

Empowering Township Elderly Women: Upcycling Post-Consumer Waste Clothes into Sustainable Livelihoods

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Abstract: Post-consumer clothing waste poses significant environmental and economic challenges, with second-hand garments often discarded despite their potential for reuse. Addressing this issue requires solutions that reduce waste and empower communities, especially marginalised groups like elderly women in township settings. This study explores how upcycling post-consumer waste clothes, guided by cradle-to-cradle principles and co-design processes, can enhance sustainability and social empowerment among elderly women in a South African township. Adopting a qualitative, case-based approach, participants were engaged through Grandmothers Against Poverty and AIDS (GAPA). Second-hand clothes sourced from local stores served as raw materials. Data collection included semi-structured interviews, participant observations, and examination of final products. Initially, participants relied on intuitive sewing techniques. Later, an expert introduced a structured, step-by-step upcycling method, encouraging them to apply more deliberate design strategies. Participants exhibited resourcefulness and creativity before the expert's intervention without explicitly recognising their efforts as sustainable. After the expert-led workshops, their products showed improved quality, durability, and potential marketability. Participants recognised upcycling as personally enriching, potentially income-generating, and environmentally meaningful. They also expressed interest in sharing knowledge with other grandmothers, indicating a ripple effect of skill dissemination. This research demonstrates that blending community-based ingenuity with structured upcycling strategy guidance can transform second-hand clothing waste into a vehicle for environmental stewardship, social cohesion, and economic resilience. It illustrates how local craftsmanship, informed by sustainable design frameworks, can foster ecological sustainability and community empowerment.

Introduction

The fashion industry is a significant contributor to global waste, with millions of tons of clothing discarded annually. Globally, the fashion industry produces around 92 million tonnes of textile waste each year, contributing significantly to environmental pollution and accounting for 10% of global carbon emissions (Bick et al., 2018). This waste is primarily driven by the fast fashion model, which encourages frequent purchases and disposals due to rapidly changing trends and low-cost production (Andreadakis & Owusu-Wiredu, 2023). The environmental impact is further exacerbated by the fact that less than 1% of the total fiber input used for clothing is recycled into

new garments, resulting in substantial material value loss (Ellen MacArthur Foundation, 2017). In response to these challenges, sustainable practices such as upcycling have gained attention. Upcycling, the process of

transforming waste materials into new, higher-value products, offers a sustainable solution to this problem. Unlike traditional recycling, which often downcycles materials into lower-quality products, upcycling adds value by creating items that are of equal or greater quality than the original materials (Sung et al., 2020). This process not only reduces waste but also conserves resources by minimizing the need for new raw materials. Upcycling supports a circular economy, where products are reused and repurposed, thereby extending their lifecycle and reducing environmental impact (Singh & Rani, 2021).

In South Africa, the fashion industry primarily engages with sustainability through second-hand clothing markets and informal recycling practices. However, research and implementation of advanced sustainable practices, such as upcycling, remain limited. Studies indicate that upcycling in the Global South focuses more on livelihoods and

employment, as opposed to environmental priorities emphasized in the Global North (Monyaki & Cilliers, 2023).

Cape Town-based businesses, for example, have highlighted the potential for remanufacturing and upcycling in advancing sustainable fashion; however, these efforts are constrained by limited skills and resources (Monyaki & Cilliers, 2023). Additionally, grassroots innovations play a significant role in addressing sustainability and socioeconomic challenges, particularly in marginalized communities (Calvo et al., 2020). Yet, these initiatives lack the formal structure and design strategies needed to scale their impact effectively.

This study explored how upcycling post-consumer waste clothes can empower elderly women in township communities, enhancing their skills and creating sustainable livelihoods. Elderly women in these communities often face economic and social challenges, including limited access to employment opportunities and social isolation. By engaging in upcycling activities, they can develop valuable skills, gain financial independence, and foster a sense of community (Tyler & Han, 2019). The workshop sessions designed for this study aimed to enhance their upcycling skills, enabling them to transform discarded clothing into trendy marketable products.

This research aimed to enhance both academic discourse and practical applications in sustainable fashion by integrating environmental sustainability and social empowerment. Addressing waste reduction and fostering skill development and economic opportunities are crucial for achieving sustainable development goals (Hajam et al., 2023). This study not only highlights the potential of upcycling as a sustainable practice but also demonstrates its capacity to create meaningful social change.

