RESHAPING FASHION TOWARDS INCLUSION AND SOCIAL RESPONSIBILITY

ANNAMARIA RECUPERO

Università di Siena, Italy
annamaria.recupero@unisi.it
Orcid 0000-0003-2686-4010

GIUSEPPE DE FILPO

Università di Siena, Italy
giuseppe.defilpo@student.unisi.it
Orcid 0009-0006-0037-969X

PATRIZIA MARTI

Università di Siena, Italy
patrizia.marti@unisi.it
Orcid 0000-0002-2448-8747

Abstract

Sustainability in the fashion industry has predominantly been addressed through environmental and circular economy perspectives, often overlooking its social dimension. This paper argues that social sustainability must be recognised as a core component of sustainable fashion. Mainstream fashion continues to reproduce normative body standards and marginalise people with disabilities, while only a limited number of specialised enterprises challenge these paradigms. Adopting a mixed-method qualitative approach, this study investigates the relationship between fashion and inclusion across three interconnected levels: the scientific debate, public perception, and market practices. The research combines a scoping literature review, a digital ethnography, and a desk-based analysis of fashion case studies. By integrating these data sources, the paper critically examines prevailing models of disability, design approaches, product features, and representational strategies within the fashion system. The findings reveal a dominance of function-driven, medicalised design approaches that prioritise performance and discretion at the expense of aesthetic expression. In contrast, emerging inclusive fashion practices reframe clothing as expressive artefacts challenging conventional assumptions about the "standard" body and expanding aesthetic norms. The paper contributes to design research by articulating fashion as a socio-cultural system of artefacts, values, and representations, emphasising the need to move beyond adaptive solutions towards systemic inclusion.

Keywords: *Fashion, Disability, Body Diversity, Inclusion, Representation*

INTRODUCTION

In recent years, the issue of inclusion of marginalised social groups has increasingly emerged as a key concern taking on a central role in political, social, and scientific debates across different cultural and institutional contexts. The growing awareness of inequalities and social exclusion has highlighted how discrimination can hinder individual potential and undermine social cohesion, making these issues one of the most significant challenges facing contemporary societies. Discrimination not only constrains individual agency and life opportunities, but also weakens social cohesion and collective well-being, positioning inclusion as one of the most pressing challenges facing contemporary societies (Barton,

2006; Putnam, 2005). This challenge concerns all economic sectors, influencing the ways in which organizations operate, innovate, and represent social values. Within this framework, the fashion industry occupies a particularly influential position. Standing at the intersection of culture, creativity, and the market, fashion plays a key role in shaping social imaginaries, body norms, and systems of value (Annett-Hitchcock, 2023). Through design practices, visual representations, and material artefacts, fashion actively contributes to defining which bodies are considered desirable, normal, or legitimate. Numerous studies have shown how mainstream fashion has historically reinforced ableist and exclusionary standards by privileging normative body ideals and marginalising non-

conforming bodies, including those of people with disabilities (e.g., Hall & Orzada, 2013; Melkumova-Reynolds, 2023). At the same time, fashion also holds transformative potential: as a cultural and design-driven system, it can function as a powerful vehicle for inclusion, self-expression, and social recognition when alternative models and practices are adopted (Foster & Pettinicchio, 2022). The research discussed in this paper is part of the project "ResHaping made in ITAly" (RHITA) that aims to reshape the Italian fashion landscape towards sustainability in terms of digital transition, circular economy, and inclusion - also broadening the view outside the confines of the Italian context to investigate the relationship between fashion and inclusion. The research started from the assumption that sustainability in the fashion industry should extend beyond circular economy and environmental perspectives to encompass social sustainability as a responsibility of the fashion players to address inequality, challenge discriminatory norms, and design products, systems, and representations that acknowledge bodily diversity. While sustainability initiatives in fashion have predominantly focused on environmental impact and resource efficiency, recent scholarship argues for an expanded understanding of sustainability that explicitly incorporates its social dimension (Rana et al., 2024; Venkatesan, 2025). Emerging practices in inclusive and adaptive fashion illustrate this shift. Independent brands such as *EveryHuman*[1], *Buck & Buck*[2], and *Free Form*[3] have demonstrated how clothing design can integrate functional accessibility with aesthetic expression, while also embedding ethical commitments and community engagement into their business models. Conversely, the limited and often symbolic initiatives of major fashion brands highlight the risk of superficial inclusion, or "DEI (Diversity - Equity - Inclusion)-washing," where diversity is addressed without structural change. Understanding how the fashion domain simultaneously perpetuates exclusion and enables inclusion is therefore essential for guiding innovation towards collective well-being, ensuring that fashion's social, cultural, and economic value extends beyond a restricted segment of society. Standing the complexity of the issues at stake and with the aim to contribute to

the debate, we performed the research adopting a mixed qualitative method that included: a) a scoping literature review to investigate the scientific debate; b) a digital ethnography to understand the public perception and social debate; c) a fashion market analysis through the collection of some case studies to understand the market landscape. The data corpus included several materials that were integrated to avoid a simplistic or polarised interpretation of the relationship between fashion and inclusion (Annett-Hitchcock, 2023). The final goal is to highlight potential trajectories for re-shaping the fashion landscape towards inclusion and social responsibility.

Framing social sustainability in the fashion studies

Sustainability in the fashion studies has gained increasing relevance in recent years (e.g., Daukantiene, 2023; Rita Sedita et al., 2025; Schiaroli et al., 2025). When mapping the evolutionary trajectories of the fashion studies, Rita Sedita and colleagues (2025) identified a progress from an initial focus on the environmental impact that led to eco-friendly products, sustainable supply chain management, sustainable design approaches (e.g., zero-waste design, design for durability), to a holistic perspective that considers also the social aspects of sustainability. These aspects are mainly considered in terms of fair working conditions (Schiaroli et al., 2025), consumers' awareness, and sustainable consumption practices such as lowsumerism, capsule wardrobe, and second-hand clothing (Daukantiene, 2023). Given the multidisciplinary nature of the fashion studies, the research agendas call for addressing sustainability along the entire value chain through next-generation material, collaborative fashion consumption systems, business models based on rental rather than purchase, data analytics methodologies, transparency and ethical sourcing, second life retailing, just to name a few directions (Abbate et al., 2023; Sinha et al., 2023; Schiaroli et al., 2025). These directions of the research agendas overlook that social sustainability is related to inclusion, social equity, and justice for all individuals, irrespective of their abilities, identities, and cultural background. This concept applied to the fashion domain calls for considering fashion brands as influential cultural entities which shape cultural norms and consumer behaviors (Lee et al., 2024 a, b). Acknowledging their role, the fashion enterprises are increasingly taking on social responsibility conceived as the relationship

---

1   EveryHuman. https://everyhuman.com.au/
2   Buck & Buck. https://www.buckandbuck.com/
3   FreeForm. https://freeformstyle.com/

between business and society based on trust, transparency, shared values, ethical behaviour, and societal impact (Thorisdottir & Johannsdottir, 2020; McBee-Black & Sun, 2024). The theme of social responsibility of the fashion enterprises is intertwined with relevant reflections on power dynamics leading to inclusion or exclusion, on the legitimacy of some narrations and canon normativity in the contemporary fashion discourse (Jansen, 2020; Pilyarchuk, 2024), on the socially constructed meaning of clothing (Kaiser et al., 1985; Nagasawa et al., 1991; Kaiser, 1997; Kaiser, 2001), as well as on the role of editorials and advertising campaigns in conveying representations where diversity in body, gender, ethnicity, ability can be portrayed or remain invisible (Foster & Pettinicchio, 2022; Berger & Hermes, 2023; Oliveros, 2024; Pilyarchuk, 2024; Venkatesan, 2025).

