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# Can Digital Technologies Support Sufficiency in Fashion? Evidence from Innovative UK Fashion SMEs

**Anja Connor-Crabb, Caroline Hemingray and Steven Toms**

## Abstract

**The far-reaching environmental impacts of the fashion industry are well documented. Although impact reduction per garment has improved, these gains are eclipsed by the steadily increasing rates of clothing consumption and production. Meaningful change can be achieved through the de-acceleration of consumption, aligned with concepts of degrowth and sufficiency. While this area is growing, research into conceptual**

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**developments and practical applications are needed. This paper critically explores the interplay between physical and digital realms and examines their potential to curb excessive clothing consumption and production. Drawing on case studies from industry networks of the Future Fashion Factory (University of Leeds) and the Business of Fashion, Textiles and Technology Institute (University of the Arts London), it critically investigates how companies respond to these challenges and utilize digital technologies. Examples include a mobile phone app for wardrobe inventory, online communities that foster connections with nature, and social media content that encourages resourceful fashion practices. The findings contribute to sustainability discourse in fashion, highlight best practice, identify barriers to wider adoption and offer recommendations for industry and policy.**

**KEYWORDS: fashion, sustainability, sufficiency, overconsumption, digitalization, SME**

## Introduction

Due to finite global resources, the continued growth of fashion and textiles (F&T) production and consumption poses significant threats to planetary health (De Ponte, Liscio, and Sospiro 2023; European Environment Agency 2019; Fletcher 2014; Niinimäki et al. 2020; Statista 2024). The rise of low-cost fast fashion has diminished the perceived value of clothing, creating a "throwaway" fashion culture (Centobelli et al. 2022), enabled by the rise in synthetic petrochemical-derived fibers (Klepp et al. 2023b; Niinimäki et al. 2020). Despite warnings, global clothing consumption and production nearly doubled between 2000 and 2015 (Ellen MacArthur Foundation 2017) and is projected to increase by 63% by 2030 (European Environment Agency 2019; Šajn 2019), while the global population grew by only 20% (Klepp et al. 2023b). In the EU, whilst the proportion of household expenditure on clothing and footwear has declined since 1995 (Eurostat 2024), the number of items purchased per person continues to rise (European Environment Agency 2019; Šajn 2019). This pattern of increased consumption at lower cost coincides with growing digitalization in daily life and the F&T industry (Hemingray et al. 2023; Nobile et al. 2021).

While much research focuses on digitalization in relation to production efficiencies and marketing, less attention has been paid to how these tools can potentially support sufficiency, accountability, and cultural change. This paper addresses that gap by examining three purpose-driven UK fashion SMEs chosen for their innovative use of digital tools and explicit commitment to sustainability beyond efficiency. These exemplary cases are explored through four interlinked themes: navigating growth, deploying digitalization, using certification for

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accountability, and engaging citizens in cultural shifts. These themes structure the literature review and provide a multi-dimensional lens through which the case studies are analyzed. The discussion highlights commonalities and tensions across the cases, while the conclusion outlines key barriers, implications for industry and policy, and directions for future research.

## Literature Review

### *Limits to growth*

Most sustainability efforts in fashion and textiles focus on production efficiencies (Kozlowski, Searcy, and Bardecki 2015) or lower-impact materials (Schaltegger et al. 2012). However, the exponential growth in production and consumption undermines the overall effectiveness of these eco-efficient measures (Fletcher and Tham 2019; Freudenreich and Schaltegger 2020). As climate change intensifies, such strategies are proving inadequate; instead, radical shifts are needed to avoid irreversible ecological harm (e.g. Fletcher 2014; Hot or Cool 2022; Niinimäki et al. 2020; Rockström et al. 2009). Reducing volumes remains the most impactful strategy of the "Reduce, Reuse, Recycle" ("3Rs") hierarchy (Bocken and Short 2016; Brooks et al. 2017; Klepp et al. 2023b); this framework has since been expanded to the "9Rs" to incorporate additional dimensions: R0 Refuse, R1 Rethink, R2 Reduce, R3 Reuse, R4 Repair, R5 Refurbish, R6 Remanufacture, R7 Repurpose, R8 Recycle and R9 Recover (Kirchherr, Reike, and Hekkert 2017). R0-R5 align most closely with principles of degrowth, sufficiency and post-growth – related concepts that prioritize reducing production and consumption (Schneider, Kallis, and Martinez-Alier 2010). This "less is more" approach aims to simultaneously advance equity, well-being, and ecological health, particularly in high-consuming regions (Hickel 2020; Liegey and Nelson 2020).

