balance out the limitations related to the usage of single methodological approach in the papers included.

Furthermore, the most used author keywords throughout the studies included, with a minimum of 2 occurrences every year, are 'circular economy', followed by 'sustainability', 'fashion industry', 'circular fashion', 'fashion', 'industry 4.0' and 'sustainable development' (Fig. 3). This evaluation of author keywords helps illustrate the trends and gaps in research, as well as the main ideas discussed. As for instance, as seen in Fig. 3, there was a limited focus on circular economy and sustainability in the studies prior to 2017, but since that interest and focus have been increasing over the years while also diversifying into different industries like the fashion industry. Fig. 3 also shows that although the same combinations of keywords were used to for finding studies between 2000 and 2022 to identify the studies included in this paper, the keywords 'fashion industry', 'fashion' and 'circular fashion' have started appearing with regular occurrence in the year 2021. This shows the growing trend of researching circular economy in fashion due to the increase of awareness between the two topics. However, there is a need for a lot more research to be conducted to learn more about the association of the topics. Finally, it should be noted that this research was conducted in early 2022, hence the data has not been collected for the full year which explains why the figures show a decline in the trends for the year 2022.

##### 4.1. Hard aspect examples and their challenges

There are several hard aspects related to circular economy found in the literature. However, for the purposes of the paper 4 main criteria are identified covering most of the significant hard aspects, which are:

|                      |                      |                                            |                      | Sustainable development (2)<br>Sustainability (5)<br>Industry 4.0 (2)<br>Fashion industry (3)<br>Fashion (2)<br>Circular fashion (2)<br>Circular economy (8) |                      |
|----------------------|----------------------|--------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Circular Economy (2) | Circular economy (3) | Sustainability (2)<br>Circular economy (4) | Circular economy (5) | Circular economy (8)                                                                                                                                         | Circular economy (3) |
| 2017                 | 2018                 | 2019                                       | 2020                 | 2021                                                                                                                                                         | 2022                 |

Fig. 3. Evaluation of authors' keywords, with a minimum of 2 occurrences, from the studies included.

**Table 2**  
Summary of the Hard aspects' examples and their challenges.

| Hard aspects examples     | Challenges                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | References                                                                                                                                                                                                                            |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Business model innovation | <ul style="list-style-type: none"> <li>Achieving the three components of circular economy business models.</li> <li>Focusing on product-related and consumer-related factors not just customers' satisfaction and profit maximisation.</li> <li>Modifying the economic system and product analysis.</li> <li>Implementing the four strategies of waste management in the fashion industry.</li> <li>BMI must align with internal and external conditions.</li> <li>Fast-fashion phenomenon encourages consumption of short lifespan, less durable and quickly disposed clothing.</li> <li>Lack of up-to-date, cost-effective, and efficient circular economy-oriented technologies.</li> <li>Risk of circular economy rebound.</li> </ul>                             | (Berberyan et al., 2018; Colucci and Vecchi, 2021; Dissanayake and Weerasinghe, 2021; Hina et al., 2022; Kumar et al., 2021; Ostermann et al., 2021; Pieroni et al., 2019; Richardson, 2008; Tura et al., 2019; Zink and Geyer, 2017) |
| Regulatory pressures      | <ul style="list-style-type: none"> <li>Regulations, legislations, and corporate social responsibilities affect how companies operate.</li> <li>Some fashion companies outsource their production processes to countries with less regulations regarding circular, sustainable and ethical practices.</li> <li>Lack of customers' obligation to support circular strategies.</li> <li>Lack of governmental support, especially for small and medium enterprises.</li> <li>Lack of strict regulations for waste minimisation and the implementation of circular economy-oriented technologies</li> <li>Lack of standardised regulations regarding the application of circular strategies.</li> <li>Poor link between policy makers and the fashion industry.</li> </ul> | (Dissanayake and Weerasinghe, 2021; García-Quevedo et al., 2020; Global Fashion Agenda, 2018; Hina et al., 2022; Kumar et al., 2021; Tura et al., 2019; Turker and Altuntas, 2014; World Economic Forum, 2021)                        |
| Stakeholders' pressures   | <ul style="list-style-type: none"> <li>Having the collective action and engagement of all stakeholders.</li> <li>Meeting the requirement of direct and indirect stakeholders without damaging the future needs of stakeholders.</li> <li>Stakeholders consider short-term incentives and self-interests, neglecting the long-term sustainable performance and environmental concerns.</li> <li>Collaboration of different functions and departments in the organisation.</li> </ul>                                                                                                                                                                                                                                                                                   | (Hina et al., 2022; Riva et al., 2021; World Economic Forum, 2021)                                                                                                                                                                    |
| Financial pressures       | <ul style="list-style-type: none"> <li>Financial market supports short-term returns.</li> <li>Difficulty to access financial capital due to lack of financial performance and evaluation measures.</li> <li>Costly financial investments.</li> <li>Lack of financial means and</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | (Bui et al., 2020; García-Quevedo et al., 2020; Hina et al., 2022; Kumar et al., 2021; Sousa-Zomer et al., 2018; Torstensson, 2016; Tura et al., 2019; World Economic Forum, 2021)                                                    |

**Table 2 (continued)**

| Hard aspects examples | Challenges                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | References |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
|                       | <ul style="list-style-type: none"> <li>support.</li> <li>High risk of mis investment</li> <li>No previous data available and the difficulty of estimating data based on assumptions.</li> <li>Unpredictable market demand.</li> <li>Uncertainty of profitability</li> <li>The cost of reverse logistics is high.</li> <li>Pilot testing is more suitable for large and multi-national companies.</li> <li>Lack of financial support for small and medium enterprises.</li> </ul> |            |

business model innovation (BMI), regulatory pressures, stakeholders' pressures, and financial pressures (Table 2). It should be noted that studies included may not specifically mention the exact term for those four criteria, as this categorisation is based on the interpretation of the meaning of information. The number of studies (x-axis) mentioning this interpretation of hard aspects and their challenges (y-axis) are as seen in Fig. 4.

