

# **Designing for longevity and neutrality: Investigating how the Swedish children's clothing industry implements circular economy principles**

## **Abstract**

As research has well established, the fashion industry has a significant and growing waste problem. In response, experts argue that our clothing needs to have a longer life. However, not all items of clothing can be used for a long period of time. Children's clothing, for example, can quickly become obsolete, creating a waste issue. To explore this issue further, we examine the Swedish children's wear market and how designing for the circular economy can address this market segment's unique sustainability challenges. Rather than centering on a consumer perspective, we investigate the role of design in supporting the transition to a more circular children's clothing industry. As a key contribution, this article demonstrates that there are more circular design strategies available than prior research has explicitly mentioned. In particular, we show how design for longevity and design for neutrality can help to overcome some of the sustainability challenges facing the industry.

## **Main Text**

### **Introduction**

The fashion industry's dirty secret is its waste problem. It has been estimated that "92 million tons of textile waste is created each year and the equivalent to a rubbish truck full of clothes ends up in landfill sites every second" (Beall, 2020). Without change, the industry will account for 26% of global greenhouse gas emissions (EMF, 2017). Farra (2019) indicates that "fashion needs to reassess its value system and quickly, insisting that we must rethink our relationship with clothing. Rather than treating clothes as disposable items, as a fast (or ultra-fast) fashion t-shirt can often cost less than a take-away coffee, we should see garments as items of value. Farra (2019) further emphasizes that disposable fashion, like single-use plastics, should be phased out, and some experts propose a collective stakeholder approach that would re-educate consumers along the way (Lee and Magnus, 2021). Yet this approach has a key limitation that currently lacks research: not all fashion products can be used for a long period of time.

To explain, most studies that discuss fast fashion and the linear (take-make-use-dispose) system refer to womenswear (e.g., Henninger et al., 2019; Blazquez et al., 2020). However, research has not yet focused on children's wear, a 'hidden' environmentally damaging fashion segment. As Falconer (2020) observes, "our children's rapid growth only exacerbates the issue – it's the ultimate fast fashion" (Falconer, 2020). Children's wear creates a significant waste issue for two reasons: children not only grow fast in their first years, with clothes quickly becoming too small and obsolete (Petersen and Riisberg, 2017), but also play outside and thus soil or

damage their garments more easily (Ræbild and Bang, 2017). Within Europe, parents spend on average €600 annually on children's clothing and often discard it before it reaches its full useful wear-time (CBI, 2021). Yet few studies focus specifically on the childrenswear segment and its ongoing waste problem.

The circular economy (CE) seeks to counteract the waste issue through the reuse of resources in a continually flowing loop (Niinimäki, 2017; Henninger et al., 2020). It offers an alternative to traditional linear economies where raw natural resources are extracted, transformed into products, and subsequently disposed of (Brydges, 2021). The CE tries to transform the linear flow of material and energy, which guides many production processes, into a circular "closed loop" system or economy, one that takes resource use and waste residuals into consideration (Andersen, 2007; De los Rios and Charnley, 2017).

In doing so, the CE proposes a new relationship with goods that "replaces production with sufficiency: re-use what you can, recycle what cannot be reused, repair what is broken, and remanufacture what cannot be prepared" (Stahel, 2016: 435). Ultimately, it is argued, when a CE transforms waste into usable supply chain materials, it decouples economic growth and environmental losses (Elia et al., 2017).

Sweden is a key player within the sustainable childrenswear market, with multiple brands (e.g., Mini Rodini, Newbie, Polarn O. Pyret, Isbjörn) included in "the 10 best stylish-and-sustainable buys for babies and children" (Diner, 2020; Doll, 2020; Moore, 2020). As the Sweden Institute (2021) has a strong commitment to sustainability in fashion, the circular economy, and circular business models (Brydges, 2021), this dominant role makes sense. Sweden has a longstanding reputation as a global leader in sustainability policies (c.f. Andersson, 2016; Sweden Institute, 2021) and as a fashion trendsetter for its cool designs and global brands (Hauge et al., 2009). Moreover, it not only hosts the Swedish Fashion Summit, which has a strong sustainability agenda, but also offers Mistra Future Fashion, a cross-disciplinary program that enables systemic change in the Swedish fashion industry (Warkander, 2020; MFF, 2021; SFC, 2021).