OBJECTIVES AND METHODOLOGY

The research was carried out through a mixed method to investigate the relationship between fashion and inclusion from different perspectives: the scientific debate, the public perceptions, and the fashion market. The Research Questions (RQs) that guided the data collection and analysis are the following.

- RQ1: How does the fashion domain contribute to reinforcing and spreading stereotypes and exclusion of people with disabilities?
- RQ2: How can the fashion domain convey the values of inclusion, respect, and valorisation of diversity?
- RQ3: What are the models and values that guide the design of fashion products for people with disabilities?

The variety of methods used to respond to these RQs allowed us to produce a comprehensive data corpus.

SCOPING LITERATURE REVIEW

The scoping literature review aims at analysing the scientific debate about the role of fashion in reinforcing stereotypes and stigma, or in promoting an inclusive approach. It is an exploratory investigation of the scientific literature to develop an overview on the landscape and key concepts of a broad topic like the relationship between fashion and inclusion (Peterson et al., 2017). The scoping literature review was performed through the

following steps:
1) definition of the scope, databases, keywords, exclusion criteria;

2) records identification through database searching and other sources (in-text citations);

3) removal of duplicate records;

4) screening of the records based on metadata and abstract reading;

5) screening of the records based on full-text reading;

6) analysis of the selected records.

The database searching was performed on November 2025 on Scopus and Google Scholar using the following keywords: fashion, disab* OR impairment, accessor*, inclus*, "inclusive fashion". The database searching provided 215 records and additional 43 records were retrieved from in-text citations. For the Google Scholar database, we limited the record identification to the first 154 search results. Given the exploratory and broad nature of the scoping literature review (Peterson et al., 2017), the exclusion criteria used for the screening were defined as follows.

a) the record is not written in English language;
b) the full text of the record is not accessible for the authors;
c) the record is out of topic considering the research objectives;
d) the record does not contain enough detail to answer the RQs.

After the screening process, 75 records were selected as eligible for the data analysis [fig. 01]. The data analysis was performed as a content analysis by clustering the contents of the selected records according to the RQs. A digital online board was used to facilitate the process.

SELECTION OF CASE STUDIES FROM THE FASHION MARKET

To understand how the fashion market addresses the challenges of inclusion and social responsibility, we performed the desk research to identify relevant examples of fashion enterprises, using Google search with the keywords "adaptive clothing" and "inclusive fashion", and based on the data collected

through the digital ethnography. We selected 21 case studies [fig. 02][4]. Most of them (14 out of 21 case studies) are located in the United States of America. The fashion enterprises specialised in adaptive clothing and inclusive fashion are small enterprises (17 out of 21 case studies), while the major fashion brands with a catalogue section of adaptive clothing are big enterprises with some branches worldwide. Considering the size and variety of the catalogues, some enterprises have a large and varied offering featuring a wide range of products, styles, and sizes to meet different customer needs, while other enterprises focus on a more limited and highly specialized selection, concentrating on specific products or style (e.g., backpacks for wheelchair as in the case of the adaptive catalogue of *JanSport*[5]). For each selected case study, we examined the web site and catalogue of products, and we reported the main information on a summary sheet [fig. 03]. The summary sheets were useful to map and to compare the brand identity, the product features, the consumers' need, and the images used to present the products. Notably, this research does not claim to provide a complete and comprehensive mapping of the market complexity. Rather, it generates some insights to understand the state of the art and to identify future trajectories towards consumers' inclusion and enterprises' social responsibility.

DIGITAL ETHNOGRAPHY

The digital ethnography was performed on two social media, *Reddit* (https://www.reddit.com/) and *Pinterest* (https://it.pinterest.com/), to investigate the social debate and public perspective on the fashion market especially by the people with disabilities. We selected these two social media because of their characteristics, as detailed hereafter. The data corpus includes a selection of online discussions and images. The analysis of the data was performed through a bottom-up approach to identify thematic patterns and to categorise the data based on the patterns. *Reddit*
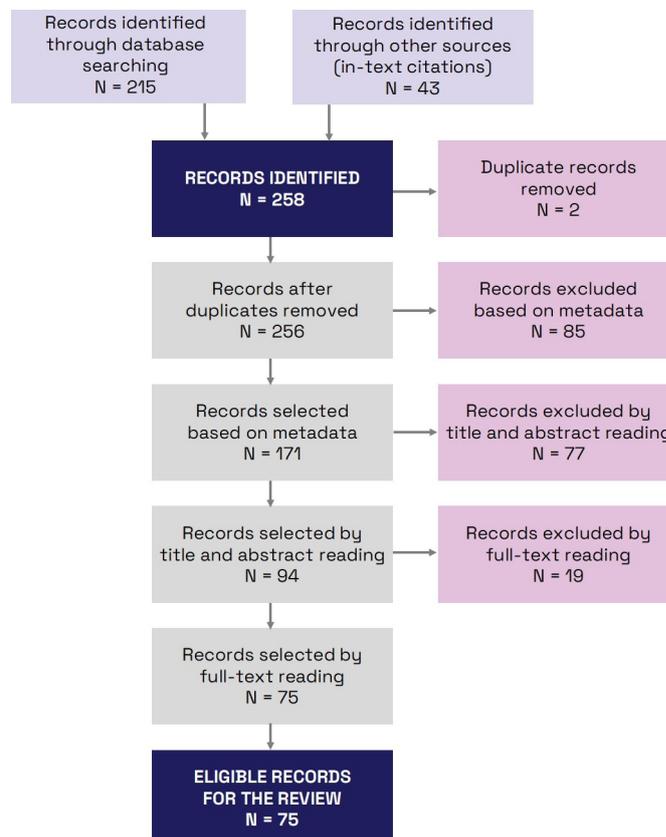

Fig. 01

is structured in subreddits, thematic communities centered around particular interests, practices or specific identities, allowing analysis about norms, shared values or language. Our analysis considered three communities: *r/amputee* (around 11.000 members); *r/disability* (around 69.000 members); *r/wheelchairs* (around 13.000 members). Data were collected from October 2024 and January 2025. The contents in all three subreddits are written discussion-oriented posts, where the main themes are mutual help, social and emotional support for new members. Fashion and aesthetics were rarely discussed in *r/amputee and r/disability*, where people focused mainly on the functional aspects of clothing and accessories, and only few posts mentioned visibility and "normalization" of prostheses and personal difficulty in finding fitting garments for personal styling. In r/wheelchair, fashion-centred discussions, even though it wasn't the main topic, were periodically shared compared to the other two subreddits. Here wheelchairs users talk about clothing and wheelchairs customizations. Wheelchairs are not considered just a medical device, but a styling tool that reflects one's own personal aesthetic preference. The lack of contents