Literature Review

The linear production model of fast fashion and rapid consumption cycles present huge detriment to environmental. The way the industry does this is by focusing on frequency of turnover and cheap, poor quality garments that are meant to be used often, thereby depleting natural resources, producing huge amounts of waste and pollution. The following subsections examine the key environmental issues linked to fast fashion:

Resource Overexploitation

Many fast fashion models are based on intensive use of the raw materials and cheap labor and choose unsustainable practices. For example, the practice of cotton growing consumes gigantic amounts of water and pesticides and incurs enormous ecological damage. Aral Sea's good example of how large expanses of water can be destroyed by water intensive farming, ruching regional ecosystems and communities (Marrocco, 2024).

Waste generation

The reason why the textile waste is piling up is because of fast fashion's special focus on affordability and disposability. Currently, less than 1% of fast fashion garments are recycled, enabling a missed opportunity to recover valuable materials and reduce landfill use (Soudi & Mohssine, 2024). The problem is compounded by the fact that the industry is responsible for major contributions to micro plastic pollution. Approximately 35 per cent of all microplastics found in the ocean stem from synthetic apparel fibers that threaten marine life and food security over the long term (Marrocco, 2024).

The kind of severity implied by these challenges gives way to emerging innovations that can bring about a more responsible fashion industry (Sonnenberg et al., 2022). Closed loop recycling systems and bio based materials offer opportunities to conserve resources, minimise waste and alleviate reliance on dangerous chemicals (Hvass, 2014). Translating fast fashion from ecological crisis making, to a circular economy will facilitate the reorientation of fast fashion to be in line with sustainable development goals, minimizing its environmental footprint and securing long term ecological resilience (Lin & Chen, 2022).

Building on these environmental challenges and the potential solutions offered by circular economy principles, the following section further explores the role of upcycling as a strategic alternative to conventional recycling. This emphasis on value retention, creative reuse, and enhanced product durability not only aligns with the broader aims of circularity but also addresses many of the ecological and socioeconomic concerns identified above (Balu et al., 2022).

Circular Economy

In the context of the fast fashion industry, the circular economy (CE) has become an attractive alternative to the linear production models, which are predominant. According to CE, rather than the 'take-make-dispose' scenario, the Foundation advocates for resource efficiency, material waste minimization, and the ongoing circulations of materials at their highest available value (Ellen MacArthur Foundation, 2017). CE based strategies attempt to alleviate environmental pressures, minimize virgin material dependence and promote long term sustainability within the fashion sector through rethinking supply chains, product lifecycle and consumption behaviours (Bick et al., 2018).

Circular Economy: upcycling principle

Upcycling, under the CE paradigm, is increasingly garnered as a means extending a product's lifespan but also increasing product value. Compared to downcycling, upcycling converts post-consumer waste into equal or better value products, thereby saving resources, eliminating environmental footprints (Singh & Rani, 2021). This suggests that integrating upcycling into current fashion systems can alleviate clothing waste, reduce the overall emissions, and spur people to take on more ethical consumption habits (Soudi & Mohssine, 2024). This practice supports CE goals by that keeps materials in circulation for as long as possible, hence slowing resource depletion and reducing landfill use (Repp et al., 2021).

Cradle to Cradle (C2C) in Upcycling Clothing

Building on the cradle-to-cradle (C2C) framework proposed by McDonough and Braungart (2010) the principle that "waste equals food" underscores the potential for transforming post-consumer textile waste into valuable inputs for new garments. Two aspects of their design framework are particularly relevant to upcycling clothing: (1) viewing everything as a resource for something else, and (3) celebrating diversity in design.

Everything is a Resource for Something Else

Central to the first principle is the concept that materials should be perpetually cycled through biological or technical loops to eliminate waste (McDonough & Braungart, 2010). In the context

of clothing, this means selecting textiles and components that can be continuously repurposed. Instead of discarding old garments, their fibers, buttons, and zippers become raw materials for new items. Previous studies on sustainable fashion have demonstrated how this aligns with the circular economy, reducing the need for virgin fibers while alleviating the burden on landfills (Ellen MacArthur Foundation, 2017). Upcycling, as a technique, operationalizes this principle by reintroducing value into discarded textiles and extending product lifespans.

Celebrate Diversity

The third principle emphasizes the importance of diversity in design, acknowledging that cultural, environmental, and material variation can drive innovation and resilience (McDonough & Braungart, 2010). For upcycled clothing, this principle encourages tailoring designs to local contexts, resources, and artisan skills, thereby producing garments that reflect unique community aesthetics and cultural narratives. Such an approach resonates with community-based initiatives, where incorporating local patterns, stitching techniques, and regional motifs can improve product desirability and marketability (Tyler & Han, 2020).