This article focuses on the Swedish childrenswear market and how designing for the CE can address this industry segment's unique sustainability challenges. Rather than centering on a consumer perspective, we apply an industry lens and explore the role of design in supporting the transition to a more circular children's clothing industry. Specifically, we address the following research questions:

1. What are drivers of circular fashion design in the children's clothing industry?
2. What are barriers to circular fashion design in the children's clothing industry?

## Literature Review

## *Circular economy and the fashion industry*

The fashion industry is producing increasingly more clothing every year, which is worn less. It is estimated that half of all fashion items produced are disposed of in less than one year, and less than 1% of unwanted clothing is ultimately recycled (EMF, 2017). As a result, \$500 billion USD in value is lost annually due to the under-utilization of clothing and a lack of recycling (EMF, 2017: 36). Accordingly, there is a need for research to avoid treating the fashion industry as a monolith and instead examine how different segments are grappling with sustainability in their transition to a more circular industry. For example, within the fast fashion industry, it is the womenswear segment that has been fundamentally transformed by the introduction of weekly 'drops' of trend-driven designs (Blazquez et al., 2020; McKinsey, 2021).

We also see these issues magnified within the childrenswear market. As an individual child often cannot use a piece of clothing for a long time, this industry segment relies on CE principles to reach its full potential through re-looping. The childrenswear market may be moving towards more circularity because the CE emphasizes not only environmental protection and social justice but also economic opportunity. For example, some rental companies in Denmark cite government estimates that parents spend an average of 20,000 Danish Kroner (€2,700) on childrenswear within the first year, an amount that can be significantly reduced through utilising a rental service (Petersen and Riisberg, 2017). Yet, despite the potential for cost savings, many rental and leasing companies specialized in childrenswear struggle to survive, with many closing after only a couple of years in operation (Petersen and Riisberg, 2017; Henninger et al., 2022).

In academic studies of circularity in the fashion industry, researchers have examined how the CE is leading to new strategies for tackling the waste crisis. These strategies include introducing access-based consumption modes into already existing business operations (Niinimäki and Hassi, 2011; Ræbild and Bang, 2017; de Padua Pieroni et al., 2018; Kjaer et al., 2018; Rathinamoorthy, 2019). For example, some brands have implemented garment take-back programs (Hvass and Pedersen, 2019), textile recycling (Sandvick and Stubbs, 2019), textile upcycling (Han et al., 2016), and garment reuse (Henninger et al., 2019; Machado et al., 2019).

However, to address the environmental and social sustainability crisis, the fashion industry cannot implement CE principles by focusing solely on waste (Brydges, 2021). Brands also need to explore circularity across supply chains, rather than seeing it merely as an end-of-life consideration. Here, the issue of design has been largely overlooked with only a few notable exceptions (Moorehouse and Moorehouse, 2017; Niinimäki, 2017; Smith et al., 2017; Onur, 2020; Dan and Østergaard, 2021). These studies move examinations of the CE beyond a focus on waste to a focus on radical changes through the life cycle of a garment (Ghisellini et al., 2016).

While Moorehouse and Moorehouse (2017) review how fashion houses have implemented zero waste fashion and/or sustainable fashion design strategies, Niinimäki (2017) discusses approaches that the fashion industry can take to join the CE, such as design for

longevity, design for services, design for reuse in manufacture, design for material recovery, and new business models. In particular, Onur (2020) insists that fashion design education must reinforce the need for more responsible clothing. This education will ensure that designers see circularity not as an add-on strategy but as a creative goal. Onur's idea links to a body of research dedicated to slow fashion and how it emphasizes timeless, classic designs that can support more mindful consumption behaviors (Clark, 2008; Henninger et al., 2017).