#### 4.1.1. Business model innovation

According to Richardson (2008), the three components of business model are: (1) value proposition which is what the organisation offers or delivers, potential customer or market, and approach to gain competitive advantage, (2) value creation which are the resources and capabilities available to help create value to customers, processes or activities that deliver value and standpoint in value chain, (3) value capture which is the way the organisation generates revenue and profit that exceeds their costs. However, it has been argued that fashion companies typically focus on proposing, creating, and capturing value through the customers' satisfaction and profit maximisation, overlooking the other circular practices that adopt the business model innovation perspective (Colucci and Vecchi, 2021). Therefore, business models need to focus on product-related factors and consumer-related factors (Berberyan et al., 2018).

Furthermore, a CE-oriented BMI aims to enhance resource effectiveness and economic effectiveness through narrowing or slowing and eventually closing the material loop through modifying the economic system and product analysis (Pieroni et al., 2019). There are three ways of linking BMI with the principles of circular economy in all industries, including the fashion industry: (1) downstream circular which is changing the value capture and value delivery through new revenue programs and new ways of communicating with customers such as product as a service model through subscription services to clothing or closing rental, (2) up-stream circular involves producers and suppliers, as well as the production, transportation and storage systems of creating value such as reverse logistics through take-back or recycling programs, and (3) fully-circular which is the most impactful as it combines the principles of downstream and up-stream circular (Dissanayake and Weerasinghe, 2021; Pieroni et al., 2019). However, there are four strategies necessary for waste management and to establish a successful link between BMI and circular economy in the fashion industry and need to be incorporated within the downstream, upstream and the fully circular paradigms, including: resource efficiency, circular design, product life extension and end-of-life circularity (Dissanayake and Weerasinghe, 2021; Kumar et al., 2021). These four strategies can also help improve business model innovation and flexible resources and materials consumption (Hina et al., 2022). Therefore, business

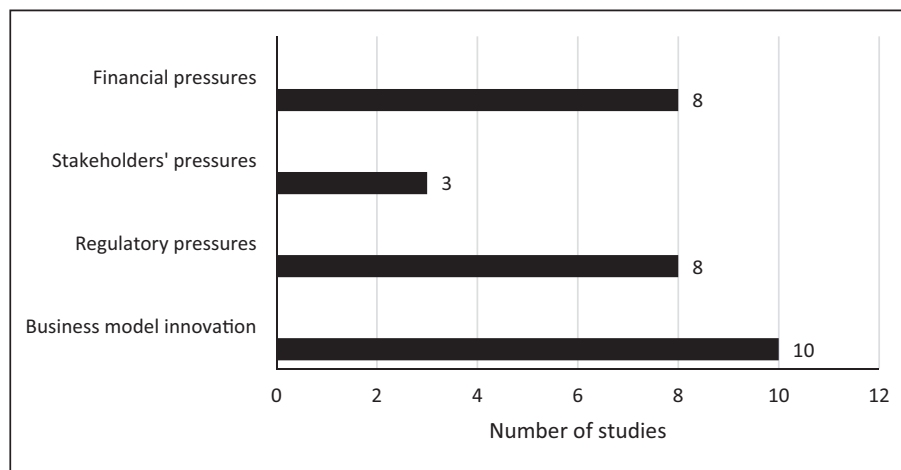


Fig. 4. Number of studies mentioning the 4 examples of hard aspects and their challenges.

models must align with internal and external conditions to succeed in developing circular business strategies at the micro-level, and this makes it challenging.

Moreover, the fashion industry's growth is currently driven by a fast-fashion business model, which focuses on technological efficiencies to achieve high-scale production, short production cycle, and lower cost and price, which resulted in the emergence of the fast fashion phenomenon that encourages the consumption of short lifespan, less durable and quickly disposed clothing (Colucci and Vecchi, 2021; Ostermann et al., 2021). Therefore, there is a lack of relevant technologies that support CE business models without compromising the quality, for example: technologies for material detection and sorting, material recovery, sustainable printing technology, waterless dyeing technology, and technologies that can use materials as energy (Dissanayake and Weerasinghe, 2021; Hina et al., 2022; Kumar et al., 2021). The lack of up to date, cost-effective, and efficient CE oriented technologies is one of the key challenges in the transition implementing CE oriented business model (Tura et al., 2019). Additionally, the increased level of circular activities and strategies could increase the risk of circular economy rebound due to the increased level of overall production, which could be challenging as this could potentially reduce the benefits of circular economy (Zink and Geyer, 2017).