---

4   Abilitee. https://abilitee.com/pages/about-us. Adidas. https://www.adidas.it. Ankhgear. https://ankhgear.com/. Billy Footwear. https://billyfootwear.com/. CathWear. https://cathwear.com/. Delta adaptive clothing. https://easyaccessclothing.com/. Eze Mode Plus. https://www.ezeplus.com/?lang=en. Feeldom. https://www.feeldom-life.com/. Friendly shoes. https://friendlyshoes.com/. IZ adaptive. https://izadaptive.com/. Kozie clothes. https://www.kozieclothes.com/. No Limbits. https://no-limbits.com/. Slick Chicks. https://slickchicksonline.com/. Tommy Hilfiger. https://tommy.com. Victoria Secret. https://victoriassecret.com

5   JanSport. https://www.jansport.com

strictly related to fashion and aesthetic suggests a scarce awareness of these issues entering with a predominance of common-sense debates on social acceptance, political issues, and practical advice. At the same time, the data analysis revealed a growing awareness about the disability representation in fashion communication and the growing role of inclusive fashion brands. *Pinterest,* as a visual-centred platform, allowed us to analyse common aesthetic and symbolic representations around specific themes, using textual prompts. The majority of images linked to "disabilities fashion" or "inclusive fashion" focused on physical disabilities, showing wheelchairs and prostheses. This is more likely due to the visual immediacy of certain images reflecting common expectations about disabilities. Results

The data analysis allowed us to compose a framework of topics and points of view, ranging from needs and preferences of the consumers to the terminology used to address them, to the declared

GEOGRAPHICAL DISTRIBUTION AND SIZE OF THE CASE STUDIES

Small fashion enterprises specialised in adaptive clothing and inclusive fashion

1. Feeldom (South Corea)
2. Dawn Adaptive (Malaysia)
3. Every Human (Australia)
4. Mode Eze Plus (Canada)
5. Free Form (Spain)
6. Abilitee (USA)
7. Befree (USA)
8. Ankhgear (USA)
9. Billy footwear (USA)
10. Buck & Buck (USA)
11. CathWear (USA)
12. No Limbits (USA)
13. Delta adaptive clothing (USA)
14. IZ adaptive (Canada)
15. Friendly shoes (USA)
16. Kozie clothes (USA)
17. Slick Chicks (USA)

Big fashion companies with an adaptive clothing section

18. JanSport (USA and other countries)
19. Victoria Secret (USA and other countries)
20. Tommy Hilfiger (USA and other countries)
21. Adidas (Germany and other countries)

SIZE AND VARIETY OF THE CATALOGUE OF FASHION PRODUCTS

WIDE

- Buck & Buck
- Every Human
- Free Form
- No Limbits
- IZ adaptive
- Kozie clothes
- Mode Eze Plus
- Befree
- Abilitee

HETEROGENEOUS — HOMOGENEOUS

- Adidas
- Tommy Hilfiger
- Dawn adaptive
- Feeldom
- Billy footwear
- Friendly shoes
- Victoria Secret
- JanSport
- Ankhgear
- CathWear
- Delta adaptive clothing
- Slick Chick

NARROW

Fig. 02

mission of fashion enterprises [fig. 4].

FROM ADAPTIVE CLOTHING TO INCLUSIVE FASHION AND FASHION FOR EVERY BODY

The scientific literature provides evidence about the challenges faced by people with disabilities to find clothing that meets their needs for style and comfort (Curteza et al., 2014; Annett-Hitchcock & Xu, 2015; Lobo et al., 2019). This happens because the mainstream fashion industry tends to neglect this market segment based on the misconception that it is small and thus not profitable (Chang et al., 2013; Lobo et al., 2019; Rana et al., 2024). From a design perspective, this attitude is not merely the result of limited market availability, but is rooted in dominant design paradigms that presuppose an able-bodied, upright, and normatively proportioned user. Mainstream fashion design processes are largely oriented toward standardised bodies and idealised silhouettes, with garment construction, sizing systems, and material choices optimised for standing postures, symmetrical movements, and autonomous dressing practices. As a consequence, clothing often fails to accommodate diverse bodily configurations, assistive devices, or alternative modes of interaction with garments.The marginalisation of disabled consumers is further reinforced by persistent misconceptions within the fashion industry. Some studies highlighted how this user group is frequently perceived as economically insignificant, aesthetically indifferent, or excessively demanding in terms of production complexity (e.g., Chang et al., 2013; Rana et al., 2024). These assumptions translate into design decisions that prioritise efficiency, scalability, and visual conformity over inclusivity, leading to the exclusion of disability-related needs from early design stages. When disability is addressed, it is often framed as a technical problem requiring corrective or adaptive solutions, rather than as a generative design opportunity capable of expanding aesthetic languages and fashion practices (Lobo et al., 2019). Moreover, the prevailing separation between functionality and aesthetics in fashion design contributes to a reductive understanding of clothing for people with disabilities. Garments designed under a predominantly medical or rehabilitative framework tend to emphasise ease of dressing, access points, and material performance, while neglecting the symbolic, expressive, and identity-related dimensions of dress (Annett-Hitchcock & Xu, 2015). This functionalist bias
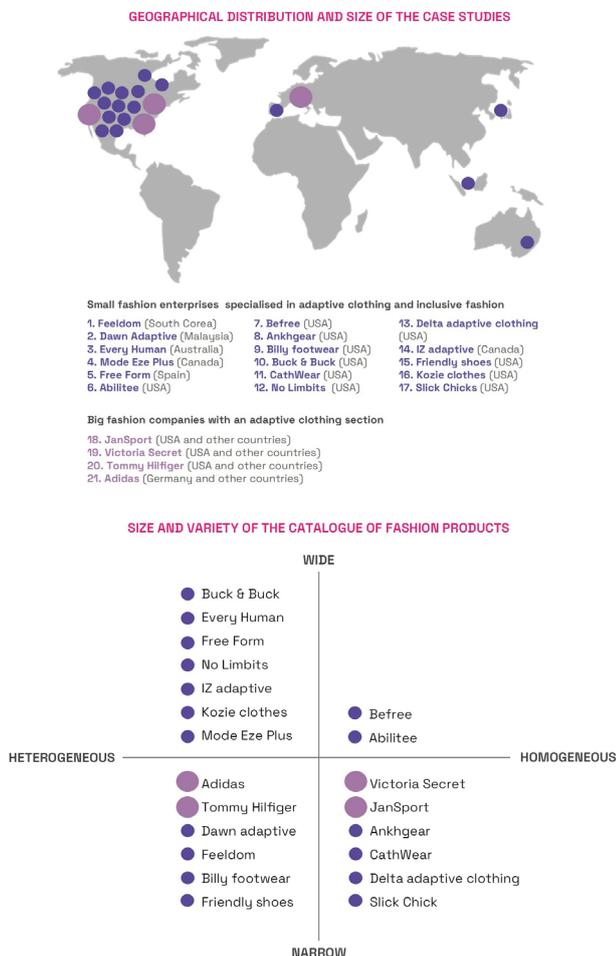
reinforces the notion that style and self-expression are secondary concerns for disabled individuals, thereby perpetuating exclusion at both material and cultural levels. From a design standpoint, challenging these assumptions requires a shift toward inclusive and participatory design approaches that recognise disability as an integral dimension of human diversity and position fashion as a socio-cultural system capable of fostering agency, dignity, and belonging. The market analysis performed on the selected case studies revealed a main distinction between a growing number of small enterprises specialised in adaptive clothing and inclusive fashion, and a few major fashion brands that improved their catalogues with some adaptive clothing. Only two major fashion brands explicitly motivated the improvement in the catalogue based on their commitment towards social responsibility. While the web sites of the enterprises specialised in adaptive clothing and inclusive fashion clearly report that their missions cover ethical and sustainable production, economic support to people and communities, and advocacy to the local/international movements promoting inclusion. Such a kind of fashion enterprises go beyond the simple production and sale of goods by actively engaging in initiatives with a positive social impact. Through ethical commitments and social responsibility, they seek to contribute to a broader societal change while redefining the role of fashion as a driver not only of economic value, but also of social progress.