We also note that research investigating male fashion appears limited. To date, most publications have focused on design aspects (e.g., trends) or, more recently, the shift towards gender-neutral fashion, changes in disposal behavior, and fashion's impact on men's self-identity (Bubna and Norum, 2017; McCauley Bowstead, 2018). Moreover, research into childrenswear and the circular economy seems even more limited. Only a few authors explicitly discuss this topic (Petersen and Riisberg, 2017; Ræbild and Bang, 2017), analyzing the childrenswear market and circular economy business models, while Elf et al. (2022) mention childrenswear brands as part of their sample. This limited body of research reveals the need for our study.

### ***Circular economy and design principles***

Less is known about how circularity during fashion design can support the transition to a more sustainable fashion industry. Here, 'fashion design' does not simply refer to the pattern design of a garment. Instead, it refers to the design phase and its many decisions, which include the pattern design, the material, the sourcing of raw materials, the production process, the distribution of the finished product, and the end-of-life treatment.

Research has established that the various stages involved in the design phase can contribute to a garment's overall environmental impact. However, only a few studies so far investigate how each stage could contribute to a more CE and, more specifically, to circular business models (Pedersen et al., 2019). Although some researchers highlight how designers can influence parts of the design phase (e.g., Gwilt and Rissanen, 2010; Fletcher and Grose, 2012), Claxton and Kent (2020: 8) point out the need for more research on "the use of sustainable design practices – activities and mindsets – themselves and their application in the fashion industry".

Various authors (e.g., Brydges et al., 2020; Henninger et al., 2020) have explored how industry actors are engaging with the concept of circularity and circular design practices, and whether this approach can support the transition to more sustainable production and consumption practices. Both NGOs and fashion brands have advocated for the CE as a way forward for the industry. In this article, we draw on Niinimäki (2017), who listed four different ways to approach circular fashion design, namely through *design for longevity*, *design for services*, *design for reuse in manufacturing*, and *design for material recovery*. This focus on design moves away from a cradle-to-grave mindset and towards a cradle-to-cradle vision (Braungart et al., 2007).

In particular, the EMF's (2017b) report *A New Textiles Economy* helped to spark an industry-wide conversation about the need for a circular approach to the contemporary textile

and fashion industry. The Report's conceptualization of the circular economy based on three key principles: 1) design out waste and pollution, 2) keep products and materials in use, and 3) regenerate natural systems (EMF, 2017a: 48). To exemplify these principles, the report calls for phasing out substances of concern, such as microfibers or toxins, increasing clothing use, radically improving recycling processes, making effective use of resources, and moving to renewable inputs (EMF, 2017b).

*Designing for longevity* implies that products should 'outlive' their initial owner and be used by multiple others, perhaps by entering an alternative retail stream, such as secondhand retailing (e.g., Gwilt, 2014). As we have noted, childrenswear differs from other fashion segments because children not only grow out of their clothes quickly but also treat them roughly by playing outside (e.g., Diner, 2020; Kelpp and Haugrønning, 2021). Making garments more durable can have environmental benefits; as a piece of clothing can be worn longer, durability thus extends a garment's lifetime and actual use (Gwilt and Rissanen, 2010; Gwilt, 2014; Claxton and Kent, 2020).

To make a garment more durable, fashion businesses must make key decisions when selecting materials and creating designs. Specifically, brands must ensure that garments not only offer key performance properties (e.g., breathability of material, ability to withstand pressure) but also appeal emotionally to consumers, in terms of actual fit, ease of putting these garments on, and style (e.g., Fletcher, 2012; Conlon, 2017). When Petersen and Riisberg (2017) investigated VIGGA, a Danish childrenswear company specializing in rentals, the company concurred that it faced two main challenges: sourcing durable materials, which in VIGGA's case was GOTS-certified cotton, and ensuring current style. Because childrenswear is increasingly trend-led (e.g., Bown, 2021; CBI, 2021), providing a rental service becomes more complex. The clothing must satisfy emotional appeal, but it must also last for a minimum of 82 weeks to be financially viable (Ræbild and Bang, 2017).