Cradle-to-Cradle Certified Product Standard

To operationalize these principles, the Cradle to Cradle Certified® Product Standard provides a structured assessment framework that encourages material health, product circularity, clean air and climate protection, water and soil stewardship, and social fairness (Cradle to Cradle Products Innovation Institute, 2013). By meeting these criteria, upcycled clothing ventures can ensure that their products not only utilize safe, renewable materials (material health) but are also intentionally designed for continuous cycling (product circularity). Applying such standards helps guarantee that upcycled garments contribute positively to local ecosystems (clean air & climate protection, water & soil stewardship) while respecting fair labor practices and community well-being (social fairness).

For example, selecting fabrics free of harmful chemicals (material health) and opting for fibers that can be mechanically or chemically recycled into high-quality yarns (product circularity)

supports continuous material flow. Simultaneously, integrating local craftsmanship respects cultural diversity, aligns with social fairness principles, and may enhance community livelihoods. Over time, meeting these certification criteria reinforces credibility and consumer trust, potentially enabling upcycled clothing brands to scale their operations sustainably.

By synthesizing C2C, upcycled clothing initiatives can move beyond ad hoc practices. This integrated approach ensures that repurposed garments meet rigorous sustainability benchmarks while remaining deeply attuned to local cultural contexts and environmental considerations.

Co-Design in Upcycling Clothing

Participatory methods that involve local stakeholders are necessary to implement upcycling and C2C strategies in a wide variety of social contexts. Understanding the relevance of co-design as an effective strategy for sustainability initiative adoption, scalability, and impact, it has been identified that co-design approach incorporating end users and the community members in processes of design, is a great strategy for that. Co-design is a process that engages participants to use their past knowledge (culturally and socially), existing skills, and creativity to 'upcycle' clothing into marketable, durable and contextually relevant garments (Calvo et al., 2020; Monyaki & Cilliers, 2023). The benefits of this collaborative framework are both in improving product outcomes — such as design quality and longevity — and enhancing social cohesion, confidence building, and the spread of sustainable practices at a grass roots level. In prior studies, engaging marginalized groups in co design can create more inclusive resilient circular fashion models that are more beneficial to all stakeholders (economically and socially) across communities (Sung et al., 2020; Tyler & Han, 2020).

Although the upcycling of clothing and textile waste is increasing globally, and cradle-to-cradle principles are gaining traction in sustainable design, research in South Africa has seldom examined how applying these concepts can empower less privileged groups, particularly elderly women in township communities.

Methodology

This study adopted a qualitative, case-based approach designed to capture the nuanced experiences, skill development, and product transformations within a community-based upcycling context. The primary setting was a township in Cape Town, South Africa, where elderly women were engaged through Grandmothers Against Poverty and AIDS (GAPA), a local non-profit organization well-established in supporting older women's health, social, and economic needs. GAPA facilitated initial contact, provided a safe and familiar space for participants, and ensured that all activities were culturally appropriate and sensitive to local dynamics.

The participant pool included elderly women aged 55 and above, who possessed basic sewing skills acquired through domestic crafts or informal garment alterations. Selection criteria emphasized willingness to participate, interest in improving sewing techniques, and openness to working with second-hand clothing. Purposive sampling ensured that those included would offer rich insights into the lived experiences, skill enhancement, and creative processes integral to upcycling. In total, 10 participants were recruited, allowing for manageable group interactions while maintaining sufficient diversity in age, experience, and personal circumstances.

Second-hand clothing items were sourced from two local thrift stores to ensure authenticity and relevance to the participants' context. These garments varied in fabric type, wear, and quality, reflecting the heterogeneous nature of post-consumer waste streams. By presenting participants with a range of materials, it was possible to observe how they navigated design challenges, identified opportunities for material reuse, and experimented with construction techniques.

Data collection employed multiple qualitative techniques to capture both process and outcome dimensions. Semi-structured interviews, conducted individually and in small groups, gathered personal reflections on participants' experiences, motivations, and perceptions of upcycling. Participant observations documented interactions during co-design workshops, noting how participants selected materials, applied sewing and design skills, and interacted with peers and the design expert. The final upcycled products were examined as tangible outputs that illustrated improvements in quality, durability, and aesthetic appeal. Photographs, field notes, and

reflective journals complemented direct observations, creating a rich data set for subsequent analysis.