In the data corpus collected with the diverse research methods, the most recurrent target group includes the people with motor disabilities using wheelchairs. In this case, the design of the fashion products is focused on clothing that is easy to wear while sitting. But the market analysis pointed out that the fashion products are designed not just for people with a permanent or temporary disability, but also for diverse body shapes, ages, and everyday life situations. This heterogeneity of the target consumers is visually represented in the fashion catalogues with images of people of diverse gender, age, ethnicity, and body shape wearing different kinds of clothes.The terminology used to address this heterogeneity should be carefully chosen since language reflects underlying assumptions and specific conceptualisations, shaping how social issues are understood, communicated, and addressed. The term "adaptive clothing" presupposes the implicit norm of the

Summary sheet

Brand: EveryHuman
Web site: everyhuman.com.au

Product category:

Clothing   Footwear

Brand identity

We are raising the bar- with solutions for **every body**.
We believe in redefining style with a dash of **inclusivity** and a sprinkle of **creativity**. We believe that fashion should fit you perfectly, no matter your **size or need**.
Our mission: At EveryHuman, we're on a mission to revolutionize **inclusive and accessible fashion**. From Sydney, Australia, we design and curate **stylish, high-quality** looks for every occasion, celebrating the **uniqueness in all of us**. We believe in **fashion that's for everyone—embracing diversity** in every piece, every collection, and everything we do.
Inclusive by design. Smashing fashion with function. It is clear that the world is ready for greater inclusion in fashion. We are proud to be a part of this **movement**.
The web site of the company includes a **blog to share stories** and discuss.

Consumers' needs

Everybody is unique and we all want to **express ourselves** and **feel confident**.
Fashion is an incredibly powerful tool that can help us feel confident in our own skin. We hope our clothes allow you to express your **personality** and **style** so you can take **control of your narrative**.
We are here for every **body-shape**, size, age, need, ability

Product features

Crafted from bamboo for a naturally **soft, seamless fit** that moves with you. Designed to **regulate body temperature** and keep you feeling fresh all day long.
Imagine **easy-access closures**, adjustable fits, and designs that cater to various needs without compromising on style. Our Seated Jeans are perfect for those who value **both form and function**. Designed specifically to follow the natural shape of the seated body, these jeans redefine adaptive fashion.
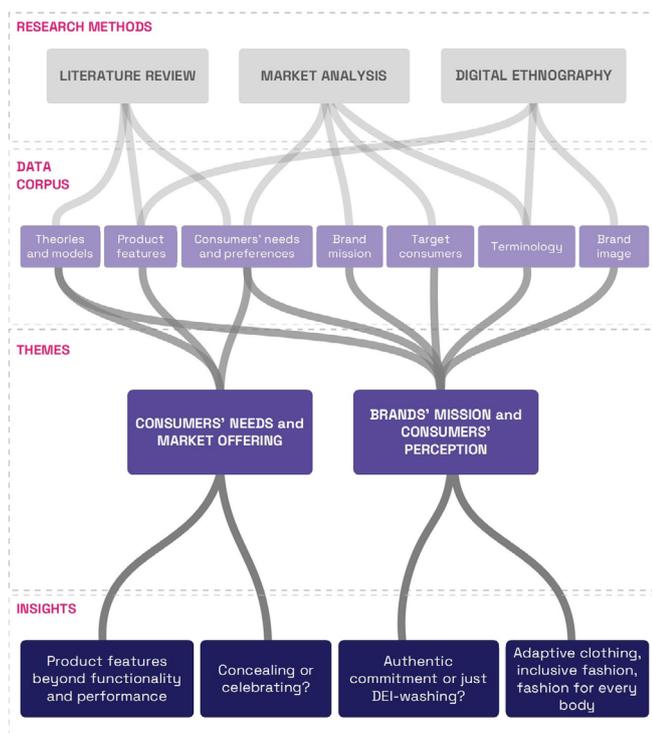
Images

Fig. 03

Fig. 04

PRODUCT FEATURES BEYOND FUNCTIONALITY AND PERFORMANCE

Considering the product features, adaptive clothing ensures high quality of design and material, functional, comfortable, customisable products, easy to wear and fit with the movement. Just to name a few examples: the pants designed by *Free Form* are made of hypoallergenic natural fabrics, with zippers on the side of the hip and legs for opening, with double-sliders so they can be opened from the top and bottom; the zipper pants designed by *Befree*[7], unlike traditional pants, can be easily put on and taken off while standing, lying down, or from a sitting position, and they can accommodate casts, braces and other medical equipment for post-surgery and injury recovery. The scientific literature provides clear requirements to guide the design of the adaptive clothing with special properties and performances (e.g., Curteza et al., 2014). Considering how the selected fashion enterprises present their products, we identified a main pattern: the major brands with the adaptive clothing collection focused on the functional features of the product (e.g., fit optimisation, minimal seams, soft yarns, one-handed zippers, magnetic buttons); while the enterprises specialised in inclusive fashion tend to highlight not only the functional features of the products according to specific consumers' needs, but especially the experience that the products can offer. The way people perceive themselves when wearing fashion products appears to be their main market differentiation: while standard clothing makes people feel unsafe, unattractive, humiliated, vulnerable, uncomfortable, and restricted - the adaptive clothing makes them feel safe, fashionable, self-confident, free to express themselves, comfortable, and independent. This is in line with the evidence provided by the scientific literature investigating the impact of clothing on the experience of people living with disability (e.g., Annett-Hitchcock & Xu, 2015; Kabel et al., 2017)This acknowledges the power of clothing in promoting self-confidence and self-expression, and in counteracting the stigmatisation (Lobo et al., 2019). Otherwise, as reported by the scientific literature, the lack of attractive clothing is detrimental to the overall well-being since the person cannot present themselves according to their personal sense of style and identity, and they are concerned about what other

