



Closing the loop on take, make, waste: Investigating circular economy practices in the Swedish fashion industry

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ABSTRACT

The fashion industry is one of the most wasteful consumer industries in the world. Through the advent of fast fashion – trendy, low-cost clothing produced by global fashion brands – clothing has evolved from a durable good to a daily purchase. In recent years, the concept of the circular economy, a framework for a more efficient, closed-loop economy, has emerged as a key way forward in the transition to a more sustainable and less wasteful fashion industry. This paper investigates how the Swedish fashion industry has implemented circular economy principles. Drawing on interviews with the founders, CEOs, and/or brand sustainability managers of 19 Swedish fashion brands, this article maps circular economy strategies across key stages: take, make, and waste. Crucially, for the fashion industry to move towards circularity, this paper argues that brands must integrate these strategies across supply chains, rather than limiting them to the waste stage. The analysis explores the gaps between circular economy principles and practice, identifying challenges inherent in fashion brand approaches. It concludes with recommendations for further study of the circular economy and the fashion industry.

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1. Introduction

Over the last 30 years, the fashion industry has undergone a dramatic transformation. Facilitated by innovation in global supply chains (Tokatli, 2008), lean retailing (Abernathy et al., 1999), and more recently, digitization (Crewe, 2017) and direct-to-consumer online retailers (Wood et al., 2019), fast fashion has become the dominant mode of production and consumption in the contemporary fashion industry. With fast fashion—trendy, low-cost clothing sold by mass market retailers (cf. Barnes and Lea-Greenwood, 2006; Bhardwaj and Fairhurst, 2010; Bick et al., 2018; Pal and Gander, 2018; Tokatli, 2008)—clothing has evolved from a durable good to a daily purchase for many consumers, who enjoy the “thrill” of the deal and shop often to restock their closets (Beard, 2008; Leslie et al., 2014).

The fashion industry follows a linear model consisting of three key stages: take (the harvesting of raw materials), make (the production of garments), and waste (the wearing and subsequent disposal of garments) (Ellen MacArthur Foundation, 2017). Fast fashion, a dominant industry business model, consumes vast

quantities of natural resources to produce inexpensive clothes made by low-paid workers, which are worn by consumers for a short time, and subsequently disposed (Leslie et al., 2014; McAfee et al., 2014). As the production of clothing has increased, the number of times an item of clothing is worn has decreased¹ (European Environmental Agency, 2014; Ellen MacArthur Foundation, 2017). The result is an industry that, by various estimates, produces tremendous amounts of waste (Niinimäki et al., 2020) and has created a social and environmental sustainability crisis (Bick et al., 2018).

In recent years, the circular economy (CE) has dominated conversations—both policy oriented and academic—about how to make industries, including fashion, more sustainable (cf. Andersen, 2007; De los Rios and Charnley, 2017; Elia et al., 2017; Geissdoerfer et al., 2017; Stahel, 2016; Witjes and Lozano, 2016). Based on restorative thinking, the CE is a sustainability framework that aims to “maximize resource efficiency and minimize waste” (Abu-Ghunmi et al., 2016: 228). The CE concept has roots in ecological,

¹ According to estimates from the European Environmental Agency (EEA) between 1996 and 2012, the amount of clothing bought per person in the EU increased 40%, while at the same time, 30% of the clothes in Europeans' closets had not been worn for at least a year (EEA, 2014).

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environmental, and industrial economics, where scholars have investigated the relationship between the environment and economic systems. (For a comprehensive overview of the evolution of the concept and key debates, see Ghisellini et al., 2016; Geissdoerfer et al., 2017; Kirchher et al., 2017; Lieder and Rashid, 2016; Winans et al., 2017; Rosa et al., 2019.)

The CE mainly seeks to redirect the linear flow of material and energy, which guides many production processes, into circular or “closed loop” systems that emphasize resource use and waste residuals (Andersen, 2007; De los Rios and Charnley, 2017). By bridging production and consumption activities, advocates argue, the circular economy will lead to new, more sustainable business models (Witjes and Lozano, 2016) that can decouple economic growth and environmental loss (Elia et al., 2017).