Data analysis followed a thematic approach guided by Cradle-to-Cradle (C2C) design principles. Initial coding identified patterns related to skill development, product innovation, and environmental sustainability. Subsequent thematic refinement involved cross-referencing participant narratives with observed practices and product outcomes, clarifying how structured guidance influenced participants' understanding of sustainability and enhanced their craftsmanship. Ethical considerations were paramount throughout the study. Informed consent procedures ensured that participants understood the purpose, benefits, and potential risks of involvement. Confidentiality measures included secure data storage and anonymized reporting of findings, maintaining participants' privacy and autonomy.

By triangulating multiple data sources and drawing on a theoretical lens grounded in C2C principles, this methodology enabled an in-depth exploration of how co-design processes and structured upcycling guidance could transform discarded materials into meaningful, marketable products, ultimately fostering empowerment, social cohesion, and environmental stewardship.

Results and Discussion

The findings highlight that the participants not only improved their technical skills but also gained personal and social benefits that are often overlooked in similar initiatives. These include enhanced confidence, a sense of purpose, and emotional fulfillment, which were described as transformative. These non-tangible outcomes complement the tangible improvements, such as product quality and design structure, showcasing the broader impact of upcycling activities.

The findings indicate that participants, who initially relied on their household-level sewing skills and intuition, were already transforming post-consumer waste clothes into useful items before any formal intervention. Although these early efforts lacked a structured approach, the women demonstrated creativity, resourcefulness, and a willingness to engage with discarded materials. At this stage, participants did not recognize their actions as contributing to sustainability, yet their instinctive modifications aligned, in principle, with cradle-

to-cradle ideals by giving old garments a second life.

The introduction of the design expert and a more systematic, step-by-step methodology brought a clear enhancement to both the process and the outcomes. Through co-design workshops, participants learned to dissect garments, sketch designs, and tailor their constructions more thoughtfully. This newfound structure did not replace their intuitive strengths; instead, it refined them. As a result, participants produced items that were more durable, aesthetically pleasing, and better suited for potential market ventures. The co-design environment encouraged collaboration, idea exchange, and the recognition that their work could serve broader environmental and economic purposes.

Interviews revealed that the women came to view upcycling as more than a set of techniques: it became personally fulfilling, therapeutic, and enriching. Many expressed plans to continue producing upcycled garments for extra income and saw value in sharing these skills with other grandmothers in their communities. In essence, blending local ingenuity with expert guidance not only improved product quality but also fostered environmental awareness, social cohesion, and economic resilience, thereby exemplifying the transformative potential of community-driven, sustainable fashion practices.

Conclusion and Recommendations

This study shows how integrating cradle-to-cradle principles with co design approaches allow township elderly women to make their post-consumer waste clothes sustainable livelihoods. Participants were able to learn to produce upcycled garments of improved quality, durability, and marketability by taking their existing local ingenuity and sewing skills and merging them with structured design guidance. What it accomplished went beyond technical outcomes: It developed essential non tangible skills such as confidence, creativity, and collaboration; it motivated individuals to take action; and it generated significant emotional fulfillment for participants.

Environmental waste management and socioeconomic marginalization are tackled by the study through the use of structured upcycling initiatives. In addition to environmental stewardship, participation

allowed participants to extend the lifecycle of discarded clothing, in the process improving economic resilience in their communities. With their new knowledge to share, and increased awareness of sustainable practices, they are now empowered as agents of change equipped to pass on the knowledge to their community in a compliant manner. This provides clear proof of the transformative upcycling can be a tangible, scalable solution for sustainability in resource scarce environments.

The research also provides a replicable model for enabling marginalized communities globally, particularly in parts of the Global South burdened with socioeconomic inequality and environmental pressure. Using local skills to bridge the gap between the informal craftsmanship and structured sustainable production systems provides a means by which transformation to the circular economy can be triggered and inclusive participation can be achieved. Upcycling is then seen more than as a sustainability tool, but as a driver for social cohesion, environmental awareness, and economic opportunities among under served populations.

It is recommended that future work concentrates on scaling these findings in collaboration with non profit organizations, policymakers and local businesses. Expanding such programs will depend crucially on providing access to funding, training, and market platforms. In addition, longitudinal studies could also test the long term beneficial effects of upcycling on participants' financial stability, skill retention or environmental contributions.

The research reinforces the value of upcycling to deal with textile waste and aggrandize marginalized communities. Upcycling represents an opportunity to combine local resourcefulness with the structure of sustainable design principles to create a powerful vehicle to achieve social justice and environmental sustainability within a circular economy.

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