standard body, a deviation from it and a corrective intervention, so that the clothing adapts to an exceptional case that is not dominant. Notably, this term is the only term used by the major fashion brands to present products targeted to people with disabilities. On the contrary, the term "inclusive fashion" acknowledges the plurality of bodies, needs, preferences, identities, and thus the diversity is at the foundation of the design. Differently, the term "fashion for everyone" recalls a universalism that could lead to an abstract (and ideally neutral) conception of the human being. Finally, the term "fashion for every body" marks the pluralities of the human bodies, extending the dominant norm to various body sizes, shapes, ages, abilities, sex, and genders. Moreover, compared to the term "adaptive clothing" that focuses on the product, the other terms (inclusive fashion, fashion for everyone, fashion for every body) shift the focus from the product to the system. Quoting the web site of the company *Dawn Adaptive*[6], "a more inclusive fashion industry [is the] one that integrates accessibility not only in design but throughout marketing, customer service, and the entire retail experience, ensuring everyone can participate fully in fashion".

---

6   Dawn Adaptive. https://dawnadaptive.com/

7   BeFree. https://befreeco.com/

people think of them (Annett-Hitchcock & Xu, 2015; Chang et al., 2017). This is critical especially in the case of important life occasions, celebrations, and formal events: the lack of appropriately designed clothing is a barrier for participation. This harms relationships, reinforces isolation and exclusion (Kabel et al., 2017). The enterprises selected as case studies to understand the market landscape offer only casual shoes, bags, underwear and sport/fitness-related clothing. Elegant and formal clothing are hard to find on the market, let alone clothes that are not based on Western fashion models. This is an unmet need that negatively impacts social engagement (Li et al., 2023).

Through the digital ethnography, we collected a thread of discussion among *Reddit* users who state that they are forced to use casual comfortable clothes given the lack of alternatives available on the market. A quote from a user with motor disability who uses the wheelchair points out that: "Jeans and a sweatshirt have become my uniform, purely for comfort. I'd like to dress well. I'd really like to expand my wardrobe with more interesting fashion expressions (especially with winter coming - there are so many really cool styles for men out there)". Another user replied stating: "Finding reasonably priced, attractive, and fashionable clothing that is comfortable for wheelchair users is difficult".

Facing the failure of the fashion market to meet people's needs, personalization practices have become established among people with disabilities, as both the scientific literature and the digital ethnography pointed out. The personalisation of garments and accessories is often referred to as "fashion hacking" performed by online communities on social media to share ideas and solutions. In a manner not dissimilar to the Information Technology field, the term has both a technical and a political meaning: the practice of hacking one's own clothing enables individuals to accommodate diverse body configurations and personal styling requirements; at the same time, it constitutes a form of critical design practice that challenges dominant aesthetic norms and standardised modes of industrial production (Barry, 2019; Barry et al., 2023). Through acts of modification, adaptation, and reappropriation, fashion hacking operates not only as a pragmatic response to unmet needs, but also as a situated form of resistance that questions ableist design

assumptions and reclaims creative agency within the fashion system. Customization, DIY (Do-It-Yourself) practices contribute to defining people with disability as designers of their own garments, increasing their sense of personal agency in the making of personalized clothing and accessories (Profita et al., 2018).

CONCEALING OR CELEBRATING?
Both the scientific literature and the digital ethnography pointed out a dichotomy in the function of the clothing between concealing (hiding physical differences and visible impairments) or celebrating (enhancing self-expression, communicating group identification) (Lobo et al., 2019). Adopting the theoretical lens of the negotiated outcomes model - theorized by Susan B. Kaiser (Kaiser et al., 1985; Nagasawa et al., 1991; Kaiser, 1997; Kaiser, 2001) to understand how people negotiate the meaning of their appearance in social interactions, using dress and adornment to present aspects of themselves to others and receive positive social feedback, especially in the case of stigma or physical differences - we assume that clothing acts as a means to control other people's perception and reaction. Bodily differences, prosthesis, and assistive devices act as visual cues and signifiers for stigmatizing categorization, based on specific definition of normalcy within the social dominant model (Hall & Orzada, 2013; Melkumova-Reynolds, 2023). Normative design practices, by reproducing assumptions about body image and functions, reinforce expectations in which disabled corporalities have no room (Hamraie & Fritsch, 2019). This leads people to hide their non-normative bodies to conform to normative standards, to look like everyone else, to avoid negative reactions by other people like aversion, repulsion, pity (Hall & Orzada, 2013; Melkumova-Reynolds, 2023). Adaptive clothing and assistive devices, while designed primarily with their function in mind, are conceptualized to be aesthetically discreet, hidden and disguised (Brilhante et al, 2021). This approach of camouflaging the disabilities could foster an aesthetic hierarchy that contributes to reinforcing the stigma and exclusion (Wilkinson et al., 2018), suggesting that non-conforming bodies are something to hide and be ashamed of (Barry, 2019). With the same intention to control social reaction but in the opposite direction, appearance management through clothing is used to emphasize uniqueness and visible differences,

even as a form of social and political statement (Kaiser, 1997; Hall & Orzada, 2013). What has long been defined solely as a medical device is now also considered a stylish accessory, as data from the digital ethnography suggests. Grassroots practices such as customization and fashion hacking manage to reclaim visibility, no longer conceptualised as a problem to solve, but as a social and political resource (Hamraie & Fritsch, 2019) used to oppose hegemonic aesthetic and affirming non-normative bodies. Prostheses have traditionally sought to achieve a realistic form factor to closely replicate the limb they replace. By contrast, this alternative approach emphasizes creating personalised prostheses, whether through unconventional shapes (Whatley et al., 2023; Burton & Melkumova-Reynolds, 2019) or through playful design strategies that better reflect children's expectations of what their prostheses can be (Sansoni et al., 2016). In a similar manner, cochlear implants users customize their devices using vibrant colours, exaggerating shapes and using pop references to make them more personal, in opposition to the norm that want hearing aid devices to be "invisible" and discreet, drawing attention to them and, by doing so, to their disability in order to reclaim the power of managing other people expectation, and fostering relationships with other assistive technologies users (Profita et al., 2018). A notable example of paradigm shift in the design of hearing aids are the smart jewels designed to address emotional and sociocultural needs of deaf people beyond the functional goal of supporting hearing (Marti & Recupero, 2019; Marti, 2021).

AUTHENTIC COMMITMENT OR JUST "DEI-WASHING"?

The digital ethnography revealed that the social debate is focused on the intentions of the fashion enterprises behind their offering of fashion products. A quote from a *Reddit* user exemplifies the reaction to the hands-free slip-on shoes of a major fashion brand: "They finally make a shoe for us and you're pissed?". The concerns of some users are related to the expensive cost of this product, and to the effort of the brand that is perceived as not authentic, but rather occasional, to present itself positively to the public. Similarly to the greenwashing phenomenon related to the environmental sustainability initiatives, DEI-washing (Diverse - Inclusive - Equitable) happens when organisations make superficial or symbolic efforts to appear inclusive without enacting

meaningful, structural change (van Rijswijk et al., 2025).