#### 4.1.2. Regulatory pressures

The fashion industry has been developing and expanding massively over the years, with a globalised mass production and consumption. Regulations, legislations, and corporate social responsibilities (CSR) in different cultures and geographical locations could affect how companies in all industries operate, hence could be drivers or barriers to the implementation of circular economy business models (García-Quevedo et al., 2020). A lot of the fashion companies outsource their production processes to developing countries, where there are less regulations regarding ethical practices including inadequate working conditions and exploitation of labour (Turker and Altuntas, 2014). Moreover, consumers have no obligation to support the circular strategies offered by the companies, resulting in higher level of disposal and waste.

On the other hand, the development of government laws and stronger regulations could encourage to organisations to make a change and to comply with the set standards (World Economic Forum, 2021). The governments have a key role in the transition of the fashion industry towards a circular economy, as there are good initial steps and innovative approaches that could be implemented to support the transition, including: policies regulating the design, manufacturing, transportation, transition, supply, consumption and usage of products and materials

(Dissanayake and Weerasinghe, 2021; Hina et al., 2022). As having more strict regulations and lower taxes can drive successful implementation of circular economy business models (García-Quevedo et al., 2020). However, there has been a lack of support from the governments around the world in implementing rules and regulations for waste minimisation and in the implementing of CE-oriented technologies (Kumar et al., 2021). Especially for the SMEs that perceive this governmental support as a necessity to enable them to induce circular economy business models, as SMEs tend to find the administrative costs and burdens quite high which could be challenging at the start of the transition (García-Quevedo et al., 2020).

Therefore, a formalised engagement between policymakers and the industry is necessary to incentivise and develop a circular fashion model (Global Fashion Agenda, 2018). Also, the standardisation of global regulations and policies must be reinforced to support these initiatives and encourage the transition to a circular economy within the industry successfully. As initiatives are usually hindered by the difficulty of expressing these links and standardisation between industry and policymakers and differences between societies and governments resulting in complex and overlapping regulations which makes the implementation of circular economy challenging (Tura et al., 2019).

#### 4.1.3. Stakeholders' pressures

The implementation and operation of circular business models require the engagement and collaboration of all stakeholders and the full value chain, as their collective action help in planning and developing the business strategy, transferring the knowledge, developing incentives, and tackling the challenges (Riva et al., 2021; World Economic Forum, 2021). Therefore, organisations need to meet the requirements of direct and indirect stakeholders without damaging the future needs of stakeholders to address challenges and incentives to stimulate the change to a circular business. As the involvement of all stakeholders reduces the constraints and self-interests faced by the organisations and leaders, thereby also helps in achieving competitive advantage.

However, stakeholders add pressure on the circular economy practices adapted in the organisation or brand which could act like a challenge. This is because an integration and communication between different functions and departments in the organisation and collaboration with other brands will also be required, as well as collaboration and communication with other non-industry actors like the customers (Hina et al., 2022). For instance, brands could offer take back programs to restyle, recycle and resell the products, they usually do this in-house for a lower cost or partner-up with other brands for larger scale programs. However, these brands would still need to find way to encourage

**Table 3**  
Summary of the soft aspects' examples and their challenges.

| Soft aspects examples      | Challenges                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | References                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Green intellectual capital | <p>Green human capital challenges:</p> <ul style="list-style-type: none"> <li>Lack of skills and knowledge of circular economy among employees and workforce.</li> <li>Lack of sufficient resources such as time, financial means, and commitment to improve and develop human capital.</li> <li>Difficulty in achieving valuable, rare, imitable, and non-substitutable resources.</li> <li>Inability to recognise resources and capabilities and use them effectively.</li> </ul> <p>Green structural capital challenges:</p> <ul style="list-style-type: none"> <li>Organisational culture can obstruct change.</li> <li>Self-interests can rule out the social, economic, and environmental goals.</li> <li>Resistance to change.</li> <li>Lack of awareness of the circular economy benefits.</li> <li>Lack of managerial capability to distribute and apply knowledge regarding circular practices.</li> <li>Implementing effective operational management and integration across different departments and hierarchical levels.</li> <li>Managing the set of independent behaviours inside the organisation.</li> <li>Motivating employees and achieving their commitment to support the transition.</li> </ul> <p>Green relational capital challenges:</p> <ul style="list-style-type: none"> <li>Lack of alignment of fashion brands and retailers and uniting the visions.</li> <li>Lack of sufficient collaborations across the supply chain.</li> <li>Lack of transparency, trust, and incompatibility in the collaborations across the supply chain.</li> </ul> | <p>(Asante et al., 2022; Bag et al., 2021b; Claxton and Kent, 2020; Dissanayake and Weerasinghe, 2021; García-Quevedo et al., 2020; Kumar et al., 2021; Riva et al., 2021; Wang and Juo, 2021) (Bertassini et al., 2021; Hina et al., 2022; Kumar et al., 2021; Ritzén and Sandström, 2017; Riva et al., 2021; Torstensson, 2016; Wang and Juo, 2021). (Colucci and Vecchi, 2021; Global Fashion Agenda, 2018; Hina et al., 2022; Wang and Juo, 2021)</p> |
| Consumer-related issues    | <ul style="list-style-type: none"> <li>Managing the set of independent behaviours outside the organisation.</li> <li>Communicating with customers and motivating them to participate in the circular initiatives.</li> <li>Addressing attitude--behaviour gap.</li> <li>Difficulty of changing the consumers' behaviours and attitudes towards circular products and strategies.</li> <li>Risk of circular premium affecting current consumer base and their purchasing</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p>(Auger and Devinney, 2007; Berberyan et al., 2018; Colucci and Vecchi, 2021; D'Adamo and Lupi, 2021; Dissanayake and Weerasinghe, 2021; Hina et al., 2022; Kumar et al., 2021; Sousa-Zomer et al., 2018; Tura et al., 2019)</p>                                                                                                                                                                                                                        |