In the fashion context, Fletcher and Tham (2019) Earth Logic Action Plan rejects endless growth to propose an "earth first" paradigm in place of conventional market-driven logic. Niessen (2022) extends this critique by calling for the "defashioning" of the industry, i.e. replacing the dominant system with a "pluriverse" of local, equitable, decolonial and ecologically respectful clothing models. A recent Textile Exchange report (2024) brings industry voices into the dialogue: it proposes pathways for "reimagining growth" via capping fossil-based resources; reducing overproduction using digital technologies; promoting equity and respecting human rights; eliminating messages promoting overconsumption; and policy aiming to level the playing field. Some microbusinesses and SMEs already resist growth pressures, pursuing modest economic viability to advance social and ecological aims (Black et al. 2024; Connor-Crabb, Miller, and Chapman 2016; Rojas et al. 2024); here, sufficiency becomes an opportunity for innovation and success

(Bocken and Short 2016). However, such enterprises frequently fall short of fully implementing degrowth across operations (Hankammer and Kleer 2018; Khmara and Kronenberg 2018; Rojas et al. 2024), highlighting the paradox that financial growth can be necessary to enable transformative projects, despite limiting degrowth efforts (Andreoni 2020).

Despite increasing momentum for stricter regulation to curb overproduction and overconsumption (European Commission 2022; The Business of Fashion and McKinsey & Company 2024), responsibility still largely lies with individual firms. A UK government report (UK Government 2021) criticized the fashion industry's unsustainable scale, but Fashion Revolution (2024a) noted a lack of meaningful government response. Environmental targets, such as halving residual waste by 2042 (DEFRA 2022; UKFT 2023), remain broad and non-binding. A recent Fashion Revolution report (2024b) found low disclosure among 250 major brands on actions addressing decarbonization and overproduction. Yet, voluntary schemes still dominate, placing the onus on businesses to reduce emissions and material use while prioritizing profitability. EU proposals, such as Extended Producer Responsibility (EPR) and the EU Commission's 2030 Vision for Textiles, have been criticized for ignoring the role of low prices and high volumes, enabled by cheap synthetic fibers – factors that must be addressed for sustainable business models to flourish (Klepp et al. 2023a, 2023b; Maldini and Grimstad Klepp 2024).

### *Digital technologies and digitalization*

Digitalization, the integration of digital technologies into business operations to create new value and transform models (Gartner 2024; Hagberg, Jonsson, and Egels-Zandén 2017), is widespread in fashion, impacting "all facets" of the industry (Nobile et al. 2021, 293). Sustainability applications include laser-cutting for upcycling waste, 3D rendering to reduce physical samples, and 3D knitting to eliminate production waste (Earley and Goldsworthy 2015; Kant Hvass and Pedersen 2019; Sandvik and Stubbs 2019). Digital tools can improve efficiency and supply chain flexibility while reducing waste (Moon, Yi, and Ngai 2012; Papahristou and Bilalis 2017; Payne and Mellick 2022). Their strategic use can also support circular business models (Coscieme et al. 2022), consumer education (Joyner Armstrong et al. 2016), and sufficiency-oriented business offerings (Freudenreich and Schaltegger 2020). Digital tools, while not a "silver bullet", can support broader sustainability efforts (Brooks et al. 2017; Davis, Dunne, and Bigger 2024). However, technologies addressing excessive production and consumption remain underexplored, partly because technocentric approaches often conflict with post-growth paradigms (Fletcher and Tham 2019; Liegey and Nelson 2020).

Local supply chains gained momentum post-COVID-19 (Hemingray et al. 2023; Napoleone et al. 2022). Some scholars propose that localized production may allow users to more easily relate to clothing production, strengthening relationships and empathy between users and other stakeholders in the F&T industry (Clark 2008; Ertekin and Atik 2015; Leslie, Brail, and Hunt 2014). Digital applications can transform supply chains across all firms, including those with localized models (Casciani, Chkanikova and Pal 2022). In addition to localized systems, transparency enabled by blockchain technology can increase user participation and offer added value (Freudenreich and Schaltegger 2020). When combined with strategies to reduce production volumes, such approaches hold potential to effectively address systemic issues of overproduction (Davis, Dunne, and Bigger 2024).

Innovative strategies to reduce fashion production and consumption include digital platforms for sharing, swapping, wardrobe management, and co-creating designs online (Black et al. 2024). Wardrobe apps, for example, can help reduce overconsumption and improve well-being by encouraging conscious engagement with existing garments (Jiang and Macintyre 2025; Shaw and Duffy 2020), while integrated Artificial Intelligence (AI) tools can make outfit suggestions (Davis, Dunne, and Bigger 2024). Furthermore, digital fashion may support dematerialization by fulfilling the desire for novelty through virtual self-expression (Casciani, Chkanikova, and Pal 2022; Periyasamy and Periyasami 2023).