This issue recall what is discussed in the *paragraph 3.1* regarding how the fashion enterprises present themselves and their products: companies specialised in inclusive fashion conceive a strong connection between economic profit, social responsibility, and social impact and they pursue this mission through the design of clothing for diverse consumers as well as through sharing stories from the community, supporting social initiatives and local/global movements. This approach is in line with the social model of disability that argues that people are disabled because of the societal barriers (physical, attitudinal, organisational, and structural barriers), shifting the focus from fixing the individual condition - the medical model of disability - to changing society towards equal opportunities (Barton, 2006). Moreover, this approach acknowledges the function of clothing beyond practical aspects and contextualises the experience of the people with disability within the socio-cultural context (Venkatesan, 2025). We believe that the authentic commitment of the fashion enterprises towards social responsibility should be based on such an approach.

DISCUSSION

Returning to the Research Questions that guided this study, this section discusses the main findings with the aim of identifying potential trajectories for reshaping the fashion domain towards greater inclusion and social responsibility.

RQ1: How does the fashion domain contribute to reinforcing and spreading stereotypes and exclusion of people with disabilities?

The current fashion market makes it difficult to find (at an affordable price) products that fit with one's needs, identity, and diverse life situations (Kabel et al., 2017; Rana et al., 2024). There is a significant gap between the demand of the consumers with temporary or permanent disability, and the range of products currently supplied by the market (Chang et al., 2013; Lobo et al., 2019). When the market fails to respond to consumers' demand, the online communities grow to promote and support the fashion hacking practices: fashion hacking is not limited to adjusting clothing to accommodate one's body configuration (e.g., for easily donning on and off trousers from a sitting position), but

rather it includes customisation practices based on personal styling preferences, cultural norms, and social occasions, to use clothing as a means for appearance management (Kaiser, 1997). The fashion domain seems to perpetuate the canons of bodily normalcy and disregards the differences in consumers' needs and preferences (Brilhante et al., 2021; Melkumova-Reynolds, 2023), especially in the way the fashion products are presented in advertisements and editorial venues (Foster & Pettinicchio, 2022; Qayyum et al., 2023). Indeed, the fashion domain contributes to exclusion through norms that assume able-bodied users, invisibilising disabled bodies and needs (Brogin & Okimoto, 2019; Annett-Hitchcock & Xu, 2015). This approach derives from, and at the same time reinforces, the medical model of disability that tends to restore normal functioning by correcting the individual impairment, illness or injury that is socially undesirable, and thus it is minimised in public appearance (Putnam, 2005). This approach has direct implications for the design of the fashion products, leading to the adaptive clothing with a focus on the functional features of the product.

RQ2: How can the fashion domain convey the values of inclusion, respect, and valorisation of diversity?

The fashion domain can propose new visual representations, narratives, and products which consider the clothing not just from a functional perspective (Foster & Pettinicchio, 2022; Melkumova-Reynolds, 2023; Qayyum et al., 2023), by designing products to be an extension of the self within the socio-cultural context (Hall & Orzada, 2013). This is relevant not only for fashion products but also for assistive and medical devices, which can be transformed into fashion accessories to counteract the stigmatisation (Profita et al., 2018; Marti, 2021). On one hand, the fashion domain can smooth out the diversity by designing "fashion (products) for every one", fitting diverse needs with a single solution. On the other hand, the fashion domain can valorise the diversity of bodies, social identities, cultures, genders, ages by normalising the diversity without diminishing one's unique characteristics (Lee et al., 2024a). The rise of fashion brand activism (Lee et al., 2024a) and the commitment of some fashion enterprises towards social justice are pushing a change in the fashion domain. But if this commitment is not authentic, merely for the sake of appearing inclusive, it is counterproductive: the social debate

and the scientific debate about DEI-washing are questioning some initiatives of major brands as manipulative and unethical, perpetuating stereotypes and hindering a meaningful structural change of the fashion as a system (Foster & Pettinicchio, 2022; Lee et al., 2024a).

RQ3: What are the models and values that guide the design of fashion products for people with disabilities?

To reshape the fashion industry towards inclusion and social responsibility, it is necessary to go beyond the medical model of disability and a purely functional approach, to consider the impact of the clothing on psychological, social, and cultural levels. It is necessary to go beyond the standardisation of the human body and to question the conventional boundaries of beauty in favour of multiple models. Reducing clothing to a "technical solution" reinforces stigma (Kaiser, 1997; Barry, 2019; Annett-Hitchcock, 2023). Garments become a symbolic device capable of constructing identity (Hall & Orzada, 2013; Sansoni et al., 2016). For these reasons it is essential to include expressive and emotional objectives alongside functional ones in the project briefs when designing for disabilities, moving beyond the purely functionalist paradigm. There is no singular form of disability, rather it encompasses diverse and heterogeneous experiences (Putnam, 2005; Jansen, 2020; Pilyarchuk, 2024). Hence the need to involve people with disabilities in design processes (Brogin & Okimoto, 2019; Barry et al., 2023; Rana et al., 2024), refusing one-size-fits-all solutions. The centrality of situated bodily experience has been emphasised in design research (Curteza et al., 2014; Kabel et al., 2017; Brilhante et al., 2021). Rather than assuming a standardized body, designing for bodily diversity requires attention to the variability of bodies and gestures as they are enacted in everyday contexts, analysing of ordinary micro-actions (getting dressed, sitting, using the bathroom, and moving through space) through methods as body mapping and bodily user journey maps. Personalization, by redistributing representational and material agency, has been theorised as an emancipatory design practice, allowing people to actively shape how their bodies and identities are articulated and mediated (Barry, 2019; Profita et al., 2018; Whatley et al., 2023). It operates as a political intervention into normative design logic. Brands and campaigns that demonstrate the greatest impact do not simply

replicate mainstream fashion norms, but they actively reconfigure and expand them.