**Table 3 (continued)**

| Soft aspects examples | Challenges                                                                                                                                                                                                                                                                                                                                                                                                                                      | References |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
|                       | <p>behaviour.</p> <ul style="list-style-type: none"> <li>Difficulty in anticipating and managing consumer--related challenges.</li> <li>Conflicting external conditions and social norms.</li> <li>Sustainability and circularity dilemmas and risk of bias.</li> <li>Lack of social awareness of consumers regarding circular economy.</li> <li>Lack of clear incentives for consumers provided through clear marketing mechanisms.</li> </ul> |            |

customers to engage and participate in the circularity and sustainability programs, which could be very challenging.

#### 4.1.4. Financial pressures

The financial market today supports short-term returns which does not work in favour of the circular business models. It focuses on the traditional accounting and reporting systems, neglecting the efforts exerted to reduce environmental and social costs (Torstensson, 2016). This is usually because it is difficult to access the financial capital for circular business models due to its poor financial performance and the lack of effective evaluation measures, due to the circular economy being a new concept (Tura et al., 2019).

Moreover, most stakeholders consider self-interest and short-term goals and self-interests, requiring immediate output and neglecting the long-term sustainable performance and environmental concerns (Kumar et al., 2021). This is likely based on four main drivers: risks, costs, intangibles, and revenues to determine the benefits and returns. As, circular business models may only be sustainable and not profitable in the short-term. Therefore, organisations usually hesitate to invest financially in circular economy.

Organisations or brands may sense the urgency and have the passion for circular economy, lack the financial means and support implement it since investments required to implement circular economy business models, especially for SMEs or small/start-up brands, are quite high and are accompanied by high risk of mis investment which would have negative implications on the organisation or brand as a whole (García-Quevedo et al., 2020; Kumar et al., 2021; Tura et al., 2019). Although profitability of business models usually relies on market demand, circular business models are considered relatively new, which makes it unpredictable (Hina et al., 2022). Moreover, the cost of reverse logistics is relatively high due to the cost of transportation from different geographical locations, as well as the uncertainty about the flow of resources and materials (Hina et al., 2022). Therefore, decisions cannot be made based on assumptions due to no data being available. Organisations or brands need to collect their own data because what worked with others might not work with them. Consequently, organisations or brands perceive the transition to circular economy as a risky and costly change.

Furthermore, organisations choose to perform pilot tests before fully launching the product to explore insights, feedback, and the acceptance of customers to the new business model or strategy, and therefore reduce operational risk (Sousa-Zomer et al., 2018). However, this could be more suitable for large and multi-national companies as it requires major costs. This shows that small and medium enterprises need to have access to stable and sufficient financial services to obtain the

more financial support required to adopt sustainable practices (Bui et al., 2020; World Economic Forum, 2021).

#### 4.2. Soft aspects and their challenges

Soft aspects referred to in the paper are the foundations for developing an effective green human resource management within organisations to mediate between organisational human resource management and firm-level sustainability (Chiappetta Jabbour et al., 2019). Soft aspects include a lot of practices. However, the paper focuses on two elements: green intellectual capital and customer relations (Table 3). Once again, the studies included may not specifically mention the exact term for those 2 soft aspects examples, as this categorisation is based on the interpretation of the meaning of information. The number of studies (x-axis) mentioning this interpretation of the soft aspects and their challenges (y-axis) are as seen in Fig. 5.

##### 4.2.1. Green intellectual capital

According to Wang and Juo (2021), there are three dimensions of green intellectual capital: (i) green human capital (GHC) which refers to the knowledge and behaviour of employees concerning environment protection and management of environmental concerns, (ii) green structural capital (GSC) which refers to organisational cultures and managerial skills in the development and management of the environment, (iii) and green relational capital (GRC) which refers to the collaboration of organisations with external partners on environmental strategies.

**4.2.1.1. Green human capital.** Green human capital affects economic performance through increasing organisational readiness, enables the organisation to recognise its intangible assets such as employees' green knowledge, and helps in achieving green innovation (Wang and Juo, 2021). Green knowledge enables employees to gain precise and up-to-date knowledge about the environmental issues (Riva et al., 2021).