Overall, only a few studies focus on actual design options. Gu et al. (2004) develop the 'adaptable design' approach, which, as its name suggests, allows consumers to make changes to their garments without discarding them. For example, "Fragments Garments" are designed to be easily disassembled and reconstructed, a feature that helps buyers to follow new trends, at least to some extent (Fragments Garments, 2019; Jayot, 2019). Gu et al. (2004) emphasize that businesses can implement design adaptability in two ways, either in the design of the product or in the actual product itself. An adaptable design implies that brands can use the blueprint to create another product, while an adaptable product (such as a garment) is one that the user can change, as is the case for Fragments Garments (2019) and Petit Pli (2022). However, consumers may not like this approach because adaptable garments require more time and other options are cheaper.

Clearly, *designing for longevity* faces various issues: durability, design, appeal, adaptability, and fashion trend. To address these challenges, companies such as VIGGA seek to create subscription boxes that are more gender neutral and classic, yet companies still divide the clothing into 'boys' and 'girls'. A question that emerges here is whether *designing for neutrality*

could be a viable option, labeling garments less in line with gender stereotypes and more in line with age groups. Nonetheless, this under-researched option may also be challenging, as garments help to distinguish a baby's gender in the early months, either through color (blue, pink) or decoration (additional frills and ruffles for girls' clothes) (Paoletti, 2012).

*Designing for services* links to studies by Petersen and Riisberg (2017) and Ræbild and Bang (2017), who explore the potential for parents to rent or access childrenswear, rather than owning it. The fashion industry is paying increased attention to access-based consumption, in which the ownership of a garment does not change hands; instead, individuals pay a set fee to use the garment for a set time (Armstrong et al., 2015; Brydges et al., 2020b; Mukendi and Henninger, 2020). Not surprisingly, renting or leasing (long-term rental) is more popular within fashion segments catering to adult consumers. The reasons for this popularity, currently unknown, may not be logical. After all, adult consumers do not usually 'grow out' of garments, unlike infants, toddlers, children, and adolescents, who often need new clothes every month.

To date, limited research focuses specifically on the circular economy and children's clothing. Of the existing literature, most papers discuss rental models (Brun Petersen and Riisberg, 2017; Ræbild and Bang, 2017). Yet unlike adult clothing counterparts (e.g., Rent The Runway, HURR Collective, Girl Meets Dress), childrenswear rental platforms seem more hit and miss. Whilst some companies have established themselves, such as Bundlee (UK), Tale me (BE), Räubersachen (DE), VIGGA (DK), and Circos (NL) (e.g., Orlik, 2019; Reidy, 2019), others fail to take off, with companies such as Tchibo Share ceasing operations (Bergstein, 2020; Henninger et al., 2022). One study suggests that safety concerns and kids' happiness may account for the slow uptake (Orlik, 2019). These reasons imply that not all CE business models may work for the children's wear market (Henninger et al., 2022). And finally, *design for reuse in manufacturing* and *design for material recovery* again focus predominantly on the raw materials and decisions made during the design stage. As previously noted, currently less than 1% of materials is recovered (EMF, 2017), leading to an enormous economic loss.

Implementing CE principles throughout the design phase may seem relatively straightforward, at least in theory. However, this implementation requires a complex decision-making process, one that focuses on not only economic aspects but also social and environmental ones. Which angle is most important depends on the brand itself, as well as its enablers and barriers remain under-researched.

## **Materials and Methods**

This qualitative research draws on the Swedish fashion industry, more specifically the childrenswear market. Before conducting research, we created a database of potential brands to include in this study. We identified a total of 85 potential participants and received a response rate of 22%. Overall, 19 semi-structured interviews were conducted with small, medium, and large Swedish fashion brands. Interviewees held one of the following positions: sustainability manager, brand founder, CEO, head designer, and/or a combination of some of these roles. Brands ranged in size from one employee working out of a small studio to brands with 50+

stores globally and annual profits in the millions. Table 1 provides a summary of our participants.

Table 1 Here: Summary of Participants

While conducting this research, we discovered that brand engagement in this segment of the industry is unique and thus merited further investigation. To support the interviews, we used secondary data from randomly selected Swedish childrenswear brands. By secondary data, we refer here to materials available on official company websites and social media, industry reports, newspaper articles, as well as publicly accessible promotional content. Interviews were recorded, transcribed, and sent to the interviewees to review (Valentine, 2005).