Researchers studying the CE in the fashion industry have focused mainly on the extent to which industry actions centred on consumption and waste, facilitated by circular business models, can reduce the environmental impact of (fast) fashion (cf. Armstrong et al., 2016; Machado et al., 2019; Paras et al., 2019; Pedersen et al., 2018; Pedersen et al., 2019; Sandvik and Stubbs, 2019; Stål and Corvellec, 2018; Zamai et al., 2016). Examples include garment take-back programs (Stål and Jansson, 2017; Stål and Hervé, 2018; Corvellec and Stål, 2019; Hvass and Pedersen, 2019), clothing swaps (Armstrong et al., 2015; Henninger et al., 2019), clothing libraries (Pedersen and Netter, 2015; Zamani et al., 2017), and repair services (Armstrong et al., 2015; Stål and Jansson, 2017). Studies have also examined how established practices, such as second-hand shopping² (Machado et al., 2019) and material recycling (Pringle et al., 2016; Sandvik and Stubbs, 2019), can contribute to a more circular fashion industry.

However, thus far, the impact of such initiatives on environmental sustainability is highly contested. If interventions at the stage of waste cannot affect the impact created at stages of take and make, there is also a need to investigate CE initiatives that directly target the industry at these stages. For example, garment recycling has its own environmental implications (Rosa et al., 2019), while collaborative fashion consumption can have rebound effects (Iran and Schrader, 2017). Moreover, this focus on waste overlooks a critical aspect of the fashion industry's environmental impact: according to a life cycle assessment study conducted by Roos et al. (2016), end-of-life (or waste) accounts for the smallest component of the Swedish apparel sector's carbon footprint.³ Accordingly, a focus solely on waste fails to target the industry's more environmentally damaging stages—take and make. With waste the smallest component, we must also investigate CE strategies that directly target these earlier stages. A key question then becomes: does the CE have the potential to support the transition to a more sustainable fashion industry – across supply chains – or an industry that produces less waste?

In addition to these limitations, a dominant focus on waste ignores the interconnected nature of supply chains, whereby actions taken at one stage carry through to the next (Bick et al., 2018; Brydges and Hanlon, 2020). Thus, in order to address this gap in the literature, there is a need to study not only the opportunities and potential barriers to implementing sustainability and CE initiatives but also the practices underpinning their implementation across supply chains. Furthermore, in many of the previously mentioned examples, companies have introduced new business models to help

bring in CE principles. Less is known about whether existing brands and business models, including fast fashion, are trying to adapt or retrofit their linear supply chains (at the stages of take, make, and waste) in order to become more circular.

These research gaps, and the challenges facing the fashion industry, call for applied case study research in different geographic and industrial contexts. These case studies must find out how actors at the industry's core—fashion brands themselves—are negotiating the tensions and opportunities of applying CE principles across the linear take-make-waste model. Can these principles support the transition to a more sustainable fashion industry? This paper contributes to the growing literature by investigating the implementation of CE initiatives in the Swedish fashion industry. Interviews with sustainability and/or sourcing managers, brand founders, CEOs, and head designers provide a rich qualitative account of how fashion brands are turning CE principles into practice, especially in business models such as fast fashion, contemporary womenswear, children's clothing, outerwear, and sustainable brands.

Three key questions drive this research. First, what is the CE, and how did it emerge as a potential solution to the challenges facing the global fashion industry? Second, how are Swedish fashion brands engaging with CE principles across supply chains? Third, to what extent are CE strategies supporting the transition to a more sustainable fashion industry? This paper responds to the questions in order, with the literature review addressing the first, the primary data collection addressing the second, and the discussion addressing the third. The paper concludes with themes for future research.

2. Material and methods

2.1. Study context: the Swedish fashion industry

For several reasons, the Swedish fashion industry is an ideal case to study these issues. To begin, Sweden represents a global leader in sustainability policies and discourses (cf. Andersson, 2016). For example, the European Commission gave Stockholm the title of first European Green Capital in 2010 (Metzger and Olsson, 2013).

Sweden is also known for style. In the 1990s, the industry experienced the “Swedish fashion miracle” (Hauge et al., 2009) when notable brands, including Nudie Jeans and Acne Studios, gained international attention and fueled the export of Swedish fashion to the world. This boom also included the influential fast fashion giant H&M, which has had a significant impact on the global fashion industry (for a detailed account, see Giertz-Mårtensson, 2012). In 2018, the Swedish fashion industry reported sales of 326 billion SEK (Swedish Fashion Association, 2020).