Despite their potential, digital solutions carry environmental tradeoffs, including high energy use and embodied carbon from data storage and processing; these impacts remain under-researched (Davis, Dunne, and Bigger 2024). Robust evaluation must consider these hidden costs. While digitalization lowers entry barriers for platform-based firms, startups often struggle with limited access to the infrastructure and resources needed to develop data capacity and foster user engagement (Hemingray et al. 2023).

### *Certification of fashion and textiles*

As the F&T industry increasingly engages with digital innovation to address sustainability, attention is also turning to how such tools interact with mechanisms of accountability. Certification, including digital certification platforms, is emerging as a strategy to formalize sustainability commitments and validate environmental claims. However, as with digital technologies more broadly, the role of certification within a post-growth sustainability agenda warrants critical scrutiny.

Many firms have recently joined the B-Corporation (B-Corp) scheme, which expanded amid limited and largely ineffective UK government regulation. However, certification can be costly and unattainable for smaller firms with limited cashflow (Connor-Crabb et al. 2025). Recent scrutiny of B-Corps has highlighted concerns about the credibility of its certification when granted to fast fashion companies (Santi 2025).

Moreover, such schemes risk enabling greenwashing, particularly when digital tools or assessments lack rigor or focus narrowly on specific firms or supply chain stages (Li 2024; Liute and De Giacomo 2022). Greenwashing, where claims mismatch actual performance, undermines certification value and consumer trust (Apaolaza et al. 2023; Newell, Goldsmith, and Banzhaf 1998), potentially reducing purchase intentions and fostering skepticism. Firms making genuine efforts advocate for stronger regulation to ensure a level playing field and restore trust (Connor-Crabb et al. 2025; Textile Exchange 2024). Certification may also be less critical for social enterprises, which embed ethics into their hybrid business models, combining social and commercial goals (Cornelissen et al. 2021). While certifications demonstrate ethical and environmental commitments, they operate within growth-driven systems and do not fully address the deeper changes required by sufficiency models (Freudenreich and Schaltegger 2020; Liegey and Nelson 2020).

A further possibility, not directly explored in the literature, is that certification could be effectively integrated into a sustainability strategy through digitalization. Sustainability strategies can, for example, be achieved through transparent engagement with social media (Matzembacher et al. 2020) and might include increasing accessibility of the brand's story, thus creating interactive opportunities to engage audiences (Cooper, Merrilees, and Miller 2015; Matthes, Wonneberger, and Schmuck 2014). Where B-Corp certification drives business-wide strategy, digitalization can provide a tool for achieving specific sustainability targets (Rowney et al. 2023). Certification has the potential to enhance and effectively complement these approaches, for example, by creating mechanisms of accountability and traceability within the value chain.

Certification systems increasingly intersect with digital technologies, such as blockchain, to improve traceability and transparency in supply chains (Freudenreich and Schaltegger 2020). A key example is the upcoming introduction of Digital Product Passports (DPPs), which will be mandatory for products sold in Europe by 2030. Supported by blockchain, DPPs promise to contain secure and reliable information supporting certification strategies (Wan and Jiang 2025). While these innovations offer potential benefits, they also involve notable energy and data requirements (Davis, Dunne, and Bigger 2024), as well as incurring additional costs, which may be unobtainable for SMEs, calling for careful consideration of their alignment with degrowth principles. As with other sustainability efforts in the fashion and textile sector, certification schemes face challenges in ensuring equitable and effective impact unless integrated within broader policy frameworks that prioritize absolute reductions and systemic transformation (Fashion Revolution 2024b; Fletcher and Tham 2019).

### *Engaging citizens through fashion*

Overconsumption in fashion is tied to disconnections between production and consumption, but also to dominant cultural norms and social

structures that promote endless growth and novelty-seeking (Brooks et al. 2017; Shove, Pantzar, and Watson 2012). Addressing these systemic drivers requires communication strategies that question and disrupt growth-oriented consumption patterns (Fletcher and Tham 2019; Liegey and Nelson 2020; Textile Exchange 2024). Digital technologies and platforms, including social media, are powerful tools in shaping consumption cultures (Davari and Strutton 2014; Vladimirova et al. 2024). While green marketing can raise awareness, it also risks encouraging overconsumption through "green consumerism" (Olson 2022; Sigaard and Laitala 2023; Zink and Geyer 2017). Conversely, demarketing and sufficiency-oriented campaigns (Kotler and Levy 1971; Miklós-Thal and Zhang 2013), such as Raeburn's Buy Nothing initiative, illustrate how digital communication channels can promote alternatives to growth-driven messaging (Black et al. 2024; Gorge et al. 2015).