To begin, each researcher coded the transcripts independently, following the seven-step guide created by Easterby-Smith et al. (2018) of familiarization, reflection, conceptualization, cataloguing concepts, re-coding, linking, and re-evaluation. This approach allowed us to build an initial coding framework, based on patterns and themes that emerged not only based on the literature but also guided by the findings.

After the initial review, we discussed and reviewed the coding frameworks, paying extra attention to any discrepancies. Once we reached agreement and developed a final coding framework, the lead author re-coded the data set in order to ensure consistency. Overall, the data set was coded according to dominant themes that were analyzed and used for theory-building (Cope, 2005). All respondents are strictly anonymous to protect the identity of participating brands.

## Results

### *Enablers of circular fashion design - design for longevity*

#### *Patterns and designs*

To explore this theme, this section combines primary data with secondary data from randomly selected Swedish childrenswear brands. When discussing aspects of the CE with our interviewees, we learned that design for longevity (Niinimäki, 2017) is a key concern in their process. For example, Brand 1 indicates “*we are very firm in our belief of making durable, high quality clothes that can be used by many kids. Instead of buying a jumper from H&M for 79 SEK, you can buy ours that is twice as expensive, but it will last and look great for both, or all three, of your kids. It is one of our biggest selling points for why people choose us as a brand*”.

As this quote highlights, children’s clothing must be hard-wearing and long-lasting. Durability is a key selling point, perhaps more important than aesthetic design, confirming what the literature has shown (Fletcher, 2012; Conlon, 2017; Claxton and Kent, 2020). A number of brands in our sample (e.g. Brand 1, Brand 2, Brand 15), instead of competing on cost, focus on

an emotional appeal, targeting families with multiple children and/or parents hoping to recoup the cost of clothing later (Fletcher, 2012; Conlon, 2017). This approach further links to economic costs because longer-lasting garments that can be used for more wear-time will be cost effective for consumers. The businesses we interviewed rely on families having multiple children, an expectation that aligns with recent statistics indicating women in Sweden have on average 1.7 children (Sweden Institute, 2021b).

However, designing for longevity is not unique to our interviewees. Instead, it seems a common practice. For example, Polarn O. Pyret, who claim to be the second-hand market's best-selling clothing label, write *"we've always made clothes that are meant to be handed down – from sister to brother to neighbor to neighbor"* (Polarn O. Pyret, 2021). Similarly, Ittikid (2021) emphasizes the durability of its clothing, stating that these garments *"will last. And last. And last. Ittikid is our way of encouraging folks to reuse clothing, pass it down, eliminate the wasteful 'throw away' culture of baby and children's clothing, and throw in some fun design along the way"*.

Our primary data also supports this emphasis on durability. We discovered that a number of children's fashion brands have enlarged their labels in jackets to provide space for multiple names. Brand 15, which specializes in outdoor apparel including popular children's snowsuits, stated *"the core of circularity to us is keeping things in use as long as possible. We encourage making mindful purchases, caring for those purchases, and then keeping those purchases in use, whether that is giving them to a friend or neighbor or selling the item second-hand. We want to keep garments in motion as long as possible. That is where we believe we can have the biggest impact on the planet"*.

This statement reinforces an important observation. Both our interviewees and the randomly selected childrenswear brands assume that customers have more than one child and/or know other parents who are willing to reuse their own child's garments. Thus, in theory, the cost of a garment is reduced over time, as three children may wear the same piece of clothing for the same cost. While this possibility of recouping the money may be an attractive selling point, customers must still pay up front for the clothes, which may be quite expensive. Swedish children's brands recognized this issue but noted that many Swedish households have both working parents and extensive state support for parental leave and childcare. Thus *"the typical family's household economy is quite good"* (Brand 2).

These comments suggest that sharing clothes and spending more money on childrenswear might also be culturally anchored and thus a prerequisite for the success of these brands. This implication would expand the findings by Petersen and Riisberg (2017) and Henninger et al. (2019), which indicate that engaging with swapping practices and secondhand consumption is culturally dependent. As Scandinavian countries formed part of the sample within both research studies, we can infer that hand-me-downs, rentals, and pre-loved garments are commonplace within the fashion landscape (McCrory, 2020).