In addition, the Swedish fashion industry manifests many of the industry's tensions concerning sustainability. While Swedish brands have launched some innovative environmental sustainability initiatives, such as Filippa K's garment resale program and H&M's garment takeback scheme (Pedersen et al., 2018), the industry still faces significant challenges across supply chains, such as ensuring worker well-being and reducing energy and resource use (Roos et al., 2016).

And finally, because the Swedish fashion industry stands out as a CE leader in business and scholarly discussions (cf. Roos et al., 2016; Stål and Jansson, 2017; Stål and Corvellec, 2018; Corvellec and Stål, 2017, 2019; Sandin et al., 2019), this case may also allow us to identify best practices. A notable example is the extensive Mistra Future Fashion Project, which ran from 2011 to 2019 and involved both industry and academic partners (Mistra Future Fashion, 2019). Through offering a qualitative perspective, this new research complements and extends our understanding of the CE in an exceptional context.

² For an extensive account of the dynamics of the international market for second-hand clothes, see: Brooks (2013).

³ As Roos et al. write, “interventions that are most likely to be effective (in reducing the carbon footprint of a garment) are those directed towards reducing the burden of the production phase of the garments” (2016, pp. 694).

2.2. Research design

This research took the form of a qualitative case study. Case studies suit understudied topics that require comprehensive, exploratory work because they provide an empirically rich account of a complex phenomenon (Denzin and Lincoln, 2012). To understand sustainability and the CE in the Swedish fashion industry, we must first gain insight into why and how people and organizations adopt certain principles and practices. This phenomenon is best investigated through dialogue and engagement with the people who face these issues every day (Valentine, 2005).

The main data source for this project consists of semi-structured interviews with employees of Swedish fashion brands who were responsible for sustainability initiatives. I conducted nineteen interviews with small, medium, and large brands based in Sweden. After identifying these brands from a number of sources, including media articles, industry association membership lists, fashion week rosters, and web searches, I organized them into a database. This intentionally broad approach allowed me to capture brands from various industry segments and to invite all to participate in the study.

Notably, a brand did not require a sustainability or circular economy mandate. Rather than focusing exclusively on brands that define themselves as sustainable in some way, this study sought the perspectives of diverse brands with different experiences. After identifying brands, I sent each one an introductory email describing the project and inviting a representative to participate in an interview. Based on this database, I contacted 85 Swedish fashion brands in early 2019, for a response rate of 22%.

The fashion brands ultimately included in this study represent a range of industry segments, including accessories, children's clothing, contemporary womenswear, denim, unisex designs, and outdoor/athletic apparel. Brands ranged in size from one employee working out of a small studio to companies with more than fifty stores and annual profits in the millions. Depending on the brand's size, the interviewee was either a sustainability and/or sourcing manager, the founder of the brand, the CEO, the head designer, or some combination of the above. All respondents are strictly anonymous to protect the identity of participating brands. For an overview of interviewees, see Table 1.

To conduct the interviews, I followed an interview guide that focused the discussion on how brands interpret and implement circular principles. Interviews typically began with questions about the brand, including its product focus and style, and about the interviewee. The second set of questions addressed the sustainability challenges facing the brand, with follow-up questions to determine at what stage of the brand's supply chain (i.e., production, design, retail) these challenges took place. The third set of questions probed whether the brand had sustainability, corporate social responsibility, or circular economy policies; these questions also asked about the challenges and opportunities associated with becoming more sustainable or circular. There was also time for an open discussion and for the interviewee to bring up additional themes. Interviews took 1 h.

I recorded the interviews with permission, transcribed them verbatim, and sent them to the interviewee to review (Valentine, 2005). I then coded the transcripts according to dominant themes (Cope, 2005). This approach helps reduce the data by organizing and sorting the responses into themes for analysis and theory-building (Cope, 2005). This highly exploratory process helped me to see whether specific brand practices might connect broadly to the stages of take, make, or waste.

3. Results

3.1. Take

The first stage to consider is “take”, where industries extract raw materials in order to make new products (Ellen MacArthur Foundation, 2017). At this stage, the processes of growing, dying, and washing textiles lead to various public health and environmental impacts (Alkaya and Demirel, 2014; Khan and Malik, 2014).