CONCLUSIONS

The exploratory mixed-method qualitative research presented in this paper enabled an examination of the relationship between fashion and inclusion from three complementary perspectives: the scientific debate, the social discourse, and the fashion market. By integrating the data across these domains, the research identifies key issues related to prevailing (mis)conceptions of disability, as well as to the ways in which fashion products are designed, represented, and perceived by communities of people with disabilities. People with temporary or permanent disabilities are an underrepresented consumer group who face challenges in finding products that meet their needs and preferences. Even when the fashion market provides adaptive clothing, the design based on the medical model of disability results in products with purely functional features to improve the comfort. This way overlooks the psychological, social, and cultural aspects involved in the human experience. The aesthetic appeal of adaptive clothing has been, and in part still is, ignored in favour of comfort so that consumers face challenges when searching for non-casual, non-Western products. When body image is understood as the collective set of representations and affective responses through which individuals perceive and evaluate their own bodies, it becomes evident that clothing functions as a key medium for self-expression and the construction of social identity (Kaiser, 1997). As human-made artefacts, fashion products are therefore not neutral objects but material carriers of cultural meanings and social values that shape how bodies are interpreted, recognised, and positioned within society. The design of the fashion products should consider three levels (Li et al., 2023): a) the functionality that is related to the utility in terms of protection, fit, and ease of movement; b) the communicative and symbolic aspects of clothing within a specific social-historical context; c) the aesthetics based on customers' desire for beauty within the context of one's cultural standards. Considering the multiple insights emerged from the research, they all address the dichotomy inclusion-exclusion, the relationship between social norms and fashion industry norms, and they highlights that the "inclusive revolution" (Pilyarchuk, 2024) can follow diverse directions: the representation of diversity in editorials and advertisement (Lee et al., 2024a-b; van Rijswijk

et al., 2025), avoiding the creation of a sort of hierarchy of importance in which visible motor disabilities are prioritised over others (Foster & Pettinicchio, 2022); brand advocacy for diversity, that is not episodic, but extended beyond visibility to involve people in creative and decision making processes. Looking ahead, both the scientific literature and the social debate provide clear evidence, insights, and solutions for addressing the challenge of inclusive fashion, to guide the innovation of the fashion industry toward more responsible and socially aware practices. In light of this, we agree with Mazzarella and colleagues (2019) who state that to create counter-narratives to the current unsustainable fashion system, the designers need to become "activists" to disrupt dominant norms, reframe the problems, and make change happen at diverse scales of the fashion system.

ACKNOWLEDGMENTS

CAPTIONS

[Fig. 01] Stepwise process and number of included and excluded records for each step. Figure created by Annamaria Recupero; project ResHaping made in ITAly (RHITA); © 2026 The Authors.

[Fig. 02] Overview of the 21 fashion enterprises selected as case studies for the market analysis: (top) geographical distribution and size of the case studies; (bottom) size and variety of the catalogue of fashion products. Figure created by Annamaria Recupero; project ResHaping made in ITAly (RHITA); © 2026 The Authors.

[Fig. 03] Example of summary sheet used to collect and map the case studies. Figure created by Annamaria Recupero; project ResHaping made in ITAly (RHITA); © 2026 The Authors.

[Fig. 04] Overview of the data collected with the mixed-method qualitative research, the themes and insights generated. Figure created by Annamaria Recupero; project ResHaping made in ITAly (RHITA); © 2026 The Authors.

REFERENCES

Abbate, S., Centobelli, P., Cerchione, R., Nadeem, S. P., & Riccio, E. (2023). Sustainability trends and gaps in the textile, apparel and fashion industries. *Environment, development and sustainability*, 1. https://doi.org/10.1007/s10668-022-02887-2

Annett-Hitchcock, K. (2023). *The Intersection of Fashion and Disability: A Historical Analysis. Bloomsbury Publishing.*

Annett-Hitchcock, K., & Xu, Y. (2015). Shopping and virtual communities for consumers with physical disabilities. International Journal of Consumer Studies, 39(2), 136-144. https://doi.org/10.1111/ijcs.12161

Barry, B. (2019). Fabulous masculinities: Refashioning the fat and disabled male body. *Fashion Theory*, 23(2), 275-307. https://doi.org/10.1080/1362704X.2019.1567064

Barry, B., Nesbitt, P., De Villa, A., McMullin, K., & Dumitra, J. (2023). Re-Making Clothing, Re-Making Worlds: On Crip Fashion Hacking. *Social Sciences*, 12(9), 500. https://doi.org/10.3390/socsci12090500

Barton, L. (2006). O*vercoming disabling barriers: 18 years of disability and society*. Routledge.

Berger, N., & Hermes, J. (2023). Fashion on wheels. In *Disability in Dialogue* (pp. 115-148). John Benjamins. https://doi.org/10.1075/ds.33.06ber?locatt=mode:legacy

Brilhante, M. L. S., Júnior, V. B., Carvalho, M. M., Silveira, I., & da Rosa, L. (2021). Ostomy and clothing: a primer on developing clothing for people with an ostomy. *ModaPalavra e-periódico, 14*(33), 180-203. https://doi.org/10.5965/1982615x14332021180

Brogin, B., & Okimoto, M. L. L. R. (2019). Co-Wear: Functional Fashion Co-Creation Method with People with Disabilities Enables the Development of Functional and Inclusive Fashion Garments. *Current Trends in Fashion Technology & Textile Engineering*, 5(1), 29-36. https://doi.org/10.19080/CTFTTE.2019.05.555654

Burton, L., & Melkumova-Reynolds, J. (2019). "My Leg is a Giant Stiletto Heel": Fashioning the ProsthetisedBody. *Fashion Theory*, 23(2), 195-218. https://doi.org/10.1080/136270 4X.2019.1567061

Chang, H. J., Yurchisin, J., Hodges, N., Watchravesringkan, K., & Ackerman, T. (2013). An investigation of self-concept, clothing selection motivation, and life satisfaction among disabled consumers. *Family and Consumer Sciences Research Journal*, 42(2), 162-176. https://doi.org/10.1111/fcsr.12050

Curteza, A., Cretu, V., Macovei, L., & Poboroniuc, M. (2014). Designing functional clothes for persons with locomotor disabilities. *Autex Research Journal*, 14(4), 281-289. https://doi.org/10.2478/aut-2014-0028

Daukantienė, V. (2023). Analysis of the sustainability aspects of fashion: A literature review. *Textile Research Journal*, 93(3-4), 991-1002. https://doi.org/10.1177/00405175221124971

Foster, J., & Pettinicchio, D. (2022). A model who looks like me: Communicating and consuming representations of disability. *Journal of consumer culture*, 22(3), 579-597. https://doi.org/10.1177/14695405211022074

Hall, M. L., & Orzada, B. T. (2013). Expressive Prostheses: Meaning and Significance. *Fashion Practice, 5 (1), 9-32.* https://doi.org/10.2752/175693813X13559997788682

Hamraie, A., & Fritsch, K., (2019). Crip technoscience manifesto. *Catalyst*, 5(1), 1-34. https://doi.org/10.28968/cftt.v5i1.29607

Jansen, M. A. (2020). Fashion and the phantasmagoria of modernity: An introduction to decolonial fashion discourse. *Fashion Theory*, 24(6), 815-836. https://doi.org/10.1080/136270 4X.2020.1802098

Kabel, A., Dimka, J., & McBee-Black, K. (2017). Clothing-related barriers experienced by people with mobility disabilities and impairments. *Applied Ergonomics*, 59,

165-169. https://doi.org/10.1016/j.apergo.2016.08.036

Kaiser, S. (1997). *The Social Psychology of Clothing*. Fairchild Publications.

Kaiser, S. (2001). Minding appearances: Style, truth, and subjectivity. *Body dressing*, 79-102.