The lack of skills and knowledge relating to circular economy is one of the major challenges that impedes the implementation (Kumar et al., 2021). As having a highly skilled workforce is necessary for the implementation of circular economy business models. This is in line with the RBV, which emphasises on the importance of having valuable, rare, imitable, and non-substitutable resources to achieve competitive advantage for the organisations or brands (Asante et al., 2022; Bag et al., 2021a, 2021b). Therefore, companies in the fashion industry should allocate sufficient time and finance to education and training systems, which support the green knowledge and behaviour of

employees. These systems usually have significant focus on upskilling and training designers to educate them about sustainable materials, resources, and techniques to support the designing process and decisions, as well as allows interactions between designers and all other actors involved in the supply chain to share tools, knowledge, and awareness (Claxton and Kent, 2020; Dissanayake and Weerasinghe, 2021). As the inability of organisations and brands to recognise their resources and capabilities and use it efficiently makes the implementation of circular business models challenging especially for SMEs and small/start-up brands (García-Quevedo et al., 2020). Therefore, it enables the implementation of the principles of circular economy in the long run successfully. However, freeing up the resources such as time, financial means, and commitment to improve and develop the green human capital, is one of the main challenges faced by organisations in all industries.

**4.2.1.2. Green structural capital.** Green structural capital reflected by the organisational culture and managerial skills affects green innovation, which in turn, fully mediates the link between green human capital and economic performance, as well as green structural performance and green performance (Wang and Juo, 2021). Organisational culture is considered a fundamental part of organisational behaviour and embedding the CE principles within organisational culture is essential to ensure the employee's successful transition and compliance of all individuals with the organisation (Claxton and Kent, 2020). It is also considered a non-materials dimension that need to be managed within fashion companies. Leadership is also a crucial element of organisational culture; hence a good leadership is one of the main organisational drivers that result in successful implementation of circular economy business models (Hina et al., 2022).

On the other hand, organisational culture can obstruct change, as it establishes a power structure between individuals within the organisation on different hierarchical levels. Therefore, the implementation of circular business models requires some changes to be enforced in the organisational culture which threatens this power structure since some individuals who are benefitting from the existing business system may resist this change (Torstensson, 2016). Also, if these individuals are in a level of authority (e.g., managers), then self-interest could rule out the social, economic, and environmental goals (Torstensson, 2016).

Furthermore, resistance to change usually results due to, but not limited to, the following reasons. Firstly, the CE-oriented culture is perceived as a high-risk aversion in the short-term creating uncertainty about the change, hence organisational development, change in mind-

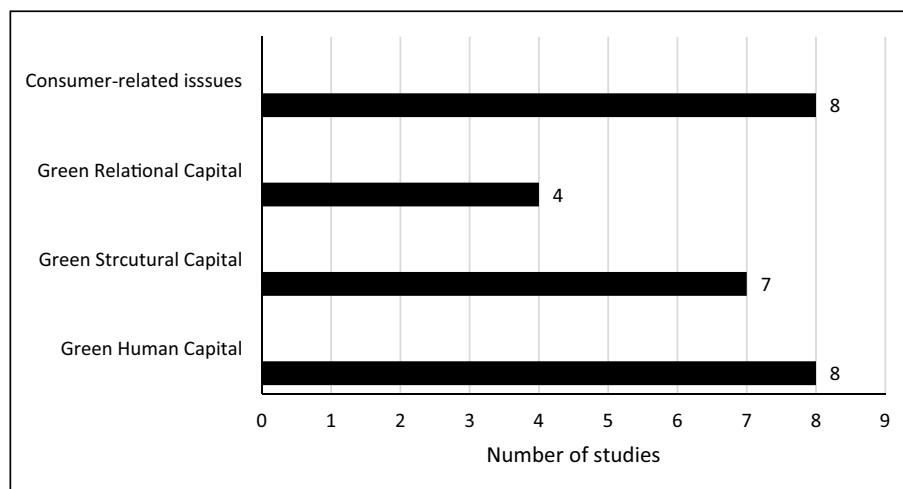


Fig. 5. Number of studies mentioning the examples of soft aspects and their challenges.

sets and other tools (e.g., readiness assessment tools) are essential to support the implementation of CE (Bertassini et al., 2021). As for instance, employees usually resist change due to a few reasons including the fear of losing their jobs which is perceived as one of the major challenges (Kumar et al., 2021). Secondly, there is a high implementation and maintenance cost accompanied with circular business models. Thirdly, lack of awareness and sense of urgency to change to a CE-oriented culture in the organisation. This is often due to the lack of awareness of the benefits that could be gained from introducing circular economy business models, which results in lacking the motivation to implement change (Kumar et al., 2021). Finally, the lack of knowledge of the CE is a major factor in resisting change, as the know abouts of CE seem to generate a positive attitude and is a key factor for real change within the organisation (Ritzén and Sandström, 2017). This results from the lack of managerial skills to distribute green knowledge and adopt green practices, as well as the lack of professional advice to adopt HR practices such as sustainable material training (Riva et al., 2021). As the lack of managerial knowledge often leads to limited capacity of learning within the organisation. Thus, it is necessary that the capabilities of employers, managers, and leaders to be developed to enable this change.

Furthermore, CE-oriented culture includes a set of independent behaviours both, inside and outside the organisation. It is very important that organisations are managed internally first to be able to understand the barriers and challenges faced as means of managing this disruptive change effectively (Ritzén and Sandström, 2017). Therefore, understanding the ways in which internal organisational issues complement each other and considering the whole system play significant role in the implementation of the CE-culture (Bertassini et al., 2021). As organisational change involves effective operational management and integration across different departments and hierarchical levels. Also, requires motivating the employees intrinsically through different ways. For instance, by altering the decision-making power so that the teams, such as designers' team, are given permission to make decisions within the agreed scope while still having the managers or leaders in the loop. This can help achieve truly committed employees and shared teams with aligned goals, thereby help organisations or brands achieve circularity (Hina et al., 2022). Therefore, managers and leaders need to carefully understand their employees, and to develop their capabilities and competencies to reinforce their behaviours and encounter change.