Only one of the brands interviewed used existing upcycled textiles in its designs, which it then made-to-order or made available in limited quantities. The rest of the brands continued to rely on new raw materials in their collections. Among the larger brands, initiatives aimed at quantifying the environmental footprint of garment production were common:

“The main circularity challenge we are working with at the moment is measuring the carbon emissions created by each product. Once we understand that, we want to then work to reduce emissions per garment by ensuring what we produce and sell can be recycled and used again so we don't have to take new resources” (Founder, Brand 8, Designer Womenswear).

As this quotation suggests, such initiatives could include calculating emissions per garment, as well as life-cycle assessments and full supply-chain traceability. This excerpt also reveals that brands described this practice—gaining a better understanding of the environmental impact of textile production—as essential for future initiatives. As well, brands connected this assessment with objectives of being more transparent with consumers about the clothing's environmental impact (interviews).

While larger brands had more resources to invest in this type of accounting, smaller brands struggled to quantify their environmental footprint:

There are things we would like to do, like measuring emissions, whether it be from irrigation or transportation, but we just don't have the time or capacity. It's what I feel the worst about. I've been talking to some other labels to see if we can synchronize parts of our businesses to finetune our production practices. (Co-founder, Brand 6, Designer Menswear).

For smaller brands, this challenge arose from the fact it was typically a very small team who were responsible for designing and implementing a range of sustainability initiatives.

The interviews revealed another sustainability practice, one related to fabrics. Some brands reported using fewer fabric blends, which are difficult to separate in textile recycling processes, and choosing more natural fibres, such as cotton and hemp (plant-based) or wool and cashmere (animal-based). As one interviewee stated, *“We are trying to develop a circular-ready model. That starts with using natural fibers. We're in the process of replacing the few synthetic or man-made fibers we have left to make sure that our products are 100 percent biodegradable”* (Founder and CEO, Brand 18, Sustainable Menswear).

Although this brand saw its transition to biodegradable garments as a good environmental step, in reality, the situation is more complicated. Such a garment might actually produce the same amount of CO₂ emissions as something that is not biodegradable.

Other industry segments, such as outerwear, took an alternative approach. Here, brands instead emphasized the use of specialized technical fabrics, which have been engineered to meet both performance standards and expectations for long garment life:

Table 1
Summary of research participants.

Interviewee	Position	Industry segment(s)	Size of firm	Location
Brand 1	Sourcing & Sales Manager	Children's clothing	Medium	Åre
Brand 2	Sustainability Manager	Children's clothing	Medium	Stockholm
Brand 3	Product Manager	Children's clothing	Medium	Gothenburg
Brand 4	Sustainability Coordinator	Denim (mens and womens)	Large	Gothenburg
Brand 5	Sustainability Manager	Designer bags and accessories	Medium	Stockholm
Brand 6	Co-Founder	Designer menswear	Small	Stockholm
Brand 7	Sustainability Specialist	Designer menswear and womenswear	Large	Stockholm
Brand 8	Founder	Designer womenswear	Medium	Stockholm
Brand 9	Sourcing Manager	Fast fashion (menswear and womenswear), children's clothing, activewear, underwear	Large	Stockholm
Brand 10	CSR and Quality Manager	Fast fashion (womenswear)	Large	Boras
Brand 11	Founder	Independent fashion	Small	Malmo
Brand 12	Founder	Independent fashion	Small	Stockholm
Brand 13	Co-Founder	Independent fashion (upcycled)	Small	Stockholm
Brand 14	CEO	Outdoor apparel	Medium	Gothenburg
Brand 15	Founder and CEO	Outdoor apparel	Medium	Nacka (Stockholm County)
Brand 16	Sourcing Manager	Second-hand	Small	Gothenburg
Brand 17	Co-Founder	Sustainable basic apparel	Medium	Sundbyberg (Stockholm County)
Brand 18	Founder and CEO	Sustainable menswear	Medium	Stockholm
Brand 19	Sustainability and Brand Manager	Womenswear accessories	Small	Stockholm

We still don't have strong enough natural fibres to make a winter snowsuit. The best we can do is to focus on durable materials. The suppliers we have today truly excel. For example, we use a very durable recycled nylon so it can be reused for lots of seasons by lots of people. The consumer can really see the sustainability of that garment through using it and then passing it on. (Founder and CEO, Brand 15, Outdoor Apparel).