Kaiser, S. B., Freeman, C. M., & Wingate, S. B. (1985). Stigmata and negotiated outcomes: Management of appearance by persons with physical disabilities. *Deviant Behavior*, 6(2), 205-224. https://doi.org/10.1080/01639625.19 85.9967670

Lee, Z., Alwi, S. F. S., & Gambetti, R. (2024) (a). Breaking barriers with disability inclusion: Brand activism as a catalyst for social sustainability in fashion. In *The Palgrave Handbook of Sustainability in Fashion* (pp. 167-183). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-69682-4_14

Lee, Z., Alwi, S. F. S., & Gambetti, R. (2024) (b). The thousand faces of beauty: How credible storytelling unlocks disability representation in inclusive luxury fashion branding. *Journal of Business Research*, 181, 114744. https://doi.org/10.1016/j.jbusres.2024.114744

Li, M., Zhao, L., & Srinivas, S. (2023). It is about inclusion! Mining online reviews to understand the needs of adaptive clothing customers. *International Journal of Consumer Studies*, 47(3), 1157-1172. https://doi.org/10.1111/ijcs.12895

Lobo, M. A., Hall, M. L., Greenspan, B., Rohloff, P., Prosser, L. A., & Smith, B. A. (2019). Wearables for pediatric rehabilitation: how to optimally design and use products to meet the needs of users. *Physical therapy*, 99(6), 647-657. https://doi.org/10.1093/ptj/pzz024

Marti, P. (2021). Framing diversity: designing hearing aids from a deaf culture perspective. In *CUMULUS CONFERENCE PROCEEDINGS SERIES* (Vol. 2, pp. 1958-1978).

Marti, P., & Recupero, A. (2019, June). Is deafness a disability? Designing hearing aids beyond functionality. In *Proceedings of the 2019 Conference on Creativity and Cognition* (pp. 133-143). https://doi.org/10.1145/3325480.3325491

Mazzarella, F., Storey, H., & Williams, D. (2019). Counter-narratives towards sustainability in fashion. Scoping an academic discourse on fashion activism through a case study on the centre for sustainable fashion. *The Design Journal*, 22(sup1), 821-833. https://doi.org/10.1080/14606925.2019.15 95402

McBee-Black, K., & Sun, X. (2024). Exploring Corporate Social Responsibility and Social Capital in Adaptive Apparel Certification Marks. *Clothing and Textiles Research Journal*, 0887302X241307562. https://doi.org/10.1177/0887302X241307562

Melkumova-Reynolds, J. (2023). "Let me be your stimy toy": Fashioning disability, cripping fashion. In *Dangerous Bodies: New Global Perspectives on Fashion and Transgression* (pp. 35-56). Cham: Springer International Publishing.

Nagasawa, R. H., Hutton, S. S., & Kaiser, S. B. (1991). A paradigm for the study of the social meaning of clothes: Complementarity of social-psychological theories. *Clothing and Textiles Research Journal*, 10(1), 53-62. https://doi.org/10.1177/0887302X9101000108

Oliveros, N. N. (2024). " Fashion Forward": Fashioning Sociocultural Narratives Through Multimodal Critical Discourse Analysis of Fashion Editorials. *Journal of English and Applied Linguistics*, 3(2), 7. https://doi.org/10.59588/2961-3094.1105

Peterson, J., Pearce, P. F., Ferguson, L. A., & Langford, C. A. (2017). Understanding scoping reviews: Definition, purpose, and process. *Journal of the American Association of Nurse Practitioners*, *29*(1), 12-16. https://doi.org/10.1002/2327-6924.12380

Pilyarchuk, K. (2024). In/exclusion in fashion discourse: Are we in or out?. *Discourse & Society*, *35*(5), 606-624. https://doi.org/10.1177/09579265241241074

Profita, H. P., Stangl, A., Matuszewska, L., Sky, S., Kushalnagar, R., & Kane, S. K. (2018). "Wear It Loud" How and Why Hearing Aid and Cochlear Implant Users Customize Their Devices. *ACM Transactions on Accessible Computing (TACCESS)*, *11*(3), 1-32. https://doi.org/10.1145/3214382

Putnam, M. (2005). Conceptualizing disability: Developing a framework for political disability identity. *Journal of Disability Policy Studies*, *16*(3), 188-198. https://doi.org/10.1177/10442073050160030601

Qayyum, A., Jamil, R. A., Shah, A. M., & Lee, K. (2023). Inclusive advertising featuring disability on instagram: Effect on consumer well-being, brand engagement, and purchase intention. *Journal of Retailing and Consumer Services*, *75*, 103515. https://doi.org/10.1016/j.jretconser.2023.103515

Rana, M. R. I., McBee-Black, K., & Swazan, I. S. (2024). Adaptive apparel for people with disabilities: A systematic literature review and future research agenda. *International journal of consumer studies*, *48*(3), e13057. https://doi.org/10.1111/ijcs.13057

Rita Sedita, S., Crespi Gomes, K., & Pellegrin, V. (2025). The evolution of the academic discourse on sustainability in the fashion industry: insights from a bibliometric analysis. *Consumption and Society*, *4*(3), 476-499. https://doi.org/10.1332/27528499Y2024D000000023

Sansoni, S., Speer, L., Wodehouse, A., & Buis, A. (2016). Aesthetic of prosthetic devices: from medical equipment to a work of design. In *Emotional Engineering Volume 4* (pp. 73-92). Cham: Springer International Publishing.

Schiaroli, V., Dangelico, R. M., & Fraccascia, L. (2025). Mapping sustainable options in the fashion industry: A systematic literature review and a future research agenda. *Sustainable Development*, *33*(1), 431-464. https://doi.org/10.1002/sd.3129

Sinha, P., Sharma, M., & Agrawal, R. (2023). A systematic review and future research agenda for sustainable fashion in the apparel industry. *Benchmarking: an international journal*, *30*(9), 3482-3507. https://doi.org/10.1108/BIJ-02-2022-0142

Thorisdottir, T. S., & Johannsdottir, L. (2020). Corporate social responsibility influencing sustainability within the fashion industry. A systematic review. *Sustainability*, *12*(21), 9167. https://doi.org/10.3390/su12219167

van Rijswijk, J., Curseu, P. L., Maathuis, C., & Mertens, G. (2025). Diversity washing: a systematic literature review and future research agenda. *Corporate Governance: The International Journal of Business in Society*, *25*(8), 196-215. https://doi.org/10.1108/CG-11-2024-0600

Venkatesan, S. (2025). Beyond barriers: A narrative review of disability and fashion. *World Journal of Advanced Research and Reviews*, *26*(03), 1843-1863. https://doi.org/10.30574/wjarr.2025.26.3.2321

Whatley, S., Benford, S., Marsh, K., Zhou, F., Ashcroft, I., Tennent, P., & Erhart, T. (2023). Personalising prosthetics: digital interventions in disability and dance. *International Journal of Performance Arts and Digital Media*, *19*(3), 318-333. https://doi.org/10.1080/14794713.2023.2196884

Wilkinson, C., Carter, B., & Shokrollahi, K. (2018). Disfigurement, the body and dress: A review of the literature. *Geography Compass*, *12*(10), e12382. https://doi.org/10.1111/gec3.12382