**4.2.1.3. Green relational capital.** Green relational capital affects green performance through the collaboration networks that enable organisations to develop new environmental ideas, knowledge opportunities and technologies, resulting in green innovation and reduced searching, transactions, and bargaining costs (Wang and Juo, 2021). According to the *Global Fashion Agenda* (2018), the alignment of the fashion brands and retailers improves their connectivity, unites their vision, and supports their commitment to implement circular strategies. This does not only help share of knowledge and experiences between brands and retailers, but also allows encourages sharing garments, materials, tools, and services. Therefore, collaboration results in an increased transparency, knowledge, and technological resources across all actors involved in the supply chain, which in turn, supports the implementation of CE strategies within the industry (Tura et al., 2019).

However, organisations or brands find it challenging to form these collaborations and innovation at the industrial level which impedes the introduction of circular economy business models, and this is partly the reason for the difficulties associated with the take-back programs offered by some organisations or brands (Colucci and Vecchi, 2021; Hina et al., 2022). These challenges often result from the lack of transparency in collaboration across supply chain, as there is an issue of fragmentation between the actors of the chain which prevents the sharing of knowledge and activities between the partners due to incompatibility and the lack of trust (Hina et al., 2022).

#### 4.2.2. Consumer-related issues

Management of behaviours outside the organisation is also crucial since the collaboration across the whole value chain is necessary for the success of circular business models (Sousa-Zomer et al., 2018). These outside behaviours are usually linked to the consumer-related factors (Colucci and Vecchi, 2021). As mentioned before, consumer-related factors include habits, values, social desirability bias, personal interests, subjective norms, perception, and convenience (Berberyan et al., 2018). This could be very challenging because it is targeting consumers behaviour and attitudes, which is difficult to manage for a few reasons. For instance, the price of the product is often the first thing the consumers look at when buying a product and if products that involve circular strategies are more expensive then this will probably negatively impact consumer's decision to purchase the product regardless (Hina et al., 2022). This increase in price is referred to as the circular premium, which is the added price over the normal price to reflect the higher cost incurred in the redesign or recycling process (D'Adamo and Lupi, 2021). The circular premium act like a challenge, as organisations or brands need to decide whether they are capable of taking the risk of losing some of the existing customers for potential future customers that would accept the price of circular products. Moreover, some consumers may be unwilling to change the ownership concept and consumption behaviour and some may lack interest in sustainability and circular economy inspired products, especially when there is no motive or if the sustainable and circular products are incompatible with the consumer's economic equity or social well-being (Hina et al., 2022). At the same time, some other consumers tend to be motivated by the effort to tackle the pressures added by the fashion industry on the environment, society and the economy, hence demonstrate conscious attention in buying fashion products with sustainable and circular characteristics and in consuming these products responsibly (D'Adamo et al., 2022). Therefore, consumer-related challenges are harder to anticipate and manage since they are influenced by conflicting external conditions and social norms, which create sustainability and circularity dilemmas and increase the risk of bias when implementing circular economy business models within the fashion industry.

However, these challenges could be reduced through transparency, removing barriers along the customers journey, as well as focusing on what motivates customers. For example, clothing disposal could be a barrier for customers but could be done through using the supply chain or having knowledge of the fibers used in the product. Another example could be having a sentimental message behind the new business models so that customer's emotions are involved to make them feel positive about participating. However, the attitude-behaviour gap will always remain a challenge for organisations/brands, as there is a significant gap between the perception of ethical clothing being very important in reducing ethical issues and the purchases the customers opt for (Auger and Devinney, 2007). Therefore, companies are required to communicate their circular strategies through for instance increased marketing, campaigns and platforms that educate and promote awareness among customers, while ensuring the commitment of retailers to these strategies to change in consumers' behaviour and mindset and gain their interests (Dissanayake and Weerasinghe, 2021; Kumar et al., 2021). As the lack of social awareness of consumers and the lack of clear incentives provided through clear marketing mechanisms are challenges to implementing circular economy business models (Tura et al., 2019).

#### 4.3. Conceptual framework

After identifying and discussing the categorisation of circular economy business models into hard and soft aspects of business management and their challenges using examples, it has been noted that the management of hard aspects and soft aspects and overcoming their challenges are crucial for the transition towards circular economy. Although the majority of the literature used and research done have focused on the hard aspects and how their challenges are affecting the

implementation of circular economy business models, the analysis has demonstrated that the soft aspects and their challenges are integrated within each of the hard aspects and their challenges. Therefore, according to examples used in this paper, the management of green intellectual capital and consumer-related aspects are required to overcome their challenges and to successfully manage the business model innovation, stakeholders' pressures, regulatory pressures, and financial pressures which present the more difficult and broader challenges to organisations. However, the soft aspects and their challenges need to be viewed as the core aspects and challenges that organisations or brands need to manage and find solutions for in order to overcome the challenges of hard aspects.