As for why brands were paying attention to resource extraction and raw materials, the interviews identified a consistent reason: growing consumer demand for more environmentally sustainable products. As a sustainability manager of Brand 2, a children's clothing brand (who had extensive experience in other industry segments), told me, *"when Scandinavian consumers talk about sustainability, they are talking about the environment."* Interviewees frequently mentioned Sweden's record-breaking temperatures and forest fires of summer 2018, as well as the Climate Strikes movement led by Greta Thunberg, as catalysts for consumers' concern about climate change and, by extension, the fashion industry's environmental impact. Clearly, consumer pressure was influencing the progress made by Swedish fashion brands.

Although the stage model helps us explore the transition from linear to circular supply chains, we must still keep in mind the interdependence of these chains. One interviewee offered an example:

"Let's say you produce in Turkey and you decide you want to use organic cotton. That will increase your costs 10–30%. You can move production to Bangladesh to get cheaper labour to try and compensate for the fact you now are working with a more expensive material" (Co-founder, Brand 6, Designer Menswear).

As this quotation highlights, decisions made at one stage of the supply chain can have downstream implications for subsequent stages. The next section examines these implications in detail.

3.2. Make

At the stage of make, fashion brands engage in complex activities and processes to produce a garment (Ellen MacArthur Foundation, 2017; Earley, 2017). To unpack the implementation of circular principles in more detail, therefore, we must examine the interrelated practices of design and manufacturing, and recognize the interrelationship between processes.

First, the interviews indicated that designing for circularity is a challenge. A key business model within the Swedish fashion industry is fast fashion, which is locked into a trend-driven, price-conscious business model that consumers have come to expect. For many customers, style is more important than sustainability:

"Our consumers want a really good looking garment and if it's sustainable they are happy about it. But, they won't choose the more sustainable garment before a better looking one" (Sourcing Manager, Brand 9, Fast fashion).

Moreover, the fast fashion business model marries style with low costs. This combination drives the design process and discourages brands in this segment from moving towards more circular business practices. One fast fashion interviewee explained:

"We know we currently charge too little for garments. Designing a garment to last a long, long time requires a different design mentality. It affects every decision you make. We keep discussing whether we could increase our prices slightly, not several hundred Swedish kronor but maybe 50 Swedish kronor, so we could add design details to garments to raise our quality and make our garments last longer and be even better than what they are today." (CSR and Quality Manager, Brand 10, fast fashion).

These words reveal the difficulty of reorienting a garment's design and production. To steer practices away from a trend-driven, limited-use lifecycle towards one built on longevity and durability, fast fashion brands must rethink their business goals and approaches. Perhaps not surprisingly, such a reimagining has been slow to come.

Independent fashion brands and contemporary designer brands have taken a different approach. Rather than competing on cost, these brands have built their reputation on design. It is no accident that Sweden is known for style⁴ (Hauge et al., 2009), and some brands recognize that their high-quality design can support circularity; after all, both first-hand consumers and second-hand buyers

⁴ Over the last 60 years, the Swedish fashion industry has undergone significant restructuring, beginning in the 1960s and 1970s when the industrial city of Borås experienced a rapid decline of garment manufacturing. Swedish fashion brands reoriented themselves around expertise in design, marketing, and retail while simultaneously outsourcing production (Hauge et al., 2009).

want these garments. This long-term value helps brands to promote circularity by encouraging consumers to consider their clothes as an investment rather than as disposable goods:

For me, circularity is about buying something that you really, really like. It is a bit more expensive but you keep it for a long time and when you feel you are done with it, you pass it on." (Brand 8, Designer Womenswear, Stockholm).

A design-oriented approach also helps brands to sidestep some pressures of competing on cost. As the co-founder of an independent fashion brand explained, *Over time, I've realized that the problem isn't that I'm too expensive, the problem is that everything else is too cheap* (Brand 12, Independent fashion, Stockholm). Some designers described incorporating design features to extend the garment's size. For example, some added an extra seam to the waistband (in adult fashions) or to the arms and legs (in children's clothes), a feature that enhanced longevity and supported the idea of clothing as investment.

