

## **Abstract:**

Despite growing expectations of diversity, equity, and inclusivity, the adaptive apparel landscape is still facing challenges with designs regarding limited availability in mainstream markets, neglect of aesthetics, and exclusion of disabled voices in the design process, therefore perpetuating stigma that reinforce societal perceptions of disability as “otherness.” Adaptive apparel is supposed to address the specific clothing needs of people with disabilities (PWDs), providing comfort, confidence, and autonomy, ultimately promoting social participation and improving quality of life. This study aims to understand the intersection between co-design, sustainability, and inclusive marketing to enhance the accessibility and effectiveness of adaptive apparel for PWDs. Existing literature from online academic databases and adaptive apparel brands were thoroughly investigated. A three-tiered screening for academic papers across (1) keywords, (2) publication years, (3) geographic regions was conducted for systematic review.

**Research Question:** How does the integration of co-design methodologies, sustainable practices, and inclusive marketing strategies enhance the accessibility, functionality, and social acceptance of adaptive apparel for people with disabilities (PWDs)?

## **Introduction:**

According to World Bank, approximately 15% of the world population live with some form of disability. These people, also known as PWDs (persons with disabilities), are at greater risk of encountering unfavorable socioeconomic conditions such as lower educational attainment, reduced employment opportunities, and higher poverty rates. Research suggests an unmet demand for adaptive apparel, as highlighted by significant growth projections of the global adaptive apparel market. Despite this economic viability, PWDs are often an overlooked demographic in the fashion industry which manifest in limited accessibility, innovation, and inclusivity (Kabel, et al.).

**Current Landscape:** Furthermore, most adaptive apparel emphasize medical functionality rather than aesthetics with a focus on practicality for caregivers of PWDs. Research suggests that there is a demand for aesthetic clothing options (Freeman et al.). This demonstrates a substantial market gap, suggesting that adaptive apparel has economic viability in the fashion industry as well as the medical industry. Furthermore, design processes and marketing campaigns often exclude disabled voices-by prioritizing medical utility over style, designers inadvertently reduces PWDs the opportunity of self expression which could lead to the misinterpretation that they lack the capacity for rich and multifaceted tastes. Current existing adaptive clothing solutions also frequently fail to address the diverse functional, aesthetic, and sensory needs-such as the incorporation of back pockets on pants that may cause pressure sores of wheel chair users-of PWDs (Freeman and Schenkman).

**Sustainability:** In recent years, consumers’ sense of responsibility in regards to environmental sustainability has been on the rise with shifting consumer values. As the fast fashion model is often applied to adaptive apparel, it often contributes to textile waste as it requires frequent replacement due to poor, short lived, and non-recyclable designs (Kabel). The fast fashion industry sees more than half of garments discarded within a year (Ellen MacArthur Foundation, 2017), and adaptive apparel’s reliance on similar materials suggests comparable waste patterns (Kabel). Furthermore, social sustainability demands equitable participation of people with disabilities (PWDs) in the

design. Incorporating PWDs into the design process not only addresses clothing needs but can break down social barriers and offer employment opportunities.

**Inclusivity:** Additionally, clothing-related challenges such as the pursuit of fashionable clothing can affect their mental well-being- elaborate. The desire for stylish attire that allows for self-expression—without the immediate identification as “abnormal” underscores the social urgency of inclusive design. This demonstrates an urgent ethical imperative to advocate for adaptive apparel (Disability Horizons and Chesire).

**Cognitive Aspect:** Humans are cognitive misers who attempts to simplify their observations for categorization to more easily understand their environment. Often, the outcome of this simplification are stereotypes which influence the interactions between disabled and non-disabled individuals by reinforcing social divides and perpetuating stigma (McLeod). Beyond this natural implication, humans often fixate on physical disabilities, serving as distinctive stimuli. This prompts the the observer to make dispositional attributions to PWDs. This inclination is intensified when the PWD’s clothing is unconventional (Miller, 1982). One example are the orange backpacks designed to improve visibility of visually impaired children promoted by the Chinese government. The visibility the bags offered drew unwanted attention and made social integration more difficult. (Zhao, 2017) This highlights the critiques of adaptive apparel designed *for* PWDs rather than *with* them. The backpacks were discontinued partly because they excluded input from visually impaired children themselves. Hence why visibility of special features such as Velcro, magnetic snaps, elastic waistbands, etc. were negatively viewed by PWDs due to fear of judgment.

**Co-Design:** By including PWDs into the early stages of the design process enhances efficiency by preemptively addressing user needs through lived expertise, reducing dependency on retrospective participant testing. This user-centric approach ensures that the apparel aligns with the functional, aesthetic, and sensory requirements of PWDs (Jun, 2024).

Freeman et al. found that most adaptive apparel brands develop clothing based on the ease of dressing PWDs for caregivers rather than the comfort of PWDs during wear. Most PWDs appreciate and gravitate towards clothing with “self-help” features that allow PWDs to dress themselves, which is also another overlooked feature. The idea of self alteration of mass produced clothing to better serve the personal style, comfort, and motion requirements was popular amongst participants.

Mainstream fashion brands’ engagement with adaptive apparel was low until 2016, when Tommy Hilfiger introduced its Adaptive clothing line—a pioneering initiative that utilized co-design methodologies. They brought PWDs into the research and design phases to prioritize lived experience as a critical driver of functional and aesthetic innovation, challenging longstanding exclusionary practices in design.

**Marketing:** PWDs face systematic barriers in accessing adaptive apparel, both online and offline. Most of them have limited access to technology which hinders their abilities to access e-commerce platforms. In physical retail spaces, accessibility challenges persist: inconsistent physical access, inadequate store layouts, and uninformed employee interactions often lead to negative experiences, compounded by a lack of adaptive apparel options. To bridge these gaps, inclusive marketing must address both digital accessibility (e.g., screen-reader-friendly interfaces) and in-store adaptations (e.g., staff training, adaptive product displays), ensuring equitable access to

clothing that meets functional, aesthetic, and emotional needs. (Menzel Baker et al. and Childers & Kaufman-Scarborough)

**Cultural Gaps:** Existing research on adaptive apparel remains predominantly confined to English-language studies conducted within North American contexts. This indicates a gap in research in regards to cross-cultural applicability of findings. Findings derived from studies on American PWDs lack universal applicability, as the lived experiences are not homogeneous across global populations. (Rana et al.)

**Methodology:**

A systematic search was conducted across PubMed and Web of Science using Zotero for citation management. The three tiered screening approach can be broken down into:

Tier 1: Keywords

Tier 2: Publication Year

Tier 3: Geographic Location

Keywords used in the screening process included: people with disabilities, persons with disabilities, disability, disabled, PWDs, adaptive, apparel, clothing, design, garment, sustainability, marketing, accessibility.

A PRISMA flow diagram will be used for visualization of the screening process.

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