While longevity seems a key design strategy for Swedish children's brands, however, aesthetics are still vital. Happy, playful prints and patterns set Swedish (and Scandinavian)



children's clothing apart. Swedish fashion brands in general are well known and celebrated for their cool designs (Hauge et al., 2009), and children's clothing is no exception.

For example, Ittikid's (2021) website highlights its fun designs, emphasizing the distinction between trend-led and design-led aesthetics (in terms of patterns, colors, and prints on fabrics). As design-led aesthetics are less likely to go in and out of fashion, they contribute to the success of these garments on secondhand markets. Similarly, Villervalla (2021a) describes its childrenswear as a *"magical world. A world created of colorful fantasies and liberating childishness. A world where games and adventure never end. A world where every child can join in, where every child is welcome. So step into the magical world of Villervalla - a world where kids are always kids"*. What is interesting here is that the focus is on design patterns and color that may be less trend-led and thus, reiterates that these Swedish fashion brands *design for neutrality and longevity*.

Significantly, our research shows that Swedish childrenswear companies seem to be designing for 'kids' rather than boys or girls. They hope to provide gender-neutral garments that can be *"worn by as many kids as possible – true value"* (Polarn O. Pyret, 2021). Villavalla (2021a) goes even further to state that *"we design and create children's clothing for all children (...) all children can wear all the colors of the rainbow. You can mix and match clothes across the whole collection, and the fit of the clothes suits both boys and girls"*. Instead of having boy/girl collections on their websites, various brands are promoting products according to the type of garment (e.g., ebbe, 2021; JNY, 2021; Villavella, 2021b).

This finding differs from past research (Petersen and Riisberg, 2017; Ræbild and Bang, 2017), which reports that multiple brands have either converted to a traditional retail model, as opposed to leasing or renting, or have ceased operations (Henninger et al., 2022). To explain these conversions and closings, the studies point to the complexity of the market. Yet offering garments according to size rather than gender reduces some of this complexity because brands can reduce and customize rental packages according to, for example, seasons and age groups.

Thus, a key finding of our study, not yet explored in the literature, is design for neutrality, an approach with both advantages and disadvantages. It overcomes the challenge of gender-specific garments, which during interviews it was suggested that parents may find more difficult to pass down. On the other hand, gender-neutral garments may not satisfy parents who want to reveal their baby's gender to friends and family, often through stereotyped colors (pink, blue). Although colorful patterns and fun designs may work well for slightly older age groups, these neutral designs may not appeal as strongly to parents of younger children.

### *Clothing design*

In line with Gu et al. (2004), who developed an adaptable design approach, we noticed that only a few interviewees use a new manufacturing technique that allows garments to be worn longer: *we have extendable sizes built into our clothing. It may sound technically advanced, but it is as simple as adding an extra seam in the inner lining so arms or legs can be expanded as the child grows (Brand 1)*.

Although the expandable design could overcome some of the key challenges in the childrenswear market, namely the fast turnover of garments that no longer fit, few companies follow this approach. The reasons are not yet known. Cost (both in terms of production as well as potential additional costs to the consumer) may be a factor, or brands may struggle to make garments durable enough to last for several years of steady wear. In addition, adaptive designs imply that one child will wear an item for longer, rather than passing it on to multiple kids. For example, if the seams are removed to make sleeves longer for one growing child, parents may need to take in the seams again for a younger sibling. This additional work could also explain why this design approach has not hit the mainstream market.

In summary, the circular design process for the Swedish childrenswear brands depends on not only design for longevity but also design for neutrality, a driver that previous research has not, to our knowledge, discussed. Yet designing gender-neutral clothing may make economic sense and become even more important, seeing as gender stereotypes face increasing scrutiny. In another key finding, this research shows that fashion brands assume the secondhand market is growing and culturally acceptable. Children's fashion brands set out to design long-lasting garments that parents can hand down to several children. This approach—design-led rather than trend-led—further links to design for neutrality.