The interviews identified a new development with the emergence of permanent collections. Under this business model, a brand will offer part or all of its collection continuously rather than seasonally. One founder/CEO clarified the advantages of this approach:

"With seasonal collections, fashion is about constant renewal and novelty. You need to produce more and more. We wanted to create what we couldn't find: garments free of compromise when it comes to design, quality, durability and fit. With a permanent collection, we spend more time working on each garment: finding fabrics, designing, and learning about the complexities of our supply chains" (Founder and CEO, Brand 18, sustainable menswear).

As this description reveals, designing permanent collections offers an added benefit. The brand can spend less time coming up with new designs and more time addressing other supply chain management issues.

With respect to garment manufacturing, brands react to the make stage as they do to the take stage: they seek to quantify, and ultimately improve, their production practices. The vast majority of brands interviewed produce their collections abroad, in countries such as Bangladesh, China, Italy, and Poland. The interviewees described a range of experiences working with manufacturing facilities, a diversity that the following quotation sums up:

"We work with factories where the owners don't know the first thing about sustainability and they aren't interested. Then, there are those who have everything under control: water filters, renewable energy, you name it. And you have the ones in the middle, which are trying to understand what they need to do, not necessarily because sustainability is important, but because of legislation or because the customer is asking for it. There are cultural differences too, where your factories may not really understand why you are asking about sustainability, but as they work with these issues over time, they see the importance" (Founder, Brand 8, Designer Womenswear).

Aware of the issues and challenges, several interviewees explained how they were trying to take responsibility for better production practices, detailing several approaches. One strategy was to consolidate the number of production facilities that the brand worked with:

"Bangladesh is one of the largest garment producing countries in the world. Naturally, they have huge clients. We've tried to

minimize the number of suppliers we work with, so we are a larger part of a supplier's production units. Currently, we have 10 suppliers and, it is much easier to try and engage with sustainability measures. For example, we've asked them to measure energy use but in exchange, we minimize our usage. We made it a win-win situation" (CSR and Quality Manager, Brand 10, Fast Fashion).

Moreover, as research has established, the fashion industry faces significant, ongoing issues concerning the safety of garment workers in producing countries (ILO, 2017; Brydges and Hanlon, 2020). Some brands struggled to retain oversight of their production facilities and, in many cases, advocated for change:

"There are millions of people working in modern slavery in the supply chains of Western apparel brands producing garments faster and cheaper than ever. Garments are the product of delicate human labour and natural resources, but we are not paying the true cost of either one of those things" (Founder and CEO, Brand 18, Sustainable menswear).

In response, some brands are working with new intermediaries, such as the Fair Wear Foundation, which audit factories and recommend ways to improve labour conditions, such as reducing the number of hours worked or increasing the number of fire extinguishers on site. However, only one brand interviewed took part in a voluntary living wage program, where the brand itself paid the difference between the living wage and the minimum wage in its country of production.

3.3. Waste

Finally, brands are exploring ways to support more sustainable consumption patterns and reduce textile waste. As the interviews showed, these discussions engage and excite the industry:

"We are looking at traditional business models and questioning if the way we do things today is the way forward. What can we change? We need to work towards a model where we take accountability for the garments we make, including at the end of their life. Can we look at clothing rental? Repair? Recycling?" (Sourcing and Sales Manager, Brand 1, Children's Clothing).

Initiatives that have been implemented so far take many forms. Some brands offered garment-repair services or clothing take-back programs (interviews); other brands encouraged consumers to repair and take better care of their garments. The interviewees described practices such as introducing more detailed garment care tags and providing extensive information online, advising consumers to wash clothing less often, use colder water, and avoid dry cleaning. However, sharing this information cannot guarantee less waste, or that consumers will decide to change their behaviour and participate in such practices.

Some brands are also exploring brand-specific recycling programs (such as in-store garment take-back programs), but the interviewees emphasized that they lacked the technological capabilities required for developing in-house textile recycling initiatives. In related responses, many brands welcomed the emergence of rental and/or resale businesses that featured their designs. While they applauded these initiatives and valued a longer life for their products, many small and medium brands, in particular, had yet to develop these programs in-house:

"We have been discussing turning our physical stores into a space where parents can sell, swap, or buy second-hand. We've also

debated a rental program for new-born clothing which is worn for such a short amount of time. However, when you start to think about the amount of logistics that would go into starting any one of these programs, it becomes too much for our brand" (Product Manager, Brand 3, Children's Clothing).