Social media is an area of increasing influence, particularly among the younger generations, providing the potential to influence consumption patterns and drive social change (Hilbert 2020; Vladimirova et al. 2024). Platforms can strengthen product value, for instance, by showcasing production, developing skills of garment care and repair, and bringing audiences into design decisions (Santos, Gosler, and Newton 2024). As repairs are typically undertaken by consumers, this provides valuable opportunities for upskilling and helping consumers make more informed choices (Klepp et al. 2023a; Laitala et al. 2021). Social media platforms, such as Instagram, can facilitate interactions and are open access, facilitating autonomy and conviviality, potentially supporting degrowth principles (Zoellick and Bisht 2018), when they are not used as a driver of mainstream consumption through targeted algorithm-driven marketing (Phaneuf 2021). However, research on sufficiency marketing, or demarketing, and the role of social media in promoting reduced consumption remains limited and requires further research (Vladimirova et al. 2024).

Digitalization has emerged as a transformative force for niche firms, driving social innovation and enabling alternative business models such as peer-to-peer sharing, rental services, and (re)sale platforms (Langley and Rieple 2021). Moreover, it has created opportunities for independent designers and smaller producers to sell directly to consumers, using social media (Buchel et al. 2022; Guercini and Runfola 2015). New market entrants committed to reducing material-derived profit evidence a radical shift in fashion, though challenges toward full implementation of degrowth principles within a growth-oriented economy remain (Bocken and Short 2016; Rojas et al. 2024).

While social media platforms shape consumer cultures, digitalization more broadly is reshaping how fashion businesses, particularly smaller firms, respond to sustainability challenges. Beyond communication, digital tools can potentially support new business models that challenge growth-oriented paradigms. This paper uses a case study approach to

explore the tradeoffs between resource, risk and reputation faced by firms implementing digital strategies to address overconsumption challenges. The cases include a digital platform new entrant, an incumbent participant in a B-Corp certification scheme and a social enterprise. Each case is analyzed in terms of their responses to overconsumption, use of digital technologies, barriers to further adoption, and the potential of these tools to support sufficiency goals.

## Methodology

To gain an understanding of how companies in the UK F&T sector are integrating practices of sufficiency within their business models, research was conducted with 15 UK-based SMEs sourced through industry networks of the Future Fashion Factory (University of Leeds) and the Business of Fashion, Textiles and Technology Institute (University of the Arts London). Following the initial analysis, the team employed a purposive sampling strategy, selecting participants based on predefined characteristics relevant to the research aims (Mills, Gabrielle, and Elden 2010). Three of the case studies were found to have a particular focus on the use of digital technology to foster resourceful clothing practices, and these three case studies are presented in this paper. The researchers adopted a qualitative approach, using case studies, to interpret the actions, values and behaviors of businesses in a complex industry (Gillham 2000). Each case study drew on a combination of publicly available information and semi-structured interviews, offering meaningful insights into current business practices, sustainability values and future considerations.

These case studies provide distinct lenses for a multi-faceted examination of the research topic, as outlined below:

- A digital tech provider connecting users with clothing care and repair services (C1)
- A social enterprise with a focus on UK sourcing and manufacture (C2)
- A B-Corp company that promotes health and reconnecting with nature (C3)

For the interviews, a protocol was developed based on a literature review, findings from a prior industry study (Hemingray et al. 2023), and pilot interviews. Questions focussed on participants' sustainability values and business strategy, product life cycles and materials used, supply chain transparency, ethical practices in terms of society, digital practices to achieve sustainability goals, engagement and communication with consumers, funding and investment as well as the future landscape and ambitions. Interviews were conducted online, lasted 45–60 min, were recorded and fully transcribed.

Thematic analysis was employed to interpret the data and identify emerging insights (Braun and Clarke 2012), supported by cross-case analysis to draw out commonalities across the data (Simons 2009). The qualitative data was coded using QSR NVivo software, following an inductive approach to enable flexible and in-depth exploration of specific themes (Braun and Clarke 2006).

The research was approved by the Faculty of Arts, Humanities and Cultures Research Ethics Committee at the University of Leeds, reference LTDESN-173. All interviewees received participant information before deciding to voluntarily take part in the research. All data was anonymized and stored securely.