### ***Barriers to circular fashion design***

When it comes to children's clothing, cost presents the main issue because children grow so quickly. This financial factor could be a barrier to circularity, as it could encourage brands to sacrifice quality for cost. However, while Swedish fashion brands admit buyers may have an "expectation that children's clothes be very cheap" (Brand 9), they also agree that parents are "more concerned about their children's clothes than their own" (Brand 2). Accordingly, the assumption is that parents are willing to pay more for garments that are safe for children and made with high quality materials.

Interviews (e.g., Brand 1, Brand 2, Brand 3, Brand 15) revealed a number of strategies that brands employ to manage cost but still produce durable garments for multiple users. First, as the cost of organic materials has declined in recent years, brands have taken advantage of this change, which has helped make their products relatively less expensive: "*We've reached a tipping point in terms of the cost difference between conventional garments. Whereas the conventional t-shirt costs 149 SEK, it used to be the organic cotton was 399 SEK and today, it's closer to 199 SEK. The difference is not so big, and we see people making new choices*" (Brand 3).

Table 2 compares a simple flower print baby onesie produced by three childrenswear brands classified as sustainable (Diner, 2020) with one produced by two high street brands. As Brand 3's comment suggests, the prices differ, but the actual price gap is shrinking. This trend implies that, in the future, price may no longer deter customers from buying sustainable brands.

Table 2 about here

During interviews, brands have also stated that they actively seek to counteract the price argument. Rather than lowering quality to reduce costs, these brands instead reduce the number of styles they produce: *“to keep a good price point for our consumers, we use standard designs but change the prints on our fabrics. Working with the same manufacturers has allowed us to perfect our fit and focus on what we do best, which is our prints”* (Brand 1). This choice reinforces our finding that brands are designing more for neutrality, choosing ‘standard’ styles that will last a longer time and designing gender-free clothes that will suit all kids.

Table 2 further highlights the material composition that these brands advertise. Companies admit that even though labels such as “organic” or “eco-friendly” may confuse buyers, they believe that parents consider these tags positive and necessary. This reaction is interesting; it partially agrees with previous research (Henninger, 2015; Henninger et al., 2016) yet also indicates that brands must provide labels, even confusing ones, as a bare minimum. In turn, this indication implies that parents expect a slight price premium and will make this investment for their children. Purchasing safe and durable garments may matter more to them than cost.

Overall, cost seems the biggest challenge facing these sustainable childrenswear brands. Ultimately, they must justify their slightly higher price point to their target audience. The key drivers of design for longevity and design for neutrality can help companies overcome this challenge by allowing them to reduce costs without compromising on quality and/or design.

### ***Enabler and barrier: Secondhand markets***

In an unexpected finding, our research revealed that secondhand markets can act as both an enabler of CE practices and a barrier to them. Brands indicated that they design for longevity, making garments durable enough for multiple children. If a piece of clothing has passed through all children in a family and remains intact, parents can thus sell it on or give it away to someone outside the immediate family.

Although brands recognize their product’s value on secondhand markets, our interviewees described lacking the capacity to capitalize on this opportunity. For these relatively small companies, the logistics behind setting up rental programs or opening secondhand boutiques made such initiatives too much to undertake. Although in the case of children’s fashion brands design their garments to be circulated for longer, they are unable to facilitate this in greater detail and are reliant on their customers to follow through. The logistics behind setting up and running rental companies can also be one of the reasons as to why childrenswear rental companies often revert to traditional retailing formats and/or cease operations (Petersen and Riisberg, 2017; Henninger et al., 2022).

A brand that has created a rental model is Hyper. In an interview, Olivia Rothschild (Hyper) describes, *“each item of clothing is typically rented out to three different children which,*

*since 2015, has saved our members an average of €245 each*" (Mallalieu, 2020). This approach mirrors a similar one taken by our interviewees (e.g., Brand 1, Brand 15), who emphasized 'handing down' clothing to ensure that garments are worn by at least three different children.