Because small brands typically employ only a few people to manage all sustainability initiatives, they have trouble launching these ideas. In contrast, some larger brands with more resources do not see the need. The following large designer menswear and womenswear brand explained why it had not implemented such a program:

We don't collect old clothes in our stores, the way H&M does. That is because we hope our customers are not using our garments the same way they would an H&M garment. We make a premium, high-quality product and know a lot of our customers would prefer to resell their [brand-name] products when they don't use them anymore" (Sustainability Specialist, Brand 7, Designer Menswear and Womenswear).

Yet this comment reveals an opportunity for future investment that could support a more circular fashion industry. Specifically, brands could regulate and capture the profits from second-hand retail sales while promoting a longer life for garments.

4. Discussion

Returning to the questions that guide this study, to what extent is the circular economy supporting the transition to a more sustainable fashion industry? Can the CE help close the sustainability loop? As Table 2 summarizes, this examination across the linear take-make-waste model found that brands are working to adopt sustainability-oriented practices that, in their view, align with a CE mandate. However, when we interrogate these practices in more detail, questions arise about the conceptualization and implementation of the CE in the Swedish fashion industry.

Moving across the take-make-waste model, examples of circular practices include new design strategies (such as seasonless collections) that may encourage consumers to keep and wear clothing longer. For some industry segments, such as contemporary womenswear and children's clothing, high-quality design was described by interviewees as supporting circularity, while trend-driven design and cost remain challenges for fast fashion brands.

Because the fashion industry largely lacks the technology needed to produce new garments from old materials (cf. Paras et al., 2019; Pringle et al., 2016), brands are working to quantify and reduce the environmental impact of textile and garment production. Clearly, the use of new raw materials contradicts circularity,

given that textile production causes extensive CO2 emissions. Yet the brands' efforts at this stage still matter.

And although some brands are improving the quality of inputs, such as transitioning from conventional to organic cotton, cotton remains a highly water-and-chemical intensive fibre (Claudio, 2007). Moreover, under the current linear fashion system, brands are not responsible for recycling that garment; they have little incentive, therefore, to develop textiles constructed for circularity. If the fashion industry adopted a more comprehensive view of the CE – for example, where brands were responsible for garments at the end of their life – companies might then act differently.

The issue of garment worker rights must also be emphasized. While some brands have engaged in new partnerships to support better conditions for garment workers, these initiative needs much more effort. Many CE models seem to overlook the exploitation built into industry supply chains. Brands should not prioritize circularity at the expense of vulnerable workers' welfare (cf. Brydges and Hanlon, 2020).

With respect to waste, some brands have developed in-house clothing rental and/or resale programs, while some consider partnerships with emerging second-hand businesses. Many companies are actively encouraging consumers to take better care of their clothes, such as by mending them or washing them less often. This better treatment may contribute to circularity by extending the garment's life, and these strategies share useful information. However, they ultimately shift responsibility from brands to consumers. Instead, there are more effective CE strategies, especially given current R&D limitations, with respect to textile-to-textile recycling (Paras et al., 2019; Pringle et al., 2016; Rosa et al., 2019; Sandvik and Stubbs, 2019). Methods of textile waste disposal, such as downcycling and landfill/incineration, present obvious material, economic, and technological disadvantages. In contrast, upcycling and direct-use are circular strategies better equipped to increase clothing's lifespan (Paras et al., 2019).

In recognizing differences in cultures of consumption (Iran et al., 2019; Machado et al., 2019), we must change our relationship to garments. For example, there is little environmental benefit to producing a more circular garment (such as one made from recycled textiles) if the buyer consumes it with a fast fashion mentality (that is, wears it once or twice before disposing of it).

Taken together, the findings expose the tensions of transitioning from linear to circular supply chains and the difficulties of retrofitting existing business models to become more sustainable. This research also illustrates the need to go beyond a focus on waste and consider whether the implementation of CE principles aimed at reducing environmental impact of the fashion industry at one stage of supply chains can affect other stages. For example, the growing efforts to extend garment life through targeted recycling or take-back programs fail to address issues at earlier stages of supply

Table 2
Examples of CE practices emerging the Swedish case.