## Findings

The literature review outlines current discourse at the intersection of fashion, sustainability and digitalization, highlighting a gap in understanding of the way digital tools can support sufficiency goals. This research addresses that gap in understanding by examining how the participating companies respond to issues of overconsumption and overproduction, their use of digital tools to support these aims, and resulting barriers and opportunities. The following section will examine three companies individually before comparing them in relation to key themes identified in both the data and the literature. Table 1 provides an overview of the participating case study companies.

### *Case 1 (C1)*

The C1 consumer-facing platform (B2C), offered free of charge, enables users to digitally catalogue garments in their wardrobes to increase the active use of their clothing and direct users to local repair services, reducing the need to buy new. C1 also provides chargeable digital services for brands (B2B), offering a streamlined end-to-end experience for clothing care and repair that mirrors online shopping. As the C1 participant explains:

> We digitise the whole flow, from the booking, the payment, the logistics. We also digitise the repair shop, or the service if they have it in-house. [ … ] We're making repair seamless, helping them to reduce lead time, making it fun and removing all the friction for the different stakeholders.

At the time of the interview, C1 primarily worked with luxury brands but aimed to engage a broader range of fashion brands to expand circular practices at scale. Greater uptake, the interviewee suggested, could lead to "a big shift" in consumption habits.

The app also collects consumer data that reveals growing purchases from fast fashion brands. The participant commented: "[it's] getting

worse and worse … [they're] very aggressive." Economic pressures may be driving this trend. However, the data also show rising interest in secondhand clothing and increased use of repair services.

C1's business centers on digital services. Looking ahead, they hope to use Virtual Reality (VR) to visualize wardrobe items in 3D, engaging users in immersive ways to extend garment lifespans. They also envision AI-enabled, made-to-measure services that reduce waste to become more commonplace. Despite its footprint, digital fashion was seen as a lower-impact way to satisfy novelty compared to physical garments.

**Table 1.** Overview of participating case study companies.

| Participant | Interviewee position | Core business | Year founded | Case study description |
|---|---|---|---|---|
| Company 1 (C1) | Co-founder and Chief Technology Officer (CTO) | Digital technology service provider (fashion) | 2017 | • B2C app enables users to create digital records of their garments<br>• App connects users with aftercare services (e.g. cleaning, customization, repair)<br>• Digital services offered to fashion brands and service providers (B2B), digitally connecting their customers to post-purchase services |
| Company 2 (C2) | Project Manager | Apparel | 2016 | • Social enterprise<br>• Brand manufactures exclusively in the UK, with the goal to create and sustain employment opportunities locally.<br>• Aims to create affordable high quality, seasonless products, made from natural fibers. |
| Company 3 (C3) | Co-founder and owner | Footwear | 2012 | • B-Corp certified: required to meet standards in social and environment, transparency and accountability<br>• Products designed to benefit to human health and bring wearer closer to nature<br>• Aimed at athletic and active outdoor pursuits (e.g. trail running and hiking) as well as everyday wear |

### *Barriers and opportunities*

When C1 launched in 2017, they struggled to attract funding, as sustainability was not yet a priority in the sector. The interviewee also described gender bias, noting that the female founder was not taken seriously by investors. The pandemic, however, accelerated uptake: over a million garments have since been digitized, and the app has been downloaded more than 200,000 times. Their B2B services have expanded, and in 2022 they received a high-profile industry award for innovation.

One ongoing challenge is the shrinking garment care and repair sector. Capacity, especially in the luxury market, often falls short of demand: "I can bring the best technology and if at the end there is no one to repair [the items] [...], there is no point." The interviewee stressed the importance of making repair work more appealing to younger people, calling for brand and university initiatives alongside government funding and subsidies. They also cited new legislation, such as the Digital Product Passport, as encouraging transparency and innovation. France's Repair Fund and fast fashion tax were seen as promising developments. The UK, in contrast, was viewed as lagging in regulation and incentives to reduce consumption.

Unexpected uses of the app have also emerged. One disabled user described how it enabled them to independently choose outfits. Personal shoppers and stylists have used the app to support clients remotely, helping them make better use of existing garments while reducing travel and enhancing access to styling services.

## *Case 2 (C2)*

Sustainability is central to the way C2 design and develop their apparel. The company prioritize natural and deadstock fibers, avoiding synthetics. Some challenges remain, particularly around end-of-life, as the lack of textile recycling infrastructure hinders full circularity. To address waste, C2 has introduced a buy-back scheme and repurposes textiles into new products.