Other brands, including Arket (2021), have gone into partnership with Circus, an "*online shop and rental service for children's and maternity wear, founded with the mission to increase the use and prolong the life of garments that are typically used for only a short period of time*". Partnerships and/or collaborations offer advantages: they can reduce the risk, and they can ensure that someone with the right service experience will manage the CE business model. Thus, it could be argued that designing for service may not always be necessary, especially if collaborations are possible. This finding further aligns with industry reports that have pointed out rental platforms in the childrenswear market do not generally do as well as their counterparts in the adult garment industry (e.g., Orlik, 2019; Reidy, 2019).

## **Discussion and conclusion**

Taken together, the results suggest that in the Swedish children's fashion industry, brands approach circularity and the industry's considerable waste problem by focusing on ways of extending a garment life. In a key contribution, this article reveals that there are more circular design strategies available than prior research has explicitly mentioned, such as design for longevity and design for neutrality. These strategies can help brands to overcome identified challenges, namely cost and financial viability of the business.

It is noteworthy that in a segment of the market that is known for cost pressures (as garments have an inherently short-life as children grow so quickly), we have found examples where children's fashion brands are utilizing circular economy principles that create value and can extend the life of garments. Designing for longevity supports a longer life with the initial garment user (as well as subsequent users) while designing for neutrality reinforces this by encouraging use by children regardless of gender. These are attributes that can be applied to other market segments. For example, unisex clothing is also increasingly becoming a trend (and is something that may continue to grow in popularity in the future, while design strategies to support longevity (such as waistbands and hems that are easily altered) are evident in the slow fashion sector.

While it is indeed encouraging that some industry segments (outerwear, children's clothing, and independent fashion brands) are working to close the loop, these developments raise some concerns. First, the impact of these circularity measures is difficult to quantify. While brands are taking many steps to encourage consumers to resell or hand down their garments, we do not know how many consumers are actually engaging in these activities. In addition, rather than offering these services in-house, brands are also choosing to forgo this market to new consumer-to-consumer or business-to-consumer collaborative consumption businesses.

Moreover, by focusing on waste by promoting clothing reuse, many of these initiatives fail to discuss workers' rights. Few brands are fully addressing garment production issues

relating to who is making clothes and under what conditions. For example, only one brand we interviewed offered a living wage program where the company paid the difference between the living wage and the minimum wage in its country of production. In brief, a CE approach focused on waste has the potential to greenwash brand activities without addressing issues at the heart of the industry's sustainability crisis (Bick et al. 2018).

Thus, while the CE is leading to new industry conversations about sustainability, there is still a need to interrogate brand practices and to probe which actors or processes are being privileged. Similar to earlier sustainability efforts (Henninger et al., 2016), current applications of the CE risk ignoring critical issues, such as garment workers' rights and safety. Rather than creating the transformational change that CE advocates such as the Ellen MacArthur Foundation call for, these initiatives may hinder progress.

While our research draws on a relatively small sample, it demonstrates that the fashion industry is not experiencing a uniform transition to circularity and that we must look inside different segments to better understand CE dynamics. This study also reveals that local market dynamics play an important role in shaping the transition. For example, while a design-led, higher-cost approach may work in an affluent country such as Sweden, it likely would not work in other markets. Accordingly, as more researchers study the CE in the fashion industry, one theme for further investigation is differences across industry segments in different contexts.

Future research could also take a more cultural angle, exploring whether culture is a prerequisite for engaging in the anticipated hand-me-down approach to consuming garments.

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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 (including children's)	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

*Table 2: Summary of price comparison*

<b>Brand</b>	<b>Garment</b>	<b>Material</b>	<b>Prize</b>
<b>Mini Rodini</b>	Ivory Organic Cotton Bodyvest	100% organic cotton	335SEK
<b>Newbie</b>	Baby white floral print body with site extender	100% organic cotton	118SEK
<b>Polarn O. Pyret</b>	Floral Frilled Babygrow	GOTS certified organic cotton	229SEK
<b>H&amp;M</b>	Cotton romper suit	Composition -Cotton 100% More sustainable materials - Organic cotton 100%	155SEK
<b>Lindex</b>	Wrap bodysuit with autumn leaves	GOTS certified organic cotton	119SEK