Stage	Examples of CE practices from the Swedish case
Take	<ul style="list-style-type: none"> • Promote the use of natural fibres and reduce the use of fabric blends • Quantify the environmental impact of production processes • Reduce environmental impact of production, such as limiting waste water or amount of chemicals used in dyeing processes • Relocate staff to work closer with suppliers of raw materials
Make	<ul style="list-style-type: none"> • Transition from seasonal to seasonless collections • Engage in design and branding practices that can support retention of product value on second-hand markets • Build relationships with manufacturers to encourage more sustainable practices in garment manufacturing facilities • Partner with intermediaries, to facilitate monitoring and oversight production facilities
Waste	<ul style="list-style-type: none"> • Develop in-house clothing rental and/or resale programs, or partner with emerging businesses, to extend life of garments • Encourage consumers to take better care of garments, such as washing clothing less often and/or mending • Introduce or extend garment takeback programs • Invest in textile recycling programs in order to support circularity and reduce landfill

chains, such as chemical inputs, poor design decisions, or unsafe working conditions. As such, it is vital to also consider CE strategies at the stages of take and make, in addition to waste. Taking such a holistic approach is relevant for our understanding of sustainability and the CE in the fashion industry.

Overall, the interviewees were optimistic about the circular economy's potential for creating a more sustainable fashion industry. As one CEO described it, *"the industry is upside down. Everything is changing, which I think is quite good. Anything can happen. I've been working in this industry for many, many years and I've never experienced anything like this. It is a very different time"* (CEO, Brand 14, Outdoor Apparel). Yet, it remains to be seen if the industry will capitalize on this momentum, if the CE will prevail as a dominant sustainability approach, and if the assumptions that underpin current conceptualizations of the CE approach (with a dominant focus on waste) can lead to an industry with a smaller environmental impact.

5. Conclusion

In recent years, the CE has been proposed as the solution to the immense challenges faced by the fashion industry. Here, a key argument has been that interventions at the stage of waste can address the environmental impact of the industry created at the stages of take and make. As this is still highly contested, there is a need to also investigate a broader range of industry CE practices. In this context, it has been argued there is need to investigate the implementation and integration of CE practices across the fashion industry's supply chains, instead of seeing these practices merely as interventions at the stage of waste. Although the fashion industry has complex and deeply interconnected supply chains, where decisions made at one stage impact the next, sustainability efforts tend to ignore this interconnection.

Through interrogating the CE practices of Swedish fashion brands across the stages of take, make and waste, this research found that brands are selectively and strategically implementing CE interventions at different stages of their (still quite linear) supply chains rather than overhauling the practices that make the industry so unsustainable in the first place. Moreover, there continues to be a focus on tackling the issue of waste. Continued engagement with the CE that fails to take a holistic approach to the sustainability challenges facing the fashion industry is a missed opportunity to not only meaningfully confront and challenge dominant industry norms, but affect the environmental impact of the fashion industry. Continuing on this trajectory runs the risk that the CE, like other sustainability concepts before it (Henninger et al., 2016), will become another nebulous idea susceptible to greenwashing.

While drawing on a relatively small sample of fashion brands, this research suggests that the fashion industry will not experience a uniform transition to a more circular system. Despite a number of limitations, technological as well as dominant industry norms (including cost, trend and consumer motivations), circularity as it has been conceptualized does not seem currently attainable in the fashion industry. Yet, the industry is still taking some steps towards circularity, and these steps may lead to the growing acceptance and implementation of CE practices. If successful well-known brands (like many of those that define the Swedish fashion industry) make significant, structural changes, other industry actors may follow suit.

To the broader study of circular economies, this research offers two important takeaways. First, we must consider industrial specificity, because the application of CE principles will look different in each industry. For example, fashion has specific external barriers to CE practices, including style, aesthetics, and the role of consumers. Second, we must consider the local industrial

context. Even as the CE will look different in different industries, so too will it reflect local factors, such as policies and regulations related to sustainability and/or the CE. Industrial dynamics particular to the local context will influence decisions.

Future research is needed to continue to monitor developments in the Swedish fashion industry, studying its transition towards circularity over time. For example, how will the impact of COVID-19 affect ongoing or planned brand sustainability investments? Going forward, CE research that recognizes the power imbalances inherent in fashion's supply chains will also provide a useful lens of analysis. In addition, we need to better understand enablers and barriers to the CE in different industry segments in more detail (such as children's clothing or menswear). Finally, future research must examine the ways local, national, and supranational policies related to circularity can support the transition to more sustainable economies and help close loop of the take-make-waste model.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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