Their seasonless design approach contrasts with mainstream fashion cycles and is reflected in C2 referring to its products as "clothing" rather than "fashion". They aim to reduce the appeal of newness and limit waste. Prices are stable, with no discounting, to avoid overproduction. Product quality is also emphasized. The Right to Repair movement and consumer education were highlighted as key to encouraging longer garment lifespans. The C2 participant called planned obsolescence ethically questionable, though they acknowledged commercial pressures:

> It's hard because people have businesses to make money, and I understand that. I'm not naive in that sense, but I do think there has to be a responsibility to think about where your product is going to end up and the longevity of your product.

Furthermore, to encourage extended garment use, C2 has hosted swap shops and volunteered at the Leeds Community Clothing Exchange, fostering conversations on sustainability. While offering in-house repairs is challenging due to slim margins, some are handled in the factory, with most customers referred to local repair or alteration services.

C2's commitment to local manufacturing reduces carbon emissions and supports employment in areas affected by F&T industry offshoring since the 1990s, primarily in the North of England. The participant described fostering "pride", "dignity and respect" among workers as well as ensuring fair pay and good working conditions. Moreover, garments are produced during off-peak periods to support factory profitability and reduce labor costs.

C2 communicates its core messages via its website, which includes a blog, and through social media (Instagram, Facebook, and X). As most products are sold online, a strong digital presence and clear communication are essential to the brand's success. According to their website, C2's business model is designed to "reduce waste and minimise consumption." Brand messaging emphasizes social impact, sustainability, and reducing the need to buy. C2 also promotes sustainability through practical tips on their blog (e.g. wearing a wool jumper instead of turning up heating). Their commitment is reflected in a modest marketing budget (5%, compared to the industry norm of 20%). As the C2 participant explains:

> We don't encourage people to buy stuff they don't need. We genuinely don't. We encourage people to be sustainable in their approach to purchasing clothes to see it as an investment, to see it as something that has longevity, that will be looked after.

The founder's recently published book advocates sufficiency: living with fewer, high-quality, locally made items and they also support Northern England Fibreshed, which develops regenerative textile systems (Northern England Fibreshed, n.d), underpinning the authenticity of brand messages. Still, tension exists between growing sales and promoting reduced consumption. A recent online campaign increased sales and brought the last underwear factory in South Wales back to full-time operation, justified by the environmental and social benefits of their product versus fast fashion.

Online communication supports their operations, including remote working. C2 would like to expand their use of digital tools, particularly for transparency, but currently lacks the resources. Instead, they use their website to share information about materials and name the factories they work with. This rare level of openness is enabled by local sourcing and close supplier relationships.

### *Barriers and opportunities*

Local production allows for greater transparency and control but also brings challenges for C2. The C2 participant cited a shortage of skilled machinists, worsened by Brexit and an aging workforce. They called for greater investment in skills training and government policy support. Other issues include economic uncertainty and competition from cheaper overseas products. C2 depends on customers understanding the value in locally made clothing. As the participant noted:

> I was helping people understand that if you buy something from a company abroad and it's made in China, that money goes outside of the country, that money goes outside of your community. [...] So when you're investing in a locally made, good quality piece of clothing, you are also investing in your community.

To scale up digital tools for consumer education and transparency, C2 would need additional resources. This could come from increased sales, external funding, government subsidies, or a combination of these.

## *Case 3 (C3)*

C3's products aim to improve foot health and ergonomics by encouraging a barefoot-like experience, achieved through thin outer soles. Their broader mission is to support both human and planetary health by promoting outdoor activity and reconnecting with nature; this ethos is also reflected internally, with meetings often held outdoors. As the participant explained:

> Our mission [is] to reconnect people into the natural world and their natural potential. On a philosophical level, we believe in this journey of the closer we are to nature and all the closer we are to our innate natural selves, and the healthier and happier we will be.

C3 reduces environmental impact through two approaches: using recycled materials that can be recycled and natural materials that decompose. An example of the latter is a 98% natural, compostable shoe made with mycelium foam. However, infrastructure and legislation are still needed to support industrial composting and material recovery. Sales revenue supports research and service-based initiatives, including online health courses (e.g. mobility and ergonomics), a refurbish-and-resale platform, and a digital made-to-measure circular footwear system.

C3 sees digital engagement as essential, since "most people's primary touch points to a brand are digital." They are expanding their service offerings through a membership platform that rewards participation in events, shoe returns, and online health courses. While some events are

in person, all are promoted digitally. They are also developing fully digitized products, custom-made through 3D foot scans (in-person or mobile). Shoes are linked to a bill of materials and digital records that track use, repairs, and lifecycle. This enables speed, precision, and transparency, helping C3 to "make less stuff better."