The conceptual framework shows the examples of hard aspects and soft aspects and their challenges discussed in the paper (Fig. 6). It represents the soft aspects as being the core part of the hard aspects. This is because within each of the hard aspects, there are soft aspects that organisations need to be managed first in pursuit of successful changes within organisations. The conceptual framework illustrates that soft aspects represent a crucial part of the hard aspects, and therefore highlights the relationship between both aspects and the importance of addressing both aspects for a successful shift towards a circular economy. Also, it emphasises the importance of managing soft aspects in ensuring a stronger and more resilient human capital, relational capital, structural capital, and consumer relations, which in turn, affects how organisations and brands deal with the challenges encountered by the hard aspects. This preserves the value of all resources including human-resources. Based on the framework, organisations need to focus on addressing the challenges of soft aspects first, as they already constitute a main part of the hard aspect challenges. Thus, the conceptual framework is used as a guideline to facilitate the implementation

of circular economy in all industries including the fashion industry. As the framework helps in presenting the order of which aspects and challenges should be managed and dealt with, which helps with the prioritisation of strategies that need to be implemented to support the introduction of circular economy business models effectively.

#### 4.4. Managerial implications

The outcome paper has the potential to support the management of brands or companies within the fashion industry with the introduction of circular economy practices and overcoming the challenges faced in all stages of production and consumption of materials and energy.

The paper identifies and demonstrates the different challenges that organisations or brands face when implementing circular economy business models. These challenges are categorised into hard aspects and soft aspects, and the aspects were supported by examples. Also, a conceptual framework was developed to provide a recommended guideline for management to help with the prioritisation of strategies and actions required to overcome the challenges and support the implementation of circular economy.

The paper recommends that in order to facilitate the transition towards circular economy within the fashion industry, there is need for management to focus on managing and overcoming the challenges of soft aspects first. Therefore, management is required to focus on green human capital to ensure that that workforce and employees are trained and developed so that they are with up to date with the skills and knowledge necessary for the transition. Moreover, management need to focus on green structural capital which involves altering the organisational culture to support the implementation of circular economy, as well as improving managerial and leadership skills to enhance

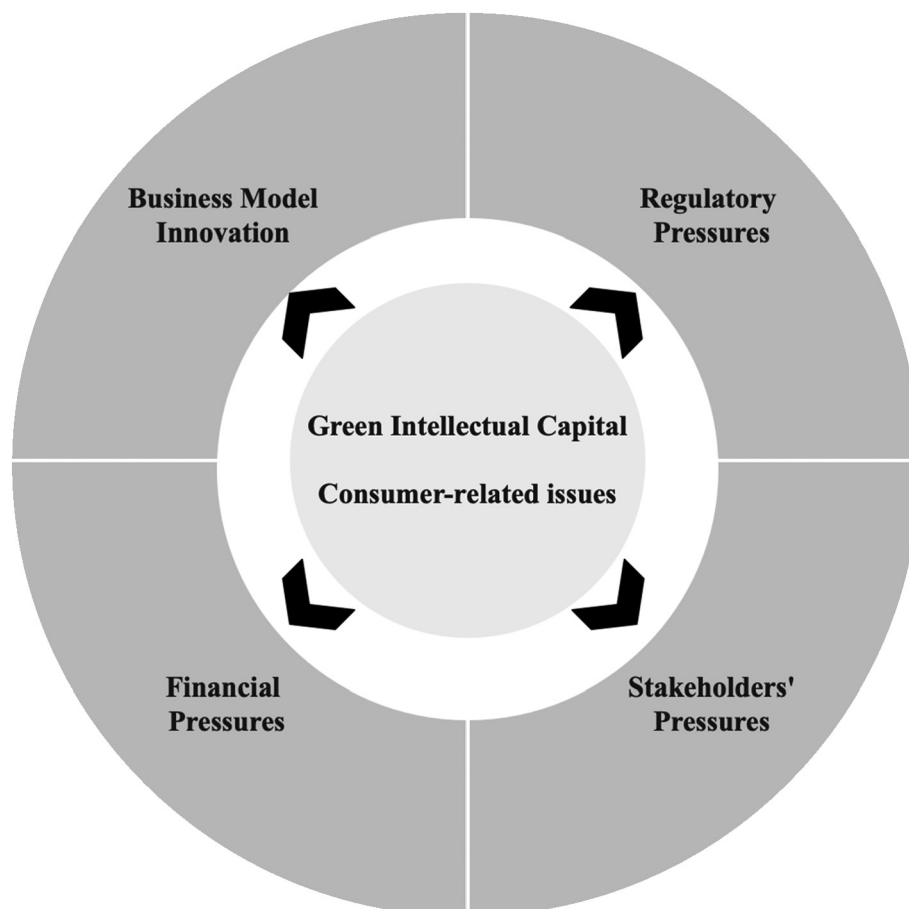


Fig. 6. A conceptual framework representing the examples of soft and hard aspects.

the awareness of the need for the transition on a personal level and organisational level and to minimise the resistance to change. Management needs to also focus on relational capital, as the engagement with other managers and actors across the supply chain will potentially have positive outcomes including new circular ideas, techniques, opportunities, and activities. Furthermore, management need to help with making decisions related to the marketing of circular products and ensuring that the messages are communicated with transparency to increase social awareness and influence consumers' trust and perception, which could potentially impact their behaviour and attitudes towards the circular premium and buying circular products.