C3's online sustainability report includes both achievements and setbacks, including a reflection on the "paradox of regenerative growth." The co-founder argues that scaling up helps displace more damaging products and demonstrates the viability of their model, though they ultimately hope the global shoe market will shrink. They acknowledge that global disruptions may force changes to business operations and eventually require downscaling. Their B-Corp certification supports ongoing assessment and accountability.

### *Barriers and opportunities*

The scale of excessive consumption was raised by the interviewee: 24 billion pairs of shoes end up in landfill every year. Taxing companies that do not comply with environmental standards was proposed to incentivize change; consistent impact measurement would be necessary in this scenario to avoid greenwashing. The government lacks long-term thinking, they stated, hindering real progress toward sustainability. The C3 participant proposed mandatory B-Corp adoption to ensure accountability, particularly if commitment to the triple bottom line was legally binding.

C3's online sustainability report provides both numerical information, e.g. progress made in relation to B-Corp standards and discusses unresolved issues as well as failed projects. They consider sustainability as "unfinished business" within their company, that is, acknowledging that there is still "a long way to go" to achieve full transparency and sustainability.

## Cross-Case Comparison and Discussion

This section compares the case study businesses, focussing on similarities and differences on ways in which they address overconsumption, and the role of digital technologies. The findings reveal that while digital technologies offer potential to enable sufficiency, they also introduce new tensions and tradeoffs.

Although none of the case study participants explicitly used the term *degrowth*, a concept literature suggests has negative connotations (Rojas et al. 2024; Textile Exchange 2024), all recognized the need to reduce consumption, embodying several sufficiency-based 9Rs. C1's service demonstrates R4 Repair; C2's rejection of fashion cycles exemplifies R1 Rethink, and C3's resale platform combines R4 Repair and R3 Reuse (Kirchherr, Reike, and Hekkert 2017). However, both C2 and C3 depend on the sales of physical products to remain viable and fund

sustainability initiatives. This dichotomy reflects the literature (Andreoni 2020; Hankammer and Kleer 2018; Khmara and Kronenberg 2018; Rojas et al. 2024) and is referred to by C3 as the "paradox of regenerative growth". Both companies view increased sales as beneficial because their products may displace less sustainable alternatives. However, this represents a redirection, not a reduction of consumption, aligning with Rojas's et al. (2024) critique of strategies that remain within the growth logic. This indicates that, without a systemic shift in consumption norms away from low-cost fast fashion, the impact of such initiatives is likely to remain limited, as acknowledged by both C2 and scholars (e.g. Fletcher 2014; Klepp et al. 2023a; Niinimäki et al. 2020).

C2's motivations for profit are aligned with social goals. As a social enterprise, economic growth is framed to improve livelihoods and support community development. Unlike C3, C2 is not certified but builds legitimacy through transparency and local engagement. This reflects the literature's critique that certification may not always be necessary for accountability, especially for hybrid models embedded in ethical practices from the outset (Cornelissen et al. 2021). This reflects broader patterns among purpose-driven fashion SMEs (Black et al. 2024; Connor-Crabb, Miller, and Chapman 2016). C2's rejection of mainstream fashion cycles, localized production, and emphasis on skilled employment resonates with Niessen's (2022) concept of *defashioning*: reimagining clothing systems to prioritize dignity, care, and social justice.

C1's digital services to extend garment lifetimes exemplify a *sufficiency-oriented business model* (Freudenreich and Schaltegger 2020). However, without mechanisms to screen partners or verify claims, their services risk enabling greenwashing (Li 2024; Liute and De Giacomo 2022), an issue certification can help address. Yet, as noted in the literature, schemes like B-Corp are costly and may exclude smaller firms, suggesting the need for more inclusive forms of accountability, possibly through digital tools that support transparency (Connor-Crabb et al. 2025; Rowney et al. 2023). Government subsidies could further support SMEs adopting digital tools. A key issue in this context remains the low cost and convenience of buying new clothing, which hinders repair uptake (Laitala et al. 2021). Although C1 and C2 refer customers to local repair services, most clothing repairs are done by wearers themselves (ibid). Empowering consumers with tutorials and skill-building via apps or online content can be effective, alongside measures like consumer rights, marketing regulation, VAT, and product guarantees (Klepp et al. 2023a).