Once the soft aspects and their challenges are managed, it will become less difficult for management to handle the challenges associated with hard aspects, as the organisation or the brand would have a stronger and more resilient organisational culture and structure, skilled workforce, good level of collaboration and engagement across the supply chain and less consumer-related issues. Therefore, management would be able to implement circular economy business model innovation successfully. However, management will still have to ensure that production of circular products is done at the moderate required level to avoid circular rebound and partially or fully offsetting the benefits of circular economy. Moreover, management need to incorporate new circular economy inspired technologies and techniques whenever they are available and feasible for a more effective implementation of circular economy. Additionally, management are required to focus on long-term goals instead of short-term goals, and neglect self-interests to support the transition. Finally, management need to focus on using the financial resources effectively and making careful decisions with regards to investments to achieve better outcomes from the implementation of circular economy strategies and to avoid negative implications.

#### 4.5. Policy implications

The governments regulations and legislations play a crucial role in the transition towards a circular economy. Therefore, governments are required to shape their policies and strategies, for instance through implementing more strict regulations and lower taxes, to support the introduction of circular economy business models and deal with the barriers associated with the implementation. Moreover, governments are required engage with other governments and policy makers around the world to standardise the policies and regulations that must be reinforced to avoid outsourcing of production processes to other countries that do not comply with the minimum standards required for the transition. Furthermore, governments are required to conduct collective action and effort with organisations across industries, including the fashion industry, to increase awareness of the importance of circular economy to stimulate the implementation of circular economy strategies and business models. Additionally, governments must set strict regulations regarding the prices and the production levels of circular products. This is to prevent organisations from exploiting consumers and resources, hence, to potentially avoid impacting consumers' purchasing of circular products negatively and to avoid offsetting the benefits of circular economy. Finally, the government can also encourage the training and development of workforce and management, and the introduction of new technologies and technique for better and more effective outcomes of the transition. Thereby, governments could potentially eliminate some of the barriers encountered which would make the transition less challenging for organisations to manage.

## 5. Conclusions

The main objective of this paper was to provide a systematic report on the challenges of implementing the principles of circular economy in the fashion industry. As the fashion industry and the growth of the 'fast-fashion' phenomenon have been adding on the environment, the society, and the economy, highlighting the need for the fashion industry

to shift to a circular economy and apply circular strategies in the production and consumption of materials and energy.

The aspects and challenges of implementing circular economy identified are categorised into hard aspects and soft aspects, and examples are provided to allow better understanding of the categorisation. This is to establish a new direction for the existing research in the same area. The four hard aspects identified in the paper include: (1) business model innovation, (2) regulatory pressures, (3) stakeholders' pressures, and (4) financial pressures. Whilst the two soft aspects identified in the paper are: (a) green intellectual capital – (i) green human capital, (ii) green structural capital and (iii) green relational capital – and (b) consumer-related issues. A conceptual framework was proposed to represent the soft and hard aspects, and to be used as a guideline to facilitate the implementation of circular economy in all industries including the fashion industry. The framework aids in presenting the order of which aspects and challenges should be managed and dealt with, which supports the prioritisation of strategies that need to be implemented to overcome the challenges faced at all stages of production and consumption in order to support the introduction of circular economy business models effectively. The development and prioritisation of strategies based on the challenges reported and the conceptual framework proposed can also assist with accomplishing the outcomes of SDG 12 successfully, due to their positive influence on sustainable production and consumption through the reduced use and efficient management of goods and natural resources.

Despite the contributions of this paper, it entails a few limitations. Firstly, although a lot of literatures have been reviewed, the paper does not cover all examples related to hard and soft aspects due to time and resources contains. Secondly, the categorisation of aspects in this paper relies on the interpretation of the meaning of the data and information based on the description provided for both aspects, hence may not be fully accurate. Finally, the use of PRISMA and systematic reviews could encounter bias analysis since the selection of publications is usually influenced by the author's view to promote a specific idea.

Future research within the topic is needed, as the interest surrounding circular economy has only surged in recent years. Future research should cover more areas that could help with the accuracy and better understanding of the topic and the categorisation. Also, this paper prompts the need for future empirical research, thus this paper could be used as a guideline for the empirical research for other researchers to further explore and test. Moreover, future research should provide a wider scope of insights and knowledge related to the challenges of implementing circular economy, as well as the categorisation of hard and soft aspects. This could provide practitioners with a strong basis to establish a variety of solutions for key stakeholders to enable them to overcome the challenges presented throughout the paper. Furthermore, future research can expand the conceptual framework developed to include the circular strategies and opportunities resulting from the challenges identified in the paper and maybe some of the solutions to help overcome these challenges, so that it could be used by key stakeholders in different ways. Finally, future research should consider the context, location, demographics, and culture of the practitioners while analysing the data since these factors have massive influence on the key findings of the research.

## Declaration of competing interest

The authors would like to state and confirm that there are no conflict of interest in this research work.

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## **Investigating the challenges of applying the principles of the circular economy in the fashion industry: a systematic review**

**Abdelmeguid, Aya; Afy-Shararah, Mohamed; Salonitis, Konstantinos**

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