Digital engagement through online tutorials or courses on clothing care, repair, or style curation, as offered by C1, C2 and C3, can also provide opportunities for sufficiency-oriented education (Joyner Armstrong et al. 2016), while increasing access to the brand story (Matthes, Wonneberger, and Schmuck 2014; Matzembacher et al. 2020,

Cooper, Merrilees, and Miller 2015). C2's use of blog content and social media to promote resourceful practices reflects a form of demarketing (Kotler and Levy 1971; Miklós-Thal and Zhang 2013), while C3's digital community-building encourages values of care, repair and reconnection. Such strategies align with calls in the literature to repurpose digital tools not just for information, but to reframe fashion's purpose and reorient values (Textile Exchange 2024; Vladimirova et al. 2024). Digital storytelling, interactive content, and open reporting (as seen in C2's supply chain disclosures and C3's "radical candour") can serve as more flexible, decentralized alternatives to traditional certification, particularly when used to cultivate long-term trust and a participatory culture among citizens. Furthermore, C2's work with local schools suggests the importance of early education, particularly considering UK government cuts to arts and design funding. Developing textiles-based skills from a young age could instill lasting values of care and sufficiency. C3's mission to reconnect people with the natural world offers a route to rediscovering the intrinsic value of nature beyond its role as a resource (Brooks et al. 2017). This reflects a broader paradigmatic shift that sustainability efforts increasingly demand, with both digital and physical spaces offering sites of cultural change.

Transparency was a recurring theme. C2's localized supply chain enables unusually high levels of disclosure. This can strengthen consumer trust and potentially reduce consumption by reconnecting customers with the provenance and impact of their garments (Clark 2008; Ertekin and Atik 2015, Leslie, Brail, and Hunt 2014; Santos, Gosler, and Newton 2024). C3 though manufacturing overseas, compensates with transparent reporting, both reflecting how in the absence of enforced regulation, SMEs assume responsibility for accountability. However, achieving full transparency, is extremely challenging, due to complex global supply chains. Although blockchain and other digital tracking systems offer possibilities (Freudenreich and Schaltegger 2020), these are often financially out of reach for smaller firms, such as C2 and C3, giving larger brands an advantage.

All three companies called for more robust policy support to realize these values at scale; scholars and advocacy bodies echo this call (e.g. Fashion Revolution 2024a; Klepp et al. 2023a; Taylor 2019). Government action, such as the Repair Fund in France and fast fashion taxation (as suggested by C1), could play a key role in creating a level playing field for SMEs (Connor-Crabb et al. 2025; Klepp et al. 2023a; Textile Exchange 2024). Yet changes in government and shifting global geo-political landscapes can make it difficult for long-term sustainability strategies to be successfully implemented.

Each case offers tangible strategies for reducing consumption. However, as Khmara and Kronenberg (2018) and Rojas et al. (2024) note, systemic change is limited by the overarching capitalist context in which these businesses operate. Despite this, elements of each case

reflect the Earth Logic framework proposed by Fletcher and Tham (2019): C1 promotes care and longevity through wardrobe digitalization; C2 nurtures local livelihoods and growth of social capital; C3 aim to reconnect their customers to nature as well as increasing health and personal wellbeing. The potential of digital technologies to support post-growth values depends on how they are designed, implemented, and embedded within wider systems of change.

## Conclusion

This research examined how three UK fashion SMEs use digital strategies to reduce overconsumption. The findings highlight the importance of continued development of digital technologies that serve sufficiency goals, with an emphasis on open-access and decentralized solutions that can be adopted by SMEs. Such tools should be critically assessed for potential rebound effects and environmental tradeoffs.

While the case study companies demonstrate promising practices, they also face significant barriers to expanding sufficiency-based models. These include the structural tension between profitability and reduced production; a lack of supportive and evidence-based government policy or subsidies; limited capacity to invest in advanced digital tools; and cultural and infrastructural challenges related to repair, reuse, and local production.

Recommendations arising from this research include increasing industry recognition of the need to reduce consumption and production levels in fashion, and positively framing sufficiency as driver for innovation. They also point to the need for coordinated and consistent government intervention to support sufficiency-focused business models, for example through taxation on fast fashion or restrictions on synthetic fibers.

The study also acknowledges its limitations, including its focus on the UK context, a small sample size, and the limited scalability of SME practices without broader systemic support. Nonetheless, the findings contribute valuable insights into the role of purpose-driven fashion businesses and digital tools in reimagining more sustainable, sufficiency-oriented futures.

Future research should include larger, comparative studies across different regions to further examine sufficiency-based models. It is also important to explore the long-term behavioral impacts of digital interventions, as well as to investigate how digital technologies can be designed and governed to serve sufficiency goals, rather than simply replicating dominant growth paradigms. Additionally, future research must further interrogate the intersection of degrowth, digitalization, and policy, particularly beyond the Global North. As the climate and social crises deepen, the need to move beyond efficiency and growth becomes ever more urgent.

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